ECE/CEP/172

UNITED NATIONS ECONOMIC COMMISSION FOR €OPE

ENVIRONMENTAL PERFORMANCE REVIEWS

CROATIA

UNITED NATIONS
New York and Geneva, 2014

Environmental Performance Reviews Series No. 40

NOTE

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The United Nations issued the first Environmental Performance Review of Croatia (Environmental Performance Reviews Series No. 7) in 1999.

This volume is issued in English only.

ECE/CEP/172

UNITED NATIONS PUBLICATION
Sales E.14.II.E.7
ISBN 978-92-1-117076-4
e-ISBN 978-92-1-056519-6
ISSN 1020-4563

Foreword

In 1993, Environmental Performance Reviews (EPRs) of the United Nations Economic Commission for €ope (ECE) were initiated at the second "Environment for €ope" Ministerial Conference, in Lucerne, Switzerland. They were intended to cover the ECE States that are not members of the Organisation for Economic Co-operation and Development (OECD). Subsequently, the ECE Committee on Environmental Policy decided to make them part of its regular programme.

At the fifth "Environment for €ope" Ministerial Conference (Kiev, 2003), the Ministers affirmed their support for the EPR Programme, and decided that the Programme should continue with a second cycle of reviews. This second cycle, while assessing the progress made since the first review process, puts particular emphasis on implementation, integration, financing and the socio-economic interface with the environment. The seventh "Environment for €ope" Ministerial Conference (Astana, 2011) formally endorsed the third cycle of reviews. As response to new global and regional concerns, it was decided that integrating green economy into the third cycle of the EPR Programme promises to add added value to its work, first, due to its relevance and importance for the countries under review and, second, due to the potential to enhance international cooperation with the community of donors and investors.

Through the peer review process, EPRs also promote dialogue among ECE member States and the harmonization of environmental conditions and policies throughout the region. As a voluntary exercise, an EPR is undertaken only at the request of the country concerned.

The studies are carried out by international teams of experts from the region working closely with national experts from the reviewed country. The teams also benefit from close cooperation with other organizations in the United Nations system, for instance the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP), as well as with the European Environment Agency (EEA), World Health Organization (WHO) and other organizations.

This is the second EPR of Croatia published by ECE. The review takes stock of progress made by the country in the management of its environment since the country was first reviewed in 1999. It assesses the implementation of the recommendations in the first review (annex I). This second EPR also covers nine issues of importance to the country related to policymaking, planning and implementation, the financing of environmental policies and projects, and the integration of environmental concerns into economic sectors, in particular water management, waste management, and biodiversity and protected areas, and tourism.

I hope that this second EPR will be useful in supporting policymakers and representatives of civil society in their efforts to improve environmental management and to further promote sustainable development in Croatia, and that the lessons learned from the peer review process will also benefit other countries of the ECE region.

Sven Alkalaj

Executive Secretary
Economic Commission for €ope

Preface

The second Environmental Performance Review (EPR) of Croatia began in October 2012 with a preparatory mission. During this mission, the structure of the review report was discussed and the time-schedule established. A review mission took place 12-19 March 2013. The team of international experts taking part included experts from Austria, Czech Republic, Germany, the Republic of Moldova, Slovakia and as well as from the EEA and the secretariats of the United Nations Environment Programme (UNEP) and ECE.

The draft EPR report was submitted to Croatia for comment and to the Expert Group on Environmental Performance Reviews in August 2013 for consideration. During its meeting on 1-2 October 2013, the Expert Group discussed the report in detail with representatives of the Government of Croatia, focusing in particular on the conclusions and recommendations made by the international experts.

The EPR recommendations, with suggested amendments from the Expert Group, were then submitted for peer review to the nineteenth session of the ECE Committee on Environmental Policy on 24 October 2013. A high-level delegation from Croatia participated in the peer review. The Committee adopted the recommendations as set out in this report.

The Committee on Environmental Policy and the ECE review team would like to thank the Government of Croatia and its experts who worked with the international experts and contributed their knowledge and assistance. ECE wishes the Government of Croatia further success in carrying out the tasks involved in meeting its environmental objectives, including the implementation of the recommendations in this second review.

ECE would also like to express its appreciation to the German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety and to the German Federal Environment Agency for their support to the EPR Programme through the Advisory Assistance Programme for Environmental Protection in the Countries of Central and Eastern €ope, the Caucasus and Central Asia; and to Austria, Czech Republic, Germany, EEA and UNEP for having delegated their experts for the review; and the United Nations Development Programme for its support of the EPR Programme and this review.

Team of experts for the second EPR of Croatia, 2013

LIST OF TEAM MEMBERS

Mr. Antoine Nunes	ECE	Team Leader
Mr. Yaroslav Bulych	ECE	Project coordinator
Mr. George Georgiadis	ECE	Project coordinator
Ms. Oksana Rott	ECE	Logistics coordinator
Mr. Jyrki Hirvonen	ECE	Introduction
Ms. Ana Jakil	Austria	Chapter 1
Mr. Valeriu Mosanu	Republic of Moldova	Chapter 2
Mrs. Anita Pirc Velkavrh	EEA	Chapter 3
Mr. Lukas Pokorny	Czech Republic	Chapter 4
Mr. George Georgiadis	ECE	Chapter 5
Mr. Juraj Farkaš	Slovakia	Chapter 6
Ms. Stella Rickert	Germany	Chapter 7
Ms. Ivonne Higuero	UNEP	Chapter 8
Mr. Yaroslav Bulych	ECE	Chapter 9

Mr. Mikhail Kokine, Chief of the Operational Activities and Review Section of the ECE Environment Division, undertook a full substantive review of this publication.

Information cut-off date: 30 November 2013

ECE Information Unit
Palais des Nations
CH-1211 Geneva 10
Switzerland

Tel.: +41 (0)22 917 44 44
Fax: +41 (0)22 917 05 05
E-mail: info.ece@unece.org
Website: http://www.unece.org

LIST OF CONTRIBUTORS

National Contributors

Ministry of Environmental and Nature Protection

Mr. Hrvoje Dokoza
Ms. Gordana Ruklić
Ms. Marina Prelec

Ms. Katica Bezuh
Mr. Hrvoje Buljan
Ms. Silvia Cikoš
Ms. Mirna Čorak
Ms. Tamara Čimbora Zovko
Ms. Zrinka Domazetović
Ms. Romana Domijan
Ms. Loris Elez
Ms. Karmela Fontana Pudić
Ms. Višnja Grgasović
Mr. Goran Heffer
Ms. Zora Hižman
Mr. Josip Hren
Mr. Ivo Hruškar
Ms. Ivana Husnjak
Mr. Krešimir Ilić
Ms. Snježana Iličić
Ms. Ivana Jelenić
Ms. Nataša Kačić Bartulović
Ms. Ana Kobašlić
Ms. Solveg Kovač
Mr. Domagoj Stjepan Krnjak
Ms. Andreja Markovinović
Ms. Anamarija Matak
Ms. Mira Medić
Ms. Brigitte Mrvelj Čečatka
Ms. Jasenka Nećak
Ms. Dubravka Pajkin Tučkar
Ms. Jasna Paladin Popović
Ms. Vlasta Pašalić
Mr. Damir Pavelić
Mr. Lovel Petrović
Ms. Branka Pivčević Novak
Ms. Anita Pokrovac Patekar
Ms. Biserka Puc
Mr. Ivan Pušić
Ms. Sanja Radović
Mr. Aleksandar Rajilić
Mr. Mario Roboz
Mr. Damir Rumenjak
Ms. Jasmina Serdar
Ms. Dubravka Stepić
Mr. Nenad Strizrep
Ms. Marija Šćulac Domac
Ms. Lidija Tadić
Ms. Jelena Uroš
Ms. Gordana Vešligaj

Ms. Ljiljana Vrbanec
Ms. Ivna Vukšić

Ministry of Agriculture

Ms. Dunja Barišić
Mr. Anđelko Grospić
Ms. Sanja Krnić Bastać
Mr. Željko Matić
Ms. Ivana Pešut
Ms. Mirjana Vrabec Bistrović

Ministry of Construction and Physical Planning

Ms. Antea Ključe Ileković
Ms. Jozica Lažeta

Ministry of Economy

Mr. Boris Makšijan
Ms. Mirta Pokršćanski Landeka
Mr. Igor Raguzin

Ministry of Finance

Mr. Zvonimir Marinović

Ministry of Health

Ms. Katica Boban
Ms. Biserka Bastijančić Kokić
Ms. Ana Marija Crnić
Ms. Valerija Golub
Ms. Jasna Mesarić
Ms. Spomenka Uremović
Ms. Valentina Zoretić Rubes

Ministry of Justice

Mr. Dinko Kovačević
Mr. Daria Iva Štedul

Ministry of Maritime Affairs, Transport and Infrastructure

Ms. Ružica Jurić

Ministry of Science, Education and Sports

Ms. Verica Batur
Ms. Katarina Grgec
Ms. Mara Ivanković
Ms. Ivana Pilko Čunčić

Ministry of Tourism

Ms. Antonija Drmić
Mr. Damir Gorski
Ms. Manda Horvat
Ms. Jelena Šobat

Environment and Nature Protection Committee of the Croatian Parliament

Mr. Branko Bačić

State Institute for Nature Protection

Ms. Vlatka Dumbović Mazal
Mr. Aljoša Duplić

Mr. Matija Franković
Ms. Jasna Jeremić
Ms. Ivana Plavac
Ms. Ana Štrbenac
Ms. Ramona Topić
Ms. Boria Vitas
Ms. Irina Zupan

State Institute of Public Health

Mr. Krunoslav Capak
Mr. Željko Dadić

State Institute for Radiological and Nuclear Safety

Ms. Sanja Krča

Institute for Development and International Relations

Ms. Ana-Maria Boromisa

Institute for Tourism

Mr. Hrvoje Carić
Ms. Izidora Marković

Croatian Bureau of Statistics

Ms. Vesna Koletić

Croatian Environment Agency (CEA)

Ms. Andrina Crnjak Thavenet
Ms. Savka Dragičević Kučar
Ms. Natalija Golubovac
Ms. Milena Grgić
Ms. Ivana Lampek-Pavčnik
Mr. Branimir Pavlinec
Ms. Đurđica Požgaj
Ms. Andreja Steinberger
Mr. Vedran Vađić
Mr. Marijo Vranaričić
Mr. Rene Vukelić
Ms. Mira Zovko
Ms. Nina Zovko

Education and Teacher Training Agency

Ms. Diana Garašić

Environment Protection and Energy Efficiency Fund

Ms. Vesna Cetin Krnjević
Ms. Aleksandra Čilić
Mr. Teo Čolan
Ms. Stela Favro
Ms. Silvana Muškardin

Croatian Waters

Mr. Danko Biondić
Mr. Zijah Mahmutspahić

Croatian Chamber of Economy

Ms. Nikolina Ceraj-Cerić
Mr. Krešimir Štih

Ms. Dijana Varlec

Croatian Cleaner Centre Production
Mr. Goran Romac

Croatian Business Council for Sustainable Development
Ms. Mirjana Matešić

Municipal State Attorney of Zagreb
Mr. Mario Grubišić

Municipal Criminal Court of Zagreb
Mr. Dražen Kevrić

Misdemeanor Court of Zagreb
Ms. Gordana Prpić

City of Zagreb
Ms. Sandra Haramin
Ms. Nevenka Preradović
Ms. Sandra Tucak- Zorić

County of Zagreb
Mr. Tomislav Fratrić

City of Dubrovnik
Ms. Jelena Bender
Ms. Jelena Lončarić
Ms. Erna Raguz-Lucić
Mr. Milan Perić
Ms. Biserka Simatović

Dubrovnik Tourist Board
Ms. Eta Lović
Ms. Romana Vlašić

City of Split
Ms. Katarina Puljić
Mr.Terry Tarabarić

Čistoća Zagreb
Mr. Dinko Sinčić
Mr. Branimir Valašek

Čistoća Zadar
Mr. Tomislav Ćurko

Jakuševac landfill
Ms. Marija Novosel

International community

United Nations Development Programme (UNDP)
Ms. Sandra Vlašić

World Bank
Mr. Mario Josić

	Mr. Igor Kreitmeyer
European Commission Delegation to Croatia	
	Mr. Davor Percan
Embassy of the Czech Republic	
	Mr. Bohuslav Zavadil

Non-governmental and other organizations

WWF International and Mediterranean Programme	
	Ms. Petra Boić Petrač
	Mr. Leon Kebe
	Ms. Irma Popović Dujmović
	Ms. Stella Šatalić
	Ms. Andrea Štefan
	Mr. Goran Videc
Zelena Akcija	
	Mr. Bernard Ivčić

Others

GKP ČAKOM d.o.o. Čakovec	
	Mr. Saša Avirović
	Ms. Snježana Tkalčec Avirović
Steinbacher consult, Zagreb	
	Ms. Mirjana Prodan
Safege d.o.o.	
	Ms. Monika Přibylová
Spectra Media	
	Mr. Kerim Mujkić
Integra Consulting	
	Mr. Jiří Dusík

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KEY ABBREVIATIONS

SIGNS AND MEASURES

..	not available
-	nil or negligible
.	decimal point
$	dollar
Ci	Curie
GWh	gigawatt-hour
ha	hectare
kg	kilogram
kJ	kilojoule
km	kilometre
km^2	square kilometre
km^3	cubic kilometre
kgoe	kilogram of oil equivalent
ktoe	kiloton of oil equivalent
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hour
l	litre
m	metre
m^2	square metre
m^3	cubic metre
MW	megawatt
ppm	parts per million
s	second
t	ton
toe	ton of oil equivalent
tofe	ton of fuel equivalent
TWh	terawatt-hour

CURRENCY CONVERSION TABLE

Year	NCU per Euro
2005	7,40
2006	7,32
2007	7,34
2008	7,22
2009	7,34
2010	7,29
2011	7,44
2012	7,52
2013	7,58

Source: ECE common database (accessed January 2014).
Note: NCU = National Currency Unit

Executive summary

The first Environmental Performance Review (EPR) of Croatia was carried out in 1999. This second review intends to measure the progress made by Croatia in managing its environment since the first EPR, especially from 2005, and the potential for addressing upcoming environmental challenges.

Croatia's GDP achieved an average 4.1 per cent growth rate during 2005-2008. However, the international financial crisis led to a contraction of GDP by 6.9 per cent in 2009 and 2.3 per cent in 2010. Year 2011 saw zero growth but the contraction continues, as the latest available figures show a 2 per cent decrease for 2012. Croatia's ranking in the UNDP's *Global Human Development Report* remained constant: with a Human Development Index (HDI) score in 2012 of 0.805, it came in 47th place out of a total of 186 countries, the same ranking as in 2005. Progress was made in Croatia's gender parity, with women occupying 24 per cent of Parliament seats and several high political offices. The 2012 Gender Inequality Index was 0.179, placing Croatia in 47th place out of 186 countries.

Key environmental indicators showed a positive trend. Air pollution emissions were reduced, with the exception of the share of mobile source emissions from total NOx emission, which increased from 62.6 per cent in 2005 to 65.3 per cent in 2011. Total greenhouse gas emissions decreased by 7.2 per cent while CO_2 emissions alone during the same period decreased by 11.1 per cent. Total waste generation stayed steady over the review period: 3.39 million tons in 2005 and 3.38 million tons in 2011. Designated protected areas expanded from 7.23 per cent of the national territory in 2005 to 8.45 per cent in 2013.

Policymaking framework for environmental protection and sustainable development

Since 1999, Croatia made significant progress in adopting and strengthening environmental legislation, with progress on laws in various sectors, such as air quality and waste management. However, implementation of some of these laws is less encouraging and several strategic documents are out of date. With regard to the policy framework, some strategic documents, such as the National Environmental Strategy of 1999 which expired in 2012 need to be updated. Croatia, moreover, is still in the process of adopting river basin management plans.

Green Economy Initiatives signify a step forward for Croatia. The 2001 Strategic Guidelines for Green Economic Development include a set of action plans and strategic documents for developing a green economy. However, the Guidelines do not set concrete goals, activities or deadlines and there are no institutional mechanisms for coordination and monitoring. Despite this deficiency, several green economy initiatives have started since 1999. A total of €3.2 million went to the financing of 78 projects in the sustainable building sector related to energy efficiency in lighting and heating, substitution of primary energy source in boiler plants and the optimization of combustion plants.

Public institutions such as the Croatian Environment Agency, the Environmental Protection and Energy Efficiency Fund and the State Institute for Nature Protection, under the competence of the Ministry of Environmental Protection, provide additional oversight of environmental policy and information and are largely independent. The Agency was established in 2002 to analyze and interpret environmental data and provide information necessary for environmental policymaking. The Fund was established in 2003 as an extra-budgetary legal entity for ensuring the implementation of environmental protection programmes on waste management, nature conservation, sustainable consumption, energy efficiency and renewable energies. The State Institute was established in 2002 and it provides expertise on nature protection.

While significant progress is lauded, Croatia has room for improvement in strengthening its institutional mechanisms. In particular, there is a need for greater promotion of strategic environmental assessments (SEA) and the establishment of quality assurance mechanisms for implementing SEA. SEA implementation remains deficient, due in part to the weak role of the Ministry of Environmental and Nature Protection in the SEA screening process and procedures The Ministry of Environmental and Nature Protection lacks, moreover, a dedicated unit for coordinating subnational environmental protection.

Compliance and enforcement mechanisms

Since 1999, Croatia has established an environmental regulation and compliance assurance system that responds to the needs arising from the country's international obligations. Environmental impact assessment (EIA) is well developed in Croatia, with a number of cases of application in many areas. Both permitting and EIA procedures were amended to make them more transparent. Public participation has improved, as well as the coordination with administrative procedures such as integrated permitting. Croatia transposed the EU Directive on integrated pollution prevention and control (IPCC), although there is insufficient capacity for implementation and a backlog of IPCC permits to be issued.

While Croatia has made significant progress in compliance and enforcement, better use of compliance promotion instruments and procedures would strengthen its effectiveness and capacity for administrative and judicial enforcement. Compliance promotion and voluntary schemes are relatively limited, although environmental labeling has been gradually put in place: as of early July 2013, 13 manufacturing companies and 15 hotel/campsite operators were awarded the national environmental label. The system of carrying out environmental inspection largely follows internationally recognized practices and there is a demonstrated capacity in place that functions well. Training for industrial operators is taking place.

Environmental monitoring, information, public participation and education

Croatia has made significant improvement in environmental monitoring, in particular monitoring of air quality, bathing and drinking water and radioactivity. Monitoring, which has improved since 2002, is largely the purview of the Croatian environment information system (CEIS), a system of over 40 different databases. The CEA is charged with establishing, maintaining and coordinating a single national environmental information system comprised of several environmental databases. Gaps remain in monitoring of bio-diversity, soil, noise, vibrations and land-use (except for forestry) though educational workshops aim to improve these areas.

Preparation of state of the environment reports is on track under the responsibility of the CEA. However an inordinately long approval process threatens the credibility of the Report, since figures are often outdated by the time it is published. In order to alleviate the time-lag of available data, the CEA has started to publish "Selected indicators of the environment in Croatia".

Croatia is active in environmental education, at the kindergarten level for which around 40 environmental experts have been trained in eco-programmes, and at the university level, where ecological education is part of natural and social science education. It has adopted the Strategy on Education for Sustainable Development. They are 200 eco-schools and 130 schools under the Global Learning and Observations to Benefit the Environment (GLOBE) Programme in Croatia.

Implementation of international environmental agreements and commitments

Since 1999, Croatia has ratified 22 multilateral environmental agreements (MEAs). Since 2005, Croatia has taken broad range of measures to ensure the participation in and implementation of the majority of MEAs. Implementation at the regional and local levels is lacking, due to a lack of awareness and knowledge about MEAs.

In terms of technical assistance on the environment, Croatia has benefited from EU programmes for transposing the acquis communitaire into Croatian legislation, as well as from cooperation with major international financial institutions, UNEP and the Global Environmental Fund (GEF). Cooperation with GEF has included 30 projects, 14 on national level and 16 on regional level. The majority of national projects focus on biodiversity and climate change; regional projects focus mostly international waters. Cooperation with UNEP has focused mainly on sustainable consumption and production and implementation of the Barcelona Convention for the Protection of the Mediterranean Sea against Pollution.

Croatia adopted in 2009 the National Strategy on Sustainable Development (NSDS) and submitted its first progress report on the Millennium Development Goals (MDGs) in 2006 and its second national report on MDG Implementation for 2006-2010, which showed a positive trend in achieving MDG-7 ("Ensuring Environmental

Sustainability"). The link between the NSDS and the MDGs is weak, however, with a lack of coherent indicators to track progress.

Economic instruments for environmental protection.

The majority of State subsidies are directed towards sectoral support and not horizontal expenditure in support of environmental protection and green initiatives. However, some taxation schemes can be seen to support the greening of the economy, such as the exclusion of electric cars from the special tax on road vehicles.

The country has a diversified charge system for the main pollution and emission generating sources – these economic instruments consist of air pollution-, water-, and waste charges. In addition to the usual municipal and industrial waste charges – Croatia also has charges for packaging waste, used tires, end-of-life vehicles, used batteries, accumulators and oils.

Although the country adheres to an air pollution charge system for CO_2, SO_2 and NO_2 and around 1,200 polluters are obliged to pay charges, the system is not sufficiently effective as the charges do not reflect regional differences; charge levels have not been raised since 2008 and the unit charges are not adjusted for inflation.

Energy-related economic instruments are inversely related to consumption, rewarding higher energy consumption. The price structure does not motivate consumers to conserve energy nor does it give incentives for energy saving innovations and investment in energy efficiency.

A greenhouses gas emission trading system was established in 2008. Installations participating in the trading system have been obliged to obtain emission permits since 2009 and have monitored emissions from installations and submitted annually verified reports since 2010. Croatia joined the EU's Emission Trading Scheme phase III in 2013 – ahead of its accession to EU.

Financing for environmental protection has significantly changed during the review period. In nominal terms, local government expenditures stayed almost the same but a doubling of central government expenditure increased inflation-adjusted total expenditure levels almost 50 per cent from 2005 to 2011. EPEEF provided loans, grants and subsidies to promote and stimulate Green initiatives. €148.6 million were disbursed for the purpose in 2005-2011.

Waste management

Croatia has made significant progress in waste management, with the full political buy-in on the importance of having waste management plans in place and reliable data and information on waste. Hazardous wastes are exported to countries with more developed facilities. Considerable work has been done within the legislative framework for waste management, including the transposition of EU directives on solid waste and management of special waste streams, including batteries, packaging, and vehicle waste. However, information on the environmental impact of waste management in Croatia is limited.

Positive trends in waste management include the investment in waste recycling infrastructure and the development of regional waste management centres (WMC). WMCs provide the basis of safe management of municipal solid waste. However, the current system lacks consolidation and faces, therefore the challenge of redirecting waste from more than 146 disposal sites to 20 WMCs. Controls on groundwater and air pollution caused by landfills are lacking and a large amount of biodegradable waste is landfilled.

Sustainable management of water resources

Around 50 per cent of the public water supply in Croatia is from groundwater. The total volume of water abstracted from 2005 to 2012 increased from 511 million m^3 to almost 570 million m^3 per year. In addition to the normal demand on water resources, tourism presents an increased pressure, especially during the touristic period.

Flooding is also a problem, causing considerable environmental damage. Investments in the maintenance of flood protection systems were insufficient until 2005. Since then, revenues from water protection charges have grown significantly, but are still insufficient for all necessary investments to develop a protection system from water. Flood prevention measures are in place and early warning systems and alarms are used, but the safety of the population and assets in many potentially flood-exposed areas is not yet ensured.

There is a significant increase concerning wastewater from households due to an increasing connection ratio. In 2005 around 126 million m³ of wastewater originated from households and in 2012 about 184 million m³. Approximately one third of the collected wastewater quantity is discharged into the environment, for example untreated wastewater discharge into the sea. However, a clear improvement has been visible since 2007. Sewage sludge poses a persistent problem.

Biodiversity and protected areas

Since 2005, protected areas increased by 18.2 per cent and occupy 8.45 per cent of the total national territory. Almost all national or nature parks have management plans, including for visitor management for some of them. There is no national monitoring system and a lack of capacity and equipment, although some species are being monitored, e.g. large carnivores and some bird species.

The greatest threat to native wild taxa in Croatia is the destruction and loss of habitat, especially as a result of the conversion of natural habitats to urbanized areas, agricultural lands or building roads and other transport routes, which leads to the fragmentation of habitats. Wild taxa are also threatened by the introduction of non-native species, overexploitation in the fishing sector and the pollution of water, soil and air.

Tourism and environment

In 2012, the direct contribution of the travel and tourism sector accounted for approximately 12 per cent of GDP. In 2012, the total contribution of the sector to employment, including jobs indirectly supported by the industry, was 30.2 per cent of total employment (319,000 jobs). Croatia is among countries with the highest-quality bathing waters in €ope. Of 919 coastal bathing sites in Croatia, 876 of them have excellent bathing water, 27 of them have good quality and 3 have poor quality.

The total tourism waste generation is not particularly significant in a quantitative sense but its share may be relatively large if a tourist location is looked at in isolation. Data on municipal waste generated by the tourism sector are hidden in the total data on municipal waste generated. However, it is prohibited to dispose waste on the islands. The country makes efforts to relocate existing waste and unregulated landfills away from coastal areas in the waste management centers.

INTRODUCTION

I.1 Demographic and socio-economic context

Population

Most of Croatia's population indicators have been stable or changed very little since 2005. The total population, which was 4.3 million in 2012 (mid-year estimate), has been on a slow but steady decrease since 2005. The crude birth rate and fertility rates have been stable, reaching respectively 9.8 and 1.5 in 2012. The infant mortality rates declined from 5.7 per 1,000 in 2005 to 3.6 per 1,000 in 2012.

Economic and social development

Croatia's economy is a service-based economy with the tertiary sector accounting for 58.7 per cent of total gross domestic product (GDP) in 2011. Tourism is an important part of the tertiary sector producing about 15 per cent of the GDP. Industrial sector produced 22.9 per cent of the total GDP, with agriculture, forestry and fishing accounting for the remaining 4.2 per cent.

The GDP, measured in 2005 constant prices, grew from 2005 to 2008 with average annual growth rate of 4.1 per cent. However, the international financial crisis caused the GDP to contract by 6.9 per cent in 2009 and 2.3 per cent in 2010. 2011 had zero growth but the contraction seems to continue since the latest figures available show 2 per cent decrease for 2012.

Positive economic development caused the unemployment rate to drop from the 17.8 per cent in 2005 to 13.5 per cent in 2008 but unemployment rate has since then been on a steady rise reaching 20.9 per cent in 2012. In spite of the slow post-financial crisis recovery and high unemployment figures, in terms of income per capita Croatia is still ahead of some European Union member States such as Bulgaria and Romania. Estimated GDP per capita in purchasing power parity (PPP) in 2012 was around US$20,532 or 60 per cent of the EU average.

The external debt situation deteriorated during the review period and the Croatian National Bank had to take steps to curb further growth of indebtedness of local banks with foreign banks. The dollar debt figure was adversely affected by the €/USD exchange rate ratio — over a third of the increase in debt since 2002 is due to currency value changes. After 2005, Croatia's currency kuna has fluctuated between 4.9 and 5.9 kuna per US$.

Croatia's economy is heavily dependent on trade – exports of goods and services made 42.6 per cent of the GDP in 2011. Croatia's main trading partner, EU, was the source of 61.8 per cent of country's imports and the destination of 59.8 per cent of its exports in 2011.

Inflation has been moderate since 2005. It was 3.3 per cent (measured by Consumer Price Index) in 2005 and rose to 6.1 per cent in 2008 but was reduced back to 3.4 per cent in 2012. The cumulative amount of the Foreign Direct Investments (FDI) grew from US$10.6 billion in 2005 to US$27.3 billion in 2011. The annual amount of FDIs has varied from the high point of 5.6 per cent of the GDP in 2007 to 0.7 per cent in 2010.

The country's Human Development Index (HDI) score in 2012 was 0.805, placing the country in 47th place out of a total of 186 countries measured. In 2005 Croatia held the same 47th position out of 177 countries compared.

Latest, 2013, Millennium Development Goals (MDG) indicators provide the figures for the population below national poverty line only for the year 2004 when 11.1 per cent of the Croatian population lived with below the poverty line income. According to the Statistical Yearbook 16.3 per cent of population was at risk of poverty in 2006 and this had increased to 18.0 per cent in 2009. These figures were calculated by the Croatian Bureau of Statistics and based on the data collected through the Household Budget Survey (HBS). The poverty indicators for 2010 and 2011 were calculated by using data collected through the Survey of Income and Living Conditions (SILC) following the EU regulations and Eurostat`s methodology for the EU-SILC survey. According to SILC the at-risk-of-poverty rate was 20.6 per cent in 2010 and 21.1 per cent in 2011. Since the indicators from these two data sources are calculated with different methodologies they can be only observed separately.

Gender

The Constitution of Croatia includes gender equality and the Parliament has enacted several laws to protect women against discrimination, effectively creating legal provisions of equal opportunities for men and women. Croatia has achieved gender parity in the access to education. The 2010 female-to-male ratio for the primary school enrollment was 1.00 and for the secondary school enrollment 1.07. Current Parliament, elected in 2011, has 36 female members holding 24 per cent of the seats of Parliament. Women must, by law, represent at least 40 per cent of candidate lists for each political party at all levels. Women have attained high political offices, including the Prime Minister, the President of the Constitutional Court and several members of the Supreme Court.

The Gender Inequality Index of 2012 was 0.179, placing Croatia 47th out of 186 countries. In Global Economic Forums's 2011 Global Gender Gap Index Croatia got score of 0.701 placing it in 50th place (out of 135 countries).

I.2 Key environmental trends

Air and Climate Change

Air

The sulphur dioxide (SO_2) emissions diminished from 63,644 tons in 2005 to 38,792 tons in 2011 – a drop of 39.1 per cent. Total SO_2 emissions in 2011 were noticeably lower than Croatian 70 thousand tons emission target set by the Gothenburg Protocol which Croatia ratified in 2008. Most of SO_2 was emitted from combustion of fossil fuel in electricity generating power stations and industrial plants the share of which from total increased from 73.3 per cent in 2005 to 77.3 per cent in 2011. A similar development took place with nitrogen oxides (NOx) (81,369 tons in 2005 to 66,345 tons in 2011) and ammonia (NH_3) (40,383 tons in 2005 to 36,812 tons in 2011) emissions, which dropped 18.5 and 8.8 per cent respectively. The share of mobile source emissions from total NOx emissions increased from 62.6 per cent in 2005 to 65.3 per cent in 2011.

The mercury (Hg) emissions decrease 8.4 per cent between 2005 and 2010 while the cadmium (Cd) emissions were reduced during the same period by 3.3 per cent.

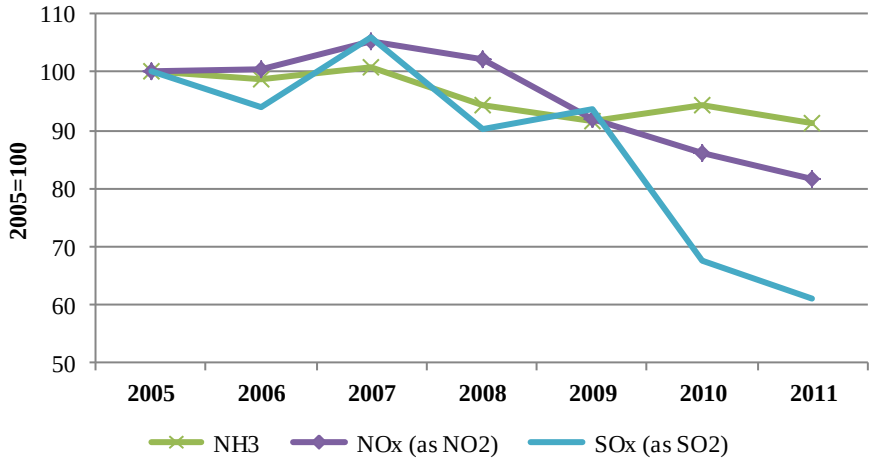
Greenhouse gas emissions

Between 2005 and 2011 total greenhouse gas (GHG) emissions decreased by 7.2 per cent while the CO_2 emissions during the same time period decreased by 11.1 per cent. Over the same time period methane CH_4 emissions increased by 12.0 per cent and HFC emissions increases by 42.7 per cent.

The energy sector, which produced 74.4 per cent of the total GHG emissions in 2005 and 73.3 per cent in 2011, had an emissions reduction of 8.6 per cent. The emissions from the industrial processes and agriculture diminished during the same time period by 8.9 and 4.6 per cent respectively. Emissions stemming from solvents diminished by 26.0 per cent from 2005 to 2011. GHG emissions from waste increased during the same time period by 32.4 per cent.

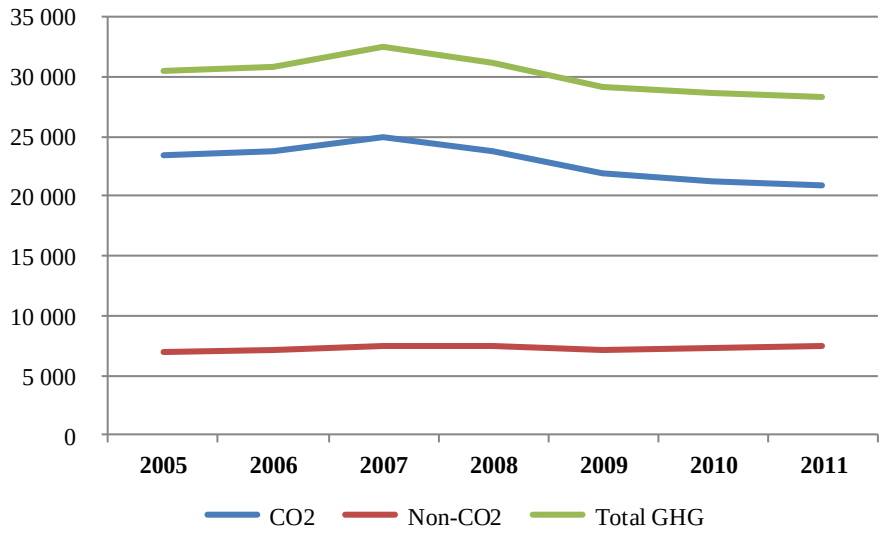
In 2011, with its 30.3 per cent share of the energy related GHG emissions, energy industry was the biggest energy sector emitter while the transport produced 28.4 per cent of the sector's GHG emissions. Within the comparison period, from 2005 to 2011, transport related emissions increased by 4.5 per cent while the emissions from manufacturing and construction fell by 23.1 per cent, energy industries by 7.7 per cent, other sectors by 14.7 per cent and the fugitive emissions by 8.5 per cent.

Figure I.1: Air emissions, 2005=100



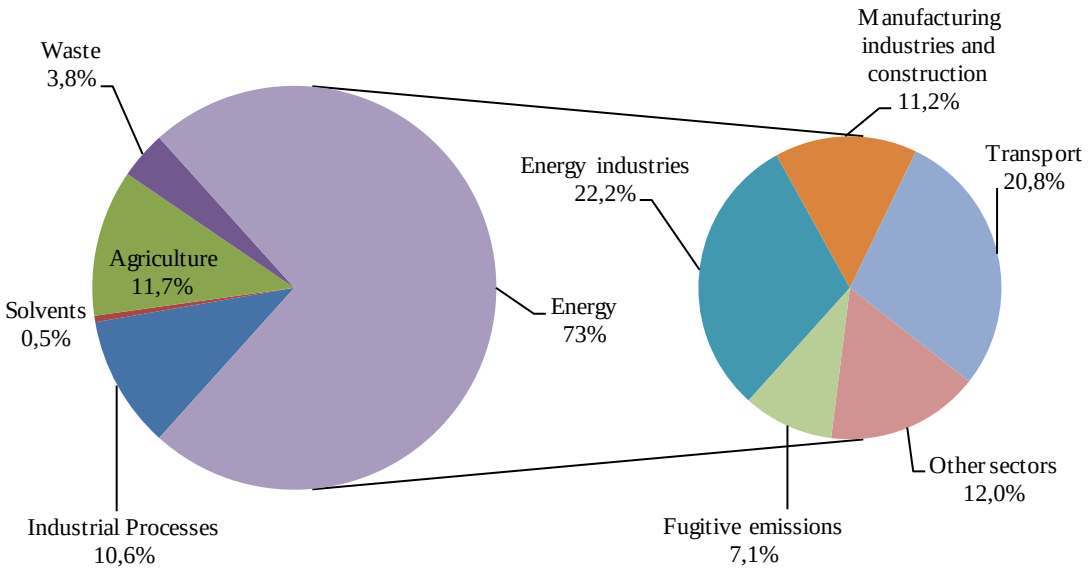
Source: Emep at www.ceip.at. Accessed on 4.9.2013

Figure I.2: GHG emissions in CO_2 equivalent in Gigagrams, 2005–2011



Source: UNFCCC database http://unfccc.int/ghg_data/ghg_data_unfccc/ghg_profiles/items/4625.php. Accessed 9.9.2013

Figure I.3: Shares of main sector emissions, 2011



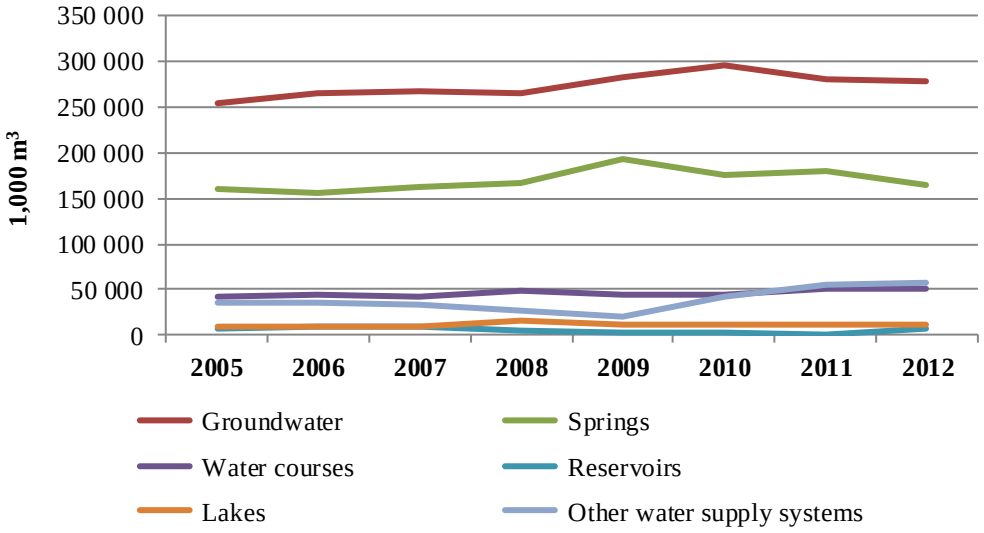
Source: UNFCCC database at http://unfccc.int/ghg_data/ghg_data_unfccc/ghg_profiles/items/4625.php. Accessed on 9.9.2013

Surface and ground water

Water abstraction and use

Amount of abstracted water increased steadily over the review period. In 2005, public water supply system provided 511 million m^3 of abstracted water while in 2012 about 569.4 million m^3 were distributed – a 11.4 per cent increase compared to 2005. Almost half (48.9%) of the public system water came from underground sources in 2012.

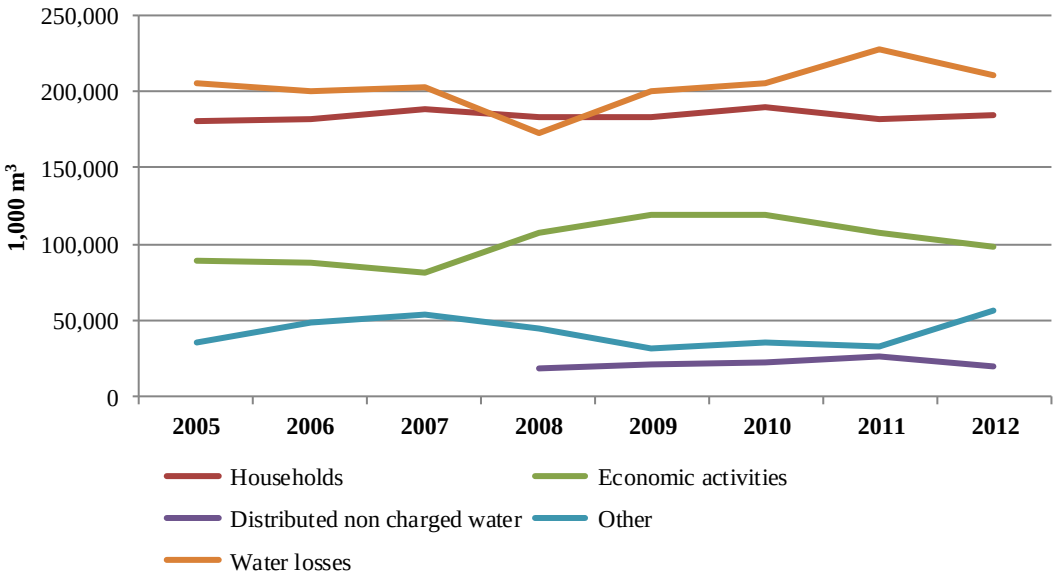
Figure I.4: Water abstraction, 2005–2012



Source: Statistical Yearbook 2012.

There were some moderate changes in the water use patterns between 2005 and 2012. The amount of total water supplied increased by 17.2 per cent. The water use of households stayed almost the same trough out the period while the water use of economic activities increased 9.5 per cent between 2005 and 2012 although its trend has been downward since 2009. Water losses of the total abstracted water were almost the same in 2005 and 2012, about 40.2 and 37.1 per cent respectively, and although the loss percentage diminished over the comparison period the absolute amount of water losses increased to 211 million m^3 as the total amount of water delivered also increase.

Figure I.5: Water use, 2005-2012

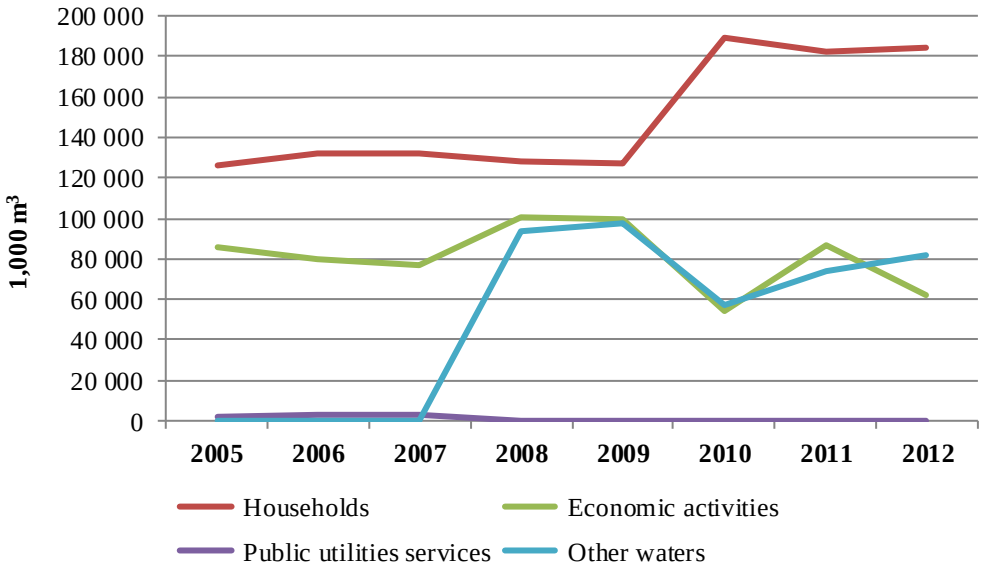


Source: Statistical Yearbook 2012.

Wastewater discharges

Between 2005 and 2012 wastewater discharges increased by 53.8 per cent. Over 56 per cent of the wastewater was generated in the households and out of 328 million m^3 discharged in 2012 about 24 per cent were untreated while in 2005 the percentage of untreated water stood at 38 per cent.

Figure I.6: Wastewater discharges, 2005–2012



Source: Statistical Yearbook 2012.

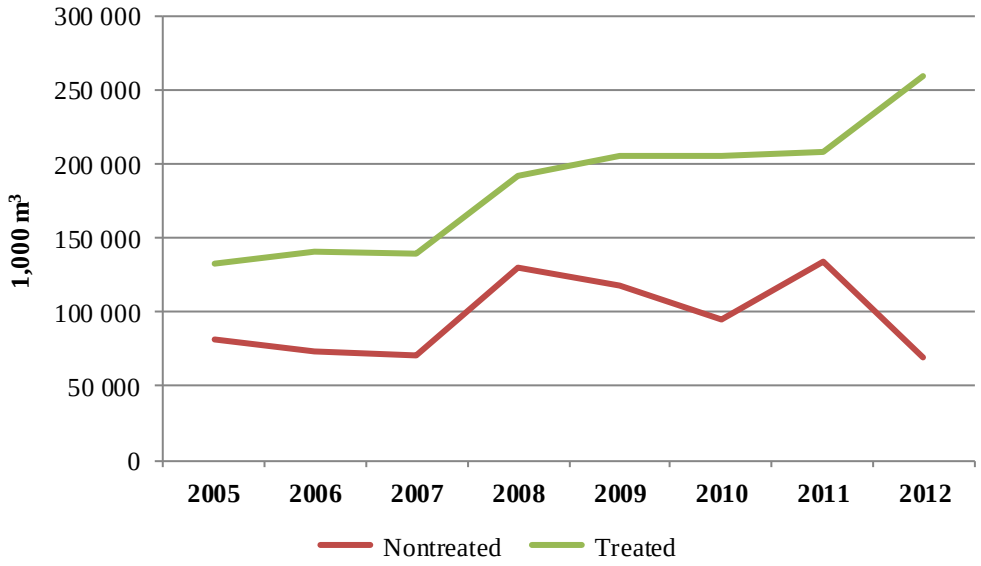
Water quality

Surface water

The quality of inland surface water was evaluated in the period 2006–2010 and the water quality was categorized to five classes of which class I – has the highest water quality and class V – the lowest quality.

The median of annual average concentration values of BOD5 in the watercourses of the Danube River Basin District corresponded to values for class II, while those of the Adriatic River Basin District corresponded to values of class I water. No significant changes were recorded in the period observed. A slight decline in BOD5 recorded in the Adriatic River Basin District may be attributable to the construction of public sewage systems and the operation of new urban wastewater treatment plants. The median annual average concentration of BOD5 in rivers was 1.8 mg O_2/l in 2006 and 1.5 mg O_2/l in 2010.

Figure I.7: Treatment of wastewater from public sewage system, 2005–2012



Source: Statistical Yearbook 2012.

Groundwater

Croatian regulations specify a maximum allowable concentration (MAC) of 50 mg/l nitrates in groundwater. The values of the annual mean average concentrations of nitrates in groundwater are way below the MAC. The average concentrations in the Danube River Basin District decreased from 7.9 mg NO_3/l in 2007 to 7.8 NO_3/l in 2010 while in the Adriatic River Basin District the concentrations were 4.2 mg NO_3/l in 2007 and 2.7 NO_3/l in 2010. Elevated nitrate values, sometimes exceeding the MAC, have been recorded in specific areas of the Drava and the Danube rivers basins as a consequence of wastewater discharge and agricultural land run-off.

Coastal water

The coastal bathing water is monitored along the whole length of the Croatian coast line from the Istrian Peninsula in the north to the Dubrovnik-Neretva County in the south. The number of sampling points on the beaches has increased from 851 in 2005 to 906 in 2011. In 2005 8,845 samples and in 2011 9,144 samples were analysed. Out of these in samples only 1.5 per cent in 2005 and 0.09 per cent in 2011 did not meet the bathing water criteria.

In 2012 season the water quality was even better, 96.8 per cent of samples were rated to have excellent water quality and 2 per cent a good water quality. The few remaining zones with water quality problem are located either next to the large towns such as Pula, Rijeka, Šibenik and Split or large estuaries with a nutrient flow to the sea.

Land and soil

Soil

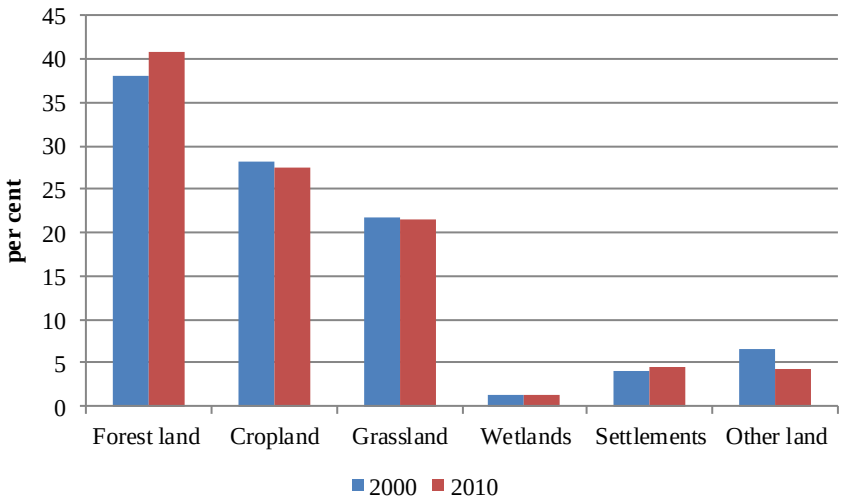
Soil organic carbon (SOC), an indicator of the soil quality, typically is in a range of 1 to 6 per cent of the total topsoil mass. In general Croatian forests have abundant organic matter and the range of SOC concentration is between 4 to 12.6 per cent. Intensive agriculture has had a negative impact on the agricultural land and the SOC content of farm land has diminished to 0.2 to 6.2 per cent.

The average Carbon to Nitrogen ratio of Croatian soil is 12:1 indicating a good soil quality. A Carbon-Nitrogen ratio analysis of 2,500 soil samples showed that 88.8 per cent of Croatian soil samples were within a range from 8:1 to 15:1.

Land use

The land use has not changed since 2000. The area of forested land increased a little from 38.1 per cent in 2000 to 40.9 per cent in 2010. Croplands, grasslands and other land areas diminished somewhat while the area of wetlands had no change at all.

Figure I.8: Land use



Source: CEA, 2013.

Flora and fauna

The situation with animal and plant species had small changes. The number of threatened vascular plants (223 species) stayed the same throughout the review period (2005-2012). The number of threatened mammal species stayed at seven through the period. The situation with birds (breeding and non-breeding population) deteriorated slightly– in 2012, 72 species were threatened while in 2008 the number was 67.

In 2012 the largest share of threatened species in the total number of assessed species had cave fauna with almost 99 per cent of threatened species among 186 assessed ones. After cave species, the largest share of threatened species was within lichen species (82%)..

Protected areas

In 2005, designated protected areas had a total area of 6,334.3 km^2, which covered 7.23 per cent of the national territory. There were 452 protected areas, under nine categories, but most of these belonged to the nature park category.

As of October 2013, the Register of Protected Areas of the Ministry of Environmental and Nature Protection had 419 protected areas in various categories and the total area had expanded to 7,400.2 km^2 covering 8.45 per cent of the country.

Waste

Illegal dumping of waste has been a problem in Croatia. In 2005, there were approximately 3,000 illegal dumpsites in the country. The Environmental Protection and Energy Efficiency Fund (EPEEF) has been assisting municipalities with the clean-up of illegal dumpsites so that at the beginning of 2012, 750 dumpsites have been cleaned up and waste from these sites was transferred to permitted disposal sites.

There was no change in the total waste generation over the review period. In 2005 the annual waste generation stood at 3.39 million tons diminishing by 0.3 per cent to 3.38 million tons in 2011.

Municipal waste

The generated amount of municipal waste increased from 1.4 million tons in 2005 to almost 1.8 million tons in 2008 but started then to diminish. In 2011 municipal waste generation was 1.51 million tons.

Special waste stream

The collected amounts of all special waste stream items, except the packaging material waste, increased during the review period. The amount of packaging material collected dropped from 198,225 tons in 2006 to 125,258 tons in 2011, a 37 per cent decrease. Packaging material formed the bulk of the special stream waste throughout the review period – about 93 per cent in 2005 to 59 per cent in 2011. Collection of other special waste has increased continuously since 2006. For example the collected amount of end-of-life-vehicles increased over fivefold from 2007 to 2011 and the waste of electrical and electronic equipment (WEEE) increased over threefold from 2008 to 2011 (see table 6.8)

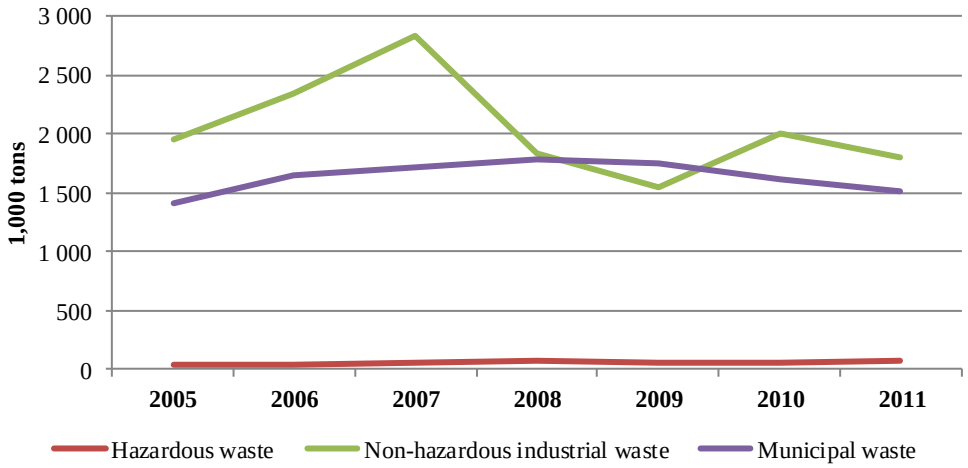
Non-hazardous industrial

In 2005 about 98.9 per cent of the total waste was non-hazardous and the industrial non-hazardous waste made about 57.3 per cent of all waste. In 2011 about 98 per cent of waste was non-hazardous and the industrial non-hazardous waste's share had dropped to 53.3 per cent of the total.

Hazardous

Hazardous waste generation in Croatia is one of the lowest per capita in the European Union area. In 2005 Croatians generated 8.3 kilograms of hazardous waste per capita, which increased to 16 kilograms per capita in 2011. Since hazardous manufacturing waste makes most of the hazardous waste (between 92 and 97 per cent over the review period) the 79 per cent increase of the hazardous manufacturing waste over the review period pushed the total hazardous waste generation up. The total hazardous waste generated increased 84.7 per cent or from 36,995 tons in 2005 to 68,333 tons in 2011.

Figure I.10: Waste generation, 2005-2011



Source: CEA, 2013.

Map I.1: Map of Croatia

Source: United Nations Cartographic Section, 2011.
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Chapter 1

POLICYMAKING FRAMEWORK FOR ENVIRONMENTAL PROTECTION AND SUSTAINABLE DEVELOPMENT

1.1 Legal Framework

Harmonization with the European Union legislation

Croatia's efforts to harmonize its legislation with the European Union (EU) acquis in the frame of the accession process to the EU enabled to further strengthen the legal framework for environmental protection and sustainable development. In 2010, Croatia successfully concluded negotiations for Chapter 27-Environment, and established transitional agreements related to heavy investment areas including air quality, climate change, waste management, water quality, industrial pollution, risk management and chemicals. In some environmental domains such as soil protection there are significant legislative gaps. Few provisions on soil protection can be found in forestry and agricultural legislation.

Environmental protection

The Environmental Protection Act (EPA) was promulgated in 1994 and amended in 1999. In 2007 a new EPA was adopted by the Croatian Parliament. The 2007 EPA includes obligations to improve the quality and implementation of environmental impact assessment (EIA), to introduce strategic environmental assessment (SEA), to reinforce public participation in environmental matters, to ensure access to environmental information and to strengthen integrated industrial pollution prevention and control (IPPC). The act also introduced decentralization of administrative responsibilities for environmental protection. To date, the EPA is supplemented by 17 implementing regulations, 1 decision and 25 ordinances. A new EPA was adopted in July 2013 to provide an improved basis for further harmonisation of national environmental legislation with the EU acquis. The 2013 EPA (OG 80/13) is based on the 2009 Sustainable Development Strategy (OG 30/09) and incorporates the provisions of a number of EU directives. In particular, it:

- Introduces the environmental permit (the obligation to have the permit is no longer prior to issuing the location permit for installation, but prior to putting the installation into operation);
- Improves the existing procedure on EIA related to the screening (assessing the need for the EIA);
- Further improves the system of prevention and remedying of environmental damage;
- Improves the system of granting authorizations for professional work in environmental protection;
- Improves the system of environmental inspection;
- Introduces the concept of integrated management of marine and coastal areas.

Croatia has made progress in terms of fulfilling several main obligations in the 2007 EPA such as the adoption of the National Sustainable Development Strategy in 2009, the establishment of new organisational units responsible for environmental protection in counties and major cities, the adoption of implementing regulations to strengthen EIA and of environmental protection programmes for a range of counties, City of Zagreb and major cities. However, some of 2007 EPA provisions remain unimplemented such as the adoption of the new eight-year National Environmental Protection Plan (NEPP) that would identify new priority environmental protection goals at national level, define implementation measures, set implementation deadlines and identify responsible authorities.

Air protection

The 2011 Air Protection Act represents the primary legislative act regulating air protection, climate change mitigation and adaptation, ozone layer protection and industrial pollution. The 2011 Act was crucial for establishing a legal and institutional framework to implement the emissions trading scheme for installations and aviation and to achieve the 2020 greenhouse gas emission target for the sectors not included in the EU trading scheme (agriculture, services, transport, households, and small industrial plants). It also created a legislative basis for regulating geological storage of carbon dioxide in an environmentally safe manner and for strengthening air quality and greenhouse gas emissions monitoring as well as administrative and inspection supervision. To date, the Act is accompanied by 9 implementing regulations, 9 decisions and 9 ordinances.

The Air Protection Act sets out the competences and liabilities for air protection, air improvement and protection planning documents, air quality monitoring and assessment of air quality, measures for prevention and reduction of air pollution, air quality reporting and data exchange, issuing permits for activity of monitoring air quality and emissions into the air, air protection information system, financing of air protection, administrative and inspectional supervision.

Croatia has made an important step forward with respect to fulfilling the Act's obligations by joining in January 2013 the third phase of the EU ETS. Transitional periods have been agreed with EU for the participation in the EU ETS for aviation (2014) as well as for modernization of existing IPPC installations (2017), and for the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations (2015). The permitting process for existing installations has been slow and the funding for upgrading such installations insufficient.

Nature protection

The 2003 Nature Protection Act was decisive to setting a strong and comprehensive legislative frame for protection of flora and fauna, biological and landscape diversity, preservation of ecological stability and improving the disturbed natural balance and restoration of its regeneration capabilities. In 2005 Croatia adopted a new Nature Protection Act to incorporate provisions of all relevant MEAs and EU directives. The amendments in 2008 and 2011 inter alia enlarged the earlier nature protection frame with regard to the protected natural values, aiming at preservation of the overall biological and landscape diversity. The details of the implementation of the Act has been specified, in 18 regulations, 23 decisions and more than 30 ordinances relating inter alia to management of protected species and areas including national and regional parks, nature parks and reserves. A new Nature Protection Act was adopted in July 2013 (Chapter 8).

Waste

The 2004 Waste Act, amended in 2006, 2008 and 2009, establishes a comprehensive legal framework for waste management. It includes principles and aims of management, planning documents, authorities and responsibilities related to management, costs, information system, and requirements for facilities where waste management shall be carried out, method of performing activities, transboundary transport of waste and concessions and supervision over waste management. The implementation of the act is currently regulated by 2 regulations, 5 decisions and 192 ordinances.

While Croatia has made major efforts to fulfill the Waste Act obligations, the progress on the ground has been slow inter alia due to heavy investment needs. Transitional agreements with the EU have been agreed for the remediation of existing landfills and the building of new waste management centres (2018) and for the amount of biodegradable municipal waste to be landfilled (2020) and the amount of waste landfilled in existing non-compliant landfills (2017). While the Waste Act is interlinked with a large number of sectoral laws, Croatia's efforts to consolidate them have to date been somewhat insufficient.

The Act on Sustainable Waste Management, which replaces the Waste Act, was adopted in July 2013, entered into force 23 July 2013 and means further alignment of Croatian legislative with the EU acquis.

Water

The area of water protection and management including water supply and wastewater disposal is regulated by the 2009 Water Act OG 153/09, 63/11, 130/11 and 56/13) and the 1995 Water Management Financing Act, last

amended in 2013 (OG 153/09, 90/11 and 56/13), alongside accompanying secondary legislation. The Water Act regulates activities and organization of water management and protection, activities of public water supply and public sewerage. It sets a comprehensive institutional organization of the water utility sector. Replacing the old Utility Management Act, it supersedes provisions related to drinking water supply, sewerage and wastewater treatment and transfers jurisdiction upon water public utilities to the Ministry of Agriculture, Water Management Directorate. The Water Management Financing Act defines water management revenues, the most significant of which are water charges (chapter 5).

Reforms in the water sector are proceeding and some key commitments were met, such as the preparation and adoption of the River Basin Management Plan. Necessary investments in the infrastructure have been insufficient.

Marine environment protection

The 2011 Regulation Establishing a Framework for Action on Marine Environment Protection (OG 136/11) aims at defining conditions for elaboration, development, implementation and monitoring of the Marine Environmental Protection Strategy (Marine Strategy) for achieving and maintaining good marine environmental status by 2020. The regulation inter alia determines goals and scope of and responsibilities for marine environment protection, whereby the Ministry of Environmental and Nature Protection represents the central authority. The act previewed the finalization of the document of initial assessment of the marine environment, of the set of the characteristics to be determined for good environmental status and of the set of environmental targets including related indicators by 2012.

In 2011, a first preparatory document of the Marine Strategy (Initial assessment of the state and pressure on the marine environment in the Croatian part of the Adriatic Sea) was prepared and adopted by implementing bodies defined by the Regulation, while others are expected to be finalized by the end of 2013. Based on the preparatory documents the Regulation also envisages elaboration of so-called Action Programmes, which include establishment of Monitoring and observation system for marine environment (by 15 July 2014) as well as Programme of measures (by the end of 2015). Elaboration of the Monitoring and observation system has been initiated in the beginning of 2013 in the framework of the second phase of the Coastal Cities Water Pollution Control Project funded by the IBRD loan 7640/HR and is expected to be prepared by the end of the project (September 2014).

Chemicals

The 2005 Chemicals Act, amended in 2008 and 2011, is the key legislative act in terms of regulating the chemicals management. It is currently accompanied by 14 ordinances. The act is also complemented by the 2007 Act on Biocidal Products (amended in 2008 and 2011) that sets out the legislative frame for management of biocidal products. In 2013, the 2005 Chemicals Act was replaced by a new Chemicals Act to further strengthen the legal and institutional framework for the safe management of dangerous chemicals.

While Croatia has made some progress in terms of fulfilling the obligations, the organization of responsibilities has hindered a unified approach to solving chemicals management questions. The mandates of several institutions involved in chemicals management such as the Ministry of Environmental and Nature Protection have been defined and formalized through legislation and the National Safety Chemicals Strategy. There is a system for monitoring chemical substances and mixtures as a registry in the Croatian Institute for Toxicology and Antidoping, while monitoring of substances regarding poisonings is taking place in another institute. The administrative capacity in relation to management of chemicals and biocidal products remains insufficient. However, the recent establishment of a new department for chemicals and biocidal products within the Ministry of Health has been an important step towards ensuring the implementation of both acts.

Noise protection

The 2009 Noise Protection Act (OG 30/09, 55/13) was decisive for regulating an acoustic environment that is conducive to protecting human health and biodiversity of ecosystems. The act determines measures to avoid, prevent and reduce adverse effects of noise on human health and environment. It inter alia obliges cities and towns with more than 250,000 inhabitants to elaborate strategic noise maps and action plans. To date, the

Ministry of Health has received five strategic noise maps: i.e., Split (agglomeration), Rijeka, BINA Istra (motorway transport), highway Rijeka-Zagreb and highway Zagreb-Macelj. Furthermore, four legal persons have been authorized to do professional work of sound design and prediction of noise levels. Some progress was achieved in terms of institutional strengthening through the establishment of the Department or General Use Items and Noise Protection within the Ministry of Health.

An IPA funded project "Technical Assistance for Development of National Environmental Noise Strategy for the Republic of Croatia" was started in October 2011 to support the implementation of the Environmental Noise Directive 2002/49/EC in Croatia. A draft of a National Environmental Noise Protection Strategy has been prepared within the project.

Genetically modified organisms

The 2005 Act on Genetically Modified Organisms (GMO), amended in 2009 and 2013, replaced the biotechnology-regulating provisions of the Act on Protection of Nature. The act regulates import, shipment, production, usage and sale on the market genetically modified crops or biotech products and in particular biosafety activities that are relevant to introduction of GMOs into the environment. The act bans the release of GMOs in protected areas and their buffer zones, in areas of organic farming and of importance to ecotourism. This provided a legal tool for all counties to effectively declare themselves GMO-free. The act also includes the obligation to elaborate a national strategy for coexistence of genetically modified crops with conventional and organic agricultural production that has not been adopted yet.

Protection against light pollution

In some areas, the national legislation in Croatia goes beyond the EU requirements. The 2011 Act of Protection against Light Pollution for example regulates the protection of environment and biodiversity from the adverse effects of light pollution as well as promotes the rational use of natural resources and energy. The Act determines principles and actors in the protection against light pollution, procedures for determining standards for regulating the lighting so as to reduce the energy consumption as well as standards and rules relating to light pollution, construction planning and maintenance of lighting. It also includes the obligation to account for light pollution in SEA.

Environmentally related provisions in sectoral laws

Since 1999, the number of environment-related provisions in sectoral legislation such as agriculture, energy, industry, tourism and transport has increased. The sectoral legislation typically makes cross-reference to relevant environmental legislation and defines environmental goals and requirements for subordinated sectoral legislation and policies. However, environmental provisions in sectoral legislation are largely at conceptual and not implementing level. Only some sectoral legislation such as the Energy Act clarifies competences and roles of environmental authorities in reviewing and enforcing sectoral legislation and policies.

An important step towards sensitizing sectoral laws for environmental concerns was made with the adoption of the 2011 Act on Regulatory Impact Assessment (RIA) and its 2012 implementing regulation. Until 2009, there were merely few provisions in the Rules of Procedure of the Government stipulating obligatory RIA on economy and – if necessary – evaluation of financial and social impacts as well as ecological impacts. The 2011 Act established a new system for analysis of positive and negative regulatory impacts of regulations, making equally binding the evaluation of impacts on the area of economy and of financial impacts and the evaluation of impacts on the area of social welfare and environmental protection. In addition, it previews consultations with the public and interested parties. The RIA implementation in terms of evaluating environmental, economic and social impacts of regulations is guided by the RIA Guidelines. The RIA Guidelines are publicly available.

Implementation

While there has been significant strengthening of the legal framework for environmental protection and sustainable development since 1999, Croatia has been slow in terms of implementing new legislation in particular at the subnational level. This has been particularly the case in the areas demanding high infrastructure investments such as air protection, waste and water management. This is primarily linked to insufficient

allocations from the State budget and financial investments due to the social and economic situation in Croatia and the global economic and financial crisis. Weak implementation of environmental legislation at local level is also linked to insufficient administrative capacity in particular on chemicals, climate change, IPPC, nature protection and noise.

The Government has made insufficient efforts to ensure regulative harmonization of the existing and new environmental and sectoral legislation and establish a stable mechanism of regulatory improvement that allows wide consultation within the government and with other stakeholders. For example, the reform of the environmental legal system is largely based on ad hoc legal fixes.

1.2 Policy Framework

National Sustainable Development Strategy

The 2009 National Sustainable Development Strategy (NSDS) for the period 2009-2019 represents the highest ranking policy document for environmental protection and sustainable development at national level. The NSDS was critical to establishing long-term goals related to economic and social development towards sustainable development. It defines guidelines for long-term actions and for horizontal and vertical coordination of policies by defining goals and determining measures in eight key cross-sectoral areas. The NSDS is to be implemented through action plans.

However, the NSDS implementation has been insufficient. To date, Croatia adopted only one action plan: the action plan for education for sustainable development. The Ministry of Environmental and Nature Protection initiated the elaboration of three further action plans: the new National Environmental Protection Plan (NEPP), the Action Plan for Sustainable Consumption and Production (APSCP) and the Action Plan for Protection of the Adriatic Sea, Coastal Area and Islands. The elaboration of the latter was stopped to prevent duplication with the Marine Protection Strategy and the corresponding new Intervention Plan in Case of Sudden Sea Pollution that are currently in elaboration. The Ministry outsources the elaboration of the NEPP and the APSCP to an external advisory body, resulting in complex and overambitious drafts that are now being scoped to ensure their feasibility. No coordination mechanisms are in place to promote synergies and reduce trade-offs between challenges and coordination measures to tackle them. All in all, the NSDS thus proved to be an insufficient policy framework for ensuring coordinated implementation and monitoring of interdependent environmental and sectoral strategies and plans in place, making coherent action difficult.

National Environmental Strategy

The 2002 National Environmental Strategy (NES) was adopted together with the National Environmental Protection Plan (NEPP) in 2002 as overarching strategic document for the environmental protection. In 2009 NES was replaced by the NSDS which puts national strategic environmental goals for the ten year period in the context of sustainable development. Until adoption of a new NEPP, the one from 2002 continues to represent the central policy document for environmental and sustainability action at national level

Coastal and Marine Management Strategy

Having in mind the obligation to prepare the Coastal and Marine Management Strategy (Marine Strategy), variety of policies dealing with the management of coastal and marine environments, as well as the definition of the coastal zone according to the ratified Protocol of the Barcelona Convention on Integrated Coastal Zone Management in the Mediterranean (e.g. its land and sea components), the Ministry of Environmental and Nature Protection within the 2013 EPA linked the obligations arising from the ICZM Protocol and the Regulation Establishing a Framework for Action of Croatia in the Field of Marine Environment Protection (OG 136/11) in a way to prepare a unique national strategic document for the Croatian Adriatic Region that would integrate both – the ICZM and the Marine Strategy including adaptation to climate change issues and taking into account the Water Management Strategy and relevant Plans.

National Environmental Protection Plan

The NEPP adopted in 2002 was not yet replaced by a new NEPP for a period of eight years as prescribed by the 2007 EPA. In practice the 2002 NEPP continues to represent the central policy document for environmental and sustainability action at national level. It outlines national priority goals, principles, investment, regulation and organizational priorities and criteria for prioritizing plans of action. All in all, the NEPP encompasses 750 measures in 16 thematic chapters covering a wide range of sectors (industry, mining, energy, agriculture, forestry, tourism, transport, hunting and fishery) as well as cross-sectoral issues (air quality management, water management, management of soil and forests, waste management, noise protection, biodiversity, landscape protection and geological heritage, coastal and island management, urban and rural areas). Each measure in the NEPP identified goals, measures, target groups, responsible institutions, implementation deadlines (priority projects to be implemented within 0-2 years, 2-5 years, 5 or more years), and interdependencies with other action plans as well as with EU and MEAs requirements, and possible financial resources. NEPP also defines strong governance mechanisms for implementing and monitoring action plans in a coherent and sustainable way, including monitoring and information instruments, science and development, integration instruments, awareness raising and participation instruments, education, economic and financial instruments as well as inspectional supervision.

National state of environment reports

Croatia has continuality in national environmental reporting covering different time periods and different aspects of national priorities at that time. However, due to the EU accession process and harmonisation with the reporting cycles of the European Environment Agency (EEA) it was decided to establish a legal obligation to elaborate national state of environment reports (SoER) for each four year period based on the national thematic indicators which are very much in compliance with the EEA indicators. The SoER for the period 2005-2008 was published with severe delay in 2012. The CEA finalized the draft in 2010 and the Government adopted the report in June 2011, after which it was put on the agenda of the Croatian Parliament. However, due to the parliamentary elections in December 2011, the procedures needed to be repeated with the new Government and the Parliament.

The 2012 SoER offers exhaustive insight into the progress in terms of achieving goals and implementing measures outlined in the main sustainable development and environmental protection documents. However, in practice it had limited influence on decision making. The SoER offered also limited just-in-time knowledge due to severe delays in their adoption. The SoER for the period 2009-2012 has not been finalized yet.

Strategy and Action Plan for the Protection of Biological and Landscape Diversity

So as to implement the Nature Protection Act, the Croatian Parliament in 2008 adopted the Strategy and Action Plan for the Protection of Biological and Landscape Diversity of Croatia. This is a fundamental document for nature protection, laying down long-term objectives and guidelines for the conservation of biological and landscape diversity and protected natural values, and methods for implementation thereof. The Nature Protection Act prescribes the obligation to analyze the objectives and guidelines as well as the implementation of action plans every five years, whereupon the Strategy will be revised where necessary. Croatia is currently in process of preparing a report on State of Nature that will serve as basis for preparation for revision of the Strategy and Action plan that is envisaged for 2014. (Chapter 8)

National Waste Management Strategy

The system and priorities of waste management are determined in the 2005 National Waste Management Strategy which assesses the situation, identifies problems and obstacles and sets the main waste management objectives for the period 2005-2025 (Chapter 6). The Strategy is implemented through the 2007 Waste Management Plan valid for the period 2007-2015 that sets out the objectives of the Waste Management Strategy: (1) establish an integrated waste management system; (ii) rehabilitate or close landfills; (iii) rehabilitate “hot spots”; (IV) establish regional and county centres for waste management and pretreatment of waste before final disposal or land filling; and (v) computerize the waste management system. The Plan serves as a framework document for waste management plans and for elaboration of individual projects that fit into the country/regional integrated waste management system. Croatia is currently preparing a new waste management strategy as to better meet the EU requirements and legal obligations in the waste management area.

Water Management Strategy

The water management policy is determined by the 2008 Water Management Strategy, the core national long-term strategic water management document. It was critical for establishing a unified water management policy and an integral and coordinated approach to improving the water system in line with international commitments. It defines strategic goals, establishes current and future needs and services, and identifies how they might be met through management plans for four water districts: water district of Sava basin and water district of Danube and Drava river basins in Black Sea Basin; water district of river basins in Istria and Primorje and water district of basins in Dalmatia in Adriatic Basin.

Two river basin districts for the management of river basins on the national territory of Croatia were established by the 2009 Water Act: Danube River Basin District, and Adriatic River Basin District. Transboundary river basins belong at the same time to international river basin districts. The part of an international river basin district on the territory of Croatia is managed by Croatian Waters. Croatia has developed and published the river basin management plan before EU accession.

Climate and Air Protection Policies

Air quality and climate change protection represent the third national priority area according to the NES. To meet this challenge, Croatia in 2008 adopted the Air Quality Protection and Improvement Plan for the period 2008-2011, the National Plan for the implementation of Stockholm Convention on Persistent Organic Pollutants, the Plan on reduction of emissions of sulphur dioxide, nitrogen oxides and particulate matter from major combustion plants and gas turbines in the territory of Croatia, the Programme for monitoring the quality of liquid oil fuels at the annual basis, the 2009 Programme for gradual emission reduction of certain pollutants in Croatia for the period until the end of 2010 and the 2009 Plan on Allocation of Greenhouse Gas Emission Quotas.

Since 2012, Croatia is undertaking activities on establishment of a framework for the preparation of its low-emission development strategy (LEDS) and a new national air quality protection and improvement plan for the period 2012-2017 as well as an action plan for reduction of ozone pollution. Their bottom-up elaboration based on trans-sectoral and multi-stakeholder approaches has set new procedural standards in terms of transparency, participation and horizontal integration.

Croatia to date does not have a climate change adaptation strategy, although the process of preparing the Impact, Vulnerability and Adaptation Strategy to Climate Change under the IPA programme started in 2008. In 2013 within the IPA Transition facility Project was proposed and preliminary approved by the European Commission. Project for adaptation to climate change refers to particular sectors, preparing scenarios on impacts, vulnerability and adaptation, assessment of measures, making prioritization of the sectors and adaptation measures, and the preparation of the adaptation strategy.

Other environment-related policy documents

The 2005 National Environment Instrument for Structural Policies for Pre-Accession (ISPA) Strategy inter alia covers waste, water and air protection management, including an indicative list of priority projects which were selected in line with the general criteria for ISPA projects as well as specific criteria. The Operational Environment Programme for the period 2007-2013 aims at developing environmental infrastructure and public services in municipal waste management and disposal, drinking water supply, municipal wastewater and water resources treatment. However, a number of policy initiatives launched during the review period to address individual environmental components have not been adopted, including inter alia the National Strategy for Coexistence of Genetically Modified Crops with Conventional and Organic Agricultural Production and the National Noise Protection Strategy and Noise Protection Action Plan.

Subnational environmental policies

The main strategic documents for environmental protection at subnational level are the four-year regional and local environmental protection programmes (EPPs) outlining conditions and measures for environmental protection, priorities, authorities and the sources for its funding. According to the 2007 EPA, EPPs shall be

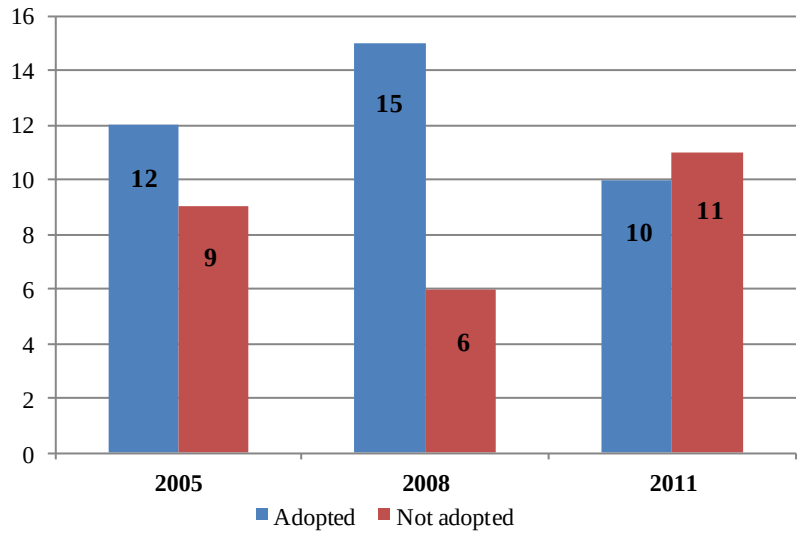
adopted by counties, City of Zagreb and all major cities within six months from the adoption of the NEPP, subject to the prior approval of the Ministry of Environmental and Nature Protection. However, as a new NEPP has not been elaborated yet as stipulated in the 2007 EPA, counties and major cities missed the necessary incentive to adopt or revise their EPPs.

In total, 17 counties and City of Zagreb adopted EPPs since 2007. However, a majority of those has expired and have not been renewed. Two counties (Međimurje and Požega-Slavonia) have not adopted EPPs yet. All in all, only three counties have EPPs still in force: until 2014, for Dubrovnik-Neretva and Sisak-Moslavina counties and until 2016 for Šibenik-Knin County. Only two major cities to date adopted EPPs. While Osijek adopted its EPP in 1999, Sisak adopted its EPP in 2009 and amended it in 2013. The Sisak EPP will be in force until 2016. If envisaged under the EPP of the county, cities or municipalities may also adopt a programme for their territory. To date this has been the case in five municipalities. EPPs are in force in following cities: Ivanić-Grad (until October 2013), Dugo Selo (until November 2013), Sveti Ivan Zelina (2014) and Zaprešić (until 2017). Kostrena has been the only municipality to develop an EPP that was in force until 2012.

According to the 2007 EPA, the SoERs shall be prepared by local and regional governments and the City of Zagreb and other large towns for a four-year period. The reports monitor the implementation of the environmental protection programmes that are adopted at the local and regional level after being brought into line with the NEPP. In 2005, a report for a four-year period was adopted by 12 counties, after which evident progress was reported (Figure 1.1). Regarding the fulfilment of the statutory obligation to prepare reports for large towns, of 22 large towns only Sisak prepared a report in 2009.

Major progress was achieved in terms of adopting strategic documents in the waste sector. By April 2013, all 20 counties apart from City of Zagreb adopted waste management plans in accordance with the National Waste Management Plan. In practice, 17 out of 22 major cities, as well as 48 cities and 176 municipalities have their own waste management plans. In 2008, only seven municipalities had such plans. However, their conformity with the National Plan remains questionable. The compliance of the local and regional governments with the legally prescribed deadlines for the fulfilment of individual obligations relating to municipal waste disposal has been insufficient. In particular, there is a need to accelerate the construction of single regional waste management centres (RWMC) that are being financed by the local governments, the Environment Protection and Energy Efficiency Fund (EPEEF) and the EU funds. In 2012, construction started in 2 of Croatia's 21 counties. For RWMC, a transitional period has been granted by the EU by January 2019 to bring landfills in compliance with accession requirements (Landfill Directive). The relatively low level of implementation of the waste management plans has been a consequence of a number of factors, including a shortage of adequate financial resources, of skilled staff at all government level, lacking coordination between government agencies and the regional and local government and lacking interaction with public and private groups (Chapter 6). .

Figure 1.1: Status of the number of state of the environment reports adopted and not adopted by the counties and the City of Zagreb in 2005, 2008 and 2011



Source: CEA, 2012.

Progress has been made in marine contingency planning. In 2008, Croatian Government adopted a new Contingency Plan for Accidental Marine Pollution (OG 92/08) made in accordance with Prevention&Emergency Protocol of the Barcelona Convention and the Agreement on the Sub-regional Contingency Plan for Prevention of, Preparedness for and Response to Major Marine Pollution Incidents in the Adriatic Sea. All seven coastal counties have adopted county contingency plan in accordance with that national one.

The counties, City of Zagreb and major cities have not yet fulfilled the obligation to adopt air quality programmes and plans (if the level of pollutants in air exceed any limit value or target in a given zone) and short-term action plans (if there is a risk that the levels of pollutants will exceed the alert thresholds) as previewed in the 2011 Air Quality Act. With the aim of fulfiling prescribed obligations, the project "Support to the preparation of a national action plan to reduce particulate matter (PM) and nitrogen oxides (NOx) in Croatia (Directive 2008/50/EC)" was finished in 2012 under which short-term action plan for the cities of Kutina, Sisak and Split was drafted.

Sectoral policies with environmental impact

Since 1999, Croatia has adopted a range of sectoral policies that have direct and significant pressures on environment. They include the 2006 National Health Care Strategy for the period 2006-2011, the 2009 Energy Strategy, the 2010 Regional Development Strategy, the 2011 Strategy for Broadband Development, the Strategy of Rural Development for the period 2012-2014 and the 2012 National Health Care Strategy for the period 2012-2020. Other national strategic documents and implementation plans determining the system and priorities in specific environmental areas include the 2002 National Agricultural and Fishery Strategy, the 2003 National Forest Policy, the 2008 National Strategy for Chemical Safety and the 2008 Intervention Plan in Case of Accidental Sea Pollution.

Although there has been some progress on the ground, the mainstreaming of environmental concerns in sectoral policy documents often remains at the conceptual level, while little integration can be seen at the implementation level. Improving the implementation and integration of environmental protection principle in sectoral strategic documents thus remains one of the priority challenges.

1.3 Strategic Environmental Assessment

Legislative framework

The 2007 EPA establishes the first comprehensive legal framework for SEA. The 2008 Regulation on SEA of Plans and Programmes (SEA Regulation) and the Ordinance on the Committee for SEA further specify the SEA implementation. At the national level, the ministry competent for the sector for which the plan or programme adopted is responsible for carrying out the SEA screening procedure and the SEA procedure. Administrative bodies competent for environmental protection in the county or in City of Zagreb carry out SEA of plans and programmes at the regional level.

The SEA procedure has to be carried out prior to the establishment of the final proposal of the plan or programme on the basis of the strategic impact study that is elaborated by an external authorized person to be selected by the competent body. The competent body also appoints an advisory experts committee that gives opinion on the completeness and expertness of the strategic impact study prior to its submission for public debate. While the participation of the Ministry of Environmental and Nature Protection in the committee is mandatory for SEA procedures at the national level, it is optional for regional plans and programmes.

Implementation

Pursuant to the 2007 EPA, the SEA procedure is mandatory for all plans and programmes on agriculture, forestry, fisheries, energy, industry, mining, transport, telecommunications, tourism, and waste and water management adopted at the national and regional level and for the counties' spatial plans and the National Physical Plan. In case of amendments to plans and programmes, a SEA screening procedure has to be carried

out so as to determine the necessity to proceed with a comprehensive SEA procedure. However, this is not the case in practice.

A SEA has been carried for four strategic documents: the Operational Environment Programme for the period 2007-2013, the Operational Programme for Transport for the period 2007-2013 and the Operational Programme for Regional Competitiveness for the period 2007-2013 and the River Basin Management Plan for the period 2007-2013. In all four cases, the competent ministries initiated SEA procedures that are still in progress. SEA procedures for all except for the Operational Programme for Regional Competitiveness are finished.

At the county level, SEA screening procedures were carried out for seven county spatial plans and for the waste management plan of City of Zagreb. Only in four cases, counties decided to initiate a SEA procedure. They include amendments to the spatial plans of Istria County (SEA procedure since 2010), of Primorje-Gorski kotar County (since 2011), and of Vukovar-Srijem County (since 2012), and the Waste Management Plan of City of Zagreb by 2015 (since 2012). To date only SEA procedure for Primorje-Gorski kotar County have been completed. In contrary to legal obligations, no SEA screenings were conducted for the waste management plan of Zadar County (2009-2017), Lika-Senj County (2010-2018) and Zagreb County (2011-2019).

The low SEA implementation is caused by several factors. First, SEA is mandatory only for plans and programmes and not for strategies. Second, even for plans and programmes, the weak role of the Ministry of Environmental and Nature Protection (no veto right) in the SEA screening procedure and in the SEA procedure is a barrier to the SEA implementation. While competent bodies are obliged to ask the Ministry for the opinion about the necessity of carrying out the SEA procedure and about the quality of the SEA, they do not have to obtain its approval. Consequently, four counties decided not to implement the SEA procedure for their spatial plans despite the recommendation from the Ministry to do so.

The insufficient methodological frame for carrying out the SEA represents another reason for the implementation gap. The 2008 SEA Regulation establishes criteria for determining the likely significance of effects on the environment that include merely an indicative list of descriptive characteristics of plans, programmes, effects and areas to be affected by the implementation of the plan or programme, while failing to determine quantitative criteria with threshold values for evaluating the significance of effects of plans and programmes on environment in a unified and systematic way. Also the content prescriptions for the strategic impact study in the SEA Regulation include only exemplary list of areas (e.g., air, biodiversity, human health and population) that could be significantly affected by programmes and plans and fail to establish threshold values for determining the significance of these effects. The evaluation of the need for the SEA and the assessment of significance of effects on environment are thus a highly interpretative matter. This makes it difficult for the Ministry of Environmental and Nature Protection and for the public to challenge the results of the SEA screening and the content of the strategic impact study submitted by the competent authorities.

The capacity building measures for SEA have been insufficient. The Ministry of Environmental and Nature Protection failed to develop supporting tools such as guidelines or a handbook for the SEA practitioners. The 2003 SEA Guidelines are not coherent with the new legislation on SEA. To date, no comprehensive training on the SEA has been organized for members of central administration. Four two-days SEA trainings were organized for the county representatives in Split, Rijeka, Varaždin and Osijek in 2010. With the new EPA, significant improvements are expected. Already in 2013 two roundtables were held in Zagreb for key stakeholders. Another two are planned for Zadar and Split at the end of 2013 and three more in 2014 (Zagreb, Rijeka and Osijek).

Public participation

A central element of the EPA and the 2008 Regulation on Information to and Participation of the Public in Environmental Matters is the obligation to inform the public and to ensure public participation in procedures of SEA of plans and programmes. According to the 2007 EPA, the period of time determined for informing the public shall not be shorter than 30 days. In the SEA procedure of plans and programmes, the public has the right to participate in the development of the strategic impact study determining its content and in the public debate on the strategic impact study and the draft proposal of the plan or programme, except in the case of the SEA of a physical plan, when public participation is regulated in accordance with the provisions of the legislation governing physical planning. Public examination has to last at least 30 days.

The implementation of the legislative provisions by the ministries and counties regarding public information and participation in the SEA procedures has been poor. To date, no debate report and no information about how opinions, proposals and objections submitted in the public debate were incorporated in the SEA, was published. There is also no centralised information platform on the on-going and completed SEA procedures at national and subnational levels.

1.4 Green Economy Initiatives

Policy frame

The 2011 Strategic Guidelines for Green Economic Development were developed for the purpose of sensitizing sectoral ministries with the new concept of green economy and informing about financial instruments for implementing green economy initiatives. They also include a set of action plans and strategic documents that are to be adopted by the ministries so as to create conditions for green economy. The regulated community and State-owned companies are invited to develop green economy action plans. However, the Guidelines are not suitable instruments to set deadlines, time lines or concrete goals. Moreover, the distribution of responsibilities in the Guidelines is partly outdated due to a reform of the ministerial competences after the parliamentary elections in 2011. Thus activities to promote green economy remain highly dispersed, while no institutional mechanisms for coordination and monitoring of green economy initiatives are in place.

Case analysis

Although Croatia lacks effective governance mechanisms for coordinated inter-sectoral activities and investment for green economy and a clear strategic action plan for greening of economy, a number of green economy initiatives have been started since 1999.

According to its annual financial reports to the Parliament, the Environmental Protection and Energy Efficiency Fund (EPEEF) since 2003 provided a range of loans, grants and subsidies to stimulate green initiatives. For example, in the period 2004-2010, a total of €3.2 million were disbursed to finance 78 projects in the sustainable building sector. All projects were related to the improvement of energy efficiency of buildings with regard to lighting and heating systems, energy efficient building envelopes and substitution of the primary energy source in boiler plants as well as optimization of combustion systems. Since 2006, EPEEF has also financed a system of separate collection and recycling of packaging waste. EPEEF collects its revenue from fees paid by producers/importers for bringing packaging into the market. These fees are used by EPEEF to recover (dispose only if recovery is not possible) waste collected through an authorized collector, who dispatches PET, aluminum and tin (Al/Fe) cans, and glass packaging to waste packaging management centers. This led to improvements in collection of packaging waste. More than 4,000 green jobs were created in the waste management system between 2006 and 2011, fuelling the interest of economic entities in establishing new recycling plants that created further jobs. In 2011, a budget of €17.66 million was previewed for projects and programmes on energy efficiency and renewable energy. They were inter alia used to finance the implementation of the 2010 National Energy Efficiency Programme for the period 2008-2010.

The 2007-2013 UNDP COAST project aimed at promoting conservation and sustainable use of biodiversity in the Dalmatian Coast represents one of the main flagship projects. The project initiated the Green Business Support Programme in 2008 so as to support small business that will preserve the natural wealth and biodiversity in Dalmatia and promote sustainable economic development of rural areas and creation of new jobs. Partners in direct support to green entrepren€s included four Dalmatian counties (Zadar, Šibenik-Knin, Split-Dalmatia, Dubrovnik-Neretva) and their development agencies, together with Splitska and Jadranska banks. The potential and importance of green business for rural development of Dalmatia was exhibited by 97 entrepren€ial projects in the total value of 169 million HRK. Since 2008, 300 projects from the territory of Dalmatia applied. Support within the Green Business Support Programme is targeted at: (i) direct loans via the loan-guarantee fund, (ii) financial and technical assistance in the implementation of green business project, and (iii) technical and financial assistance in the preparation of project proposals to be applied under other national and international support programs. In 2013, the UNDP published the publication “Nature and People Together, outlining 31 best cases of green entrepren€ship in rural areas of Dalmatia.

In 2010, the Croatian Business Council for Sustainable Development started the National Network for Developing Corporate Social Responsibility (CSR) Initiative together with its partner organizations: the Global Compact Croatia, the Croatian Chamber of Economy, the Croatian Employers' Association, the Croatian Trade Union Association and the Faculty of Economics and Business of the University of Zagreb. The initiative established a network to support business sector in setting CSR action and a web-based CSR database. It organizes the annual CSR Index Award and in 2012 it published a "Selection of Best Cases of CSR" outlining 20 best cases of CSR in Croatia. They inter alia include a partnership between Banco Popolare Croatia and Alliance for Energy Zagreb created in 2011 to place the biggest line of 'green credits' for small- and medium-sized enterprises and citizens so as to encourage energy efficiency improvements and use of renewable energy sources.

The domestic and foreign private capital plays an increasingly important role in promoting green economy and in particular in building, developing and transferring clean technologies. Green economy has been recognized as an important priority area for securing the EU funds and for triggering domestic and foreign investment in Croatia. This has also been reflected in documents such as the Environmental Operational Programme 2007-2013 to use the IPA that builds on previous investments and capacity building initiatives funded by earlier EU programme such as CARDS, ISPA and Phare.

1.5 Institutional Framework

Ministry of Environmental and Nature Protection

Since 1999, the national environmental authority for environmental protection and sustainable development has been subject to institutional restructuring. In 2000, its status has been upgraded from that of a State Directorate for the Protection of Nature and Environment to that of a Ministry of Environmental Protection and Physical Planning. This change resulted in extending its responsibilities to physical planning and inspections in the area of construction. After its restructuring into the Ministry of Environmental Protection, Physical Planning and Construction in 2003, nature protection was put under the competence of the Ministry of Culture. Following the division of the former into the Ministry of Environmental and Nature Protection and the Ministry of Physical Planning and Construction in 2011, the Ministry of Environmental and Nature Protection regained its responsibility for the nature protection. Currently, it is responsible for environmental protection and sustainable development, including inter alia nature protection, protection of environment components (air, flora and fauna, sea, soil and water) in the totality of their interaction and for monitoring of the status and preventing pollution of air, soil, marine environment and water.

The last restructuring of the Ministry in 2011 represents an important step towards reducing the fragmentation of responsibilities for environmental protection and sustainable development. However, it has also had negative effects with respect to administrative supervision. From 2000 until 2011, the Department for Complaints and Administrative Supervision within the Ministry of Environmental Protection and Physical Planning regularly controlled the quality of acts and decisions and their implementation at subnational level and proposed measures so as to prevent irregularities in terms of requirements of the national legislation. The Department thereby made regular spot checks in counties according to the annual plan of the Ministry. Since the splitting of the Ministry in 2011, this competence was transmitted to the Independent Service for Legal Affairs in the Ministry for Environmental and Nature Protection that currently has six employees. Due to low administrative capacity, the Service was not able to fulfill this responsibility anymore.

At present, the strategic management of the Ministry of Environmental and Nature Protection encompasses the Minister**,** the Deputy Minister and three assistant ministers heading the directorates for Inspection Affairs, for Nature Protection and for Environmental Protection and Sustainable Development. The Ministry also includes the General Secretariat, the Independent Services for Internal Audit, the Independent Service for Legal Affairs, and the Independent Sector for EU (Figure 1.3).

In order to adapt organization and operation of the Ministry of Environmental and Nature Protection to the enhanced scope of obligations pursuant to EPA and new EU requirements, the 2011 Regulation on its internal organization previews a staff increase amounting to a total of 336 employees. However, the efforts of the Ministry for Environmental and Nature Protection in respect to administrative capacity strengthening have been insufficient. From December 2012 until April 2013 the number of employees increased from 268 to 282 only.

The total number of employees was 54 employees less than planned. In particular, the Independent Sector for EU, the Directorate for Nature Protection and the Directorate for Inspection Affairs each lacked 12 employees.

Sectoral ministries

Despite substantial changes in the organizational structure and scope of work of the Ministry of Environmental and Nature Protection, responsibilities for environmental protection and sustainable development remain fragmented. Many parts of environmental and nature protection are under responsibility of other sectoral ministries and State institutions.

Activities related to regulation, inspection and appeal on water management are conducted by the Ministry of Agriculture. The Ministry has also the responsibility for protection of agricultural lands, animal waste management and forest conservation. A special role in water management rests with the National Water Council, a body appointed by the Parliament. It discusses legislation, financing system, the Water Management Master Plan and the needs arising in various areas of life in connection with the water system.

The Ministry of Health is competent for genetically modified organisms (GMO), noise protection, protection from the damaging effects of the poison, protection against non-ionizing radiation and public health. New departments for chemicals and biocides and for noise protection were created.

The Ministry of Maritime Affairs, Transport and Infrastructure has the competence for the protection of maritime pollution and protection of inland waters from pollution from ships. The Ministry of Economy is responsible for renewable energies and energy efficiency. The customs department of the Ministry of Finance controls illegal trade of protected species. It also controls transboundary movements of waste and notifies the environmental inspection if they notice something suspicious.

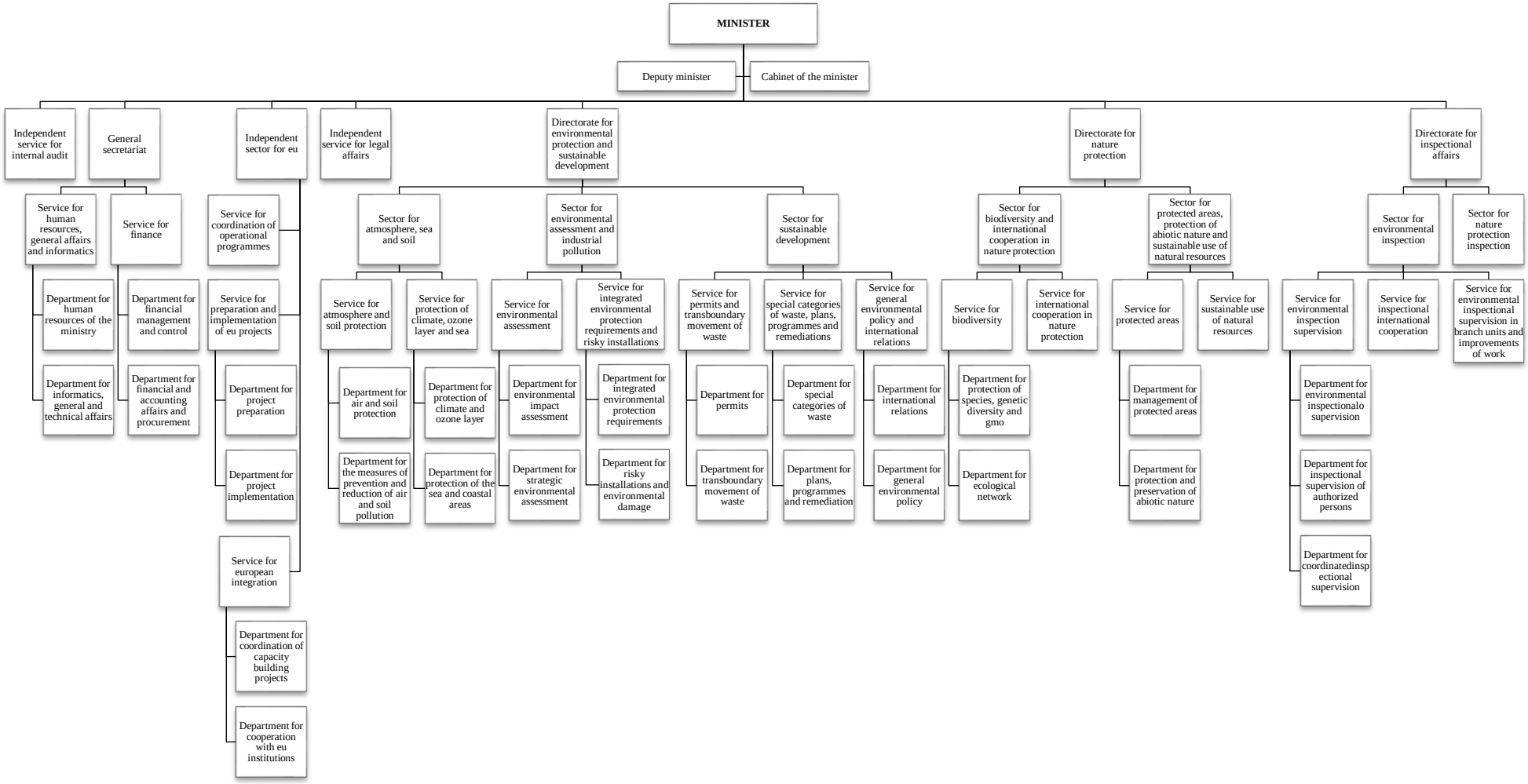
State administrative organizations

Three State administrative organizations representing a part of the State administration have an explicit responsibility for environmental protection. The Meteorological and Hydrological Service is the focal institution for climate and air quality monitoring. The State Office for Nuclear Safety has competence over radiological and nuclear safety. The National Protection and Rescue Directorate has responsibility for the protection of people, assets and environment in events of disasters, accidents and at extending or obtaining help from other countries in the emergency situations. Pursuant to the 2011 Act on Public Administration System, all three organizations are headed by a director that is appointed by the Government and is responsible to the Government as well as to the competent ministries.

Subordinated institutions

Public institutions, public-right organizations, and companies which perform public service, and whose major shareholders are the State, counties, towns/cities or municipalities represent another level of public administration. These organisations include expert and implementation agencies that were largely established pursuant to special acts and as such are independent. In their work they are largely linked either to specific ministries or to the Government. For example, CEA, EPEEF and the State Institute for Nature Protection work on programmes under the competence of the Ministry of Environmental and Nature Protection. The work of Croatian Waters is linked to programmes under the responsibility of the Water Management Directorate of the Ministry of Agriculture. The link to ministries consists in the fact that managing committees of these agencies include a representative of the respective ministry.

Figure 1.3: Structure of the Ministry of Environmental and Nature Protection



Source: Ministry of Environmental and Nature Protection, 2013.

The CEA established in 2002 by a decision of the Government is an independent public institution that has the obligation to analyze and interpret the environmental data collected and provide the information necessary to implement the environmental policy efficiently to the state administration, the Government and the Parliament. Pursuant to the EPA 2007, the Agency's scope of work includes developing, managing/operating, and coordinating a single Environmental Protection Information System (EPIS). The state-of-the-environment reporting represents another major task of the Agency. It includes preparation of the SoERs for Croatia, activities related to the National List of Indicators, preparation of topical reports on specific environmental components and international reporting activities. The CEA acts as the national focal point for collaboration with the European Environment Agency (EEA) and is included in the European Environment Information and Observation Network (EIONET). The activities that have greatly intensified in the last years are the international projects for the CEA capacity building and for strengthening environmental reporting.

EPEEF is an extra budgetary legal entity that was established in 2003 to ensure necessary additional funds for financing preparation, development and implementation of projects and programmes in the areas of environmental protection and management of certain types of waste, energy efficiency and use of renewable energy sources. Funds for financing these activities are secured from fees (Chapter 5).

The State Institute for Nature Protection (SINP) is a public institution established by virtue of a 2002 regulation of the Government and began its operations in September 2003. SINP carries out expert tasks of nature protection for Croatia in particular, tasks pertaining to: inventorying; monitoring and assessing the state of nature; developing and coordinating the nature protection information system; preparing expert base proposals for the protection of natural values, managing protected species, establishing the conditions for the use of natural resources; providing expert opinions in the appropriate assessment procedure; reporting on the state of nature; participating in the implementation of international agreements on nature protection, particularly preparing reports to the EU and acting as national expert authority (e.g., regarding implementation of CITES); organizing and implementing educational and promotional activities in nature protection; preparation and implementation of projects supported through international funding. SINP actively cooperates with State administration bodies, agencies, universities, non-governmental organizations, school and other interest groups.

Other public institutions

Pursuant to the Nature Protection Act, the Government established 8 public institutions in charge of national parks and 11 in charge of nature parks.

The Institute for Toxicology and Antidoping is a State institution subordinated to the Government and is responsible for education about the protection against dangerous chemicals, for keeping registers on toxins in production, import, export, use, marketing and retail trade, work on the prevention of chemical accidents, for care for accidents and elimination of their consequences, and for all other tasks with regard to preventing accidents involving chemicals and or mitigating their consequences. As such it inter alia serves as a technical body for the implementation of the Chemicals Act.

The responsibility for managing water and public water estate, and protective and hydro-ameliorative water structures rests with Croatian Waters. Croatian Waters is a public institution that performs water management activities as a public service and is part of the third level of public administration. It is run by the Management Board and the General Manager, both appointed by the Government. Croatian Waters provides expert, technical, economic, and legal assistance to municipal users in defining, preparing, and implementing projects of varying complexity.

Decentralisation

Since 1999, environment-related responsibilities of local self-governments (428 municipalities and 127 cities) and regional self-governments (20 counties and City of Zagreb) increased. Up to 2001, environmental protection at the county level fell within the scope of offices for physical planning, housing and municipal affairs, construction and environmental protection. From 2001 until 2008, the State administration offices in counties or their organizational units had the competence for environmental protection.

The 2007 Physical Planning and Building Act and EPA introduced significant changes with regard to distribution of competences and performance of activities on environmental protection between national and subnational level. Decentralization of administration has been implemented, including the transfer of competence for tasks of environmental protection from the State administration offices in the counties to organizational units in the counties. By 31 March 2008, all counties and major cities established organizational units responsible for environmental protection. All employees from State offices working on environmental protection tasks have been allocated to these organizational units.

Organizational units for environmental protection are currently thus responsible for development of physical planning documents and monitoring of the implementation of physical planning documents in the part related to environmental protection, development of environmental reports and programmes, development of environmental protection programmes and of environmental protection project proposals, for keeping of the pollution register, issuance of location permits, for carrying out EIAs for projects of county and local significance as well as SEAs for relevant plans and programmes. Their competences also include the issuance of non-hazardous waste management permits, keeping of the waste cadastre and waste management plans and issuance of nature protection requirements.

While delegation of additional tasks to municipalities and towns was considered as an option in course of the drafting the 2007 EPA, this did not happen. Municipalities and major cities thus carry out environmental protection tasks that are of interest to them. In particular, they cooperate with the counties on implementation of joint objectives as set out in the strategic county documents. Municipalities and major cities however do not engage in the preparation of pollution registers and EIA and SEA.

The enhanced responsibilities of the counties due to decentralization process pursuant to the EPA 2007 created a severe need for strengthening the administrative capacities at the regional level. While the number of staff increased since 2007, the goal of recruiting a minimum of five employees per county in the organizational units in the counties was largely not achieved. The capacity building measures set at the subnational level such as twinning projects and trainings (e.g. SEA trainings) were important but not sufficient to ensure a systematic and coordinated implementation of environmental legislation and policies.

Regional and local self-governments established 20 public institutions that are responsible for the management of protected areas and/or other protected values at regional level and 6 at the local level. These public institutions are managed by administrative councils.

Cooperation with major groups

Since 1999, Croatia experienced an upward trend in terms of institutions, organizations and other legal persons dealing with activities in environmental domains such as measuring, processing of data and information, analysis and training. The interest of legal and natural persons to become authorized persons for performing professional environmental protection activities such as the activities related to SEA, EIA or IPPC has been high.

Officially, the number of non-governmental non-profit associations dealing with environmental protection has been continuously rising since 1999, amounting to 873 non-governmental organizations (NGOs) in April 2013. While the number of these NGOs increased by 40 per cent in the period 2005-2008, it has grown by further 50 per cent in the period 2008-2013 (Table 1.1.). However, only few NGOs play an active role in the policymaking processes at national, regional and local level. This has inter alia been the case due to lacking institutional mechanisms for public participation, lacking funding and lacking capacities and professionalism of NGOs.

Table 1.1: Environmental NGOs

NGO	2005	2008	avr-13
Nature protection	278	363	475
Oher areas of environmental protection	140	220	398
Total	418	583	873

Source: Ministry of Public Administration, 2013.

While the public information and participation in environmental matters improved in legal terms, the progress on ground has been slow. The activity of the majority of NGOs has been largely limited to promotional and awareness raising activities. Only some government organized NGOs such as Green Action and some social partners such as the Croatian Chamber of Economy and the Business Council for Sustainable Development have been actively involved in the interministerial working groups. Their involvement thus largely took place on an ad-hoc basis.

Since 1999, social partners play an increasingly important role in mainstreaming economic and social concerns into environmental and sustainability legislation and policies. For example, the Croatian Chamber of Economy, an independent professional and business organization of all legal entities engaging in business, has for example been actively involved in several ad hoc working groups of the Ministry of Environmental and Nature Protection such as the APSCP and the LEDS working group. The Croatian Business Council for Sustainable Development is represented in the Economic Council of the President of Croatia. The Croatian Employers Association, a voluntary, non-profitable independent employers' association is appointed as the only employers' representative in the National Economic and Social Council. It is inter alia influencing the creation of economic policy and is also a social partner in the tripartite dialogue with trade unions and Government representatives. Its activities inter alia focus on lobbying with national and local Government institutions and EU institutions for employers' interests in passing and/or amending legislation and regulations on environmental protection.

Horizontal coordination

The horizontal coordination of environmental protection legislation and strategic documents at national level largely takes place in the frame of working groups, commissions and workshops that are responsible for the technical work. They are established by the ministries on an ad-hoc basis for a clearly defined task such as the Commission for intersectoral coordination of State administration bodies for policies and measures for climate change mitigation and adaptation and the working group for development of action plan to implement the IPPC obligations. The composition of these bodies is usually determined by competent ministers. As there is no formal unified practice in terms of involving relevant stakeholders in the coordinating bodies, there are significant differences in terms of the range and level of stakeholders as well as the intensity, time and length of their involvement.

The Government has created several permanent advisory bodies for the purpose of the horizontal multi-stakeholder coordination that comprise high-level representatives. However, their activity has been weak to non-existent. For example, the Council for Environmental Protection established in 2001 was replaced by the Sustainable Development and Environmental Protection Council in 2009 that is to provide opinions on proposals of documents to be adopted by the Government or the Parliament, on the level of harmonization in resolving issues related to environmental protection, economic development, climate change and protection of the ozone layer, and to perform tasks entrusted to it by the Government and the Minister of Environmental and Nature Protection. The first meeting of the Council took place in 2012, when the Minister of Environmental and Nature Protection appointed a new Council encompassing nine members including one representative of the Ministry and members from a range of relevant institutions and civil society organizations. The Council had four meetings since its establishment, the last one in June 2013, when the Council gave its comments to the draft new Sustainable Waste Management Act.

The activities of the National Committee for the Development and Implementation of the Strategy for Sustainable Development established in 2003 were virtually non-existent. The main task of this permanent body is to create conditions to include environmental protection issues in the sectoral policies and to strengthen interministerial coordination. It consists of high-ranking Government officials from various sectors, including ministers and representatives of all ministries relevant to environmental protection as well as representatives of NGO sector.

In order to establish a horizontal coordination platform for development and implementation of the Marine Strategy according to the Regulation OG 136/11, in 2012 the Government enacted a decision on the appointment of the Expert National Committee for the implementation of the tasks laid down by the Regulation and for the development and implementation of the Marine Strategy (OG 117/12). The Expert National Committee includes appointed representatives of scientific and expert institutions as well as representatives of

the Ministry of Environmental and Nature Protection and other competent bodies identified under the Regulation. The idea to link Marine Strategy with ICZM Strategy in one single document (Coastal and Marine Management Strategy), as reflected in the new 2013 EPA, induced the procedure of enlargement of the Expert National Committee with the members of ICZM Coordination group established in 2009. Representatives of coastal counties as stakeholders are also invited to actively participate in the Committee´s work in the form of a working group since the area of the coastal counties is the area where the future Strategy will be implemented. The Extended National Committee is thus expected to present an institutional coordination platform for elaboration and implementation of the Coastal and Marine Management Strategy, as well as to contribute to the overall improvement of the existing coordination mechanisms for marine environment and coastal area protection and management on the national and regional level. So far in 2011 the National Committee adopted the first document of the Marine Strategy - Initial assessment of the state and pressure on the marine environment in the Croatian part of the Adriatic Sea.

The Environmental and Nature Protection Forum established by the Minister of Environmental and Nature Protection in 2012 has to date remained non-active. It was established for the purpose of giving suggestions and opinions on policy guidelines related to environmental and nature protection, prior to the adoption of regulations and making strategic decisions in the respective areas. The Forum includes 12 members including representatives of economic sectors, local and regional self-governments, professional institutions and NGOs.

The sectoral ministries largely failed to establish units for environmental protection or determine responsible coordinators for environmental protection and sustainable development that are responsible for collaboration with the Ministry of Environmental and Nature Protection as this was previewed in the 2002 NEPP. However, horizontal coordination is established in practice through a number of ad hock working groups appointed for different environmental themes on regular basis. Members of the working groups are appointed from relevant governmental bodies, business and civil sector, institutes and agencies.

At the county level, the horizontal coordination of policies typically takes place in the frame of weekly interdepartmental meetings between the organizational units for environment protection and other units of the county. There are no institutional mechanisms in place to ensure coordinated elaboration and implementation of the EPPs between counties and major cities. The cooperation among counties and large major cities largely takes place on ad hoc basis at the level of heads of organizational units for environmental protection.

The Croatian Association of Counties was established in 2001 to strengthen cooperation between counties. However, the Association, now encompassing all counties except the City of Zagreb, has not played an active role in terms of horizontal coordination of development and implementation of the EPPs and it has not been present at workshops and commissions created at national level to develop strategic documents. The Association of Towns, now including 102 members, was created in 2002 to improve cooperation at the local level and promote common interests of towns. However, also its role in the development and implementation of the environment protection was minimal.

Vertical coordination

The level and intensity of involvement of counties, major cities and municipalities in development and implementation of legislative and strategic documents at national level differs across different areas of environmental protection. In some cases, single counties and major cities were invited to take part in the working groups created by the ministries to develop strategic and legislative documents. However, too often counties have the opportunity to express their views on environmental legislation and policies only within the public consultations. Consequently, counties are often confronted with legal obligations in the field of environmental protection that were developed without their involvement or input. City of Zagreb and Zagreb County for example were invited by the Ministry of Environmental and Nature Protection to take part in the working group to amend the Waste Act in 2011. However, they were not invited to the meetings any more thus having no influence on the finalization of the Waste Act, although it includes a range of obligations for the counties.

Counties, municipalities and towns can adopt their EPPs only upon prior approval by the Ministry of Environmental and Nature Protection that checks the conformity of the EPPs with the NEPP. However, the Ministry of Environmental and Nature Protection is not actively involved in the elaboration and implementation

process of the EPPs. Also the coordination of environmental and sustainability policies between counties and municipalities/towns largely takes place on an ad hoc basis.

1.6 Conclusions and Recommendations

Croatia has significantly strengthened the environmental legislation and the policy frame for environmental protection and sustainable development since 1999. This has particularly been the case in the area of air quality, nature protection, climate change, water management and waste management. The public participation and information in environmental matters have been improved significantly in legal terms.

However, the environmental legislative and policy frame is highly fragmented and insufficiently harmonized with the sectoral legislation and policies. The mainstreaming of environmental concerns into sectoral legislation and policies has been largely the case at the conceptual level, while no such integration can be seen at the implementation level. The implementation gap continues to represent a major challenge. This is inter alia linked to three factors: i) insufficient formal institutional mechanisms for horizontal and vertical regulatory and policy coordination in particular at high administrative and governmental level combined with high fragmentation of responsibilities for environmental protection and sustainable development, ii) insufficient allocations from the State budget and investments in areas such as waste and water management, air quality, Adriatic and biodiversity protection and iii) lacking administrative capacity in particular at regional and local levels due to decentralization of public administration and growing EU requirements.

Recommendation 1.1
The Government should strengthen institutional mechanisms for horizontal and vertical coordination of legislation and policies on environmental protection and sustainable development, in particular by:

(a) Activating the existing coordination bodies, such as the Environmental Protection and Sustainable Development Council, the National Committee for the Development and Implementation of the Strategy for Sustainable Development and the Environmental and Nature Protection Forum;

(b) Designating the Ministry of Environmental and Nature Protection as the coordinating body on environmental issues among the relevant sectoral ministries;

Recommendation 1.1 (bis)
The Ministry of Environmental and Nature Protection should designate a unit responsible for facilitating coordination and cooperation with and among the country's counties in developing and implementing subnational environmental legislation and policies, such as the environmental protection plans.

Recommendation 1.2
The Government should strengthen the environmental protection and sustainable development capacities of public institutions at the national, regional and local levels, in particular by:

(a) Fulfilling the obligation to increase to an adequate level the number of employees in the Ministry of Environmental and Nature Protection to cover the increased responsibility of the Ministry;

(b) Continuing to strengthen the environmental training programme for civil servants, including the development of supporting tools, such as guidelines and handbooks, to ensure the systematic and high-quality fulfilment of the enhanced responsibilities of various public authorities for environmental protection.

While Croatia in 2008 established a legal framework for exercising SEA, its implementation on the ground has been poor inter alia due to the weak role of the Ministry of Environmental and Nature Protection in the whole SEA procedure in particular at the regional level, weak methodological frame of the SEA, insufficient capacity building measures for SEA and narrow scope of the SEA.

Recommendation 1.3
Based on the 2013 Act on Environmental Protection, the Government should promote strategic environmental assessment (SEA) implementation by:

(a) Extending the scope of SEA to all strategic documents;

(b) Increasing the role of the Ministry of Environmental and Nature Protection by making its approval of the whole SEA procedure and its membership in the regional SEA committees mandatory.

Recommendation 1.4

The Ministry of Environmental and Nature Protection, in cooperation with other competent authorities, should establish a quality assurance mechanism ensuring the effective implementation of SEA obligations at the national and local levels and the provision of support for those carrying out SEAs.

While the private and public sector in Croatia are increasingly committed to promoting green economy, Croatia lacks a formal strategic policy frame, establishing strong governance mechanisms for intersectoral, multi-actor, multilevel coordination of green initiatives and for ensuring a strong public-private partnership with a common agenda for green economy.

Recommendation 1.5

The Government should strengthen its development policy, investments and expenditures towards green economy by developing, coordinating and monitoring the implementation of a strategic action plan for green economy that:

(a) Formalizes responsibilities for promoting green economy;

(b) Establishes institutional mechanisms at the political and technical levels for intersectoral coordination of green initiatives;

(c) Sets priorities and measures for the systematic and integrated use of European Union (EU) structural funds, national funds and earmarked financial sources, and for triggering domestic and foreign private investment;

(d) Sets deadlines, timelines and concrete goals for implementation and monitoring mechanisms.

CHAPTER 2

COMPLIANCE AND ENFORCEMENT MECHANISMS

2.1 Main developments since 1999

There are many positive developments in Croatia since 1999. Permitting and environmental impact assessment (EIA) procedures were amended to make them more transparent, coordination of inspection activities improved and risk-based planning approaches were adopted, and the deterrent effect of criminal enforcement was increased. At the same time, the compliance assurance system is very much skewed towards punitive approaches, with compliance promotion being at an early stage. Judicial enforcement, which is used in Croatia more extensively than in other countries, is often slow thus insufficiently effective. Fines (a preponderant non-compliance response instrument) are high but do not have sufficient economic underpinning. In relation to small and medium-sized enterprises, compliance assurance strategies are not yet adequately aligned to the country's regulatory regime that widely employs general binding rules to reduce administrative burden on the regulated community. Compliance with EU legislation will require additional capacity development among regulators and the regulated community alike.

Croatia enters the European Union at a moment when focus on implementation is increasingly strong though, at the same time, the costs of environmental compliance come more and more under the spotlight because of the economic challenges faced by the enterprise sector. This combination of circumstances requires public authorities to put in place compliance assurance strategies that would undergo the feasibility test and would be based on a full understanding and acceptance of regulatory goals and needs by the regulated community.

2.2 Institutional framework for compliance assurance

Croatia has a tradition of centralized governance on environmental regulation and compliance assurance, with regional self-governing units (counties) having a role only in EIA and non-hazardous waste permitting. Institutional arrangements for environmental compliance assurance are shared between the Ministry of Environmental and Nature Protection, the Ministry of Agriculture, the Sanitary Inspection of the Ministry of Health, the Ministry of the Interior, the Ministry of Maritime Affairs, Transport and Infrastructure, the State Inspectorate, the Croatian Environment Agency (CEA), and the National Protection and Rescue Directorate. Most of the central-level agencies have sub-units at the local level.

Ministry of Environmental and Nature Protection

The Ministry of Environmental and Nature Protection's mandate covers industrial pollution, air quality, waste, light pollution, protection and management of sea and coastal area, including sea bathing and water quality, and nature protection. It deals with strategic and project-level environmental assessments, integrated and hazardous waste permitting, inspection and administrative compliance assurance.

The Ministry is the competent authority responsible for EIA and permitting of large industrial plants, as well as coordination with authorities responsible for other types of permits. These functions within the Ministry are performed by the Sector for Environmental Assessment and Industrial Pollution, which is part of the Directorate for Environmental Protection and Sustainable Development.

Environmental inspection and administrative enforcement functions are delegated to the Ministry of Environmental and Nature Protection's Directorate for Inspection Affairs (DIA) that has two sectors: (i) the sector for environmental inspection (SEI) and (ii) the sector for nature protection inspection (SNPI). The SEI performs inspection of legal and natural persons regarding the implementation of the Environment Protection Act (EPA), the Air Protection Act, the Act on Protection against Light Pollution, and the Waste Act and the related secondary legislation. Among others, the scope of SEI work includes issues related to the quality of bathing water at beaches, the transboundary movement of waste and hazardous waste, petroleum-derived liquid fuels, the handling of substances that deplete the ozone layer, and the implementation of ratified international

agreements. The SNPI performs inspections of protected areas, supervises the implementation of protection of strictly protected and protected animal and plant species and use of natural assets. Additionally, in cooperation with other competent services, SNPI performs inspections related to transboundary trade of protected and other wild species for which a permit is required. Together with the Sanitary Inspection and the Agricultural Inspection, SNPI performs supervision under the Act on Genetically Modified Organisms (GMO).

DIA has a coordinating role on compliance assurance in the environmental sector and cooperates with other relevant inspectorates and government bodies when planning and managing control activities, emergency situations, and data exchange. The cooperation and horizontal coordinating role of DIA in supervising all environment components is laid down in the Agreement on Cooperation between Inspection Services in the Field of Environment signed on 2007 and regularly updated since. It was further confirmed by the Agreement on Cooperation between the Ministry of Environmental and Nature Protection and the National Protection and Rescue Directorate signed in January 2013; an earlier agreement with the Ministry of Defense exists on joint thematic control activities at military sites. DIA also acts upon applications and complaints of citizens and on request of other competent bodies.

In the period 2004-2012, which coincided with an active development of environmental legislation and institutions, the field of nature protection (including the nature protection inspection) had been in the custody of the Ministry of Culture. This resulted in lower access to capacity building offered within EU accession process, poorer endowment with equipment, and uncoordinated development of data management systems. This institutional separation also had repercussions in terms of access to international networking and information flows. Since 2012, nature protection has been integrated into the national environmental authority.

DIA's facilities and equipment are relatively modern and it has sufficient operational budget. Staff turnover is relatively low. The number of personnel in DIA increased over the last years. Continuous recruitment of new environmental inspectors in DIA was the main characteristic of the last decade. Between 2000 and 2012 the number of environmental inspectors steadily increased from 28 to 79. In 2012, DIA was joined by 16 nature protection inspectors. The SEI has offices in practically all administrative units of the country, clustered in 5 branch units following a regional pattern. By February 2013, 56 inspectors were based in branch units while 23 inspectors worked in the central office in Zagreb. The system is centralized; all inspectors have the status of civil servants and are involved in activities of similar scale. The SNPI has a limited number of staff split between the central office in Zagreb (7) and external offices (9). While performing inspections of protected areas the nature protection inspectors can be supported by some 160 supervisors and rangers working at the natural protected areas, with the notable remark that inspectors' jurisdiction spread over the entire country while rangers are confined to exert their powers within their protected areas.

Financial resources for the work of the environmental inspection are allocated from the State budget.

Ministry of Agriculture

Water and forest management have traditionally been handled independently from environment. The Ministry of Agriculture is responsible for policy development and compliance assurance in both areas, while management functions are delegated to State-owned companies Croatian Waters and Croatian Forests, which are subordinated to the Ministry. In both areas, the division of policy, economic use, and compliance assurance functions is not very clear.

The State Management Directorate at the Ministry is responsible for issues related to integrated management of water resources. Its Sector for State Water Inspection, Administrative Supervision and Appeals Procedure is responsible for supervision of implementation of the requirements set by the 2009 Water Act (OG 153/09, OG 130/11, 130/11 and 56/13) and the 2009 Act on Water Management Financing (OG 153/09, 90/11, included in new Water Act 56/13), as well as complementary regulations and planning documents, including control of payment of water fee sand water concession fees. Also, it participates in coordinated inspection supervisions with other related inspections.

Water inspection is carried out by 36 civil servants. The 700 people strong water agency Croatian Waters is responsible, inter alia, for issuing water permits and conducting monitoring of water quality while the implementation of the requirements established through water permits is checked by the above-mentioned

Sector. At the same time, Croatian Waters has prerogatives for supervision of the implementation of conditions from water rights documents ("water supervision").

The Directorate for Forestry, Hunting and Wood Industry includes the Sector of Forest and Hunting Inspection that supervises the implementation of forest legislation, notably the Forest Act (OG 140/05, 82/06, 129/08, 80/10, 124/10, 25/12 and 68/12). This function is carried out by 28 forest inspectors. On illegal transport of wood, they undertake joint actions with the police given that only road police can stop cars, while forest inspectors have the mandate to follow with actions in justice when illegal wood transport is discovered. Croatian Forests is primarily responsible for the management of State forests and forest land, although, since 2011 private forests can also be managed by the agency. It has the obligation to ensure the protection of State forests against illegal appropriation or use. Rangers employed by the agency have the right to ask for person's identification, to search the person, its luggage and means of transport, and to remove the unlawfully seized forest products and means with which the illegal seizure was performed. They cooperate with forest inspectors on resolving the bigger cases of illegal poaching.

Regional and local self-governments

The local and regional self-governments do not have control functions because the environmental protection inspection is organized only at the central level. The regional administration issues permits for non-hazardous industrial waste management, while municipal waste is under the jurisdiction of local level government (municipalities and towns). The regional self-government has to establish a register of emissions of pollutants into air, water and soil, as well of generation and transfer of waste. In terms of regulation, local self-governments may determine stricter tolerance values for air quality than those stipulated at the national level. In fact, the municipalities can order the application of special measures if alert thresholds are established.

The regional self-government administration is the competent body in the EIA procedure; the municipalities are consulted (and are influential in the final decision) but do not have statutory powers. They organize the public debate/hearing on EIA. The local and regional self-government authorities can establish public institutions for the management of protected areas at their level. Currently, there are 20 public institutions for the management of protected areas at the regional self-government level and 6 such institutions at the local self-government level.

Cooperation between SEI and the local and regional self-government bodies competent for environmental protection is in particular realized through preparation of documents containing measures for air pollution prevention, waste management and with regard to obligations to submit environmental data (counties are checking/validating PRTR data in cooperation with inspectors).

Investigation and enforcement authorities

The police have an important role in the detection of offences against the environment, both through their presence on the field, as well as the body to which citizens most often report a violation of regulations, including environmental offences. They should inform line ministries so that these line ministries can proceed with appropriate steps under the applicable legislation, including misdemeanour provisions. Furthermore they should provide assistance to inspectors in case of resistance against inspector´s activities and measures. Each county police department has at least one police officer who participated in a training programme on crimes against the environment in the training programme developed during implementation of IPA 2008 Twinning project "Enforcement of the new Environmental Protection Act harmonized with EU legislation in cases of criminal offences against the environment" in SEI.

The water inspection is mentioning an increase in the number of cases of criminal prosecution, often discovered/initiated by the police (like limited fish kills, for example). The number of joint actions with the criminal police is also on the rise, e.g. on gravel extraction cases.

2.3 Legal framework

EIA matters are regulated by the 2007 Environmental Protection Act (OG 110/07), the 2008 Regulation on environmental impact assessment (OG 64/08) and the 2008 Regulation on information and participation of the

public and public concerned in environmental protection issues (OG 64/08). The 2008 EIA Regulation includes criteria on the EIA scope, with a list of projects for which EIA is mandatory (Annex I), a list of projects subject to evaluation of the need for EIA under the competence of the Ministry of Environmental and Nature Protection (Annex II), and a list of projects subject to evaluation of the need for EIA under the competence of the administrative body in the county or City of Zagreb (Annex III).

The 2007 Environmental Protection Act (OG 110/07), the 2008 EIA Regulation (OG 64/08) and the 2008 Regulation on the procedure for establishing integrated environmental protection requirements (OG 114/08) transpose the IPPC Directive 2008/1/EC. According to this legislation the integrated environmental protection requirements are determined for new installations, and in case of reconstruction existing installations, and for existing installations that fall under activities laid down in Annex I of the Regulation on the procedure for establishing integrated environmental protection requirements.

Environmental inspection in Croatia is mainly regulated by:

- General Administrative Procedures Act (OG 47/09);
- Environmental Protection Act (OG 80/113);
- Air Protection Act (130/11) and Act on Sustainable Waste Management (OG 94/13);
- Ordinance on Responsibilities of the Inspectorate of the former Ministry of Environmental Protection, Physical Planning and Construction(OG 12/09);

The General Administrative Procedures Act describes the inspection procedures, for example the obligation of inspectors to prepare inspection reports, which have to be signed by the inspected entity. The Environmental Protection Act's Articles 180-214 deal with a broad range of compliance assurance powers, enacting the use of coordinated site visits and enabling partners from other ministries to access sites and take action following coordinated inspections. The Act on Sustainable Waste Management (Articles 141-166) and the Air Protection Act (Articles 125-144) also provide guidance on inspection criteria and procedures.

Many of the key elements of the *acquis* (such as water and waste management and industrial regulation) were reflected in the Croatian law well before the accession process started. At the same time, Croatian industry will need significant investments to comply with the EU environmental *acquis*. For instance, many of the 35 operating large combustion plants (LCPs) are not in compliance with the emission limit values (ELVs) prescribed by the LCP directive. Only one LCP, Plomin II, constructed in 1999, uses modern technology to minimize air emissions and meets the prescribed ELVs. Of the 35 LCPs, eleven have been given an extension to January 1, 2018, to reduce their emissions. The estimated cost to comply with the LCP directive is €2 billion. To comply with the IPPC Directive, transitional periods were granted to 67 installations until January 1, 2018. Emissions of volatile organic compounds need to be reduced by January 1, 2016 for a selected list of sites, with several intermediate deadlines. In order to facilitate the financial costs of reaching compliance with the IPPC requirements, an agreement with the Ministry of Economy and the Croatian Bank for Reconstruction and Development was reached, facilitating favourable loans to IPPC installations for that purpose.

Ambient quality standards

Ambient environmental quality standards for air, surface water, groundwater and sea water, together with related monitoring provisions, have been established in a range of regulations. Most have been adopted or revised in the context of harmonization with the EU regulatory framework.

On air quality, the Regulation on levels of pollutants in ambient air (OG 117/12) and the Ordinance on monitoring air quality (OG 3/13) have been prepared in the wake of the 2011 Air Protection Act, which incorporated the provisions of the new acquis on ambient air quality and cleaner air for €ope. Measures are being taken to gradually reduce pollution, along the limit values for certain pollutants set by the *acquis*. The air in Croatia is mostly clean or slightly polluted while in some urban areas the air is of moderate and excessive pollution. Implemented measures contributed to significant improvement of the air quality, for example, the town of Sisak and Rijeka.

The Regulation of water quality standards (OG 73/13) prescribes standards for surface water, coastal waters, territorial seawaters and groundwater while transposing the Directive on environmental quality standards on

water policy 2008/105/EC. Other important implementation acts related to ambient water quality objectives are the Decision on designation of sensitive areas (OG 81/10), the Decision on the designation of vulnerable areas (OG 130/12), the Decision on designating waters which support freshwater fish life (OG 33/11) and the Decision on designating waters which support shellfish life and growth (OG 78/11).

Inland waters are classified into one of five quality classes in relation to the allowed limit values of indicators, according to the 2008 Regulation on Water Classification (OG 137/08). The quality of rivers and lakes remained acceptable at most locations, with a decreasing trend of organic pollution as a result of construction of sewerage systems and commissioning of new urban wastewater treatment plants.

Croatia started implementing the Bathing Water Directive 2006/7/EC from the date of accession. Bathing water quality monitoring is carried out under the Regulation on coastal bathing water quality (OG 73/08) and the Regulation on bathing water quality (OG 51/10). The responsibilities for water and marine environment management are shared. The Ministry of Environmental and Nature Protection is responsible for implementing the Regulation on coastal bathing water quality (OG 73/08), while the Ministry of Agriculture implements the Regulation on bathing water quality (OG 51/10). During the 2012 bathing season, 96 per cent of coastal bathing waters in Croatia (out of 912 monitored sites) were of excellent quality, that placing the country among five leading countries in the EU in this respect. Respecting the transposed obligations from Marine Strategy Framework Directive 2008/56/EC Croatia adopted the obligation to develop additional criteria and standards related to marine environment in the framework of Marine and Coastal Management Strategy documents.

Emission standards

The efficient protection of the environment requires the application of ambient (air and water) quality standards as well as emission/effluent limit values, in a so-called "combined approach". The impact assessment of a project on the status of water is identified by combining assessment of the impact of the project on the status of water bodies, which are under its impact by applying the water quality standards and effluent quality standards. If the status of a water body receiving wastewater requires more stringent restriction of emissions from the project into water, then those restrictions must be applied.

The 2012 Regulation on limit values for pollutant emissions from stationary sources into the air (OG 117/12) as well as the previous 2007 Regulation (OG 21/07) defined specific environmental norms for different sectors. Those sectoral standards were aligned with relevant EC Directives and Multilateral Environmental Agreements to which Croatia is a Party.

The 2012 Regulation was further aligned with the new Directive 2010/75/EU on industrial emissions (integrated pollution prevention and control). It introduced stricter general ELVs for powdery substances to reflect the new EU and/or international requirements for particulate matter in the ambient air, as well as new ELVs for new and existing combustion plants and gas turbines, internal combustion engines, and waste incineration and waste co-incineration plants.

The Ordinance on emission limit values of wastewater discharges (OG 87/13) sets specific limited values for the wastewater discharges from industrial sector.

Product standards

The national specifications of the marketable conventional and alternative fuel products are those of the EU. The Regulation on the quality of petroleum-derived liquid fuels (OG 113/13) transposed the Fuel Quality Directive 98/70/EC relating to petrol and diesel fuels as well as the Sulphur in Fuels Directive 1999/32/EC relating to heavy fuel oil and gas oil quality. Since 2006, only lead-free petrol has been marketed in Croatia. According to the amendments to the Regulation since 1 January 2012, petrol with €O5 standards has been marketed in Croatia.

The 2013 Regulation on the quality of petroleum-derived liquid fuels (OG 113/13) transposed the new elements of the petrol, diesel and gas-oil specifications from the Directive 2009/30/EC amending the Directive 98/70/EC bringing the maximum allowable sulphur content of both petrol and diesel to 10 ppm according to EU

standards. The Regulation on the quality of petroleum-derived liquid fuels prescribed the quality of the fuel oil and marine fuel is according to the EU standards since 1 January 2013.

The 2011 Regulation on the quality of biofuels (OG 33/11) laid down the limit values for the quality features of biofuels placed on the domestic market. Annual programmes for monitoring the quality of liquid oil fuels are set.

The 2013 Regulation on limit values for volatile organic compound content of certain paints and varnishes used in construction and vehicle refinishing products (OG 69/13) transposed the EU acquis in this field. Croatia has also enacted implementing legislation relating to technical standards for the reduction of emissions of VOC from petrol stations, notably the 2006 Regulation on technical standards of environmental protection from volatile organic compound emissions by storage of petrol and its distribution (OG 135/06) and the 2011 Regulation on environmental technical standards for reduction of volatile organic compounds emissions during refueling of motor vehicles at petrol stations (OG 5/11).

In the field of construction, under the 2010 Physical Planning and Construction Act, energy performance certification of buildings has become mandatory. Croatia harmonized its Technical requirements for thermal energy saving and thermal insulation in buildings (OG 74/06) and the Technical requirements for rational use of energy and thermal insulation in buildings (OG 89/09) with the respective EU construction product requirements.

Energy efficiency standards for household electrical appliances are implemented through different regulations, e.g. Ordinance on energy efficiency requirements for household electric refrigerators, freezers and combined appliances, and the 2007 Ordinance on energy efficiency labeling of household appliances (OG 130/07).

2.4 Regulated community

Identification of the regulated community in Croatia is based on the requirement that all natural and legal persons engaged in business activity settled on Croatian territory, must become a member of the Croatian Chamber of Economy (CEE) by entry in the court registry. Currently, there are 93,063 entities registered at CEE. Their classification follows the National Classification of Economic Activities (NCEA). Main NCEA groups that are relevant for environmental protection include: agriculture, forestry and fishing (1,610 entities), mining and quarrying (245 entities), manufacturing / industrial installations (11,049 entities), energy production (216 entities), water supply, wastewater (about 160 water utility companies in ownership of local or regional self-governments are responsible for public water supply and wastewater systems including wastewater treatments) and waste management (562 entities), construction (12,565 entities), handcrafts (27,848 entities), transport and storage (3,299 entities), tourism (4,914 entities), and health and social activities (805 entities).

Besides the CEE registry, there are more specialized sources of information about the regulated community, of which the Emission Pollution Register (i.e. the national Pollutant Release and Transfer Register) has the central role. Entities that generate more than 50 kg of hazardous waste or 2,000 kg of non-hazardous waste per year have to submit data for inclusion in this register, with some 3000 entities already providing such data regularly. The register is maintained by the Croatian Environmental Agency, which shares this information with the Directorate for Inspection Affairs. The Ministry of Environmental and Nature Protection has a repository of IPPC permits thus data on large industry is mostly received by inspectors from the Ministry. Other sources of information on the regulated community include databases on major sources of volatile organic compounds or sources handling ozone-depleting substances. Thematic inspection campaigns are used to identify and profile installations performing similar activities and not regulated by IPPC and EIA.

The number of large installations in Croatia seems to be relatively limited. Information on such installations is imprecise, with the lists of such installations not being publicly available. The number of IPPC installations is not officially published and different sources present different data – generally between some 200 and 270 installations. This gives the impression that the identification of the IPPC installations is still an issue. Some of the middle size companies have difficulties in finding out whether they are subjects of IPPC requirements. Some companies argued that they should be excluded because of decreased capacity of production but the respective procedure is long. Most of the IPPC installations need transitional periods for compliance. Large poultry and pig farms constitute more than one quarter of all IPPC installations. There are 45 SEVESO

installations in total, including 11 upper tier and 34 lower tier. Thirty five large combustion plants exist. Finally, there are 146 active landfills in Croatia: a significant part of them are to be regulated under the IPPC Directive. Waste is also being incinerated at one incineration and 22 co-incineration plants.

2.5 Environmental assessment tools and permitting

Environmental impact assessment

EIA has been mandatory since 1984 for individual projects that may have significant effects on the environment by their nature, size or location. The EIA procedure is applied systematically, including in a transboundary context. It proceeds in several phases that include consultations with relevant authorities and the general public. The public can be involved in the screening and scoping phases, and a public hearing of each EIA report is mandatory. The public consultation element of the EIA procedure was strengthened since 1999.

The transposition of the relevant EU legislation resulted in a further elaboration of the EIA procedure and enlarged scope of assessments. The EIA Directive was transposed in the 2007 Environment Protection Act.
The EIA procedure is implemented at the early stage of project planning or, at the latest, prior to issuing the location permit or other approvals for project implementation. EIAs result in a formal decision by the competent authority – the Ministry of Environmental and Nature Protection – on the environmental acceptability of the project. This administrative document must contain the environmental protection measures and the environmental monitoring programme set during the EIA procedure. At a later stage, these requirements become an integral part of the project implementation permits (e.g. location and building permit) and are integrated into the project's technical documentation.

While EIA legislation normally calls for analysis of alternatives, in the Croatian legal system such "alternatives" refer mostly to examining various technologies for the proposed activity and hardly include siting alternatives. As a result, no clear requirements of EIA exist for siting waste management facilities. More generally, it is common practice to use EIA only *after* the site is selected (the EIA document is used to report retroactively on sites to justify their selection).

The EIA's screening phase, introduced in 2008, aims to define whether an environmental impact study (EIS) is necessary. This decision is made based on information supplied by the project's sponsor. Some 60 projects went through the screening phase in 2010 and almost 90 projects in 2011.

The EIA Regulation prescribes the mandatory content of the EIS, which was fully aligned with Annex IV to the EIA Directive 85/337/EEC. EIS may be prepared only by a legal person authorized by the Ministry of Environmental and Nature Protection. An Advisory Committee, composed of some 10 members that represent central government authorities, academic circles, and local and regional self-governance authorities, reviews the EIS content and provides recommendations to the competent authority. Committee members can also propose possible alternatives, environmental protection measures and an environmental monitoring programme in connection to the project. In the event that a larger number of projects of the same type are planned, a standing expert committee is appointed (e.g., for roads). The Ministry's decision on EIS also takes account of the opinion of the body competent for nature protection issues and the outcomes of public consultations. So far, public opposition to some projects led to changes to them but never to cancellation.

The positive decision on the EIS launches the location permit procedure which is delivered by the Ministry of Construction and Physical Planning or county/municipal authorities. There is no right to administrative appeal against an EIA decision; eventual disputes must be resolved in administrative courts.

Over a decade, the number of EIA cases was on a steady rise, a trend that was seriously affected by the economic downturn of 2008 (table 2.1). Most EIAs have been related to infrastructure projects (roads, waste water treatment plants), waste landfills, exploitation of mineral resources, wind farms, installations for intensive poultry rearing. During the analyzed period, the share of negative EIA decisions pronounced by the competent bodies was oscillating around 15 per cent, with a maximum of 24 per cent of negative decisions in 2005 (table 2.1), which reflects the ability of the authority to be critical in the examination of applications.

Table 2.1: EIA procedures carried out in Croatia in the period 2000-2011

Year	Number of EIA procedures	Number of negative decisions (rejected)	Share of negative decisions (%)
2000	57	5	9
2001	72	7	10
2002	115	14	12
2003	146	19	13
2004	107	22	21
2005	138	33	24
2006	173	21	12
2007	184	30	16
2008	127	12	9
2009	97	13	13
2010	79	7	9
2011	70	8	11
Total	1,365	191	14

Source: Ministry of Environmental and Nature Protection, 2013.

When a proposed activity is likely to cause transboundary impact, the assessment carried out pursuant to national legislation is supplemented by an assessment under the Espoo Convention (see chapter 4).

Improved information flows and capacity development activities contributed to the improvement of the EIA outcomes over the last decade. Currently, local and regional self-government authorities are fully informed of and closely involved in the EIA procedure. Technical guidelines for the EIS development as well as the training of authorized experts contributed to greater standardization and quality of environmental impact studies. Likewise, the training of representatives of bodies competent for the protection of individual environmental components and burdens contributed to more efficient functioning of the advisory expert committee and thus to the quality of the EIA procedure itself.

Appropriate assessment

The 2008 amendment of the Nature Protection Act took into consideration the need for an "appropriate assessment" stipulated in the Habitats Directive, which is required for projects that can have significant effects on the national ecological network, and protected areas more specifically. According to the Nature Protection, this procedure has three phases: Screening, Main Assessment and the Procedure of Establishing the Overriding Public Interest and Compensation Measures. If an EIA is not necessary but appropriate assessment is needed (this may be the case, for example, for small scale sand extraction) it will be resolved by the Nature Protection Directorate of the Ministry of Environmental and Nature Protection. Local authorities have responsibilities for appropriate assessment in case of county importance. The Procedure of Establishing the Overriding Public Interest and Compensation Measures is in all cases in the competence of the Ministry of Environmental and Nature Protection.

In July 2013 the new Nature Protection Act (OG 80/13) entered into force. Also in November 2013 the new Regulation on Ecological Network (OG 124/13) was adopted by Croatian Government establishing the Natura 2000 ecological network. The 2013 NPA improved the Appropriate Assessment of projects defining clear division of competences among authorities, as well as clear deadlines and conditions under which the Screening phase, Main Assessment phase and Procedure of establishing the Overriding Public Interest and Compensation Measures have to be carried out. All phases of the Appropriate Assessment are now defined as the administrative procedures finishing with the administrative act that is case of disagreement of the proponent subject to appeal or administrative dispute. In all phases of the Appropriate Assessment opinion of the State Institute for Nature Protection being the central expert institution for nature protection in Croatia, is required. Also, in all phases the public is informed about the process by publishing results of the process (final administrative acts allowing the project or rejecting the application) on the internet page of the Ministry or relevant county administrative office.

Integrated permitting of large industrial installations

In Croatia, the regulatory tradition does not include stand-alone environmental permits. The country has a system of location, construction and use permits, issued by the local and regional self-government or the Ministry of Construction and Physical Planning, which include requirements, set by environmental authorities. For large industrial installations, an integrated approach of establishing such requirements was introduced following the transposition of the IPPC Directive. For new installations, the IPPC permitting was procedurally integrated with EIA. It is foreseen in the law that the overall procedure, which would include the public information and public participation, should be completed within six months. The key steps of the IPPC permitting process in Croatia are the following:

- Development of an application and its submission to the competent authority;
- Preliminary assessment of application by the competent authority (IPPC Unit of the MENP);
- Circulation of the application among the "statutory consultees" (nature protection, air protection and waste management departments of the MENP, Croatian Waters / Ministry of Agriculture, Ministry of Health);
- Incorporating inputs from statutory consultees into the application;
- Review of statements and application assessment by the IPPC Unit on the MENP;
- Publishing the application;
- Public hearing/debate in presence of county and municipal authorities and NGOs;
- Preparation of a draft decision on environmental conditions to be followed by the installation and its publishing;
- Issue of final decision on IPPC permit.

Authorised Consultancy Organisations (ACOs) are normally hired by the project developer to draft the IPPC application.

For existing installations, the IPPC application process had to be completed in 2011. As a first step, the operators of existing installations had to develop a status analysis of the installation and a compliance study. These documents had to be provided to Ministry of Environmental and Nature Protection for assessment within three years from the date of entry into force of the Environmental Protection Act (October 2007). After having obtained the positive opinion in relation to the status analysis and compliance study, the companies had to submit, within a period of six months, the request for determining IPPC requirements for the respective installation. There were important delays in achieving this objective.

In its capacity of competent authority and coordinating body for the IPPC procedure, the Ministry of Environmental and Nature Protection has the mandate to issue a decision on integrated environmental protection requirements (i.e. a document that is analogous to an IPPC permit). Several line ministries participate in the process of preparing the decision. From a practical point of view this means that, for instance, the Ministry of Agriculture / Croatian Waters set conditions related to water (use and emissions), the Ministry of Health deals with noise regulation, and so on. The Ministry of Environmental and Nature Protection then integrates these conditions within the above-mentioned decision. The expertise in determining IPPC permit conditions is derived from EIA practice. There is no guidance on setting the permit conditions and those conditions are sometimes drafted in cooperation with ACOs. Environmental inspectors are not involved in the setting of IPPC permit conditions. The public is informed on the submitted request for determining IPPC requirements and the issued act stating the decision on the request. The deadline set for informing the public may not be shorter than 30 days.

The permitting procedure is often perceived by industries as being too long. Insufficient – though professional and dedicated - personnel at the IPPC Unit of the MENP is only part of the problem. The integrated permitting procedure suffers from complex application and insufficient clarity for stakeholders. For example, there is no guidance on how to prepare the IPPC permit application, including indications on how to assess best available technology (BAT) or use of best available techniques reference documents (BREF), which leads to their incorrect application. On the other side, similar lack of clarity exists on determining the permit conditions, which - besides delays - can cause interpretation problems during implementation and enforcement of permit conditions. Furthermore, the statutory consultants have difficulties when dealing with IPPC applications because this is different from their usual media based approach. The procedure can be shortened by adopting a simplified application form with clear instructions how to fill it in, clear instructions for statutory consultants how to deal with the application and clear instructions how to determine permit conditions. Training could be

provided for industrial operators and ACOs concerning the way applications should be made and what they should contain. A collection of frequently asked questions on IPPC permitting could be developed and published on internet or distributed to stakeholders.

The lengthy communication with statutory consultants could be partly shortened by requesting all participants of the permitting procedure to take part in public hearing in order to clarify remaining issues at the end of the procedure and thus minimize waiting for written responses on comments and questions which arise at the public hearing or were not solved till the hearing.

The validity of an IPPC permit is five years. In the case of substantial change, the permit should be revised. No such cases have been recorded yet.

The IPPC permits are published on the web of the Ministry. Also CEA keeps a register of issued IPPC permits[1].

The first IPPC-related decision in Croatia was issued in 2010. In September 2013, the total number of installations that received IPPC requirements was 48, mostly from the sectors of farming, food industry, processing industry and metallurgy. To-date, only one waste management installation (e.g. landfill) has received an integrated permit. The process of establishing requirements for existing IPPC installations has seen delays but accelerated lately: In March 2013, about 120 existing installations were undergoing the permitting procedure. The number of staff at the IPPC Unit has recently been increased.

With the new Environmental Protection Act and its bylaws there will be substantial changes in procedure and it is expected to be implemented in 2014. The procedure for obtaining IPPC permits will not be procedurally integrated with EIA procedure, and obtaining IPPC permit will be obligation to operators before a trail run of installation. Also, the new Act introduces a possibility for certain types of installations to obtain IPPC permit through simpler procedure by application of general binding rules in accordance with Industrial Emissions Directive.

Single media permits

The industrial installations that are subject neither to EIA nor to IPPC are regulated by general binding rules and by providing for environment protection requirements included in the project design. Thus they become part of the construction permit and further of the operation/activity permit.

Concerning air pollution prevention and abatement limit values are prescribed for emissions of individual pollutants from stationary sources. Greenhouse gas emission allowances and emission quantities are allocated; the installation operator may perform an activity emitting greenhouse gases upon obtaining a greenhouse gas emission permit from the Ministry of Environmental and Nature Protection.

Permits for hazardous waste management as well as for export/import of waste and for waste incineration are issued by the Ministry of Environmental and Nature Protection. About 100 hazardous waste export and transit permits are issued per year.

The Nature Protection Directorate of the Ministry of Environmental and Nature Protection issues nature protection permits according to the Nature Protection Act for:

- Research in relation to strictly protected species or protected areas;
- Transboundary movement and trade in wild species (based on the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) and EU regulation lists);
- Breeding and holding protected species in captivity;
- Collection and commercial use of wild growing plants and protected species;
- Transboundary movement, deliberate release and placing on the market of GMOs;
- Nature protection requirements in the procedure of obtaining location permits in protected areas as well as to be included in other sectors management plans (forestry, hunting, physical planning documents);

1 http://boudr.azo.hr/Akti.aspx

- Risk assessment studies for introduction of alien species.

The transport of hazardous substances by sea is regulated by permits issued by the Ministry of Maritime Affairs, Transport and Infrastructure.

Water permitting, including water use and wastewater discharge permits, setting water management conditions and giving water management approval, stays with Croatian Waters. Their prerogatives also include permits for accreditation of laboratories for water analyses. The big water users (> 10,000 m^3/year) must have a concession granted by the Ministry of Agriculture with the expert support from Croatian Waters. Concession terms are agreed before the delivery of the construction permit.

2.6 Compliance promotion and voluntary schemes

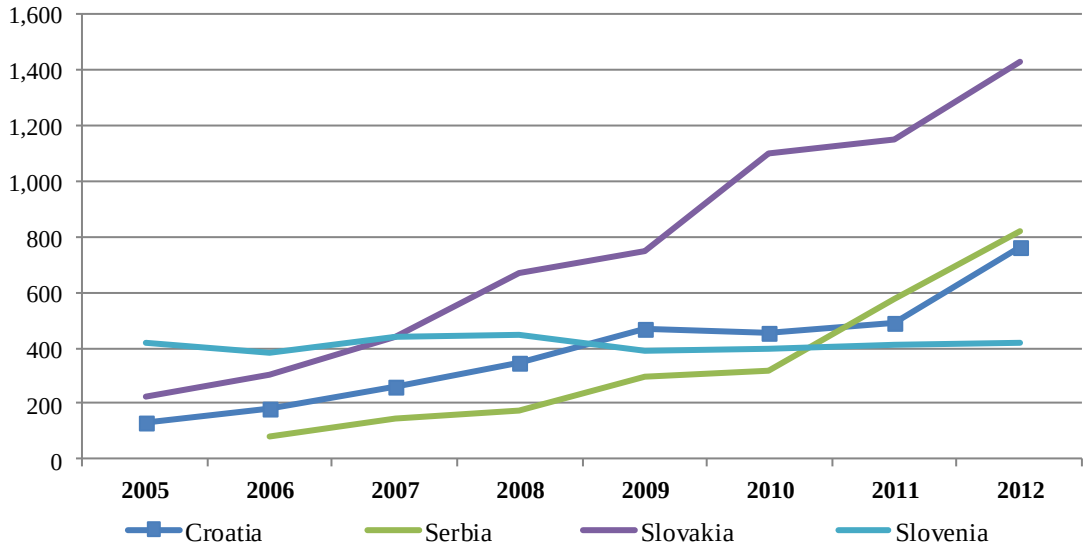
Compliance promotion activities are relatively limited in Croatia. The most basic activity is informing the regulated community and the public of the environmental legal framework, which is done using the Ministry of Environmental and Nature Protection website. Several guides on good environmental practices have been issued, e.g. on ozone layer protection or environmentally sustainable tourism. The very narrow scope of such activities can be explained by the fact that there is lack of legal framework and lack of capacities for such activities. An inspector has got not only right but also obligation to proceed according to the law which means to bring administrative measure and if required by law to file a charge if incompliance is determined during inspection. Failing to do so the inspector breaches duties in which case dismissal from services might occur. Such legal framework does not leave enough room to the inspector for compliance promotion. The new Environmental Protection Act brings some progress in that sense.

The Croatian legislation enabled the use of voluntary schemes on environment. Thus, the 2007 Environment Protection Act established the legal ground for the application of the European Union Eco-Management and Audit Scheme (EMAS) and designated CEA as its national EMAS focal point. According to data in the European EMAS Registry, there were no EMAS certified Croatian companies so far.

As concerns ISO 14001 certification, the evolution was positive over the last decade though far from spectacular. Within the segment of small and medium-sized enterprises (SME), some four per cent report to have ISO 14001 certification (€obarometer, 2012). According to the same source, the main causes of lacking implementation of environmental management systems are as follows: (i) no demand from legislation (30% of respondents); (ii) lack of information about Environmental Management Systems (EMS) and their benefits (27% of respondents), (iii) no demand from suppliers and customers (23% of respondents), and (iv) high implementation and running costs (19% of respondents). It has to be mentioned that while 44 per cent of Croatian SMEs declare being in full compliance with environmental law and not wishing to go beyond, a relatively high share of them (39%) wish to become greener. These data point to the fact that incentives for adopting EMS could be provided, in a first phase, by using relatively simple means of information and education. To some extent, this is done by environmental inspectors with most of such activities being carried out by specialized institutions outside the government.

With support from international community, the Croatian Cleaner Production Centre develops and implements cleaner production projects with financial savings from such activities being estimated at around 85 million HRK per year. Over 200 experts have been trained by the Centre in relation to cleaner production and implementation of environmental management systems. Complementary work on launching innovative projects aimed at sustainable development is done by the Center for Technological Transfer (CTT) established by the Faculty of Mechanical Engineering and Naval Architecture. The CTT also aims to provide training for experts in the industrial sector with the aim of successful technology transfer process and increasing the competitiveness of domestic industry. Another important player is the Croatian Business Council for Sustainable Development. This independent non-profit institution was established in 1997. Among its current 40 members, half are representing the industrial sector. It closely interacts with the Global Compact Local Network of Croatia, which was founded in 2007 and counts some 80 corporate members. More generally, corporate social responsibility issues were integrated into the agendas of two leading business associations in Croatia – the Croatian Chamber of Economy, as well as the Croatian Association of Employers – since 2004. Among others, a manual for implementing corporate social responsibility practices and a national rating system exist in Croatia.

Figure 2.1: Trends in the number of ISO 14001 certified companies in selected countries



Source: ISO Survey 2011, http://www.iso.org/iso/home/standards/certification/iso-survey.htm

Environmental labeling

Since 1993 a national eco-labeling scheme (called "Environmentally Friendly") has been used to promote environmentally-friendly goods on the national market. This voluntary scheme has been recently extended to the services sector and is regulated by the 2008 Ordinance on the Environmental Label (OG 70/08), amended in 2011 (OG 81/11).

Participation in this scheme is voluntary, based on the private sector's actors' interest to improve their image by demonstrating results in reducing environmental pollution and resource and energy consumption. The environmental label gives the consumers a clear indication that high environmental standards above the prescribed legal minimum are applied by the incumbent.

The Ministry of Environmental and Nature Protection awards the Croatian Environmental Label and plays the role of the national competent authority for the EU Ecolabel. The applications must contain a study on the products' compliance with award criteria prepared by an authorized institution or person. The award procedure involves expert assessment and elements of public participation. The national environmental label is awarded for 3 years. As of early July 2013, 13 manufacturing companies and 15 hotel/campsite operators were awarded the eco-label[2].

Environmental inspectors have the obligation to check on the right use of the environmental label including the compliance with the prescribed requirements for the award of the label and can propose the MENP to revoke the environmental label.

There is an equivalent label for organic agriculture products called "Hrvatski EKO proizvod" (Organic Product of Croatia). The criteria for awarding the latter label are stipulated in the 2010 Act on Organic Production and Labeling of Organic Products. Manufacturers get the right to use the label if their production is certified by a certification body and if this certification is documented. The right to use the label is being accorded for one year or one growing season. Producers and processors have, consequently, to re-itinerate their demand for accreditation every year.

In the area of energy efficiency, the Ordinance on energy efficiency labeling of household appliances (OG 130/07) has been adopted with the aim of facilitating citizens' choices towards responsible consumption.

[2] http://www.mzoip.hr/default.aspx?id=10460

2.7 Identification of non-compliance: self-monitoring and inspection

Industrial operators must conduct environmental self-monitoring. Aggregated data from self-monitoring are reported to the Environmental Pollution Register held by the CEA. Large installations make recourse to instrumental self-monitoring, which is implemented by accredited laboratories. LCPs and cement plants are required to have continuous on-line measurements. If installations exceed the emission limit values they are required by law to report to local authorities and to the SEI. Compliance with self-monitoring and self-reporting is verified during site visits or through a separate procedure of administrative (documentation) review.

The system of inspection in Croatia largely follows the Recommendation 2001/331/EC providing for minimum criteria for environmental inspections, which was transposed into the 2007 Environmental Protection Act. There are routine and non-routine site visits, as well as thematic inspections and site visits related to complaints or request from other authorities. The inspector is not obliged to notify the regulated entity that the on-site visit will take place, unless such a notification is beneficiary.

Inspector powers are generally sufficient, largely corresponding to good international practice. Inspectors are required to follow standardized operating procedures that help them to take consistent decisions. In their work, they must fully respect the public interests. They can be detached from the original location to another local unit of SEI that, among other things, can be considered as a mechanism for maintaining professional integrity.

Due to international programmes, environmental inspectors have undergone active training over the last few years. This technical capacity is likely to stay within the competent authorities given that staff turnover is limited. The mix of specialists carrying out inspection is reported to be good (IMPEL, 2012). In the Ministry of Environmental and Nature Protection as well as in all other state bodies performance control of all civil servants (including inspectors) is obligatory and it must be carried out every year.

The Ministry of Environmental and Nature Protection's DIA performs its compliance monitoring activity according to an annual work plan. This plan is published on the Ministry's web site thus transparency of inspection work being insured. It is prepared in line with the environmental priorities set in national policy documents. The objectives set in the plan are also guided by the international commitments assumed by Croatia. Inspection planning criteria are risk-based and take into account the operators performance.

The plan establishes priority sectors and specific installations to be inspected. The scope of inspection is defined based on the minimum frequency of inspection and the analysis of environmental and compliance data available from the Environmental Pollution Register and the DIA database, as well as external sources (Croatian Chamber of Economy, Croatian Chamber of Trades and Crafts, etc.). Also information from local authorities is used. The scope of inspection may be reviewed based on semi-annual reporting.

During the last years, the number of inspections carried out by SEI was in the range between 6000 and 7000 per year, of which 15-20 per cent were based on complaints (Table 2.2). Almost half of routine inspection require follow-up. Every environmental inspector executes 80-90 site visits per year, on average. In practical terms, the field work intensity of inspectors in branch units is higher since the inspectors based in Zagreb have also supervision and other kind of tasks. The work load (in terms of site visits per inspector) is comparable with that of other inspectorates covering the environmental sector.

Based on the agreement on cooperation between inspection services on environment, joint inspections are performed on the basis of a coordinated annual work plan. Most importantly, joint site visits are carried out at high-risk facilities. During the last few years, 54 joint inspections were carried out annually at industrial installations; 10 joint site visits focused on nature protection and 2 checks on former military sites having water quality problems were added in 2012 in the same coordinated framework. The findings of joint inspections are laid down in separate minutes which are sent to the coordinator of the inspections in the environmental inspectorate. Generally, the inspection takes several days and has the form of a multi-media rather than an integrated inspection. Inspectors of different competent authorities visit the company and inspect it on their specific field of competence and expertise. Apart from planned joint inspections there are ad-hoc joint inspections with other institutions: for example, about 200 inspections were carried out in 2012 on the transboundary movement of waste jointly with the customs administration.

Table 2.2: Selected indicators of inspection work on environment (number of inspections)

Indicators	2007	2008	2009	2010	2011	2012
Environmental inspection (SEI)						
Total number of inspections	6,202	6,891	6,892	7,246 (2)	7,228 (2)	5,931 (2)
Routine inspections (1)	4,123	4,593	4,159	4,673	4,713	3,291
Follow-up inspections	2,079	2,298	2,733	1,962	1,871	1,914
Nature protection inspection (SNPI)						
Total number of inspections	n.a.	n.a.	722	778	789	751
Water inspection						
Total number of inspections	981	1,204	1,319	2,368	2,707	2,869
Forestry inspection						
Total number of inspections	2,650	2,644	2,521	2,661	2,401	2,393

Source: SEI, SNPI, State water inspection, forestry inspection, respectively.
Note: n.a. – data not available
Note 1: including inspections based on complaints
Note 2: including brief checks of compliance

The minutes of the site visit include a description of issues that were verified and the conclusions made on compliance with regulatory requirements. They have to be signed by the inspector and a representative of the inspected operator. Records of each site visit should be kept in archives for five years. In case of a joint inspection report, prepared on the basis of individual minutes of the site visits, it is to be made publicly available through the website of the Ministry of Environmental and Nature Protection. Inspection-related information is also kept in the Environmental Inspection Information System that was launched in 2010.

In order to provide opportunities for citizens to contribute to compliance assurance, DIA has specified the office hours when the inspectors on duty respond to citizens requests. The Act on Administration Procedure also stipulates that on responding to written complaints establishes a 30-day deadline for an inspector to respond to a relatively simple enquiry and up to 2 months if the requested information is overly extensive and complex. No interaction with NGOs on dissuading polluters and promoting compliance is reported.

The DIA's inspection activity is relatively transparent, annual inspection report being posted on Internet (however, the last annual report available reflects data on 2010). Besides, a comprehensive annual report on coordinated inspection is issued. Information on inspection activities on water and forestry is not readily available.

2.8 Non-compliance responses

Croatian law provides for a whole range of instruments of non-compliance response e.g. administrative enforcement measures, judicial measures (misdemeanour and criminal procedures), and environmental liability mechanisms.

Administrative enforcement

A large array of administrative non-compliance response measures is available in Croatia though inspectors rarely use other measures that imposition of corrective measure and a fine. All monetary penalties paid by the companies are channeled to the State budget. The legislation provides for a gradual increase in the severity of enforcement non-compliance measures to achieve compliance, as stipulated by the Air Protection Act, for instance (see Box 2.1).

According to SEI data the vast majority of cases are related to non-compliance with the Waste Act, the rest refer to non-compliance with the Air Protection Act and, to a minor extent, the Environmental Protection Act. The number of administrative measures imposed by environmental inspectors over the review period has been around 2,000 per year, most of them consisting in administrative decisions requiring corrective measures to be

taken by the perpetrator within a prescribed period (Table 2.3). The administrative decisions are also actively used by the water inspectors that issue 400-500 such orders per year; other environmental enforcement agencies (nature protection, forestry) use the administrative measures at smaller scale (less than 100 decisions, annually). There is a clear decreasing tendency in applying administrative fines by the environmental inspectors.

Box 2.1: The enforcement strategy applied to air pollution cases

- In case of exceedance of the prescribed limit values for emissions of polluting substances into the air, the environment protection inspection reacts in concordance with the Air Protection Act and orders by decision and within an appropriate deadline the known polluter to carry out measures to eliminate irregularities which led to or could have led to the limit values exceedance,
- If the supervised person does not carry out ordered measures in accordance with the decision of the inspector, he will be coerced into carrying out the ordered measures through the payment of the coercive fine,
- If the supervised person does not execute the decision of the inspector even after the pronounced fine, the inspector will prohibit the use of the facility or the appliance in question,
- The inspector will forward to the competent authority an indictment charge or a criminal charge.

Table 2.3: Inspections carried out and administrative non-compliance measures taken by SEI

Indicators	2007	2008	2009	2010	2011	2012
Total inspections	6,202	6,654	6,892	7,246	7,228	5,931
Decisions on prescriptive measures	1,926	2,368	2,039	2,015	1,579	1,013
Conclusions on administrative fines	68	53	18	17	16	11
Total sum of administrative fines (kuna)	155,000	125,000	365,000	385,000	320,000	120,000

Source: SEI, 2013.

Operators have the right to appeal against decisions by environmental inspectors and an administrative dispute procedure is in place if the outcomes of administrative appeal seem unsatisfactory to the operator. Appeals could be filed within 15 days of the day of a decision or conclusion made by the inspector. An appeal submitted against a decision or conclusion shall not postpone their implementation if prescribed deadlines precede the end of the appeal procedure. In the first instance, appeals are resolved by special commissions the members of which are appointed by the Minister. Administrative disputes are solved by the Administrative Court. 177 appeals were (cumulatively) filed in the period 2007 – 2010, most of them against inspectors' decisions/orders. Some operators express doubts about the objectivity of appeal procedure in the first instance; sometimes those doubts do not seem unreasonable, e.g. at the Ministry of Agriculture the appeal unit is part of the same sector as the water inspection. In the Sector for State Water Inspection, Administrative Supervision and Appeals Procedure, there are two units: for Water inspection and for Administrative Supervision and Appeals Procedure both totally independent. On appeals against decisions of State water inspectors decides the committee appointed by the Government.

The Environmental Protection Act (2007) provides for many cases of derogation from the right to appeal against an inspection decision to the Ministry of Environmental and Nature Protection (first instance) permitting instead to initiate administrative disputes (i.e. filing the case directly in the second instance – the Administrative Court). This is deforming the normal appeal trajectory and may indicate the lack of qualified (educated in administrative law) personnel in the Ministry of Environmental and Nature Protection unit charged with appeal affairs that prefers to pass the cases to the Court thus avoiding potential administrative supervision problems with higher competent bodies. The administrative disputes have the inconvenient of being much longer moreover that the submission of the appeal against a decision does not postpone its enforcement.

Judicial enforcement through the misdemeanour courts

In Croatia, a relatively high number of cases of environmental non-compliance are resolved through misdemeanour courts. The use of this mechanism apparently resulted in delays of law implementation, against the background of important backlog and a limitation period of four years for resolving a case as of the date of committing the misdemeanor offence.

Every year, the environmental inspection files several hundreds of indictments to misdemeanour courts (Table 2.4). A comparable cumulative number of misdemeanor charges are pressed annually by other inspections operating on environment, namely the nature protection inspection (50-100 cases), the water inspection (50-100 cases), and the forestry inspection (400-600).

For example, in 2010, the environmental inspection submitted 328 cases to the competent misdemeanour courts. In the same period, 434 decisions on environmental cases were pronounced by the courts. Out of those court decisions, 278 defendants were found guilty and were imposed misdemeanour fines totaling over 1.1 million €o; 35 defendants were found guilty without fine imposition; 24 cases were rejected while in 97 cases the procedure was suspended. It means that the courts have found the defendants guilty in almost three quarters of the environmental cases, which is a pretty important share. To explain the relatively large share of court decisions to suspend actions (22%) both procedural aspects (exceeding the limitation period) and the complexity of environmental cases are invoked: both factors may point out to the insufficient capacity of courts to treat environmental cases and/or to courts overload.

Table 2.4: Judicial enforcement of environmental cases through misdemeanor courts

Indicators	2007	2008	2009	2010	2011	2012
Number of indictments filed to misdemeanour courts	614	419	419	328	839	536
Number of fines applied by the misdemeanour courts	467	432	225	278	433	341
Total amount of fines applied by the misdemeanour courts (million kunas)	5.29	10.52	8.71	8.72	5.87	4.02

Source: SEI, 2013.

In the misdemeanor procedure the inspector can be witness but sometimes is given the authority to investigate and prosecute, gather evidence etc. The indictment can be done both by inspector and attorney. This poses the problem of inspectors' legal competence. Related to this, the water inspection reported lack of legal background of inspectors (besides, the inspection has no lawyer).

Misdemeanor courts are understaffed. Judges are not really specialized despite the fact they have to base their judgment on the provisions of over 200 sectoral laws but they arrange unofficially for some sort of specialization, including on environmental matters. Insufficient capacity of courts to treat environmental cases and/or insufficient environmental awareness of judges joint with courts overload are sometimes leading to repeated postponement of environmental cases until the legal time expires.

Criminal enforcement

Situations leading to criminal enforcement in Croatia include, for example, illegal shipments of waste and illegal trade in protected species, major environmental threats coming from industrial plants or other stationary sources, illegal dumping of dangerous material (e.g. waste), pollution of the sea from ships, destruction of protected species, and habitat degradation and destruction. Areas for criminal response were better outlined in the 2013 Criminal Code. The Criminal Procedure Act prescribes precaution measures to prevent the perpetrator from committing further criminal acts and to ensure perpetrator's presence in the criminal proceedings, e.g. temporary seizure of passport, prohibition to engage in a certain business activity etc. The legal entities can be found guilty through the responsible person (e.g. the manager).

The number of criminal enforcement cases is quite limited and yet decreasing. In 2011, SEI submitted four criminal charges to the responsible Municipal State Attorney's Office for the threat to the environment caused by waste and other environmental pollution. Other environment enforcement agencies are neither more active on pressing criminal charges: in the same year, the State water inspection, the nature protection inspection and the forestry inspection filed one, three and five criminal charges, respectively. At the same time, the quality of environmental crime prosecution has apparently increased over the last decade: from 19 cases examined by the Zagreb Municipal Court during the last years, in 17 cases the perpetrator has been found guilty

In case of environmental crimes the State Attorney at municipal level is the competent body. The Court (in case of environmental crimes the Municipal Court) is responsible for leading the criminal proceedings and for deciding on the case once the State Attorney has submitted the indictment.

In the Croatian system, the inspector can have a wide range of attributions during the criminal proceedings; he can act as:

- Inspector as such - detecting crime and submitting criminal charge;
- Investigator - executing the actions ordered by the State Attorney under the Criminal Procedure Act; when inspectors act as investigators, their inspector powers according to sectoral laws are no longer applicable, e.g. while performing evidence collecting actions for the State Attorney;
- Witness - appear in front of the court and report on their knowledge on the case;
- Source of information for the State Attorney who may ask the inspector to gather the necessary information in order to decide whether to start criminal prosecution.

The good cooperation between the inspectors and the prosecutors on criminal affairs is crucial, therefore the need to raise their capacity for resolving environmental cases is recognized by both sides.

Police, including but not limited to the Criminal Police, are in charge of detection and investigation of crimes including environmental crimes as part of their main responsibilities. The police collect evidence, verify information received by the public and submit criminal charges to the State Attorney. The police carries out necessary inquiries to establish whether there is direct or sufficient circumstantial evidence for criminal charges and propose prosecution to the State Attorney. The police also have the role of criminal investigator under the request, guidance and supervision of the State Attorney. As a general rule in cases of violations of environmental regulations (e.g. environmental pollution), the police should inform the competent environmental inspection. Furthermore they should provide assistance to inspectors in performing their duties, in case of resistance against inspector's activities and measures.

Due to the urgency and seriousness of criminal offences – including crimes involving environmental pollution – a quick reaction by the competent authorities is required. This is sometimes hampered by the fact that involved bodies (e.g. bodies alarmed by the State Directorate for Protection and Rescue ("112")) cannot immediately decide who should react and how. To address such institutional issues and clarify procedural aspects, general Standard Operating Procedures (SOPs) on Environmental Crime, on Environmental Misdemeanour Offences and on Environmental Liability were developed in the framework of IPA 2008 "Enforcement of the new Environmental Protection Act harmonized with EU legislation in cases of criminal offences against the environment" Project. The SOPs provide to Croatian environmental enforcement authorities the necessary technical knowledge for environmental crime detection, investigation and prosecution.

Environmental liability

Environmental liability can either be civil law liability following the principles of civil law damage compensation and dealt with by civil law courts or it can be what is called administrative liability handled by the competent inspectors, e.g. environmental inspectors. The administrative liability is defined in the Environmental Protection Act and several bylaws and follows in its scope the EU Directive on Environmental Liability 2004/35/EC. Only damage to certain environmental media, such as waters, land, plant/animal species and their natural habitats and occurring from certain types of activities, such as waste handling or discharges into surface waters and groundwater, is covered. Strict environmental liability irrespective of fault (i.e. neither intent nor negligence are a prerequisite of responsibility) applies to these activities and all installations requiring an IPPC permit. In the case of damage to plant and animal species and/or natural habitats, the principle of fault based (subjective) liability applies.

Compensations for damage to individuals are handled through the civil law procedure; in some instances, damage to human health can be addressed in criminal court. Other types of environmental liability are handled by the competent authorities. Line ministries should detect and collect evidence regarding environmental damage and ensure clean up, including cost recovery from the polluter. Customs Administration is in charge of

detecting[3] illegal transboundary shipment of waste. The State Directorate for Rescue and Protection should also contribute to follow up of environmental liability cases. The police have an important role in the detection of environmental damage as they often receive information from citizens regarding environmental problems. The Police should inform relevant line ministries so that they can proceed with appropriate steps under the environmental liability provisions.

The State bodies in charge of claim for compensation are: the State Attorney, Croatian Waters or other public companies and the county/municipality. The costs of emergency measures implementation shall be covered from the State Budget until the payment from the company which had the obligation to implement the measures has been collected. In case measures are implemented upon the request of a local or regional self-government unit, the costs shall be covered from the budget of the local or regional self-government unit which has submitted the request, until the payment is collected from the company.

Cases of environmental liability (damage compensation) are not frequent in Croatia.

2.9 Conclusions and recommendations

On environmental compliance assurance, developments since 1999 are generally positive. Most of these developments stemmed from the alignment of the country's legal basis and management practices with EU requirements, and strengthening of administrative capacity in support to environmental policy implementation through international cooperation, exchange and training programmes. Croatia has introduced most of the modern instruments and procedures at all phases of regulatory management. Important efforts are made to ensure in practice that the system is result-oriented, risk-based, transparent, and participative. For example, the EIA procedure has been gradually enhanced with new phases such as screening and scoping. Its openness to public participation was enlarged, and coordination with follow up administrative procedures, such as integrated permitting, was improved. The EIA procedure is systematically applied with competent authorities being sufficiently critical to decline some 15 per cent of applications following their poor quality.

Powers granted to inspectors are extensive and enable them to act swiftly on non-compliance cases. The scope of compliance monitoring is wide, several agencies having inspection programmes, which are regularly coordinated. Coordinated site visits are conducted by various inspection authorities to reduce the administrative burden on the regulated community. Unfortunately, the interaction between different authorities is mostly procedural than substantive, with a therefore lacking integration across media. To make enforcement more effective, the Criminal Code has been updated and includes a larger number of situations when criminal proceeding can be applied. Standard Operating Procedures (SOPs) were developed and introduced to guide the enforcement procedurally in areas such as environmental liability or criminal environmental law.

Some of the existing institutional arrangements pose problems. Different departments of the Ministry of Environmental and Nature Protection conduct policy-making, law development, permitting, inspection, and administrative enforcement. Performance measurement overlooks important aspects of compliance assurance, such as the stepwise use of enforcement instruments in an enforcement pyramid. Disclosure of institutional performance information through annual activity reports is irregular or sometimes missing. While there is a cooperation agreement between enforcement authorities, the coordination efforts still need to be strengthened. Feedback between policy-making and compliance assurance is weak, and there is no unit that would have the mandate to advise sub-national authorities and follow environmental policy implementation in counties.

Recommendation 2.1:
Aiming to address the remaining governance gaps that hinder compliance assurance in Croatia, the Government should:

(a) Improve the set of compliance and enforcement indicators and request environmentally related inspection and enforcement agencies to publicly disclose their performance in a systematic manner;

(b) Continue to strengthen coordination mechanisms between various inspectorates;

[3] Between 2002 and 2008, 152 cases of illegal trading were prevented, followed by 199 cases in the period 2009-2011. This predominantly concerns species of small singing birds, shells and tortoises but sometimes also big predators. For most part, such illegal shipments are counteracted due to joint actions of the Customs and the Nature Protection Inspectorate.

(c) Analyze the effectiveness of environmental inspection bodies and ensure the adequate development of their administrative capacity.

Croatia transposed the IPPC Directive without renouncing own regulatory approaches, though the implementation of this directive has suffered from insufficient capacity within both the public and private sectors. There is an important backlog of IPPC decisions to be issued, and the very identification of IPPC installations is still on-going. General binding rules are used to regulate smaller facilities. This is a well-adapted regulatory regime that, at the same time, is not sufficiently backed by compliance assistance and promotion measures.

Integrated permitting remains an area where further efforts would be beneficial. To start with, the final list of existing IPPC installations has not yet been established and made publicly available. Knowing precisely the number of such installations is also a matter of resource allocation within the competent authorities, which seem to be understaffed currently. The current backlog of integrated permitting cases also shows a problem of technical capacity. The IPPC procedure is lengthy and suffers from complex application and lack of clarity for stakeholders. There are no guidance documents on preparing the IPPC permit applications, on determining the permit conditions, or for statutory consultants to deal with IPPC applications.

Recommendation 2.2:
In order to reduce the backlog in the Integrated Pollution Prevention and Control (IPPC) permitting procedure, the Ministry of Environmental and Nature Protection should:

(a) Complete the inventory of the IPPC installations and keep it up to date and publicly available;

(b) Develop guidance documents for stakeholders in the IPPC permitting procedure;

(c) Provide training to industrial operators and Authorized Consultancy Organizations concerning the way applications should be made and the information they should contain.

Compliance assistance activities by the competent authorities are sporadic and limited to punctual advice during inspection. There is no unique platform for offering regulatory information to enterprises. Only a couple of guidance papers targeted at the regulated community exist. No regular communication is carried out with industry associations. More generally, consultations with the regulated community are very limited, including at the law-making phase where such an approach ensures the understanding of, and support to, regulatory goals. The latter is an important drawback in a situation when important private resources will have to be allocated to compliance with EU law. The value of EMAS is not adequately promoted, and there are no information-based tools of compliance assurance such as enterprise rating.

Recommendation 2.3:
The Ministry of Environmental and Nature Protection should make a better use of instruments to promote compliance, through:

(a) Conducting consultations with the stakeholders when drafting laws or amendments;

(b) Providing small and medium-sized enterprises with easier access to information on how compliance could be ensured;

(c) Promoting the use of environmental management systems;

(d) Assessing the costs and benefits of a system of public disclosure and rating of the environmental performance of enterprises and adopting such a system, if feasible.

The regulated community, in its greatest part, is not complying spontaneously with environmental law. The available data send the signal of an enforcement system that is biased towards applying fines with hardly any recourse to other enforcement instruments. The calculation of fines does not integrate any element of assessment of unlawful economic benefits of non-compliance. Many cases are transmitted to courts where the length of procedures is far from being adapted to specificities of some environmental cases that require urgent response. The general backlog in courts and lack of technical capacity to understand environmental cases also diminishes the effectiveness of judicial enforcement. Finally, while the legal basis for criminal enforcement is advanced, the practice of applying it is limited.

Recommendations 2.4:
The Government should strengthen the effectiveness of instruments and procedures, as well as capacity, for administrative and judicial enforcement by:

(a) Annually assessing compliance with relevant standard operating procedures, updating them as necessary and conducting training and exchange of experience on their application;

(b) Providing guidance to inspectors on the use of specific enforcement instruments and requesting that the entire toolbox of administrative enforcement instruments be applied stepwise;

(c) Improving the calculation of administrative fines and informing the regulated community of the basis for such calculations;

(d) Providing environment-focused training to judicial authorities and considering whether a specialized corps of environmental judges could be established.

Chapter 3

ENVIRONMENTAL MONITORING, INFORMATION AND EDUCATION

3.1 Environmental monitoring

Air quality

Air quality monitoring system in Croatia consists of State and local networks that provide data for: classification of air quality into categories which are based on national regulations on air quality; for the national and international reporting obligations and data exchange. Since 2012, the State and local networks comprise 45 automatic monitoring stations throughout the country.

The State air quality monitoring network has in total 23 sampling points for fix measurement (Map 3.1) out of which 11 automatic stations in settlements and industrial zones (covering measurements of SO2, NOx, PM10, PM2.5, O3, CO, NH3, H2S, BTX, meteorological parameters and chemical analyses of heavy metals and PAU from PM10 samples) and 12 rural sites (5 sampling points for fix measurement in national parks, nature parks and/or protected areas; 7 sampling points for fix measurement for measuring background pollution or long-range transboundary pollution) . Since 2010, the State air quality monitoring network is managed by the Meteorological and Hydrological Service of Croatia (MHSC). Legal persons – accredited laboratories are doing measurements, maintenance of stations and equipment, data collection, quality control of monitoring measurement and air quality data, processing and presentation of results. Air Quality data shall be delivered to the Croatian Environment Agency (CEA) into the air quality information system (AQIS) that makes an integral part of CEA National Environmental Information System. This system has been established with assistance of Phare 2006 project "Establishment of air quality monitoring and management system".

Local networks of air quality monitoring stations are established by local and regional self-government units. Currently local networks include 70 measurement sites. In 2012, out of that number, there were in total 22 sampling points for fix measurement (automatic stations), including special measurements established according the Environment Impact Assessment procedure requirements. Local and regional self-government units are responsible to ensure delivery of air quality data from their local networks to CEA into the AQIS.

Water

Surface water and groundwater

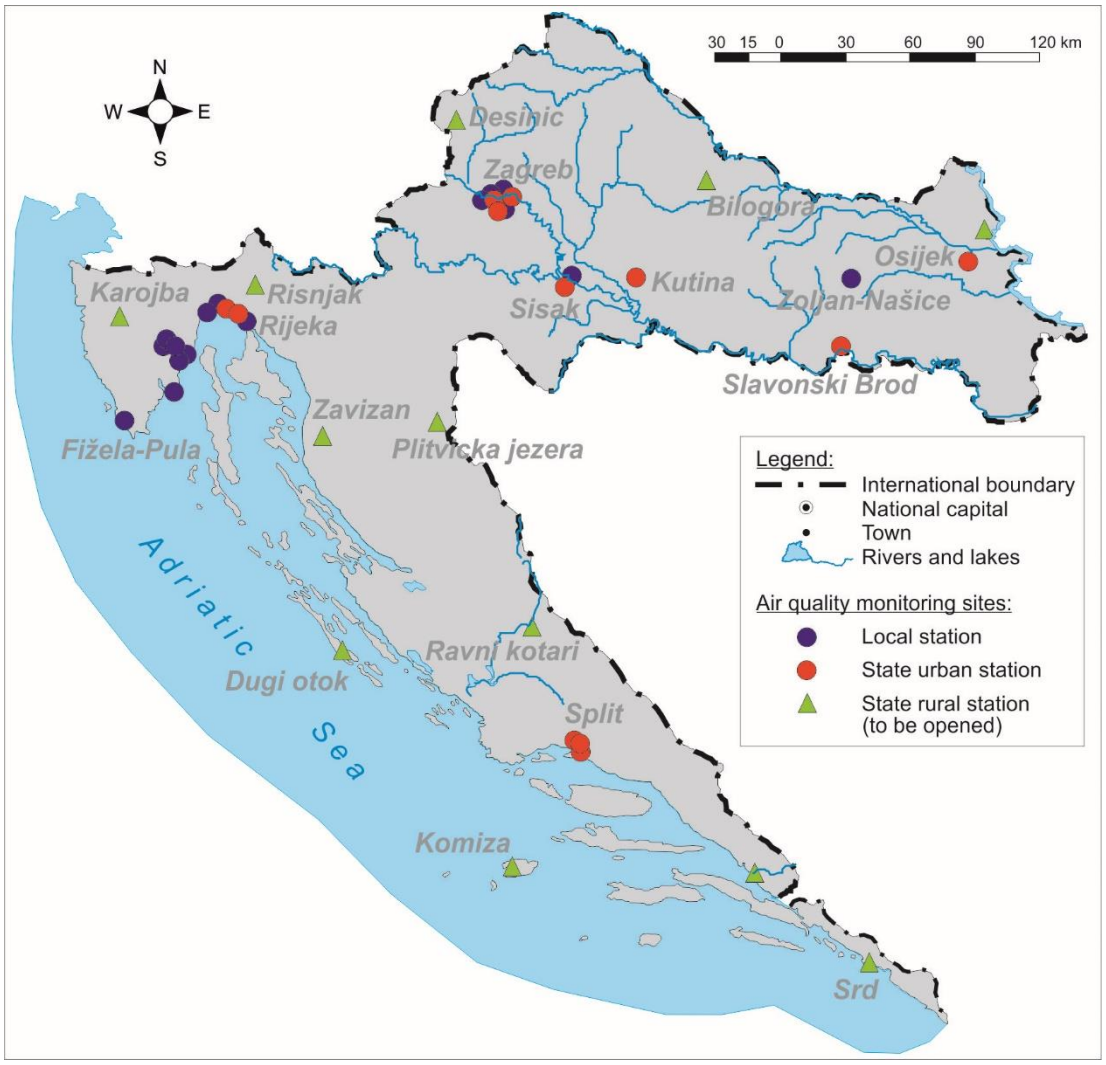
Monitoring of surface water is conducted at around 350 monitoring sites in inland surface water and around 80 monitoring stations in coastal water. Groundwater quality is tested on around 250 monitoring sites, of which around 150 monitoring sites in Zagreb aquifer, 80 monitoring sites in piezometers and wells in the Danube River basin and 35 monitoring sites in the captured springs in the Adriatic river basin.

In the period 2009 – 2012 the surveillance monitoring of inland surface water was carried out, for the general assessment of the water status in river catchment areas, on 39 river monitoring sites and 5 lake monitoring sites. Operational monitoring of inland surface water is still not implemented, but the operational monitoring plan is in the process of designation, involving water bodies identified not to reach good ecological and chemical status and water bodies at risk of not meeting environmental objectives of the Ordinance on water quality standards.

Surveillance monitoring of transitional and coastal water was partially conducted during the 2009 and 2010, when the revision of the existing monitoring plan was made and the national monitoring of chemical and ecological status of transitional and coastal water was created. The implementation of proposed monitoring plan of surveillance and operational monitoring started in 2012.

Groundwater monitoring network in Danube River aquifers is more extensive than in karst aquifers, although related to the sanitary protection zones, and covers different types of aquifers, different bodies of groundwater, as well as the bodies of groundwater identified to be at risk of not meeting the water protection objectives. The number of stations is larger in groundwater bodies at risk and in groundwater bodies belonging to the primary and secondary type of aquifer, than those in groundwater bodies' unproductive aquifers and areas without risk.

Map 3.1: Air quality monitoring sites

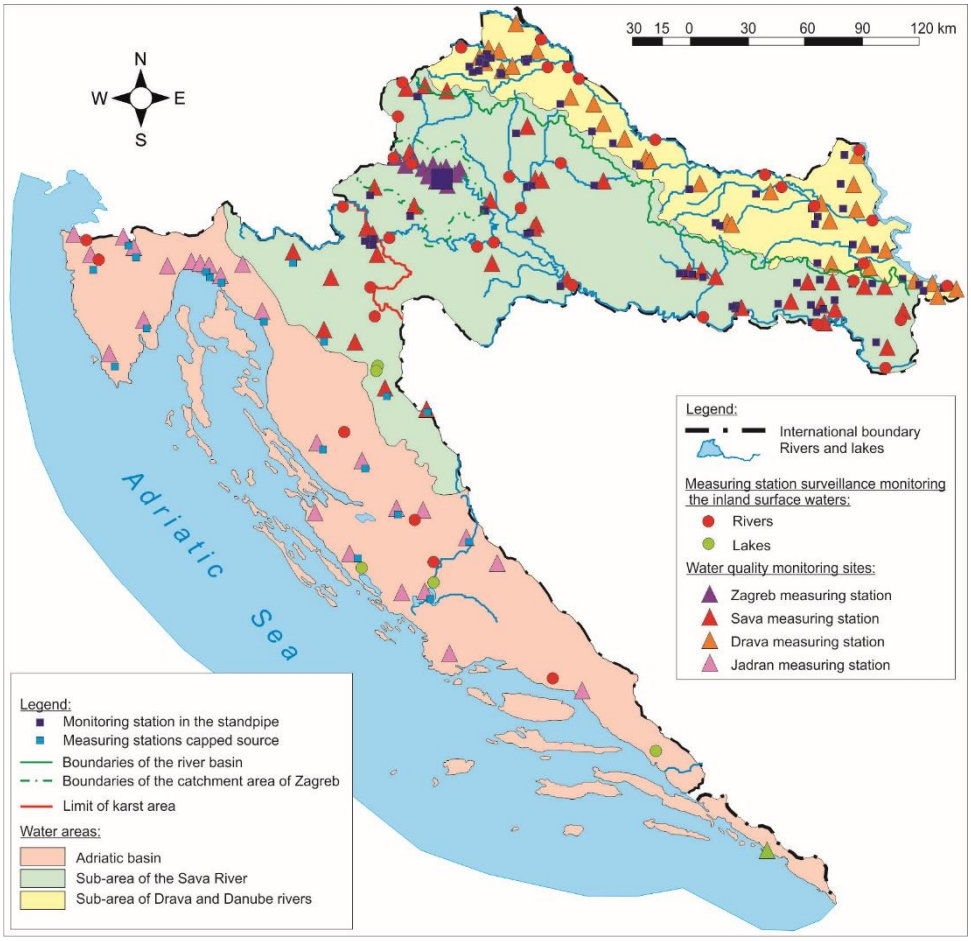


Source: Ministry of Environmental and Nature Protection, 2013.
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Bathing water

Croatia is highly dependent on tourism and therefore bathing water monitoring programme is both of high importance and well established. Croatia has reported to European Commission since 2009 for sea bathing water quality. Reporting on inland bathing water quality started in 2011 bathing season. These reports cover: start and end of bathing season for each bathing water, short term pollution events, events impacting bathing water quality and measured values of concentrations of two microbiological parameters — intestinal enterococci and Escherichia coli (also known as E. coli). This report gives a general overview of bathing water quality in Croatia for the bathing season. A total of 919 bathing waters sites were monitored in Croatia during the 2011 and 2012 bathing seasons. Of these sites, 886 were coastal bathing waters, 26 transitional bathing waters and 7 were inland bathing waters (4 on rivers; 3 on lakes).

Map 3.2: Monitoring sites for measuring inland water quality



Source: Ministry of Environmental and Nature Protection, 2013.
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Table 3.1: Number of water monitoring stations

Year	2006	2007	2008	2009	2010	2011	2012
Surface water	331	348	324	349	318	310	378
Groundwater	188	212	216	249	256	270	270
Transitional and coastal water	75	75	75	75	75	75	80

Source: Croatian waters, 2013.

Marine water

The National marine monitoring programme "Adriatic" has been in operation since 1998 and contains 2,500 time series, but because of the lack of funding, the programme was significantly reduced in 2012. Marine physics, chemistry and biology are measured. Besides the National marine monitoring programme, monitoring of different aspects of marine environment has been conducted by various institutions and the administrative responsibility for monitoring were dispersed among different ministries and state institutions.

The monitoring and observation system is currently being prepared within the elaboration of the Marine and Coastal Management Strategy. The work is underway to link all existing marine monitoring activities and develop new ones in order to increase coherence and coordination of marine environment monitoring and to adjust them for achieving goal of good environmental status. The Ministry of Environmental and Nature Protection coordinates the preparation of monitoring and observation system through implementation of the Coastal Cities Water Pollution Control Project 2.

In the elaboration of the first preparatory document of the Marine and Coastal Management Strategy named "Initial Assessment of the State and Pressures on the Marine Environment in the Croatian Part of the Adriatic Sea" data that had been processed and analysed include: quality of transitional, coastal and marine waters, oceanographic and hydrographical conditions, hazardous and harmful algal blooms, sea bathing water quality, marine pollution caused by maritime transport, invasive species, marine pollution incidents and interventions against accidental marine pollution, radioactivity in marine environment. Other important data for monitoring quality and pressures on the marine environment and coastal areas, including the relevant spatial data and information on infrastructure as well as data on marine and coastal area protection policy, are also collected and analyzed.

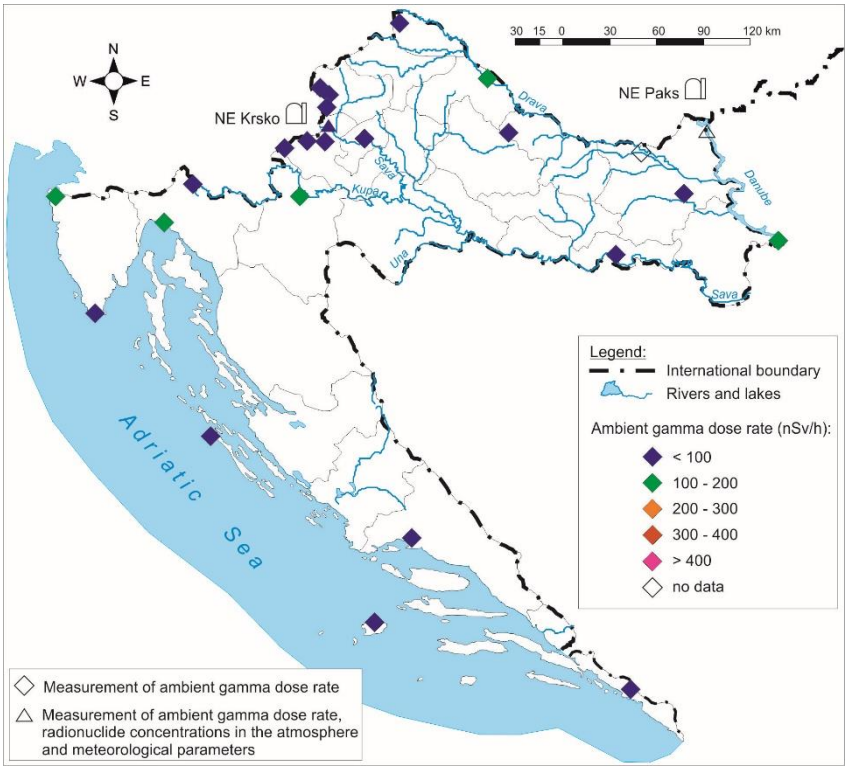
Drinking water

Croatia takes measures to ensure regular monitoring of the quality of water intended for human consumption. The National Institute of Public Health performs monitoring of water quality in public water supply systems. Monitoring is carried out, in order to check whether the water available to consumers meets the requirements of the Act on Water for Human Consumption (OG 56/13).

Radioactivity

The continuous monitoring of ambient gamma dose rate is performed at 25 stations and is part of the EU early warning system (European Radiological Data Exchange Platform) for radiation detection emergency. Two stations measure also concentration of radionuclides in the air and some meteorological parameters. Ten new stations are expected to be installed. The nuclear power plant in Krško (jointly owned by Croatia and Slovenia) has its own monitoring system which is managed by the Croatian Ruđer Bošković Institute.

Map 3.4: Radioactivity



Source: Ministry of Environmental and Nature Protection, 2013.
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Monitoring in other relevant areas

Moniotoring on biodiversity is very limited. Only, some species, such as river turtles (*Mauremys rivulata*) and Lombard frogs (*Rana latastei*) have been inventoried, as well as big carnivores such as wolf and lynx. Manuals for inventory and monitoring of habitats were developed, educational workshops were held and inventory of habitats started.

Settings for establishing the system for monitoring agricultural land in accordance with the provisions of the Ordinance on the Methodology for the Monitoring of Agricultural Land (OG 60/10) have been normatively agreed. In operational terms the implementation of the measures provided for monitoring of agricultural land has not been realized yet.

There appears to be no monitoring of biodiversity, soil, noise and vibration.

3.2 Environment reporting and information systems

Data reporting

The National GHG registry, inventory and reporting have been established alongside the EU ETS (Emission Trading System). Since beginning of 2013, the National GHG registry is linked to the European Union Registry and became a part of it. By joining the ETS Croatian part of Union Registry is fully operational.

The establishment of the Environmental Pollutant Register (EPR) in 2005 was the most important development. The register is composed of number of components regarding numerous national and international obligations. It is based on the Regulation concerning the establishment of European Pollutant Release and Transfer Register (OG 166/06). At the end of 2012, CEA launched Croatian National Portal on Emission Pollution Register (CNPEPR). CEA also launched EPR Public browser for data from EPR. CEA published the Manual for Keeping the Environmental Pollution Register containing instructions for work with the EPR and procedures for data quality assurance. It also maintains EPR Help desk which providing answers regarding relevant issues.

Data flow for EPR is regulated in the following way. A party obliged to submit data shall deliver the data to the competent authority (21 administrative bodies in 20 counties and City of Zagreb). The competent authority in cooperation with the competent inspection ensures verification of completeness, consistence and authenticity of the submitted data. CEA coordinates activities on data quality assurance and control. Since 2012, CEA maintains a list of polluters which is also published on the Internet. Information for the Environmental Pollutant Register is collected by the State Environmental Inspectorate and sent to CEA.

Data on quantities of generated, collected, processed, deposited and exported waste are collected as a part of CEA waste management information system. The waste producer/certified person for waste management delivers data on waste to the EPR yearly. In case of emissions, the frequency of measurements is determined by special regulations on air and water protection and depends on the type and the capacity of the facility in question. In 2012 an agreement was established between CEA and the Croatian Bureau of Statistics for CEA to produce information which is collected through permits and using statistics quality standards.

Environment information system

Under the Croatian environment information system (CEIS), a process of inter-connecting various databases (about 44 of them) is under way. CEIS subsystems include: air and climate, marine environment, nature protection, soil, waste, industry and energy sector, health and safety, and general issues related to environmental protection. CEA gradually improves its databases in all subsystems. To prepare suitable information in support to national and international reporting and data exchange and public data availability, CEA works on linking relevant databases seated in different institutions.

The Ministry of Environmental and Nature Protection is discussing with the Ministry of Construction and Physical Planning modalities of acquiring spatial planning data, with the Ministry of Agriculture on land use and land cover data, and with the Ministry of Health on noise data.

Databases in CEIS are quality checked four times per year on timelines of reporting to CEIS databases, authenticity, accuracy and completeness, coverage of reported information according to agreements or reporting

needs. Some CEIS databases are maintained by other institutions (responsible for monitoring or data collection). Acquiring data for CEIS from other databases is in most cases still time and human resources intensive. For example, the water information system is under the responsibility of Croatian Waters. CEA's access to them in many cases, time- and is work-consuming as access to data is on individual request and further manual copy-paste work is needed for CEA database management. In some case, due to non-common methodology and fragmented data sources, data are not harmonized and not interconnected.

The establishment of environmental information systems follows the Shared Environmental Information System (SEIS) principle of decentralized management (and thus access of data at source).

CEA has established a working group for the Infrastructure for Spatial Information in the European Community and is in the process of establishing cadaster of main objects important to environmental protection, for example big polluters, water treatment plants, nature protected areas, monitoring stations (location, entity, address). In line with the principles and activities of the European Earth Observation Programme where remote sensing is used to acquire data (Copernicus, previously GMES), the Croatian Corine Land cover database was updated in 2000, 2006 and 2012. Corine land cover database is the only land use/cover information available at the national level. Coastal and forest information were elaborated therein in more detail taking into account specific interest of Croatia (added climate change data, five themes are elaborated in higher resolution layers 1:25000).

Reporting according to international obligations

After 2005 there has been significant improvement of reporting regarding international obligations. For example, EEA priority data flows reporting improved from 17 per cent in 2005 to 89 per cent in 2011.

CEA is the central information body for coordination of reporting and reporting to the European Commission on the implementation of specific environment protection regulations, to EEA and the European Environment Information and Observation Network (EIONET). Institutions which report environmental data and information to international organizations and the European Commission shall provide a copy of the report or data set to CEA.

CEA has established a database of all environmental reporting obligations (around 245) and overview of institutions involved in such reporting. CEA has started to establish protocols to identify reporting responsibilities from various institutions to CEA. Protocols serve for a cross-sectoral collaboration in the data flow and for the production of reports and reporting in accordance with the Croatian reporting obligations. One protocol has been established so far, one with the Ministry of Interior for data and information relating to monitoring and reporting of average CO_2 emissions from light commercial vehicles and average CO_2 emissions from passenger cars.

Environment assessments and access to information

Preparation of the state of the environment report (SoER) is laid down by the 2013 Environmental Protection Act. CEA has the overall responsibility to prepare the SoER and submit it to the Ministry of Environmental and Nature Protection. As prescribed by the EPA, the report covers four years period, and has to be approved by the Government and adopted by the Croatian Parliament. The lag between data taken into consideration and the date of finalizing the reporting is one and half – two years, which is usual for this type of comprehensive documents. Croatian SoER contains 17 different environmental themes and themes about sectorial pressures and responses. The procedure of adoption lasts rather long. As a result, data provided are outdated for both information and policy purposes. Currently the preparation of the draft report 2009-2012 is under way.

The report is prepared on the basis of available environmental data and it gives an evaluation of the current and an assessment of the future state. The Environmental Protection Act stipulates that SoER reporting must be linked to the Strategy of Sustainable Development and the Plan for the Environment Protection. So far SoERs were published in 1998, 2002 (not endorsed by the Parliament), 2007 (1997- 2005 data coverage) and 2012 (covers the period 2005-2008). The 2007 report was the first indicator based report (inclusion of 198 indicators) and covered all thematic areas of the environment, pressures and response as well the assessment of the achievements of goals in the 2002 National Environment Action Plan..

To mitigate delays in the compilation and adoption of the SoER, CEA has started to publish a selective series of yearly indicators in the publication "Selected indicators of the environment in Croatia and the publication named "The Environment in your pocket". The national list of environmental indicators is based on the 2007 Environmental Protection Act and other sectorial requirements for environmental data and form part of the CEIS. Currently the list comprises 245 indicators; it is harmonized with EEA list of indicators and available on the web. The list of national indicators is being revised every two years. Not all of indicators are populated by data.

Information on environment in Croatia is publicly available in the form of published reports, publications, CEIS databases on the web or by request.

For access to some of CEIS databases account registration is needed. Helpdesks for the GHG registry and the Environmental Pollutant Register have been established at CEA. Use, accessibility and quality of environmental information have rapidly improved with the establishments of CEA. NGOs recorded improvement and possibility to acquire details of persons for further inquiries. Documents and templates are available on the CEA web site as well as a nominated person to be contacted and answering inquires.

Monitoring data on bathing water are available online to the public since 2009. Moreover, users can make comments and suggestion considering each bathing water point, propose new sampling points, get additional information of the beaches and report on possible sudden and short-term pollutions. A web application for mobile phones and other small screen devices was produced, for bathing season 2012. Bathing water profiles are available for a majority of bathing waters as well[4].

3.3 Legal, policy and institutional framework

Legal framework

The scope of environmental monitoring is defined by the 2013 Environmental Protection Act. It should monitoring of air, water, sea, soil, flora and fauna, exploitation of raw minerals, emissions into the environment, the impact of environmental pollution on human health, the impact of significant economic sectors on environmental components, natural phenomena, meteorological, hydrological, erosion, seismological, radiological and other geophysical phenomena, the conservation status of nature. An ordinance about monitoring details has to be issued by the responsible ministry. For most of the environmental themes such an ordinance has been issued, but some lack implementation (e.g. soil). In addition, the Environmental Protection Act stipulates that national reference centres have to be established or appointed by the Government to perform monitoring, to establish information outlets and to report. Only one such centre, for marine water, has been established so far.

The air quality monitoring and management system in Croatia is regulated by the Air Protection Act (OG 130/11) and by secondary legislation, such as the Ordinance on Recommended and Limit Air Quality Values, adopted before 2009 which is under process of further harmonization.

Since 2002, the State air quality monitoring network is established according to the Ordinance on locations of permanent air monitoring stations in the National network and the Programme on air quality measurement in the national air quality monitoring network.

Water monitoring is set out in several pieces of legislation: Water Act, Environmental Protection Act and Act on Water for Human Consumption. Monitoring and assessment of ecological status and chemical status of surface water (including transitional and coastal water), chemical status and quantitative status of groundwater and water status in protected areas is regulated by Water Act and its by-laws. Monitoring of inland bathing water quality is also regulated by Water Act.

[4] Bathing water results 2012 – Croatia, http://www.eea.europa.eu/themes/water/status-and-monitoring/state-of-bathing-water

Monitoring of sanitary validity of water for human consumption is regulated by Act on Water for Human Consumption. The marine water monitoring in compliance with the Regulation Establishing a Framework for Action of Croatia in the Field of Marine Environment Protection (OG 136/11) and the monitoring of coastal bathing water quality is based on the Environmental Protection Act.

Since 2010 the new Water Act was enforced and gave the legal framework for the establishment of a harmonized monitoring. In 2011 the Ordinance on water quality standards entered into force, laying down the criteria for assessing the ecological status and chemical status of surface water, chemical status and quantitative status of groundwater and the criteria for assessing the status of water in protected areas, and introducing the type-specific assessment of status on surface water. The new Ordinance on water quality standards also conveys the provisions on assessment and monitoring of water status. As well, the River Basin Management Plan (OG 82/13) is also a starting point for planning a monitoring programme for the period until the end of 2015.

The criteria for monitoring and assessment of ecological status and chemical status of surface water, chemical status and quantitative status of groundwater and the status of water in protected areas is stipulated in the Regulation on water quality standards (OG 73/13), adopted after the last amendments of Water Act. For surface water, the assessment methods and type-specific environmental quality standards for biological quality elements and hydromorphological quality elements are set out, together with limit values for chemical and physico-chemical quality elements and priority substances. For groundwater, limit values for nitrates, pesticides and specific pollutants are set out.

Coastal bathing water quality monitoring is regulated by the Regulation on coastal bathing water quality (OG 73/08) and inland bathing water quality by the Regulation on bathing water quality (OG 51/10).

Prior to the adoption of the Regulation Establishing a Framework for Action of Croatia in the Field of Marine Environment Protection (OG 136/11), the assessment and monitoring programmes for marine environment were separately conducted according to the sectoral legislation while some descriptors of good environmental status of marine environment (such as marine litter and underwater noise) have not been assessed or monitored at all. The monitoring and observation system that is in the process of preparation according to the conducted initial assessment of marine environment includes monitoring of all descriptors of good environmental status taking into consideration indicative list of characteristics, pressured and impacts defined into the Regulation (OG 136/11). Adopted obligations regarding reporting oblige all responsible institutions to make available to CEA all data and information gathered in the initial assessment and the Monitoring and observation system for the purpose of serving the needs of CEIS and the European Environment Agency.

Noise monitoring is regulated by the 2009 Act on noise and the Ordinance on the strategic maps for noise (OG 5/07), but is not implemented in the practice. As far as soil monitoring is concerned, the methodology for monitoring the state of agricultural land and the conditions for carrying out the analysis that must be performed by accredited laboratories are regulated by the Ordinance on the Methodology for the Monitoring of Agricultural Land (OG 60/10). The provisions of the Ordinance relating to monitoring are not yet implemented.

Radioactivity is monitored on the basis of the Act on radiological and nuclear safety (OG 28/10), Ordinance on the monitoring of radioactivity in air, soil, sea, rivers, lakes, groundwater, precipitation, drinking water, food and occupational space, dwellings (OG 60/08), the Regulation on the conditions and methods of disposal of radioactive waste, spent sealed radioactive sources and ionizing radiation sources which are not intended for further use (OG 44/08).

The monitoring of nature conservation status is regulated by the Nature Protection Act (OG 80/13).

Policy framework

CEA prepared a programme for CEIS management for the period 2009-2012. A programme for 2013-2016 has been drafted.

Institutional framework

The Government established in June 2002 the Croatian Environment Agency (CEA). CEA's tasks and obligations are defined in the 2002 Regulation on the establishment of the Croatian Environment Agency, then in the 2007 Environmental Protection Act, and lately in the 2013 Environmental Protection Act. The core task of CEA is to establish, maintain and coordinate a single national environmental information system, maintain appropriate environmental databases and report on environmental status in relation to environmental protection and sustainable development. CEIS was established following the Regulation on the Environmental Information System (OG 68/08) Other main institutions, defined by specific regulations, are responsible for monitoring of specific areas. Specifically:

- Supervision of air quality monitoring is under the responsibility of the Ministry of Environmental and Nature Protection, and performed by the Meteorological and Hydrological Service and local networks under local and regional self-governments. Air quality warning is the responsibility of the Ministry of Environmental and Nature Protection and regional level institutions.
- The responsibilities for water monitoring are shared between:
    - Croatian Waters for surface water, groundwater and inland bathing water (for monitoring and for establishment and maintenance of information system of all surface and ground waters, transitional and coastal waters concerning their chemical and ecological status, waters of territorial sea concerning their chemical status, mineral and thermal waters, except mineral and geothermal waters suitable for extraction of mineral raw materials or utilization of accumulated thermal energy for energy purposes). Croatian Waters in cooperation with the Meteorological and Hydrological Service covers issues of monitoring water quantities and hydrometeorological forecasts, particularly in the implementation of flood protection plans,
    - Drinking water is a shared responsibility of the Ministry of Agriculture and the Ministry of Health. Water quality is monitored by the National Institute of Public Health.
- Coordination of the marine environment monitoring is the responsibility of the Ministry of Environmental and Nature Protection, while other responsible bodies including ministries, State and scientific institutions participate and conduct in the marine monitoring activities within the scope of their competence:
    - Coastal bathing water quality is monitored by the National Institute of Public Health in seven coastal counties;
    - Monitoring of characteristics and marine environment features (e.g., hydrographical, physical, geological, chemical, biological) and pressures (e.g., physical loss, contamination by hazardous substances, eutrophication, biological disturbance) are implemented by marine scientific institutions (Institute of Oceanography and Fisheries, Institute “Ruđer Bošković”, Institute for Marine and Coastal Research from the University of Dubrovnik, Hydrographic Institute), public health institutes in coastal area and State institutions (e.g., State Institute for Nature Protection, Meteorological and Hydrological Service, State Office for Radiological and Nuclear Safety). Beside the Ministry of Environmental and Nature Protection, other ministries hold administrative responsibilities for monitoring activities (e.g., ministries responsible for the maritime transport, fisheries, science and water management).
- Biodiversity monitoring is under the responsibility of the Ministry of Environmental and Nature Protection, the State Institute for Nature Protection, and the Institute of Oceanography and Fisheries. Monitoring of forest ecosystems is under the responsibility of the Ministry of Agriculture and performed by Croatian Forest Research Institute;
- Soil monitoring of agricultural and forestry land lies within the Ministry of Agriculture, and for potentially contaminated and contaminated sites within the Ministry of Environmental and Nature Protection;
- Monitoring of emissions to water, waste water, PRTR and IPPC is the responsibility of the Ministry of Environmental and Nature Protection;
- Waste falls under the competence of the Ministry of Environmental and Nature Protection and the administrative departments of county offices;
- Radioactivity is the responsibility of the Institute for Nuclear Radiology. The Institute performs monitoring, reports to the Joint Research Centre in Ispra, Italy, and since 2013 reports to the EC (including last 10 years data). The Institute also issues permits for emitting radiological substances into the environment and monitors sources for drinking water for the Ministry of Agriculture and the Ministry of Health.

- Noise: Responsible institution is the Ministry of Health.
- Vibrations are under the responsibility of the Ministry of Construction and Physical Planning.

3.4 Environmental education

Environment education is under the responsibility of the Ministry of Science, Education and Sports and the Education and Teacher Training Agency. It is based on the Act on Preschool Education (OG 10/97), Act on Education in Primary and Secondary Schools (OG 87/08), the 2003 Act on Institutions of Higher Education, and the 2003 Act on Science and Higher Education. In addition to that pursuant to the EPA (OG 110/07) the ministry competent for the environment together with the ministry competent for education collaborates to create guidelines for education for sustainable development.

Education for sustainable development is based on the Croatian National Educational Standards for pre-school, primary and secondary education (OG 63/08), the 2010 National Curriculum Framework for primary education and secondary education, 2009 Strategy for Sustainable Development, the 2011 Action plan for education for sustainable development and the Strategy for development of vocational education for the period 2008 – 2013. The 2011 action plan results from a joint work of the Ministry of Science, Education and Sports with the Ministry of Environmental and Nature Protection in cooperation with relevant stakeholders. The action plan is part of national framework for curriculum and based on the Strategy for Sustainable Development. Environmental education is one of the National Biodiversity Strategy and Action Plan (NBSAP) strategic goals. It defines education and informing of general public as two important tools in promoting biodiversity conservation.

Long-term strategy on curricula, which includes also pre-school institutions is in preparation and is scheduled to be prepared for the consultation process with parties interested in it by October 2013. Working groups have been established on the level of Government for its elaboration, but the Ministry of Environmental and Nature Protection is not part of these working groups.

Kindergartens, which are more advanced in implementing eco programmes, play also the role of teaching centres for pedagogues through relevant eco programmes. Since 2006 around 40 experts have been trained through this programme each year.

The national framework curriculum defines environment protection as a cross-disciplinary topic, together with health, civic education and security. It is available as a subject of choice (i.e. application ecology) and as a part of other subject curricula. There is a possibility to enroll in the experimental gymnasium for sustainable development in Split. In Croatia there are around 200 eco-schools and 130 schools under the Global Learning and Observations to Benefit the Environment (GLOBE) programme[5].

At the university level, ecological education is part of natural and social science education and is in most cases linked to sustainable development. For example, there are undergraduate programme of Environmental Science of University of Zagreb, Graduate programme of Environmental Science; Graduate programme of Ecology and Protection of the Environment. The University in Čakovec provides courses on construction for sustainable development. Post-graduate studies exist within programmes for sustainable construction, management of sustainable development (in Zagreb) and management of sustainable development in tourism (in Opatija) and interdisciplinary PhD programme of University of Osijek: Nature and Environmental protection.

Through the Education and Teacher Training Agency and the Agency for Vocational Education and Training and Adult Education, teachers have the possibility to be yearly trained on specialized seminars (for chemists, biologists, geographers for primary and secondary schools) on environmental subjects.

The Ministry of Science, Education and Sports promotes education for sustainable development in cooperation with the organisations of civil society.

3.5 Conclusions and recommendations

[5] http://www.globe.gov/about-globe

With the establishment of the Croatian Environment Agency (CEA) progress has been made in the organization of the environmental information and reporting systems in Croatia. The period since the establishment of CEA has been marked by the transition and accession period to the EU, which necessitated the adaptation of the national legislative framework. At the same time efforts were oriented to customization of data (e.g., collection, methodology approach, quality assurance, quality control). Functionality of data flow is an on-going process within CEIS, following the SEIS principles. Some pieces of legislation (ordinances and regulations) related to environmental information and institutional responsibilities are still in the process of revision and adaptation to EU requirements. This process leads not only to new structures in the country but also to new reporting obligations.

Despite the progress, still outstanding issues include: problems with incoming data that are sometimes not validated, processed, harmonized or available on a timely basis, difficulties with connecting to the IT platforms (e.g., databases) of other institutions, not all requirements for building a shared CEIS have been covered by legislation, available funding for information systems databases development is decreasing and there are some gaps in capacities of issues coverage by CEA experts..

Existing environmental data subsystems are compilations of many databases which are often not connected. If protocols continue to be established for small parts of information, there is the risk that the result will be the creation of an opaque and unmanageable mechanism.

Recommendation 3.1

The Ministry of Environmental and Nature Protection, in cooperation with other relevant public authorities and other stakeholders, should continue working towards the establishment of an integrated environmental information system that should provide relevant, comprehensive, accurate and publicly accessible data and information on the state of the environment. Future steps should include:

(a) Strengthening the coordinating role of the Croatian Environment Agency (CEA), with the means for enhancing database development and ensuring adequate knowledge coverage across all issues;

(b) Establishing further National Reference Centres to collect data and report to CEA and other responsible bodies;

(c) Continuing the establishment of protocols for data flow, including workflow definitions (precisely defining who reports what, when and to whom), protocols on higher levels of information subsystems to avoid segregation of the whole system and the definition of standards to regulate methodologies and procedures in the creation, access, protection and uniformity of environmental data and information in the related institutions.

The review of monitoring activities in Croatia reveals that biodiversity, soil, noise and vibration are not monitored regularly. The timely preparation of project documentation, issuing of permits (i.e. IPPC), and preparation and use of assessments in policy making are jeopardized by information gaps, inadequacy of coverage and frequency of monitoring in some areas, too general and highly aggregated information. Methods and measurements used in some cases are not compatible with international standards, so delivered data need further interpretation (e.g. GHG emission data for E-PRTR and for the Emission Trading System are different; emission data in water from CEA and from Croatian Waters are also different). Some laboratories and measuring stations need better improvement in data quality assurance/ control. Existing monitoring networks need constant upgrading and maintenance to keep them operational. Responsibilities are unclear and there is overlapping in some areas. Water-related monitoring (including health) needs better integration in the overall environmental information system.

Recommendation 3.2

The Ministry of Environmental and Nature Protection, in cooperation with other relevant public authorities, should prepare a scoping and evaluation study of existing environmental monitoring (including monitoring on national borders), its links to environment reporting (state-of-the-environment (SoE) reports and reporting according to international obligations) and mechanisms for its continuous updating and regular implementation across all areas (air, water, soil, land use, biodiversity, waste, noise and vibration, and radioactivity).

The procedure for the state of environment reports (SoER) adoption is too complicated and lengthy. The adoption of national SOER lasts for more than two years. As reports include assessment of relevance to the implementation of environment-related strategies and programmers, it is important that the duration of and publishing has been significantly reduced.

Recommendation 3.3
The Government should speed up the procedure for the approval of the SoE report, in order to produce more timely outputs for policy and information purposes.

Croatian environmental information system has been established on the bases of shared environmental information system principles which give many advantages for its further application and use. Reporting system and accessibility of data and indicators relevant for state-of-environment reporting needs further development (digital data flows and workflows, web accessibility, frequency of updating).

Recommendation 3.4
The Ministry of Environmental and Nature Protection, through CEA, should:

(a) Establish an indicators database and make it available via the Internet;

(b) Prioritize environmental data flows and develop e-based data exchange protocols, and web portals for stakeholders (e.g., regions and business);

(c) Work towards making most of the data available at the sources and used for established e-reporting.

Good improvements and results are recorded in education for sustainable development, including environment education at all levels of educations system, especially for young children. However, whole life education has not been much implemented and more possibilities for elderly could be established. Currently, education is very often scientifically and technically oriented. Environment is very much a local issue where big diversity exists. Regional differentiation of issues and needs for environmental education are not currently taken adequately into account in the formulation of curricula.

Recommendation 3.5
The Ministry of Science, Education and Sports should strengthen education for environment protection and sustainable development in the national education curriculum.

Chapter 4

IMPLEMENTATION OF INTERNATIONAL ENVIRONMENTAL AGREEMENTS AND COMMITMENTS

4.1 Major developments since the first EPR

Since 1999 Croatia has ratified 22 multilateral environmental agreements (MEAs) (Annex II). The EU accession process contributed to a modification, refinement and reformulation of many of the laws and secondary legislation. The process of pre-accession negotiations and harmonization of the domestic legislation with that of the EU helped Croatia to continue, or even start in some cases, the implementation process. Full implementation of the MEAs is lacking at the level of regional and local self-governments.

4.2 Framework for international environmental cooperation

Policy and legal framework

The 2007 Environmental Protection Act (EPA) was the main legislative document that defines objectives of Croatia in international environmental cooperation. Concrete priority areas with significant international segment, as identified in the EPA are air, nature, marine and inland water protection, and waste and chemicals management. A new Environmental Protection Act (OG 80/13) replacing the previous EPA was adopted in 2013 (Chapter 1).

The Ministry of Environmental and Nature Protection is acting as the national focal point to most environment-related international agreements. In some areas, such as international cooperation on chemicals management, energy or spatial planning, responsibilities are shared with other ministries such as the Ministry of Construction and Physical Planning, the Ministry of Agriculture, the Ministry of Maritime Affairs, Transport, and Infrastructure, the Ministry of Health, and the Ministry of Science, Education and Sports.

The Croatian Environmental Agency (CEA) reports and coordinates reporting duties towards EEA stemming from the implementation of MEAs and relevant data gathering while the reporting on the implementation of UN MEAs is carried out by relevant ministries.

4.3 Global multilateral environmental agreements

Biological diversity

Croatia is Party to the Convention on Biological Diversity (CBD). Croatia adopted in 1999 its first National Strategy and Action Plan for the Protection of Biological and Landscape Diversity. This strategic document, which outlined the long-term goals and their implementation, gave impetus to the adoption of the Nature Protection Acts in 2003 and 2005, with amendments in 2008 and 2011, as well as the new Nature Protection Act in 2013. A new National Strategy and Action Plan was adopted in 2008. In 2007 Croatia published the Report on the State of Nature. The new Report is being drafted, which will be a basis for preparation of the new revised NBSAP in 2014.

Through these instruments, Croatia has largely fulfilled obligations ensuing from its membership in the main global environmental instruments concerning biodiversity and nature protection. Croatia established a sound biodiversity conservation system. In addition to the Ministry of Environmental and Nature Protection, the State Institute for Nature Protection (SINP), central expert body for nature protection, plays a decisive and positive role in the implementation of the CBD. It is the key institution in the process of identification of areas of natural value and determination of the level of the desired conservation. It plays a decisive role in the management of

the protected areas and use of natural resources, ensures regular reporting on the state of nature and also plays a significant role in promoting the need for protection of nature (educational activities and promotion).

Croatia has made considerable effort in mainstreaming biodiversity in other sectoral policies, in line with the CBD Strategic Goal "A" from the CBD Strategic Plan 2011-2020. Success "horizontal" stories include development of an Agri-environmental Programme 2007-13 and the strong and fruitful cooperation between stakeholders in forest management areas.

In 2003 Croatia ratified the Protocol on Biosafety to the CBD and currently is setting up a comprehensive legislative and institutional system of GMO application control. In 2005 two main acts were adopted (GMO and Food Acts) with the Ministry of Health as the central and coordinating body for managing GMOs. In 2013 the Act on Implementation of the Regulation (EC) No. 1946/03 on transboundary movements of GMOs was adopted (OG 81/13).

Since the ratification of the CBD Convention, Croatia has so far submitted four National Implementation Reports.

Croatia also ratified in 2000 the Bern Convention on the Conservation of European Wildlife and Natural Habitats and the Convention on the Conservation of Migratory Species of Wild Animals (CMS). Under CMS, Croatia ratified the Agreement on the Conservation of African-€asian Migratory Waterbirds (AEWA), the Agreement on the Conservation of Populations of European Bats (€obats) and the Agreement on the Conservation of Cetaceans of the Black Seas, Mediterranean and Contiguous Atlantic Area (ACCOBAMS). Croatia is also a signatory of the memorandums of understanding concerning Conservation Measures for the Slender-billed Curlew and on the Conservation and Management of the Middle-European Population of the Great Bustard.

Wetlands of international importance

Croatia is Party to the Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar Convention) since 1991 and has five declared Ramsar sites, namely the Crna Mlaka, Neretva River Delta, Lonjsko Polje and Mokro Polje, Nature Park Kropacki Rit and Lake Vransko which was designated in 2013. Altogether the designated area of wetlands of international importance is 94,358 ha. Five national implementation reports have been submitted by the country so far. Croatia is fulfilling obligations stemming from the membership in the Ramsar Convention.

International trade in endangered species

Since the ratification of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 2000, Croatia has submitted 3 national biannual reports (with the exception of the biennium 2005-6). Only in the biennium 2009-10 53 violations of the national law were reported. Considering the richness of Croatian biodiversity and its geographical position (six ports of international importance), CITES plays an important role in the country. The main legislative document regulating the trade in protected species is the Act on transboundary movement and trade in wild species (OG 54/13) adopted in 2013.

In 2009, Croatia hosted the first regional CITES workshop in which delegates discussed most urgent issues related to wildlife trade in the subregion (illegal trade in tortoises and illegal hunting of small birds). Croatia has been conducting yearly national workshops for education of customs, inspectors and border and crime police since 2003.

Desertification

In 2000, Croatia ratified the United Nations Convention to Combat Desertification in Those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa (UNCCD). The main responsible authority for the coordination and implementation of UNCCD is the Ministry of Environmental and Nature Protection, but other ministries and stakeholders are responsible for relevant parts such as agriculture, rural development, forestry, water management, drought monitoring, education and science.. In 2002 the Croatian Government established the 14-member National Committee to Combat Desertification with participation of

relevant ministries, academia, NGO´s and private sector, and entrusted it with elaborating a draft national action programme to mitigate the effects of drought and combat land degradation. Even though the programme was prepared, it has never been adopted because of the lack of political will. The UNCCD implementation has been focused on drought preparedness and reducing drought impacts, and partly linked with the implementation of UNFCCC. In 2006, the first UNCCD National Report on Implementation was published. Since then no national UNCCD reporting has been carried out

Climate change

Croatia is an Annex I Party to UNFCCC and Annex B Party to the Kyoto Protocol since in 2007. The overall responsibility for the implementation of the UNFCCC falls on the Ministry of Environmental and Nature Protection with the CEA being responsible, inter alia, for data collection and reporting (national emissions inventories). The Ministry is responsible for setting strategies, coordination and supervision of the implementation and providing technical assistance. Other sectoral ministries are responsible for their relevant parts of the "climate agenda" identified in national policy documents such as transport, agriculture, economy. So far, Croatia has submitted five national communication reports, the latest in 2010. The National Inventory of Greenhouse Gas Emissions Reports, covering the period 1990-2011 was submitted in May 2013.

The First National Communication was submitted in 2001. Considering the fact that at the time after the submission of Croatia´s First National Communication most of the Parties have already submitted their second and third communications and were preparing fourth one, Croatia was instructed to prepare a consolidated version in order to comply with the time frame set by Decision 4/CP.8. A consolidated version covering the second, third and fourth National Communications was prepared using the 1996-2003 data and submitted in 2007. In 2010 Croatia prepared and submitted to the UNFCCC Secretariat its Fifth National Communication.

The key documents for the implementation of the Convention's obligations are the 2008 National Strategy and Action Plan for the Implementation of UNFCCC and the Kyoto Protocol. Both were an integral part of the Air Quality Protection and Improvement Plan for Croatia 2008-2011. The plan also tackles areas and provides measures in agriculture, energy, forestry, industry, transport and waste sectors. The overarching issue of climate change has been also tackled in various documents of strategic nature (the Sustainable Development Strategy, the Energy Development Strategy and the Strategic Framework of Development 2006-2013) and naturally, within the process of legislative harmonization with the EU acquis.

Croatia has set up a robust legal framework in terms of which it is implementing measures to comply with the Kyoto Protocol commitment to keep the emissions between 2008 and 2012 at 95 per cent of total emissions in 1990.

After the reported decrease in emissions by only 0.9 per cent from the base year in 2008, compared to the required 5 per cent, Croatia managed to significantly reduce its emissions in the subsequent years, partly due to the economic recession, partly due to the implementation of measures for emission reduction. In 2007, Croatia started charging stationary sources emitting more than 30 tons of CO_2/year a price of 2 – 2,5 €/t CO_2 eq. However, since 1 January 2013, this obligation was cancelled in all stationary sources to be included in ETS system (see chapter 5).

In the energy sector that is responsible for most of the GHG emissions, Croatia aims for the share of 20 per cent of renewable energy sources in the overall energy mix in 2020, plans to achieve the 400 GWh/year of energy produced from cogeneration, aims at reducing the fossil fuel consumption through utilization of biodegradable municipal waste, plans to improve energy efficiency in the building and household-appliances sector and to introduce biofuels. However, while there have been emission reduction targets and potentials established in the energy sector, similar goals are not available for industrial processes, agriculture or waste management.

Ozone layer

Croatia ratified the Vienna Convention for the Protection of the Ozone Layer and the Montreal Protocol on Substances that Deplete the Ozone Layer in 1991, as well as all amendments to the Protocol. It belongs to a group of 147 countries with low consumption of ozone-depleting substances (ODS) and thus was given longer

periods for their phase-out. In 2006 Croatia completely phased out the consumption of chlorofluorocarbons (CFCs), halons, carbon-tetrachloride, methyl-chloroform and methyl-bromide.

Regarding the consumption of hydrochlorofluorocarbon (HCFCs), since the 2005 when the ban on the import of products using these substances was applied, significant reduction has been achieved. It is planned, in accordance with the HCFC Phase-out Management Plan, to reach complete "virgin" HCFCs phase-out by 2014, but due to EU accession Croatia banned use of "virgin" HCFCs from 1 July 2013.

Centres for collection, recovery and recycling of the above-mentioned ODS and alternative substances have been established in Dugopolje, Zagreb and Rijeka. Regarding disposal of halons from firefighting systems and appliances, halon bank has been established in Varaždin. Annually, the system has a collection rate of 10 tons of ODS. However, the replacement of HCFC containing installations poses a technical and financial challenge to the Ministry of Environmental and Nature Protection as the substances are present in complex systems in the servicing sector, food industry and hospitals.

Persistent organic pollutants

Croatia ratified the Stockholm Convention on Persistent Organic Pollutants in 2006. It submitted its first National Implementation Report in 2008. In 2008, Croatia adopted the National Plan for the implementation of the Stockholm Convention. The main coordinating body for the Stockholm Convention is the Ministry of Environmental and Nature Protection which is specifically responsible for the management of devices and liquids containing PCBs, including the hazardous waste contaminated by PCBs and emission control. It cooperates closely with the Ministries of Agriculture (POPs pesticides licences, use requirements, registration), of Health and its National Institute for Health (POPs licenses, permits) and of Economy and with the State Inspectorate.

Chemical compounds in general fall under the 2013 Chemical Act which regulates the management, production, distribution and use of chemicals in Croatia. In 2008 the National Chemicals Safety Strategy was adopted. Regarding the POPs pesticides, Croatia expects to fulfil the provision of the Stockholm Convention as there is no POPs pesticides production, import or use there. According to the National Implementation Report, no Stockholm Convention POPs compounds have been detected in water, and of POPs concentrations in air are below international requirements.

The use of PCBs and PCB-containing equipment has not been banned in Croatia. However, their use is permitted only in closed systems. PCBs have never been produced as such nevertheless Croatia was importing liquids containing PCBs for the purpose of PCBs-containing equipment. In 2008 the Ordinance on PCBs and PCTs management was adopted. Croatia plans to introduce a systematic monitoring of POPs pesticides in environment in order to reduce the possibility of transboundary pollution from abroad. While there is a satisfactory expert knowledge about the POPs, the awareness among public is lacking. Also, financial constraints limit the capacities and equipment of laboratories for physical and chemical analysis.

Prior informed consent procedure for hazardous chemicals and pesticides

Croatia ratified the Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade in 2007. It entered into force on 14 February 2008. The designated national authority for the Rotterdam Convention is the Ministry of Health which acts in accordance with the Chemical Act. Croatia has been consistent in not allowing import of hazardous chemicals to the country – the 14 import responses in 2010 were all negative, based on the bans of relevant chemicals contained in the national legislation. Croatia as the Member of the EU is part of the central EU system where the import responses fall under the competence of the European Commission.

Transboundary movements of hazardous waste

Croatia is Party to the Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal. In 2005, Croatia adopted the Waste Management Strategy and in 2007 the Waste Management Plan for the period 2007-2015.

In Croatia, import of hazardous waste is generally prohibited. It is permitted only when material recovery is used to create a new product or raw material which ceases to be waste after recovery. So far, only one such case has been reported in Croatia. The new Act on Sustainable Waste Management prohibits the import of hazardous waste, mixed municipal waste and leftovers from the incineration of mixed municipal waste for disposal. As there are no landfills or incinerators of hazardous waste in Croatia, transit and export for final disposal and recovery is permitted providing it is performed by a person registered for carrying out such activity, with a valid decision by the Ministry of Environmental and Nature Protection.

Croatia has regularly reported on the state of the transboundary movement of hazardous waste. Latest available data for 2009 show an average of 150 permits for export issued and a total of 42,444 tons of hazardous waste generated and 17,510 tons exported.

4.4 Regional and subregional multilateral environmental agreements

Access to information, public participation and access to justice

Croatia ratified the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters in 2007. Croatia has not yet accepted the GMO amendment to the Convention. The responsible authority for the implementation of the Aarhus Convention is the Ministry of Environmental and Nature Protection. Croatia has so far submitted two national implementation reports (2009 and 2012). Croatia ratified the Protocol on Pollutant Release and Transfer Registers (PRTR) in 2008. In line with the obligations of the PRTR Protocol, Croatia established the national registry and portal on environmental pollution available at the CEA website. Croatia has adopted a number of laws and regulations that implement the Aarhus Convention (most importantly the EPA, the Right of Access to Information Act and the Regulation on Information and Participation of the Public and the Public Concerned in Environmental Matters).

The first pillar of the Aarhus Convention concerning the access to information is the one best implemented, however problems still persist. CEA is in charge of coordinating and maintaining the Environmental Information System which contains several databases.

Regarding public participation in decision-making, Croatia has made some progress in recent years. However, certain problems, especially with public participation concerning plans, programmes and policies relating to the environment, still persist and the NGOs still deem the implementation of this pillar insufficient. In this sense, the Association for Nature, Environment and Sustainable Development “Sunce” in January 2012 submitted a communication alleging non-compliance of Croatia concerning public participation in adoption of waste management plans on subnational level. The Aarhus Convention Compliance Committee is currently examining the case. Also, according to several civil society representatives, the timely access to information is a problem in Croatia, especially with regard to the draft legislation. This, in effect, makes the participation of public in decision-making processes difficult as information provided is not relevant in the real time.

The implementation also lags behind the adopted legislation, especially with regard to the vertical cooperation as most of the problems seem to exist at the subnational level. Insufficient communication between the main authority, the Ministry of Environmental and Nature Protection, and self-governments is one of the main reasons for unsatisfactory practice at the regional level. The Ministry of Environmental and Nature Protection has carried out several capacity building activities which resulted in the publication of guidelines for information and participation of the public and in procedures of EIA and SEA, and the guidelines for the implementation of the code of practice on consultation with the interested public in procedures of adopting laws, other regulations and acts.

On access to justice pillar, the experience shows that there are still gaps in the implementation of the respective provisions of the Aarhus Convention. Main problems include the length of concrete legal cases and the issue of applying the injuctive relief and definition of standing, even though the situation has improved with the 2012 Administrative Disputes Act that, inter alia, enabled the NGOs to request the courts to apply the injunctive directly. Previous practice, as manifested by the Cvjetni Trg (2008-2011) case, meant that public concerned had to request the application of the injunctive relief from the institution that was being sued.

Industrial accidents

Croatia ratified the Convention on the Transboundary Effects of Industrial Accidents (Industrial Accidents Convention) in 2000. The main authority for the area of transboundary effects of industrial accidents is the Ministry of Environmental and Nature Protection together with the National Protection and Rescue Directorate. Apart from the EPA, which provides the basis for obligations, exemptions, approvals of safety reports, notifications on the safety measures implementation and prevention, Croatia has adopted related legal instruments such as the 2008 Regulation on the Prevention of Major Accidents involving Dangerous Substances and the 2008 Regulation on the Manner of Establishing Environmental Damage.

Croatia has then joined the Convention´s Assistance Programme to build national capacities to address challenges in the area of transboundary industrial accidents and their effects. Croatia participates in the Working Group on Implementation as well as the International Alert System through Center 112 with the main center being located in Zagreb. Among the most pressing is the lacking capacity in the area of safety reports preparations in major industrial installations. Under the Industrial Accidents Convention, several case-study trainings were undertaken with the aim to strengthen the capacities in safety reporting, especially regarding methodology. The cooperation of subregional level, especially with Serbia and the former Yugoslav Republic of Macedonia, has focused on the development of safety reports.

Environmental impact assessment

Since the ratification of the Espoo Convention on Environmental Impact Assessment in a Transboundary Context, three national reports on the implementation thereof have been submitted (2003, 2005 and 2009). The main body responsible for the implementation of the Espoo Convention is the Ministry of Environmental and Nature Protection which published guidelines on the public participation in EIA and SEA processes (June 2011). Between 2008 and 2011, Croatia was a member of the Implementation Committee of the Espoo Convention. Croatia has implemented the main obligations of the Espoo Convention through the EPA and specifically through the 2008 Regulation on the Procedure for Establishing Integrated Environmental Requirements and the 2009 Regulation on Environmental Impact Assessment (EIA). The latter specifies the criteria for the decision on the transboundary EIA and includes three lists of projects to be subjected to the transboundary EIA procedure.

For the period 2006-2009 three projects with transboundary impact were carried out. Croatia acted as the proponent and followed all the necessary EIA procedures. Throughout the transboundary procedure no major problems with implementation were identified.

Croatia ratified the Protocol on Strategic Environmental Assessment (SEA) to the Espoo Convention in 2009. The main authority responsible for the implementation of the SEA Protocol is the Ministry of Environmental and Nature Protection. However, lack of practical experience remains an issue both at the national and subnational levels where there is low or no practical experience with the SEA procedures (see Chapter 1).

Regarding the transboundary SEA and thus the implementation of the SEA Protocol, Croatia has been involved, as Party of origin in one of its kind, namely the river basin management plan of Croatia (2007-2013). Apart from that, as Affected Party it has been involved in five transboundary SEAs, namely the National physical plan for hydroelectric power plant Mokrice (Slovenia, completed in March 2013) and the river basin management plan of Slovenia 2009-2015 (Slovenia, completed in January 2013), the National Energy Programme of Slovenia 2010-2030 (Slovenia, completed in October 2012), the National physical plan for hydroelectric power plant Brežice (Slovenia, completed in March 2012) and the Repository for low and intermediate-level radioactive waste Vrbina in Krško Municipality (Slovenia, completed in May 2010).

Transboundary air pollution

Croatia is Party to the Convention on Long-range Transboundary Air Pollution (CLRTAP) since 1992. Between 2007 and 2008 Croatia achieved one of its four main long-term objectives for the cooperation within the LRTAP Convention, namely the ratification of the protocols of the CLRTAP on Heavy Metals, and on Persistent Organic Pollutants in 2007, concerning the Control of Emissions of Volatile Organic Compounds (VOC) or their Transboundary Fluxes and concerning the Control of Emissions of Nitrogen Oxides (NO_x) or

their Transboundary Fluxes in 2008 and to Abate Acidification, Eutrophication and Ground-level Ozone in 2009.

The implementation of the CLRTAP is under the authority of the Ministry of Environmental and Nature Protection, with support from various national agencies (e.g. the Croatian Environment Agency). The Air Quality Protection and Improvement Plan for the period 2008-2011 includes criteria for the identification of objectives and priorities, assessment of air quality and objectives and policies related thereto. It also defines intersectoral policies, priority measures and the implementation schedule. Measures envisaged in the Plan were developed according to the LRTAP findings.

Also, several sectoral emission reduction plans and programmes have been adopted. In 2008, Croatia adopted the Plan on reduction of emissions of SO_2, NO_x and PM_x from large combustion plants and gas turbines (OG 151/08) based on the information provided by these plants on their mandatory emission reduction programmes for air emissions of pollutants. In addition to this and stemming from close overlaps with the energy sector, Croatia has set strategic goals for air pollution reduction at national level through the 2009 Strategy for Energy Development. Emission ceilings for the pollutants that cause eutrophication, acidification and ground-level ozone formation have been set in the Regulation on emission quotas for certain pollutants in the air (OG 141/08) and the new Regulation adopted in 2013 (OG 108/13). Emission projection and proposal for the new emission quotas were proposed in the Programme for gradual emission reduction of certain pollutants in Croatia for the period until the end of 2010, with emission projections for the period 2010-2020 (OG 152/09) adopted according to the ratified protocols and Regulation on emission quotas for certain pollutants in the air (OG 141/08).

Regarding the SO_2 emissions, Croatia complies with the national level to keep the SO_2 emission bellow the emission at the 1990 level. The emissions in 2011 were around 78 per cent lower than in the base year 1990, thanks to greater consumption of fossil fuels with lower sulphur content and greater consumption of natural gas. The reduction of SO_2 emissions was achieved in almost all sectors due to the installation of sulphur recovery plants, first one in 1997 and second in 2008 within the refineries..

Regarding the NO_x emissions, Croatia complies with the national level to keep the NO_x emissions at the 1990 level. The biggest source of NOx is the road transport, however thanks to the catalytic convertors its contribution has decreased considerably since 1999. Stationary large combustion sources (LCS) remain among the top sources of NO_x emissions (emissions levels for LCS were set in the relevant plan in 2008).

Regarding POPs, Croatia has provided annual emissions report for three groups of POPs, namely pesticides (agricultural use), polycyclic aromatic hydrocarbons (PAH) (residential combustion, coke and aluminium production) and dioxins/furans (fuel wood residential combustion). For all three categories, emission ceilings have been set and complied with, even though at a rather slow pace.

What concerns heavy metals, the situation has since 1999 improved quite considerably, largely due to the phase-out of leaded petrol in vehicles (est. at 9.2 t annually,). Similar development has been identified on mercury and cadmium emissions.

The ammonia emission decreased, mostly because of emission reduction in NPK fertilizers production in the sector “Other chemical industry” due to the implementation of measure for ammonia emission reduction (waste gas treatment devices - scrubbers). The ammonia emission in 2011 is still above the value set under the Gothenburg Protocol (30 Gg), although a declining trend is visible. Reason for the nonconformity is the result of recalculation of the emission in 2003 result of which has led to increase ammonia emissions for whole time series. Recalculated value of ammonia emissions in the 1990 amounted to 57 Gg, which is 47 per cent more than the value set in Gothenburg Protocol.

Use of solvent, road transport, refineries and combustion of wood in households are dominated in NMVOC emissions. Road transport leads to the greatest emissions in the transport sector, but road transport has also shown the greatest reduction in NMVOC emissions due to new exhaust emission requirements. Environmental requirements for reduction of NMVOC emissions from products containing solvents have also contributed to lower NMVOC emissions. The NMVOC emissions trend reduction from 2007 forward is partly a result of implementation of best available techniques (BAT) in the sector solvent and other product use, partly as a result

of decrease in production of solvent products, and partly as a result of population decrease in Croatia. Croatia is fulfilling an obligation towards NMVOC emissions.

PM_{10} emissions are a result of combustion in small sources; industrial processes are the second in domination in respect of PM_{10} emission, while the transport is the third source of PM_{10} emission. For $PM_{2.5}$ emissions, the sub-sector "Small combustion" was the main source, which contributed to total nation $PM_{2.5}$ emissions in 2011 with 49.5 per cent, while transport, the second in domination in respect of $PM_{2.5}$ emissions, has contributed to total $PM_{2.5}$ emissions with 21.3 per cent. In comparison to 1990, $PM_{2.5}$ emissions decreased by 22.9 per cent as a result of consumption of fossil fuels with lower ash content in the stationary energy sector, and also as a result of decreasing trend of animals (number) in the sector manure management.

Transboundary waters

Croatia is involved in several bilateral and multilateral activities that aim to promote a sustainable management of shared water courses. Transboundary cooperation has a long tradition, resulting not only from the need to protect the transboundary water sources but also due to the shared history. Croatia is party to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes and the Convention on the Protection and Sustainable Use of the Danube River and to the Framework Agreement on the Sava River Basin District. The main authority on water management is the Ministry of Agriculture; however, the responsibilities are shared with other ministries, i.e., the Ministry of Environmental and Nature Protection and the Ministry of Health

The backbone of the bilateral cooperation on water management is still bilateral agreements with Hungary, Bosnia and Herzegovina, Slovenia and Montenegro. Central point of cooperation is the management of transboundary water courses, including common projects on the integrated water resource management, including flood protection, and elaboration of river basin management plans (RBMP). Regular meetings within relevant interstate water commissions and various common, internationally-funded projects on transboundary cooperation are at the heart of the transboundary cooperation in the region (see an example in Box 4.1). While there is no similar agreement with Serbia (currently under preparation), the cooperation between the two countries is satisfactory, especially on flood protection on the Danube River.

Box 4.1: Neretva and Trebišnjica Management Project (NTMP)

The Neretva and Trebišnjica Management Project (NTMP) on transboundary cooperation between Bosnia and Herzegovina, and Croatia was started in 2009. The project covers the basins of Neretva River, which is the longest river of the Adriatic catchment area and the water-richest tributary of the Adriatic Sea, and Trebišnjica River, both highly affected by the construction of seven hydropower facilities up to 1984.

The objectives are manifold and cover areas such as transboundary water resource management (capacity building, development of river basin management plans (RBMP)), management and use of wetlands ecosystems and biodiversity (pilot to mitigate salt water intrusion in the delta, management of ecological subsystems – the Baćina lakes), water pollution control (improved industrial waste-water treatment in the metallurgy plant in Konjic) and public participation.

Based on the cooperation in the joint Interstate Water Commission (ISWC), Bosnia and Herzegovina, and Croatia established a coordination committee for implementation of the NTMP. In order to involve as many experts as possible, a technical advisory group was established that comprised experts from Bosnia and Herzegovina, and Croatia from water, environment, agriculture and energy sectors as well as representatives of municipalities and NGOs.

The project has so far resulted in strengthened interstate cooperation in the area of integrated water resources management with RBMP available that are bound to be replicated elsewhere in the region. Reduced stress on environment, as results of the projects, include reduction in saltwater intrusion, improved ecosystem health and biodiversity in the basin and reduction of water pollution from municipal and industrial sources. As a follow-up a technical working group comprised of four experts from Bosnia and Herzegovina and Croatia was formed.

Source: www.gef.org

Coastline and marine environment management

The main instrument for the cooperation on the coastline and marine environment management is the Barcelona Convention on the Protection of the Marine Environment and the Coastal Region of the Mediterranean and its amendments along with the amendments of the Dumping Protocol ratified by Croatia. The focal point is the Ministry of Environmental and Nature Protection. Croatia is also Party also to the Specially Protected Areas and Biodiversity Protocol and the Prevention and Emergency Protocol. In 2006, Croatia ratified the amendments to the Protocol for the Protection of the Mediterranean Sea against Pollution from Land-based Sources and Activities (LBS) and in 2012 the Protocol on Integrated Coastal Zone Management (ICZM). The Offshore Protocol and the Hazardous Waste Protocol have not been ratified yet. Concerning the Prevention and Emergency Protocol, Croatia adopted in 2008 the National Contingency Plan for Accidental Marine Pollution that was elaborated in line with the relevant Subregional Contingency Plan signed by Croatia, Italy and Slovenia in 2005. In 2008, the Agreement on the Subregional Contingency Plan for Prevention and Preparedness for and Response to Major Marine Pollution Incidents in Adriatic Sea was ratified. Concerning the activities related to the recently ratified ICZM Protocol, since 2012 Croatia is preparing national ICZM strategy jointly with the Marine Strategy, thus implementing also the Ecosystem Approach (ECAP Mediterranean) through one strategic document (Marine and Coastal Management Strategy). As part of a GEF MedPartnership Project, an impact analysis of the ICZM Protocol on the national legal framework was conducted. In the framework of the same Project, preparation of Economic and Social Analysis of the Use and Cost of Degradation of Marine Environment and Coastal area is under way, as well as the activities of the Project on Integration of Climatic Variability and Change into National Strategies to Implement ICZM Protocol in the Mediterranean". The results of both will be incorporated into the Marine and Coastal Management Strategy.

Croatia is involved in the activities of the Joint Commission for the Protection of the Adriatic Sea and its Coastal Areas concluded between the former Yugoslavia and Italy. Croatia´s involvement in the multidisciplinary activities of the Commission is coordinated by the Ministry of Environmental and Nature Protection. In 2005 in the framework of the Commission's activities, the Agreement on the Sub-regional Contingency Plan for Prevention and Preparedness for and Response to Major Marine Pollution Incidents in Adriatic Sea was signed by all three countries. Its aim is to serve as a platform, with assistance from the Regional Marine Pollution Emergency Response Centre for the Mediterranean Sea and the UNEP Mediterranean Action Plan (MAP), for cooperation in cases where accidents exceed the available capacity for response of each individual country. The technical work of the Joint Commission is done through sub-commissions which are created according to the needs and agreement among countries. Currently active sub-commissions are dealing with the implementation of the Marine Strategy Framework Directive, ICZM and sustainable development, ballast water management and contingency plan.

In 2000, Croatia signed the Ancona Declaration that established the Adriatic-Ionian Initiative which aims at, inter alia, protecting environment in the area. The main cooperative body is the Adriatic-Ionian Council at the ministerial level with yearly meeting and round-tables on specific topics being the main tool of cooperation, the most relevant being the roundtable for environmental protection and protection against fire.

Some internationally funded subregional projects of Croatia in the area of water and coastal protection have been aimed, simultaneously, at strengthening biodiversity of concerned river basins. In the years 2007-2009, a LIFE project "The Protection of Biodiversity of the Sava River Basin Floodplains" was aimed at supporting preparations for the elaboration of the Integrated River Basin Management Plan (IRBM) and build capacities for the implementation of the Birds and Habitats Directives. In Croatia one IRBM for the entire country is in place even though there are 2 major river basins – these are tackled separately in annexes to the plan.

4.5 International technical assistance on environment

The start of the pre-accession process in 2005, Croatia has hugely benefited from the various EU programmes and projects focused on transposing the EU acquis into Croatian legislation. The most important programme since 2007 has been the Instrument for Pre-accession Assistance (IPA) that followed up on the Community Assistance to Reconstruction, Development and Stabilization (CARDS) finished in 2005. Complemented by the Programme of Community Aid to the countries of Central and Eastern €ope (PHARE) and Instrument for Structural Policies for Pre-accession (ISPA), IPA has been the main channel of funds that have been flowing to the area of environment in Croatia.

The cooperation of Croatia with the Global Environmental Fund (GEF) has so far included 30 projects, 14 on the national and 16 on the regional level. Altogether, Croatia has managed to receive grants in total value of US$43,293,700 and US$76,171,816 respectively (leveraging US$299,767,950 and 590,118,985 in co-financing). Among the national projects, the majority was in the area of biodiversity and climate change. At the regional level, the projects focused in vast majority on international waters (13 out of 16). In 2012, GEF co-funded UNDP projects "National Biodiversity Planning to Support the Implementation of the CBD 2011-2020 Strategic Plan" and "Strengthening the Institutional and Financial Sustainability of the National Protected Area Systems" were approved. Its overarching aim is to integrate and mainstream Croatia´s CBD obligations into national development and sectoral planning frameworks, in line with the global guidance contained in the CBD Strategic Plan.

In cooperation with UNEP, Croatia has focused mainly on the issue of sustainable consumption and production (SCP) and implementation of the Barcelona Convention. UNDP, in close cooperation with GEF, focused on identifying issues preventing diffusion of energy efficient technologies in residential and service sectors (2005/7-2013) and conservation of biodiversity on the Dalmatian Coast (2005-13).

4.7 Sustainable development and millennium development goals

Sustainable development

In February 2009, Croatia adopted the National Strategy on Sustainable Development (NSDS). It focuses on eight key overarching issues, sets basic objectives and identifies key challenges in their realization. By developing such strategy, Croatia fulfilled the requirements of the UN Commission on Sustainable Development (CSD). Croatia submitted national reports for the CSD 16-17 (2008) and CSD 18-19 (2010) which were coordinated by the Ministry of Environmental and Nature Protection. Croatia was actively involved in the preparations of the 2012 UN Conference on Sustainable Development, namely as the Member of the Bureau of the Preparatory Committee of the Rio+20 Conference. Croatia has also prepared a National submission to the Rio+20 Conference.

Millennium Development Goals

Croatia prepared its first Millennium Development Goals (MDGs) implementation report in August 2004 with participation of all relevant governmental institutions, academia and NGOs. Following this, in 2006 Croatia submitted the Progress Report on the Achievement of the National MDGs for the period since 2004. In 2010, Croatia submitted its second national report on the MDG implementation ("Overview of achievements of the Republic of Croatia in the fulfilment of Millennium Development Goals during the period from 2006 to 2010"). The coordinating body was the Ministry of Foreign Affairs and European Integration.

Concerning the MDG-7 ("Ensure Environmental Sustainability"), the 2010 report tackled 3 out of the 31 national targets defined, namely the "Integration of sustainable development principles into national policy and programmes and halt of the loss of environmental resources", "Reduction of number of population without adequate water supply and drainage" and "Improvement of waste management and reduction of waste in the Republic of Croatia". While all the above mentioned targets are of great relevance to Croatia, the focus has been selective and insufficient. While it is understandable that Croatia has put greater emphasis on the EU-related strategic documents which basically guided the 2010 report, the link between the implementation of NSDS and MDGs is still weak. There is a lack of coherent set of indicators in order to better track progress in achieving MDGs.

Considering specific targets and achievements, there is a positive trend, in the process of achieving the MDG-7 ("Ensure Environmental Sustainability"):

- Target 7.1: The proportion of land area covered by forest increased from 33.7 per cent in 2000 to 34.3 per cent in 2010;
- Target 7.2: On amounts of carbon dioxide emissions, the figures vary slightly depending on the sources but overall fluctuations are detectable in both cases with a spike in the years 2005-2008 and a drop in 2009 and 2010 following the financial and economic crisis;

- Target 7.3: The consumption of all ODS substances radically decreased with CFCs dropping from 141,5 tonnes in 1999 to zero in 2011;
- Target 7.6: The proportion of terrestrial and marine areas protected as a percentage to total territory area significantly increased from 6.88 per cent in 1999 to 9.55 per cent in 2010.
- Targets 7.8 and 7.9: The situation related to water usage and sanitation has been kept at high levels since 1999.

4.8 Conclusions and recommendations

Since 2005, Croatia has taken broad range of measures to ensure the participation in and implementation of the majority of MEAs. The process of the ratification of the most important MEAs has been aided to a great extent by the transposition of acquis communataire into the national legislation. Thus, on the level of legislation the implementation of the vast majority of MEAs is almost complete. However, the challenges still remain in practical implementation, mainly on the subnational level where there is lack of awareness and knowledge about the various implementing instruments.

The Ministry of Environmental and Nature Protection is the main governmental institution with responsibilities in the implementation of the country's international environmental obligations. However, in its efforst to implement these responsibilities, the Ministry needs to cooperate with other key stakeholders. So far, the level of cooperation between the Ministry and other State authorities is unsatisfactory, thus contributing to the implementation of MEAs obligations in ad-hoc manner.

Recommendation 4.1
The Government should ensure that:

(a) MEA-related administrative capacities are strengthened;
(b) Coordinating bodies are in place in order to facilitate the implementation of MEA activities;
(c) Cooperation with other State authorities and stakeholders is improved on a regular basis.

Croatia has followed the obligations stemming from the UNFCCC and Kyoto Protocol, especially in the energy sector where there are specific national targets and potentials for reduction. However, in other areas, such as industry, agriculture and waste management, no country-specific targets have been established.

Recommendation 4.2
The Ministry of Environmental and Nature Protection should further focus on establishing national emission-reduction goals in the area of industrial processes, agriculture and waste management.

Chapter 5

ECONOMIC INSTRUMENTS AND FINANCING OF ENVIRONMENTAL PROTECTION EXPENDITURE

5.1 Introduction

Before the global financial crisis that started in 2008, Croatia's economy grew by between four and six per cent annually from 2000 to 2007. In 2008 the country experienced an abrupt economic slowdown and has not yet recovered from it although there was a brief respite in 2010. Croatia re-entered a recession in 2012. The crisis has increased poverty from 10 per cent in 2008 to 14 per cent in 2012. Unemployment rose to over 14 per cent at the end of 2012. Croatia's economy will face in the medium-run pressures as a result of the continuing global financial crisis and the country's dependence on economic cycles of the European Union (EU).

In 2012, Croatia's tourist sector represented around 15 per cent of the country's GDP. The agriculture sector accounted for just 4 per cent of GDP and employed 14 per cent of the labor force. Almost 42 per cent of the country's population lives in rural areas. About half of Croatia's trade is with the €o area, which is also the source of about three quarters of foreign direct investments in the country.

5.2 Economic instruments

Pollution charges

Air pollution charges

Although there were no air pollution charges in Croatia before 1999, charge fees exist today for the emission of carbon dioxide (CO_2), sulphur dioxide (SO_2) and nitric oxides in the form of nitric dioxide (NO_2). This is in line with several Western European countries, where such charges exist, e.g. Sweden, Denmark, Norway, and Italy and where air pollution charges are limited to SO_2 and/or NOx.

Approximately 1,200 polluters are obliged to pay pollution charges that are collected by the Environmental Protection and Energy Efficiency Fund (EPEEF). The levels of charges are as follows:

- CO_2: 14 HRK/t;
- SO_2: 310 HRK/t;
- NO_2: 310 HRK/t.

These pollution charges are uniform across the country, i.e. there are no specific regional coefficients to take into account regional or local environmental conditions. Pollution charges have not been increased since 2008. Unit charges are not being adjusted for inflation. These facts raise the question of effectiveness of these charges as instruments of improving the environmental performance of economic agents operating in the country.

Water effluent charges

The "water protection fee" is a water pollution fee paid by entities that discharge wastewater and those that manufacture or import mineral fertilizers and place these on the market. The tariff of the water protection fee is calculated by Croatian Waters. The base for the calculation of the fee for the quantity of mineral fertilizers manufactured or imported into Croatia is straightforward and it is set at HRK 1 per ton of mineral fertilizers.

The base for the calculation of the water protection charge for wastewater discharge is more complex and it is a function of the quantity and quality of discharged water. Specifically, the basic fee is calculated according to the total amount of wastewater discharged as determined by measurement or expert analysis and assessment. For households and business, the amount of wastewater discharged is calculated on the basis of the quantity of

water supplied. For households that use water from their own wells or pumps, the base volume of 40 m³ of water per household per year is imputed. The base tariffs are:

- 1.35 HRK per m^3 of discharged wastewater since 1 January 2013 (was 0.90 HRK before);
- 0.00135 HRK per m^3 of cooling water discharged in 2013 (was 0.0009 HRK before).

All entities pay this basic tariff based on the volume of discharge. The resulting amount of compensation is multiplied by a coefficient (*k1*) of water pollution in cases of entities that discharge technologically contaminated water or water with modified properties (e.g. differences in temperature.). The correction coefficient *k1* expresses the composition of the wastewater through indicators of water pollution and the presence of hazardous and other pollutants in wastewater. Its calculation is based on specific water rights permits or regulations governing the emission limit values for waste water

The charge for entities whose wastewater is treated prior to discharge is reduced by coefficient *k2*. It is set at:

- 0.70 for activities where wastewater is discharged via the first stage of water treatment;
- 0.30 for activities where wastewater is discharged via the second stage of wastewater treatment;
- 0.20 for activities where wastewater is discharged via the third stage of treatment and have solved sludge treatment and disposal.

A third coefficient *kf* is applied in cases of wastewater discharges that take place in the exercise of economic activity in quantities greater than 30 m^3 per day. The fixed *kf* coefficient is 1.2.

Waste-related charges

Municipal and industrial waste

The parties subject to payment of these annual charges are owners/users of permitted disposal sites for municipal and non-hazardous industrial waste. The charge is calculated and paid according to the weight of waste disposed. The charge for hazardous waste is calculated according to the weight of generated and untreated non-exported hazardous waste, as well as according to the characteristics of such waste.

Packaging waste

Charges for packaging waste are paid by producers or importers to EPEEF to cover the costs of collection, recovery and disposal of packaging waste and are:

- Disposal charge paid by the type of material and by weight of product in order to cover disposal costs;
- Return charge for packaging of beverages with one-time use;
- Incentive charge only paid by the producers who do not have multi-use, returnable packaging in their producing line for the packaging of beverages for the purpose of promoting recycling; paid until the targets are reached.

The fee structure for the disposal charge is as follows:

- PET: 410 HRK/t;
- Aluminum cans: 410 HRK/t;
- Iron cans: 225 HRK/t;
- Paper, cardboard: 375 HRK/t;
- Multi-layered packaging with dominant paper cardboard component
    - For beverages: 410 HRK/t;
    - For other purposes: 750 HRK/t.
- Plastic bags: 1,500 HRK/t;
- Wood: 150 HRK/t;
- Textile: 150 HRK/t;
- Other polymer materials: 750 HRK/t ;

- Glass: 150 HRK/t.

Waste tires

The charge for waste tires is paid by producers and importers of tires to EPEEF to cover the costs of disposal and recovery of waste tires. Specifically:

- Imported or produced tires are charged at a rate of 1,500.00 HRK/t;
- Tires that are an integral part of the imported vehicles and aircraft are charged as follows:
    - For passenger cars at a rate of 10 HRK/tire;
    - For professional vehicles up to 3.5 t and tractors at a rate of 15 HRK/tire;
    - For trucks, buses and forklifts at a rate of 85 HRK/tire;
    - For construction work machines at a rate of 250 HRK/tire;
    - For airplanes and other aircrafts at a rate of 250 HRK/tire.

Compensation to authorized recovery operators and collectors is paid by EPEEF.

Compensation for authorized recovery operators is set as follows:

- For recycling of waste tires at a rate of 750 HRK/t
- For energy purposes at a rate of 120 HRK/t of waste tyres.

Authorized collectors are entitled to the following fees paid by EPEEF for the amount of waste tires collected:

- 350 HRK/t for the received amount of tires from holders of waste tyres;
- 70 HRK/t for temporary storage, sorting and loading prior to transportation for recovery;
- 1 HRK/t/km for transportation from their facilities to the authorized recovery operator.

Charge for end-of-life vehicles

Charges for end-of-life vehicles are paid by producers or importers to EPEEF when placing vehicles on the market to cover the costs of disposal and recovery of waste vehicles. Unit charge for waste vehicles amounts to 0.85 HRK/kg.

Compensation by EPEEF for the costs of collection and recovery end-of-life vehicle has been set at 1.65 HRK/kg.

Charge for waste electrical and electronic equipment

The charge for the management of waste electrical and electronic equipment is paid by producers and importers for placing relevant products on the market to cover the costs of separate collection, treatment and recovery of this type of waste. The unit charge, collected by EPEEF, is 2.25 HRK/ kg. The maximum weight for compensation purposes is set at 500 kg.

Compensation by EPEEF to collection operators has been set at 2.60 HRK/kg of EE waste (VAT included) submitted to the waste treatment operators. Compensation by EPEEF to treatment operators has been set at 1.60 HRK/kg for EE waste other than the first category (big home appliances) and 1.40 HRK/kg for the first category of EE waste.

Waste batteries and accumulators

Charges for waste batteries and accumulators are paid by importers and/or producers for batteries/accumulators placed on the market to EPEEF to cover the cost of collection, treatment and recycling of waste batteries and accumulators including covering of costs for raising public awareness on battery recycling. Compensation is paid per amount of imported and manufactured batteries and accumulators as follows:

- Starters at a rate of 0.45 HRK/kg (since 2009);

- Portable batteries and accumulators at a rate of 8.40 HRK/kg;
- Industrial batteries and accumulators at a rate of 0.70 HRK/kg.

The fee paid by EPEEF to authorized collectors of waste batteries and accumulators amounts to:

- 12 HRK/kg of portable waste batteries received from the holder;
- 0.50 HRK/kg of waste starters received from the holder;
- 0.50 HRK/kg of industrial waste batteries and accumulators received.

The fee paid by EPEEF to recovery operators for the treatment and/or recycling of waste batteries and accumulators amounts to:

- 100 HRK/t for treatment and/or recycling of waste starters and industrial waste batteries and accumulators;
- 7.50 HRK/kg for treatment and/or recycling of waste portable batteries and accumulators.

Waste oils

Fees for the disposal of lubricating oil waste are paid by both producers and importers of lubricating oils to EPEEF when these products are placed on the market, to cover the costs of disposal and recycling. Compensation fee paid to the authorized collectors of oils is 1 HRK/l. Authorized facilities for recovery and/or disposal have to receive waste oils from the authorized collectors without a fee.

Transport-related taxes

Tax on passenger cars, other motor vehicles, vessels and aircraft

Before July 2013, a national tax on the purchase of new cars was in place. The taxable person/entity was the importer and the domestic manufacturer of the motor vehicles, vessels and aircraft. For domestic sales, the taxable base was the sales price, excluding VAT. For imports, it was the customs base plus the amount of the customs duty. From an environmental point of view, this choice of a tax base did not constitute optimum practice, since new technologies which lower the impact on the environment often increase the price of a vehicle (e.g. hybrid cars).

Since July 2013, the Act on Special Tax on Motor Vehicles (NN 15/13, 108/13) regulates the payment of the excise tax on motor vehicles intended for use on roads in Croatia. The special tax is revenue of the State budget.

Special tax on motor vehicles is paid a percentage of the tax base on the basis of the price of the vehicle, according to Table 5.1 and the percentage of the tax base on the basis of the price of the vehicle based on average emissions of carbon dioxide (CO_2), expressed in grams per kilometer according to Table 5.2 depending on the type of fuel used for vehicle traffic, by summing these amounts.

Motor vehicles fueled by diesel fuel, whose average carbon dioxide (CO_2) is up to 85 grams per kilometer and motor vehicles fueled by gasoline, liquefied petroleum gas or natural gas, and whose average carbon dioxide (CO_2) is up to 90 grams per kilometer, not paid the special tax on emissions of carbon dioxide (CO_2).

Special environmental charge for motor vehicles

The special environmental charge is paid at the time of the registration of all motor vehicles, i.e. at the time when the vehicle is certified to be roadworthy. The special charge is calculated and paid according to the type of the vehicle (passenger car or motorcycle), type of the engine and motor fuel, power-rating of the engine, and the age of the vehicle.

This is the second most important source of revenue for EPEEF (table 5.11).

County tax on road motor vehicles

This is a county-level tax. Subject to this tax is any person or legal entity that owns a registered passenger car (up to 10 years old) or a motorcycle. Above 10 years old vehicles are not subject to this tax. The revenue from this tax is not used for environmental purposes.

Table 5.1: Part of special tax on the basis of the vehicle price

Price of the vehicle in HKRs			Tax base per cent
0,00	up to	100 000,00	1,0
100 000,01	up to	150 000,00	2,0
150 000,01	up to	200 000,00	4,0
200 000,01	up to	250 000,00	6,0
250 000,01	up to	300 000,00	7,0
300 000,01	up to	350 000,00	8,0
350 000,01	up to	400 000,00	9,0
400 000,01	up to	450 000,00	11,0
450 000,01	up to	500 000,00	12,0
	over	500 000,01	14,0

Source: Act on Special Tax on Motor Vehicles (NN 15/13, 108/13), 2013.

Table 5.2: Part of the special tax on the basis of average emissions of carbon dioxide (CO_2)

Diesel fuel				Gas, liquefied petroleum gas, natural gas and diesel fuel to the level of emissions of exhaust gases EURO VI			
Emission CO_2 (g/km)			% tax on the price of a vehicle	Emission CO_2 (g/km)			% tax on the price of a vehicle
86	up to	100	1,5	91	up to	100	1,0
101	up to	110	2,5	101	up to	110	2,0
111	up to	120	3,5	111	up to	120	3,0
121	up to	130	7,0	121	up to	130	6,0
131	up to	140	11,5	131	up to	140	10,0
141	up to	160	16,0	141	up to	160	14,0
161	up to	180	18,0	161	up to	180	16,0
181	up to	200	20,0	181	up to	200	18,0
201	up to	225	23,0	201	up to	225	21,0
226	up to	250	27,0	226	up to	250	23,0
251	up to	300	29,0	251	up to	300	27,0
301	up to		31,0	301	up to		29,0

Source: Act on Special Tax on Motor Vehicles (NN 15/13, 108/13), 2013.

The tax increases with the power of the engine expressed in kW, which is obviously environment positive. The tax decreases with the age of the car and is eliminated after 10 years according to table 5.3. This tax structure in effect penalizes newer technologies and vehicles which, as a general rule, are less detrimental to the environment.

The relevant legislative and regulatory on road taxes is the Act on Financing of Units of Local and Regional Self-Government (OG 117/93, 33/00, 73/00, 59/01, 107/01, 117/01 - correction, 150/02, 147/03, 132/06, 73/08, 25/12).

Table 5.3: Passenger car and motorcycle road tax

Power of the engine in kW	HRK paid			
	Up to 2 years old	From 2 to 5 years old	From 5 to 10 years old	Over 10 years old
Passenger car				
under 55	300	250	200	..
55 to 70	400	350	250	..
70 to 100	600	500	400	..
100 to 130	900	700	600	..
over130	1 500	1 200	1 000	..
Motorcycle				
under 20	100	80	50	..
20 to 50	200	150	100	50
50 to 80	500	400	300	200
over 80	1 200	1 000	800	600

Source: Ministry of Finance – Tax Administration, http://www.porezna-uprava.hr/en/EN_porezni_sustav/Stranice/THE-CROATIAN-TAX-SYSTEM.aspx accessed 20 June 2013

County tax on vessels

This is a county-level tax. The legal entity and natural person that is the owner of the vessel is subject to a county-level tax on vessels, that depends on the length expressed in metres, how old the vessel is, whether it has a cabin or not and the power of the engine expressed in kW. The rates are presented in table 5.4.

Table 5.4: Tax on vessels

	Vessel without a cabin			Vessel with a cabin, motor powered				Vessel with cabin and powered by sails			
	Engine power (kW)			Engine power (kW)				Engine power (kW)			
Length in meters	Up to 30	30 to 100	Over 100	Up to 30	30 to 100	100 to 500	Over 500	Up to 10	10 to 25	25 to 50	Over 50
5 to 7	..	200	400	..	200	300	..	..	300	400	500
7 to 10	100	300	500	200	400	500	2,500	200	600	1,000	2,000
10 to 12	200	450	600	300	500	1,000	3,500	300	800	2,000	3,000
over 12	..	..	..	400	1,000	3,000	5,000	400	1,500	3,000	4,000

Source: Ministry of Finance – Tax Administration, http://www.porezna-uprava.hr/en/EN_porezni_sustav/Stranice/THE-CROATIAN-TAX-SYSTEM.aspx accessed 20 June 2013

The relevant legal basis is the Act on Financing of Units of Local and Regional Self-Government (OG 117/93, 33/00, 73/00, 59/01, 107/01, 117/01 - correction, 150/02, 147/03, 132/06, 73/08, 25/12).

Excise duties levied on fuel products

Professional gas-oil end-users in agriculture, fishery and aquaculture are exempted from excise duties on the gas oil. A detailed presentation of excise duties can be found in table 5.5. Looking at the rate structure, it is noteworthy that leaded petrol is still registered in the list of excise duties, although leaded petrol has been phased out from Croatia since 2006. Also, there is an almost seven-fold differential between the tax rate for diesel intended for transport and that intended for heating: HRK 2,050 per 1,000 liters and HRK 300 per 1,000 liters respectively. The resulting price differential might certainly create opportunities for illegal use of the lower-priced heating fuel for transport purposes.

Table 5.5: Excise duties on fuel

Excise product	Excise duty
Petrol used as a motor fuel:	
Leaded petrol	HRK 3,600/1,000 l
Unleaded petrol	HRK 2,500/1,000 l
Gas oil falling within CN codes 2710 19 41 to 2710 19 49	
for motor fuels	HRK 2,0500/1,000 l
for heating	HRK 300/1,000 l
Kerosene – petroleum falling within CN codes 2710 19 21 i 2710 19 25	
for motor fuels	HRK 2,200/1,000 l
for heating	HRK 1,752/1,000 l
Liquid petroleum gas falling within CN codes 2711 12 11 do 2711 19 00	
for motor fuels	HRK 100/1,000 kg
for heating	HRK 100/1,000 kg
Heavy fuel oil	HRK 110/1,000 kg
Biofuels-pure	0 HRK

Source: Ministry of Finance – Tax Administration, http://www.porezna-uprava.hr/en/EN_porezni_sustav/Stranice/THE-CROATIAN-TAX-SYSTEM.aspx accessed 20 June 2013

The relevant regulations are:

- Excise Duties Act (OG 83/09, 111/12);
- Ordinance on the Excise Duties (OG 1/10);
- Ordinance on the Application of the Excise Taxes that Applies to Blue Painted Gas Oil for the Purposes of Agriculture, Fisheries and Aquaculture (OG 1/10, 44/10, 65/10 – correction, 78/10, 131/10, 144/10, 4/11, 44/11, 134/11);
- Directive of the Government on the Amount of Excise Duty for LPG – Liquid Petroleum Gas (OG 4/10);
- Directive of the Government on the Amount of Excise Duty on cigarettes (OG 102/10);
- Directive of the Government on the excise duties on Petrol used as a motor fuel and Gas Oil (OG 28/11).

Utility prices

Electricity prices

Average selling price of electricity in year 2011 (excluded VAT) according to Eurostat categories is shown in Table 5.6. Prices for households picked during the first half of 2009 and dropped considerably afterwards. Prices for industry did not decline.

The current structure of prices for both households and industry is inversely related to consumption, as can be seen in table 5.6. For example in 2011, tariffs per kWh for small consumption in households (< 1,000 kWh) and industry (< 20 MWh) were almost double those charges for large consumption in households (< 15,000kWh) and more than double for large consumption in industry (> 150,000 MWh). This price structure does not offer incentives for innovation and investment in energy efficiency and energy saving.

Table 5.6: Average electricity selling prices (VAT excluded) in HRK/kWh

	2007		2008		2009		2010		2011	
Category	**1-6**	**7-12**	**1-6**	**7-12**	**1-6**	**7-12**	**1-6**	**7-12**	**1-6**	**7-12**
Households										
< 1 000 kWh	0,90	1,09	1,16	1,23	1,26	1,10	1,12	1,09	1,10	1,17
1 000 -2 500 kWh	0,74	0,64	0,64	0,76	0,76	0,67	0,67	0,67	0,67	0,75
2 500 - 5 000 kWh	0,56	0,58	0,58	0,69	0,69	0,68	0,68	0,68	0,68	0,70
5 000 – 15 000 kWh	0,54	0,55	0,54	0,65	0,65	0,66	0,65	0,66	0,66	0,66
> 15 000 kWh	0,40	0,52	0,52	0,62	0,62	0,63	0,63	0,63	0,63	0,64
Industry										
< 20 MWh	0,53	0,68	0,69	0,81	0,81	0,84	0,85	0,85	0,85	0,85
20 - 500 MWh	0,59	0,58	0,58	0,72	0,73	0,75	0,77	0,76	0,77	0,76
500 - 2 000 MWh	0,49	0,54	0,55	0,68	0,64	0,66	0,68	0,66	0,67	0,67
2 000 - 20 000 MWh	0,31	0,46	0,45	0,58	0,54	0,57	0,58	0,57	0,57	0,57
20 000 - 70 000 MWh	0,30	0,34	0,39	0,43	0,46	0,45	0,49	0,49	0,45	0,44
70 000 - 150 000 MWh	0,28	0,30	0,30	0,39	0,40	0,41	0,45	0,39	0,43	0,40
> 150 000 MWh	0,28	0,33	0,33	0,42	..	..	..	0,43	..	..

Source: Annual Energy Report "Energy in Croatia", Ministry of Economy, various years

Petroleum and natural gas prices

Retail prices for petroleum products (table 5.7) and for natural gas (table 5.8) have increased across the board in the years up to 2011. The most impressive increases were seen in the selling price of natural gas in the services sector (where prices almost tripled between 2000 and 2011).

Table 5.7: Petroleum product retail prices (HRK/l) – annual average

Year	BMB EURO 98	BMB EURO 95	DG-EURO	DG-PLAVI	LUEL	UNP A
2000	5,96	-	-	2,76	2,64	-
2001	6,85	-	-	3,01	3,14	-
2002	6,73	-	5,36	2,56	2,71	-
2003	6,66	-	5,44	2,56	2,77	-
2004	7,14	-	6,00	3,08	3,29	-
2005	7,72	-	6,96	4,02	4,17	-
2006	8,24	7,88	7,26	4,21	4,70	-
2007	8,16	7,92	7,40	4,24	4,66	-
2008	8,58	8,48	8,63	5,05	5,83	-
2009	7,38	7,33	6,79	3,68	4,08	3,80
2010	8,45	8,41	7,82	4,64	5,08	4,59
2011	10,00	9,63	9,05	5,48	6,17	4,97

Source: Annual Energy Report "Energy in Croatia", Ministry of Economy, various years
BMB €O 98 - Unleaded Motor Gasoline
BMB €O 95 - Unleaded Motor Gasoline
UNP A - Liquefied petroleum gas
DG-€O - Eurodiesel
DG-PLAVI - Eurodiesel Blue
LUEL - Light Fuel Oil for Households

Table 5.8: Average selling price of natural gas, VAT included

Customer category	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Households	1,45	1,72	1,94	1,95	2,04	2,04	2,05	2,05	2,05	2,41	2,83	2,88
Services	1,45	1,72	1,98	1,99	2,08	2,06	2,07	2,07	2,08	2,44	3,43	4,12
Industry	1,38	1,72	1,94	1,94	2,04	2,05	2,05	2,04	2,05	2,43	3,60	3,99

Source: Annual Energy Report "Energy in Croatia", Ministry of Economy, various years

Water price

According to available data for 2005, the average price of water was HRK 7.89 (€2 1.09)/m^3 for households and HRK 13.64 (€1.88)/m^3 for industries. The prices ranged between HRK 3.50 (€0.48) and HRK 17.51 (€2.41)/m^3 for households and between HRK 3.50 (€0.48) and HRK 24.47 (€3.37)/m^3 for industries. Great differences in water prices between municipal operators are to a large extent the result of different scopes of work of various operators or of a different spectrum of water services they provide and charge to users. The price of water for industries is on the average almost twice the amount of the price paid by households. Around 65 per cent of the funds collected from the price of water is intended for the recovery of costs for performing the activities at the level of municipal operators (operation, routine maintenance and infrastructure management), while the rest is directed to special-purpose funds for the financing of water management and construction of water structures for public water supply and waste water sewerage or into the State budget.

The average price of water in 2009 amounted to HRK 10.54 (€1.45)/m^3 for households and HRK 19.39 (€2.67)/m^3 for industry (the price includes the costs of water supply, sewerage, VAT, and all fees laid down by law, development fee, etc.). In comparison with 2005, the price of water for households increased by 33 per cent and for industry by 42 per cent. The total increase referred mostly to the components of the price of water which is the revenue of a public provider of water utility services. The lowest price of drinking water from public water supply systems for households in 2009 amounted to HRK 3.50 (€0.48)/m^3, and the highest price amounted to HRK 20.15 (€2.77)/m^3.

Water-related fees

Water use fee

The water use fee paid for different commercial water uses related to kind of water and category of water status is a water abstraction fee. Subject to payment of this fee are legal and natural persons abstracting water from its natural reservoir, regardless of the purpose for which water is used. Uses include industry, energy production, services, agriculture and municipal services. Part of the revenue from the water use fee are used for investments in the construction of new or maintenance of existing infrastructure, including treatment plants, water reservoirs and main pipelines. The charges for surface water abstraction since 2013 are:

- HRK 1.35 per m^3 of surface water classified as being in “very good condition” when the water abstracted is related to delivery of water services to public providers;
- HRK 0.72 per m^3 of surface water classified as being in “good condition”;
- HRK 0.56 per m^3 of surface water classified as being in “moderate condition”;
- HRK 0.32 per m^3 of surface water classified as being in “bad and very bad state”.

The charges for groundwater abstraction since 1 January 2013 are:

- HRK 1.35 per m^3 of groundwater classified as being in “good condition” when the water abstracted is related to delivery of water services to public providers;
- HRK 0.32 per m^3 of groundwater classified as being in “bad condition”;
- HRK 1.60 per m^3 of thermal and mineral groundwater.

Water regulation fee

This fee is paid for real estate except the agricultural land and is paid by owners or users of real estate. The basis for the fee calculation is the surface of the property. Funds obtained are used to finance professional, administrative and other costs of the water system, which have the characteristics of public services. Areas funded include plans for flood control and ice protection, plans to protect against erosion, regular technical and economic maintenance of watercourses, regulation and protection of buildings, and the maintenance and management of the drainage and irrigation systems.

Water contribution fee

The water contribution fee is paid by constructors, including the State, under the logic that urbanization projects increase risks associated to floods and flash floods, due to changes in the nature of the landscape and the natural

flow of water. Revenue from the water contribution fee is used among other things for construction and amelioration of drainage infrastructure owned by local governments.

Water development fee

A representative body of the local self-government unit may decide that the development fee be paid. This body may introduce the development fee when increased investments in water utility facilities are needed for protecting water sources within the sanitary protection zones.

The basis for the calculation of the water development fee may be volume of the provided water service or the price of the water service.

The amount of the development fee per unit measure of the water service provided or the rate of the price of the water service is defined by the decision on the calculation and collection of the development fee reached by the representative body of the local or regional self-government.

Subsidies/State aid

Aid for environmental protection and energy saving recorded in 2011 the amount of HRK 26.8 million, which is 1.8 per cent less than in 2010 when it amounted to HRK 27.3 million or some 60 per cent less than in 2009 when it amounted to HRK 64.6 million.

For instance, aid for energy saving was granted by the Ministry of the Economy, Labour and Entrepren€ship in the amount of HRK 5.8 million under the aid scheme Promotion of bio-diesel production in 2011 to the undertakings Biodizel Vukovar d.o.o. from Vukovar and Biotron d.o.o. from Klanjec. EPEEF granted aid in the amount of HRK 5.6 million – HRK 4.1 million in the form of grants and HRK 1.5 million in soft loans.

Emissions trading scheme

Ahead of its accession to the EU, Croatia joined the EU Emissions Trading Scheme (ETS) at the start of Phase III on 2013. To this purpose the Government selected 73 installations to be covered by the EU scheme in its third phase. Out of 73, 60 installations were definitely selected and 13 that are small emitters requested to be excluded from the EU ETS in third phase, and will be covered by the special tax. Croatian companies will be required to surrender allowances in line with their emissions by April 2014.

In order to prepare the Croatian framework for integration with the system of Greenhouse Gas (GHG) emission trading among EU Member States (Directive 2003/87/EC), the Government established in 2008 a GHG emissions trading system in accordance with the criteria used for the EU trading system, based on the Regulation on Greenhouse Gas Emission Monitoring, Policy and Measures for their Reduction in Croatia (OG 87/12). From 2009 installations participating in trading system have been obliged to obtain emission permits, and since 2010 they have the obligation to monitor emissions from installations and to annually submit verified reports.

5.3 Environmental protection expenditures and their financing

The main national sources of funding for environment-related investments are from all private and State ownership business entities (Table 5.10), EPEEF (Table 5.10) and Croatian Waters. In 2011, the priority areas receiving the majority of investment funding were waste management water supply and wastewater treatment. Although there is no evidence of green procurement practices being followed, noticeable efforts are made in the direction of greening the economy, especially on energy efficiency.

Between 2008 and 2010, investments in environmental protection by all business entities declined from HRK 2.3 billion to HRK 2.2 billion, partly reflecting the broader economic crisis. However, in 2011 investments increased substantially and reached HRK 2.8 billion, but decreased in 2012 to HRK 1.21 billion. The majority of investments in 2010 and 2011 went to end-of-pipe investments, mostly in wastewater and waste management. For example, out of a total of HRK 2.8 billion in 2011, about a third went to wastewater management (36.6%) and waste management (30.5%).

Table 5.9: Environmental protection expenditures, investments and revenues from private and State-own businesses, thousand HRK

Year	2008	2009	2010	2011	2012
Protection of ambient air and climate					
Total investments	426 323	298 924	374 808	193 318	150 488
Total expenditures	100 888	119 638	81 161	181 671	129 636
Revenues from environmental protection activities	7 561	7 826	1 046 625	308 322	313 841
Wastewater management					
Total investments	608 296	420 390	349 316	1 034 908	507 490
Total expenditures	295 262	387 577	389 417	539 036	374 042
Revenues from environmental protection activities	448 468	488 323	487 605	604 454	498 823
Waste management					
Total investments	228 111	143 006	170 040	861 633	139 467
Total expenditures	584 251	617 698	645 718	790 300	1 467 031
Revenues from environmental protection activities	640 822	465 155	615 302	1 456 041	1 514 437
Protection and remediation of soil, ground waters and surface waters					
Total investments	293 444	60 741	265 280	237 341	164 392
Total expenditures	95 928	123 750	126 806	189 474	121 875
Revenues from environmental protection activities	32 828	26 629	8 378	32 086	34 795
Noise and vibration					
Total investments	17 586	16 922	141 214	43 541	37 484
Total expenditures	2 796	1 239	760	2 470	764
Revenues from environmental protection activities	107	97	..	..	..
Protection of biodiversity and landscape					
Total investments	29 163	15 984	52 495	45 791	34 385
Total expenditures	48 890	48 510	47 781	41 777	19 937
Revenues from environmental protection activities	4 040	4 130	310	3 104	4 821
Protection against radiation					
Total investments	224	142	44 264	42 760	29 319
Total expenditures	4 575	1 851	2 346	2 219	4 734
Revenues from environmental protection activities	..	..	..	..	..
Other environmental protection activities					
Total investments	713 353	1 173 998	834 866	370 039	58 058
Total expenditures	230 706	189 134	153 346	174 388	166 151
Revenues from environmental protection activities	18 847	17 647	16 446	23 881	16 575
Total					
Total investments	2 316 500	2 130 107	2 232 283	2 829 331	1 121 083
Total expenditures	1 363 296	1 489 397	1 447 335	1 921 335	2 284 170
Revenues from environmental protection activities	1 152 673	1 009 807	2 174 666	2 427 888	2 383 292

Source: Statistical yearbook, various years

Expenditures have increased during the same four-year period from HRK 1.36 billion in 2008 to almost HRK 1.45 billion in 2010 and HRK 2.29 billion in 2012 (table 5.10). In 2010 and 2011 the biggest expenditures were on payments for wastewater (16.37%) and waste management (64.22%). Expenditures for the protection of ambient air and climate reached almost 10 per cent of total expenditures in 2011.

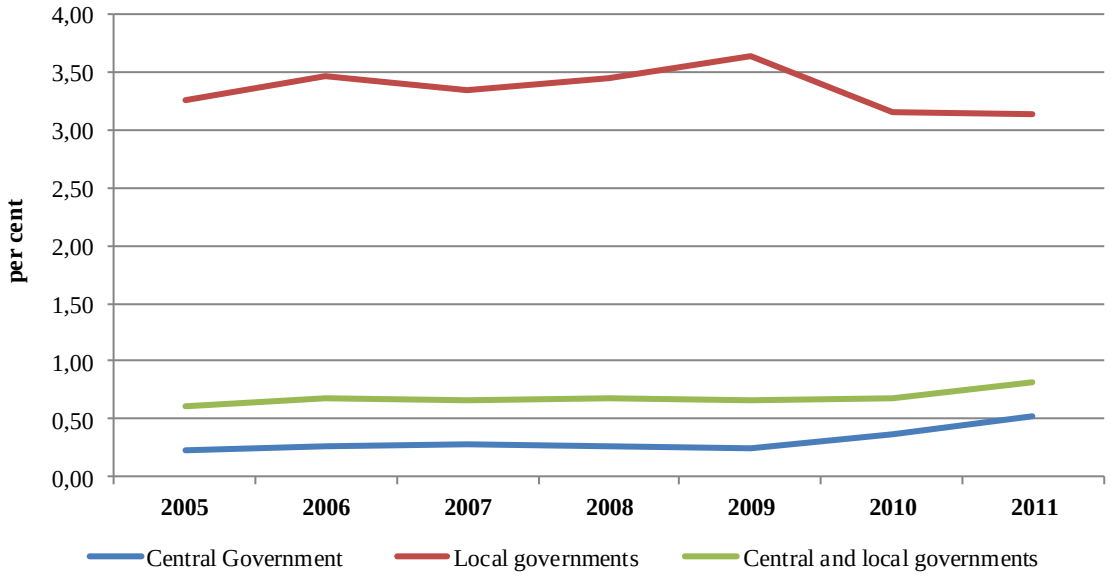
In 2005 central government environmental expenditure was almost half of local government environmental expenditures, whereas in 2011 the relationship reversed: central governmental expenditure was 50 per cent higher than local government expenditures.

The expenditure for environmental protection at the local government level increased in nominal terms from HRK 416 million in 2005 to HRK 624 million in 2009 but then declined in 2010 and 2011 reaching HRK 465 million. When adjusted for inflation, the decline is even more severe: expenditure from local government in 2010 and 2011 dropped in real terms by almost 10 per cent compared to the baseline year of 2005. In fact, the environmental expenditure at the local government level was lower in real terms in 2011 than they were in 2005.

The picture is different when looking at expenditure on environmental protection at the central government level. There was an increase between 2005 and 2011. The highest level of expenditure was observed in 2011 when, in real terms, expenditure was almost 2.5 times the levels observed in 2005. It should be added that some fluctuations were observed during the in-between years but real expenditure has never dropped to its 2005 levels.

Overall, increases in central government environmental expenditure more than offset declines in local government spending (Table 5.11). The aggregate picture is one of considerable increase between 2005 and 2011. Total expenditure (central and local government) in nominal terms in 2011 stood at HRK 1.1 billion, almost double its 2005 levels when it was 622 million. Adjusted for inflation, the 2011 levels were almost 50 per cent higher than the 2005 levels.

Figure 5.1: Percentage of environmental expenditure in total budgets of central and local governments



Source: IMF GFS database. Accessed on 31.10.2013; Statistical Yearbooks.

Waste

Major investments related to waste management are concentrated in the construction of waste management centres, landfill remediation and rehabilitation of environmental hot spots polluted by hazardous waste. Between 2006 and 2011, more than 4,000 jobs were created in the waste management system.

Implementation of a special waste flow management system is also underway (application of the 'polluter pays' principle), for which funds are ensured through the Environmental Protection and Energy Efficiency Fund.

Landfill remediation

The remediation and closing of existing municipal disposal sites is financed as part of the Waste Management Strategy by EPEEF in co-operation with local government and self-government units. Between 2004 and 2011 EPEEF accepted 299 remediation projects for a total amount of HRK 2.9 billion (€370 million) and participates in financing with the amount of HRK 1.6 billion (€213 million), accounting for 55 per cent of the total amount.

By the end of 2011, a total of 107 municipal landfills were remediated and HRK 553 million (approx. €73 million) were disbursed by EPEEF. Of the total amount of HRK 1.6 billion approved for the period until 2018, it was planned that HRK 54 million would be realized in 2012; of these, it appears that only about HRK 30 million were used (table 5.11). In 2013 additional HRK 67 million are planned and the remaining funds in the period until 2018, which is the deadline for completion of remediation and establishment of waste management centres. EU structural funds are further planned for co-financing of landfill remediation. For the 2012-2013 programming period, 42 remediation projects in the total value of €155.8 million are under preparation. The

preparation of the indicated projects, i.e. of the necessary technical and other documentation, is co-financed by EPEEF and by local self-government units in the total amount of €7 million.

EPEEF has accepted projects for the remediation of dump sites (illegal landfills) at 1,007 locations in 192 local self-government units, 2 nature parks and one national park. EPEEF has allocated funds for the remediation of dumps amounting to HRK 103 million (€14 million). By the end of 2011, 750 dumps were remediated, for which EPEEF disbursed HRK 65.7 million (€8.7 million). In 2012 preliminary figures show a drop to HRK 668,000 for this purpose.

Waste management centres

ISPA funds were used for the establishment of the Regional Waste Management Centre Bikarac, Stage I, in Šibenik-Knin County. The total approved value of the project was €8.8 million, including €6 million of ISPA funds, €1.57 million to be provided by the City of Šibenik, and €1.25 million by EPEEF. The main works contract was completed in November 2011.

The ISPA programme was officially closed on 31 December 2011, and by that time a total of €7.31 million was spent (including €4.97 million provided by ISPA funds, €1.3 million by the City of Šibenik, and €1.04 million by EPEEF). The remaining contracts under implementation were completed by mid- 2012, and the total amount of €0.51 million was financed by EPEEF (€0.42 million) and City of Šibenik (€0.09 million).

In December 2012 EU approved the revised project applications for construction of two county waste management centres Marišćina (Primorje–Gorski Kotar County) and Kaštijun (Istria County). For these two projects total eligible costs amount to €71.2 million, out of which EU funds are €50.6 million, EPEEF funds €3.8 million, and local co-financing €16.7 million. In 2012, EPEEF spent approximately HRK 24 million for the waste management centre Marišćina and approximately HRK 6 million for Kaštijun (table 5.11). The subsequent project in the pipeline for EU structural funds for 2013 Bikarac (Stage II), which are under preparation.

Within the OP Environmental Protection 2007-2013, total amount of €73.9 million was allocated for projects in the waste sector. For the programming period 2014-2020, in the waste sector, construction of both county and regional waste management centres is planned, in accordance with the National Waste Management Strategy and National Waste Management Plan 2007-2015 aimed at ensuring more efficient waste management system and fulfilment of targets under the Accession Treaty. In 2012 and 2013 HRK 392.77 million (€52.37 million) are allocated for financing the preparation and construction of waste management centers Kaštjun, Marišćina and Bikarac.

For preparatory works for the establishment and construction of nine waste management centres in the territory of Croatia EPEEF funds amounting to HRK 70.4 million were allocated, and funds amounting to HRK 37.4 million were disbursed.

Remediation of hot spots

The remediation of hot spots is co-financed by EPEEF and local self-government units. From 2004 to 2012, for the remediation of 'hot spots' and other hazardous waste locations, funds in the amount of HRK 471 million were disbursed.

Under the 2012-2014 EPEEF work plan, funds for the remediation of hot spots amounting to HRK 183 million (€24.4 million) are planned.

Other waste-related expenditures

In 2011 EPEEF expenditures connected with the implementation of the Waste Act and ordinances on the disposal of special waste categories (packaging, vehicles, tires, batteries, WEEE, oils) amounted to HRK 693 million.

Remediation activities and infrastructure investment are a top priority at this stage for Croatia. Other important activities, for example waste generation reduction, are lower priority at this stage.

It is characteristic that the following activities attracted less than HRK 20 million in 2011:

- Encouragement of waste generation avoidance and reduction;
- Recovery and use of valuable characteristics/components of waste;
- Protection, conservation and improvement of the quality of air, soil, water and sea;
- Promotion of cleaner production, avoidance and reduction of waste generation.

Water and wastewater-related investments

Local self-governments are responsible for financing construction and maintenance of water utility infrastructure. Funds collected through the water fees by Croatian Waters (water use fee and water protection fee) (Table 5.13) are used, as grant funds, for co-financing construction of water utility facilities for water supply and wastewater collection and treatment at the State level. The development fee is used for co-financing of the same purposes at the local level. The ratio of co-financing is established depending on the connection rate and level of development of municipalities (index).

Funds of the State Budget are used as financial aid (grants) for development of water utility infrastructure projects/programmes, infrastructure projects of national significance, and for the development of water utility infrastructure where the local self-governments are unable to ensure their share in financing of the total costs.

Table 5.10: EPEEF's actual investment in environmental protection and energy efficiency, thousand HRK, 2004-2012

	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Environmental protection										
Remediation of municipal waste landfills	27 420	134 903	61 463	57 460	79 176	88 013	54 928	44 474	29 630	577 468
Remediation of illegal landfills	0	8 930	16 013	9 671	16 593	8 362	4 406	2 527	668	67 169
Avoiding and reducing the generation of waste	0	0	14 108	43	1 500	0	6 983	1 834	2 054	26 522
Waste Management	0	1 504	3 694	7 006	5 108	5 206	8 169	72 621	4 688	107 997
Waste management - construction of county waste management center Kaštijun	0	0	0	0	0	0	0	0	5 914	5 914
Waste management - construction of county waste management center Marišćina	0	0	0	0	0	0	0	0	23 871	23 871
Waste recovery and exploitation valuable waste properties	418	6 442	3 153	21 775	23 683	20 075	9 579	2 926	3 624	91 675
Remediation of hazardous waste	156	546	12 531	105 696	60 411	112 091	56 622	53 359	69 893	471 305
Former factory workers compensation workers SALONIT Ltd. Vranjic	0	0	0	0	0	0	0	0	19 163	19 163
Construction waste - asbestos	0	0	0	0	0	8 280	0	0	0	8 280
Protection, preservation and improvement of the quality of air, soil, water and sea	0	0	50	0	191	4 195	200	0	264	4 900
Promoting cleaner production, avoiding and reducing waste	0	0	16 828	7 720	10 645	16 073	4 081	3 927	1 445	60 717
The protection and preservation of biological and landscape diversity	136	751	2 331	1 531	3 202	3 182	3 035	2 094	1 139	17 401
Promoting sustainable development of rural areas	0	0	0	5 516	2 026	4 904	3 366	1 048	332	17 192
Encouraging educational, research and development studies of environmental protection	0	20	413	6 138	4 150	3 942	3 253	702	1 017	19 636
Other environmental projects	0	20 469	9 309	11 110	28 412	7 960	7 016	8 982	18 462	111 720
Subtotal	**28 130**	**173 564**	**139 892**	**233 664**	**235 098**	**282 284**	**161 640**	**194 493**	**182 163**	**1 630 929**
Energy efficiency										
Implementation of the National Energy Programme	0	0	12 036	15 733	12 863	31 517	28 726	18 482	31 091	150 449
Implementation of energy audits	0	2 135	83	0	1 171	88	0	0	447	3 924
Promoting the use of renewable energy sources	0	0	2 960	15 261	5 831	8 441	14 780	7 126	13 253	67 652
Promoting sustainable construction	0	0	1 082	1 291	2 663	7 844	15 000	9 602	14 844	52 326
Promoting cleaner transport	0	0	0	0	249	44 798	33 646	3 040	0	81 732
Encouraging educational and information activities on energy efficiency	0	0	979	567	5 540	2 070	318	896	1 398	11 768
Other projects and programson on energy efficiency	0	0	0	3 784	9 982	7 918	24 299	20 441	318	66 742
International cooperation	0	0	0	0	0	0	0	0	14 386	14 386
Encouraging educational and information activities on energy efficiency	0	0	0	0	0	0	0	0	101	101
Subtotal	**0**	**2 135**	**17 141**	**36 636**	**38 298**	**102 676**	**116 769**	**59 587**	**75 838**	**449 080**
Managing special categories of waste	0	0	592 295	839 749	833 941	595 308	719 180	692 850	691 435	4 964 758
Total	**28 130**	**175 698**	**749 328**	**1 110 049**	**1 107 337**	**980 269**	**997 589**	**946 930**	**949 436**	**7 044 767**

Source: Environmental Protection and Energy Efficiency Fund, 2013.

Table 5.11: Environmental expenditure from central and local governments, in million HRK

	2005	2006	2007	2008	2009	2010	2011
Budgetary central Government total outlays, cash	89 686	97 859	111 052	118 584	120 191	121 874	121 425
of which:							
Environmental Protection	206	262	311	306	289	450	641
Local government total outlays, cash	12 783	14 143	15 809	17 861	17 165	15 687	14 786
of which:							
Environmental Protection	416	491	529	615	624	494	465
Central and local governments outlays	102 469	112 002	126 861	136 445	137 356	137 561	136 211
of which:							
Environmental expenditures	622	753	840	921	913	944	1 106

Source: IMF GFS database. Accessed on 31.10.2013; Statistical Yearbooks.

Table 5.12: Collected income of the Environmental Protection and Energy Efficiency Fund in thousand HRK

	2004	2005	2006	2007	2008	2009	2010	2011	2012	Total
Charges for emissions of CO_2	0	0	0	15,598	32,272	113,134	53,463	57,238	65,331	337,037
Charges for emissions of SO_2	2,372	8,307	9,595	12,396	18,739	16,189	6,223	9,561	2,598	85,979
Charges for emissions of NO_2	1,142	3,584	6,175	5,804	4,386	6,460	6,043	2,631	3,565	39,791
Charges for non hazardous tehnological (industrial) waste	2,486	3,459	6,027	8,862	8,277	1,488	7,086	0	2,756	40,441
Charges for hazardous waste	222	994	2,249	920	24	15	0	0	0	4,425
Special environmantal charges for motor vehicles	164,298	196,387	212,117	225,816	214,364	220,715	231,966	228,296	228,738	1,922,698
Subtotal	**170,519**	**212,731**	**236,164**	**269,397**	**278,062**	**358,002**	**304,781**	**297,726**	**302,988**	**2,430,370**
Charges for packaging and packaging waste	0	27	397,888	627,866	561,939	537,357	483,947	496,749	478,078	3,583,850
Charges for managing waste tires	0	0	21,125	44,709	42,006	31,736	27,523	28,856	28,973	224,928
Charges for managing waste vehicles	0	0	0	87,979	104,505	56,819	46,506	47,954	39,136	382,899
Charges for managing waste oil	0	0	0	29,563	49,070	42,207	35,920	40,047	41,412	238,220
Charges for managing waste bateries and accumulators	0	0	0	7,862	12,760	10,359	6,664	6,499	7,563	51,708
Charges for managing waste electrical and electronic devices and equipment	0	0	0	32,784	169,504	121,776	123,600	100,209	107,323	655,196
Subtotal	**0**	**27**	**419,013**	**830,763**	**939,785**	**800,254**	**724,159**	**720,314**	**702,484**	**5,136,800**
Total	**170,519**	**212,758**	**655,177**	**1,100,160**	**1,217,846**	**1,158,256**	**1,028,941**	**1,018,040**	**1,005,472**	**7,567,170**

Source: Environmental Protection and Energy Efficiency Fund, 2013.

Table 5.13: Sources of revenue of Croatian Waters in thousand HRK

Sources of Revenue	2005	2006	2007	2008	2009	2010	2011	2012	2013 (est.)
Water fees									
1. Fee for water use	300,974	284,805	284,754	272,986	270,864	279,312	298,133	284,724	436,000
2. Water protection fee	286,418	271,685	275,619	251,806	220,729	221,503	221,197	218,712	326,000
3. Fee for the extraction of sand and gravel *	22,932	11,222	89,898	..	..	..	..	..	..
4. Water regulation fee	475,067	570,309	650,104	720,034	682,580	672,021	659,977	757,641	690,000
5. Water contributions	..	319,698	576,267	634,567	602,489	414,682	316,448	178,163	160,000
Subtotal	1,085,391	1,457,719	1,876,642	1,879,393	1,776,662	1,587,518	1,495,755	1,439,240	1,612,000
Revenue from State budget	461,148	384,088	631,870	793,616	433,267	467,575	469,386	386,268	581,699
Other Revenues	156,856	191,759	179,600	226,616	179,022	103,286	98,640	140,990	140,288
Total	**618,004**	**575,847**	**811,470**	**1,020,232**	**612,289**	**570,861**	**568,026**	**527,258**	**721,987**

Source: Croatian Waters, 2013.
Note: * The fee for the extraction of sand and gravel was repealed in the new Water Act.

Loans of international financial institutions, which are also used for co-financing of construction and development of utility infrastructure facilities and systems, are repaid from the funds of: the development fee and special surcharge on the water tariff, the State Budget, budgets of local and regional self-governments, water fees (water use fee and water protection fee), in the percentages pursuant to the signed agreements on loan repayment.

Total investments in the development of public wastewater collection and treatment systems in 2011 equaled about HRK 938 million. This amount also includes servicing of earlier taken loans which are used for the stated purposes.

In 2015, investments will start into public sewerage systems in the Adriatic area through the Coastal Cities Water Pollution Control Project and Inland Waters Project (IBRD loan). The exact status of these investments is not known.

Nature protection

Nature protection activities are financed from the State Budget, by self-financing through activities of national and nature parks, international projects, from EPEEF, and partly from county budgets and other sources.

In the period 2007-2011, funds from the State budget and EPEEF amounted to HRK 65,738,939. For 2012, funds from the State Budget and EPEEF were envisaged in the amount of HRK 34,245,290. This sum included HRK 24,480,290 from the State Budget (of which HRK 18.774.139 is World Bank loan) and HRK 9,765,000 from EPEEF. However, only 1,139,000 appeared to have been actually spent under item "protection and preservation of biodiversity and landscape" of EPEEF (table 5.10).

In the period 2007-2011 EPEEF approved funds in the amount of HRK 16.767 million for co-financing projects on protection/conservation of biodiversity and landscape. EPEEF has invested in protection of natural values in protected areas (capital investments in national and nature parks), conservation of endangered species (such as White stork, Griffon vulture, €asian lynx), remediation of unauthorized waste landfills in protected areas and other ecologically important areas, development of a fire protection system in protected areas, inventory and monitoring, scientific research and education relevant for conservation of biological diversity and fulfilment of international obligations.

During 2011 EPEEF realised a total of almost HRK 2.1 million (39.51 per cent of planned amount for 2011 – HRK 5.3 million) for biodiversity and nature protection projects and a total of HRK 702.061 (18.48 per cent of planned amount for 2011 – HRK 3.8 million) for educational projects closely related to the topics of nature protection and biodiversity.

In its financial plan for 2012 EPEEF has allocated the following:

- A total of HRK 5 million for biodiversity and nature protection projects;
- A total of HRK 4.765 million for educational projects closely related to topics of nature protection and biodiversity.

EPEEF also supports the preparation of technical and all other relevant documentation for EU Projects together with co-financing (EPEEF), and for that purpose, EPEEF has established an expert committee for the evaluation of biodiversity and nature protection project proposals.

Green initiatives

EPEEF is one of the main financial levers promoting green investments in Croatia. According to its annual financial reports to the Parliament, it provided a range of loans, grants and subsidies to stimulate green initiatives. Total disbursements for the purpose amounted to €148.65 million in 2005-2011.

In the period 2004-2010, a total of €3.2 million were disbursed to finance 78 projects in the sustainable building sector. These projects were related to the improvement of energy efficiency of buildings with regard to lighting

and heating systems, energy efficient building envelopes and substitution of the primary energy source in boiler plants as well as optimization of combustion systems.

€17.66 million were used to finance the implementation of the 2010 National Energy Efficiency Programme for the period 2008-2010.

Within its core activities, EPEEF also supports the organization and financing of a system for the management of specific waste streams. Revenues generated by Fund from charges by users of the environment, importers and producers of packaging waste, waste tires, vehicles, oil, batteries and accumulators and electrical and electronic waste and equipment are used to pay the expenses of collection and recycling of these waste streams to licensed collectors and recovery operators.

For example, since 2006, EPEEF has financed a system of separate collection and recycling of packaging waste. Revenue from fees paid by producers/importers for bringing packaging into the marketis used by EPEEF to recover/dispose waste collected through an authorized collector, who dispatches PET, aluminum and tin (Al/Fe) cans, and glass packaging to waste packaging management centers. This led to improvements in collection of packaging waste. From 2007 to 2009, 57.4 tons of PET packaging were collected, of which 53.8 were recycled. 152.3 tons of glass packaging and 2.7 tons of Al/Fe packaging were collected, all of which were recycled.

5.4 International level

In the period 2007-2012, Croatia has received €910.2 million as an allocation from the Instrument for pre-accession assistance (IPA). For 2013 €94.8 million was allocated. The main programme for environment, the Environmental Operational Programme (EOP) of Croatia has been financed from IPA Component I – Transition Assistance and Institution Building, Component II – Cross-border Cooperation and Component IIIb – Regional Development.

EOP has three priorities: waste management infrastructure; improved water supply and integrated wastewater management systems; and technical assistance. The priorities were chosen in accordance with the overall hierarchy of national strategic document (mainly the Strategic Development Framework 2006-2013, the National Environmental Strategy and various sector strategies). Total expenditure under EOP for year 2007-2011 reached €113.8 million, of which €96.7 million were financed by IPA (at a co-financing ratio of 85%) and €17.1 million by Croatia.

The authority responsible for the implementation of the EOP is the Ministry of Environmental and Nature Protection, which is responsible for the management of environmental IPA projects. On the project-level, the Ministry of Environmental and Nature Protection shares the responsibility with the Ministry of Agriculture, Croatian Waters and the Environmental Protection and Energy Efficiency Fund.

5.5 Institutional Framework

Environmental Protection and Energy Efficiency Fund

The Environmental Protection and Energy Efficiency Fund (EPEEF) was established in 2004 by the 2003 Act on the Environmental Protection and Energy Efficiency Act (No 01-081-03-2395/2) with the aim to strengthen environmental financing of conservation, sustainable use, protection and improvement of the environment and also financing of energy efficiency and renewable energy sources.

EPEEF is an extra-budgetary fund. The operation and structure of EPEEF are defined in the 2003 Act and the 2003 Statute of the Environmental Protection and Energy Efficiency Fund (OG 107/03) that was approved by the Management Board of EPEEF with the consent of the Government. The management structure of EPEEF consists of the Management Board (Board) and the Director, who is appointed by the Board. The Board consists of the Chairman and 6 members. The members of the Management Board are appointed by the Government and include 2 representatives from the Ministry responsible for environmental and nature protection, 1 representative from the Ministry responsible for energy, 1 representative from the Ministry responsible for finance, 1 representative from the Croatian Parliament, 1 representative from the Croatian Chamber of

Economy, and 1 representative among experts in the field of environmental protection. The Director manages EPEEF's operations. The Management Board of EPEEF adopts the work programme and financial plan for each fiscal year and EPEEF's long-term work programme.

The resources of EPEEF are used to finance programmes and projects determined in accordance with the country's strategic and policy documents related to the environment and energy.

The revenues of EPEEF are generated from pollution charges, waste charges, and special environmental charges for motor vehicles.

For example, based on the regulations on the collection of fees issued by the Government, EPEEF calculates fees and issues an official decision to all polluters (enterprises) on how much they have to pay for emissions into air. The Croatian Environment Agency reviews the accuracy of the reporting of the enterprises to the Register of Environmental Pollutants. In 2010, 2011, and 2012 a total of almost HRK 240 million were charged on air emissions, of which a total of about HRK 207 million or 86 per cent was received by EPEEF.

Collected income on all types of charges in 2004-2012 is presented in table 5.12.

Croatian Waters

Croatian Waters is institutionally subordinated to the Ministry of Agriculture. For the purpose of water management, Croatian Waters establishes water management departments and water management branch offices.

The water management departments are in charge of implementing the Water Management Plan in their respective river basin district by, among other things, communicating and cooperating with the bodies of local and regional self-governments, users of water and the water estate, payers of the water fees, and users of funds provided by Croatian Waters.

The Water Services Council is responsible to ensure legality in the field of determining the price of water services. The Council consists of nine members that are experts in the field of water supply and wastewater sewerage, water management, economy, public finance or other fields. The members of the Council are appointed and suspended by the Croatian Parliament upon the proposal of the Government, and are appointed to a term of five years and may be suspended before the expiry of the stated period.

According to the Water Management Financing Act (OG 153/09, 90/11 and 56/13), water management is financed by water fees, as follows:

1. Water contribution;
2. Water regulation fee;
3. Water use fee;
4. Water protection fee;
5. Amelioration drainage fee;
6. Irrigation fee;
7. Development fee.

Water fees under item 1 through 4 are revenue of Croatian Waters. The amelioration drainage fee (5) and irrigation fee (6) are revenue of the budget of regional self-governments. The development fee (7) is revenue of the public water service provider.

The legal basis for the water protection fee is also provided by the Regulation on fees on water protection (OG 82/10 and 83/12); and the Ordinance on the calculation and payment of water protection fees (OG 83/10). Sources of revenues of Croatian Waters in 2005-1013 are presented in Table 5.13.

5.6 Policy framework for strengthening environmental expenditure and investments for greening the economy

Croatian Strategic documents regarding the environmental, nature protection, and waste management are the Environmental Protection Strategy, the Environmental Action Plan, the Strategy and Action Plan for the Protection of Biological and Landscape Diversity, the Waste Management Strategy, and the Waste Management Plan for the period 2007-2015.

In particular, the Waste Management Strategy regulates management of different types of waste with the aim of avoiding and reducing the generation of waste. One of the main principles is to encourage recycling and reuse of waste. Therefore, based on the Waste Act, which define the principle of "polluter pays", the Ministry of Environmental and Nature Protection adopted a number of ordinances which regulate measures and economic instruments used to encourage recycling and reuse of waste for economic purposes and are:

- Ordinance on packaging and packaging waste;
- Ordinance on waste tires management;
- Ordinance on the management of end-of-life vehicles;
- Ordinance on the management of waste electrical and electronic appliances and equipment;
- Ordinance on waste batteries and accumulators management; and
- Ordinance on waste oil management.

The Water Management Financing Act, which entered into force on 1 January 2010 regulates the sources of funds for the financing of water management, and in particular water fees, including payment obligation, fee payers, basis for payment, method of calculation, determining the fee rate, spending purposes of such funds, enforcement, statute of limitations, and other issues related to realizing and using such funds. The prices of water services are regulated by the Water Act (OG 153/09).

Participation of local and regional self-governments in financing the costs of construction, development, and operation and management of water utility systems is regulated by the Act on Financing of Units of Local and Regional Self-Government (OG 117/93, 33/00, 73/00, 59/01, 107/01, 117/01 - correction, 150/02, 147/03, 132/06, 73/08, 25/12).

5.7 Conclusions and recommendations

There are some useful measures the country has taken in the application of its taxation policy (e.g. electric cars being excluded from special tax on road vehicles) that can provide a useful re-direction towards the support of green initiatives. The Government established the Environmental Protection and Energy Efficiency Fund (EPEEF) as extra-budgetary sources for financing green initiatives and environmental protection projects. However, the share of green horizontal subsidies in these funds is relatively small.

Recommendation 5.1:
The Government should increase the share of green horizontal subsidies in the extrabudgetary Environmental Protection and Energy Efficiency Fund.

At the time of the EPR review, Croatia's air pollution charges were limited to only CO_2, SO_2 and NO_2. CO_2 charges stopped for installations which are included in EU ETS system, which is in force since 1 January 2013. At the same time the level of remaining charges has remained the same since 2008 because of the economic and financial crisis in order to reduce the burden on enterprises. Pollution charges are not adjusted for inflation and do not reflect regional particularities (e.g., levels of air quality for SO_2 and NO_2).

Recommendation 5.2:
The Government should review its air pollution charges policy to encourage companies to make environmental improvements, in particular by:

(a) Introducing an automatic indexation mechanism for rates;
(b) Adapting charge levels for regional particularities.

Electricity prices in Croatia decrease progressively as consumption increases for both households and industry. This price structure, in effect, rewards higher consumption and therefore does little to change the behaviour of

economic agents and households. Cumulatively, then, the price structure discourages energy efficiency innovations and energy savings.

Recommendation 5.3:
The Government should review and adjust the electricity price structure in order to encourage energy saving and energy-efficiency improvements.

Vehicle-related charges in general increase with the horsepower of engines; however they decrease with the age of vehicles (cars and motorcycles). Similarly, the tax base of sales taxes is the value of the vehicle with disregard to its environmental performance, thus penalizing environmentally friendly vehicles (such as hybrid vehicles). In this way, some of the currently applicable tax bases weaken demand for less polluting vehicles.

Recommendation 5.4:
The Government should review and adjust the current system of transport-related taxes, in order to encourage transition to less environmentally polluting practices and choices.

Chapter 6

WASTE MANAGEMENT

Croatia has a clear understanding of the necessary arrangement of waste management and has already made significant progress towards its implementation. Importance of waste management is politically and institutionally fully recognized and the Government has secured so far financing to cover new investments and operating costs.

Waste management at the national and local levels is ensured by waste management plans, which are an important tool in achieving goals defined in the National Waste Management Strategy. Information on waste data are regularly collected and published on the web site of the Croatian Environment Agency (CEA) (www.azo.hr).

Waste management centres will create a backbone for safe management of municipal solid waste. The implementation of generators' responsibility principle is supported by packaging waste recovery and creates pressure on industrial waste generators to improve their waste management.

Lack of capacities for safe disposal of hazardous waste was solved by exporting hazardous waste to countries with developed facilities for this type of waste. Waste management in Croatia is benefiting from availability of European Union (EU) funding and guidance defined in legislation and waste management policies of the EU.

6.1 Current situation

Municipal solid waste

Generation and collection

Information on municipal solid waste (MSW) in Croatia is sufficiently detailed; each of 21 counties regularly reports waste-related data to CEA. The trend in municipal solid waste generation on national level was increasing by 4.6 per cent per year in average until 2009. Waste statistics show a nine per cent decrease of municipal solid waste in 2010, this may be due to economic crisis and wider use of weighbridges on disposal sites. Table 6.1 shows amounts of collected municipal solid waste divided to Capital area (Box 6.1), Adriatic Croatia (coastal counties) and Continental Croatia (remaining inland counties).

Table 6.1: Municipal waste generation by regions in tons

	2005	2006	2007	2008	2009	2010	2011
Capital area	390 451	398 929	446 731	435 838	399 382	388 048	376 029
Adriatic Croatia	437 051	490 778	558 376	591 597	615 490	513 364	457 789
Continental Croatia	584 732	764 398	718 078	760 875	728 339	707 989	677 821
Total	**1 412 234**	**1 654 105**	**1 723 185**	**1 788 310**	**1 745 220**	**1 609 401**	**1 511 639**

Source: CEA, 2013.

Aggregating data by these regions indicates that per capita generation of municipal solid waste in Croatia is region specific. Based on 2011 data, it exceeds the average in the Capital area with 460 kg/cap/y and in the coastal region influenced by tourism reaching 480 kg/cap/y, but excluding the impact of tourists the average is 420 kg/cap/y. The remaining inland region show under average waste generation, only 223 kg/cap/y. Comparing these aggregate results with data published for individual counties, the range of waste per capita indicator is much wider: lowest generation per capita shows Međimurje County, only 163 kg/cap/y and the highest was found in Lika-Senj County reaching 574 kg/cap/y. The reason for such a high variation in per capita waste generation on county level could be that impact from tourism as non-permanent population is not included in the calculation of this indicator.

The coverage by municipal solid waste collection is increasing and reached 96 per cent of total population in 2011, compared to 80 per cent in 2000. The country is expecting that in 2025 almost the entire population will be included in the organized collection of a municipal waste system, recycled and treated waste will grow significantly, and an important reduction of disposed municipal and biodegradable waste will be achieved.

Table 6.2 shows the composition of municipal solid waste published in the Waste Management Plan reflecting the situation in 2002 and updated information based on the preparation for development of regional waste management centres in 2007. Higher content of kitchen and biodegradable waste in towns than the regional average is in line with situation observed in other countries. Waste in coastal regions shows higher share of packagings than in continental regions, which may be caused by tourism. Variations in data may be caused by time between the analyses and different regional scope.

Table 6.2: MSW Composition, percentage

	2002		2007	
	Continental	Coastal	Split	Pula
Kitchen and biowaste	43,1	41,0	44,8	51,5
Paper and cardboard	19,6	20,3	21,5	17,2
Plastics	11,6	12,3	11,3	16,3
Glass	6,6	7,0	4,4	3,6
Textile	7,8	8,2	3,9	3,5
Metals	4,1	4,0	2,5	2,9
Leather and bones	3,0	3,1	1,6	-
Wood	1,3	1,2	1,4	1,0
Rubber	0,9	0,5	0,5	0,8
Hazardous	0,4	0,2	-	1,2

Source for 2002: Waste Management Plan for the period 2007-2015, 2007.
Source for 2007: D. Kovačić: Recent Achievements in Landfill Technology in Croatia.

Box 6.1: Municipal waste management in Zagreb

Collection of waste in Zagreb is done by the Company Čistoća, subsidiary of municipally owned Zagreb Holding. The company serves the Capital with collection of mixed municipal waste, separate collection of recyclables and bulky waste, street cleaning and cleanup of illegal dumpsites. The Company has about 1,600 employees, operates a fleet of 114 waste collection vehicles, 85 vehicles for street cleaning and several other specialized vehicles.

Projects of primary recycling and separation of hazardous waste are part of the comprehensive system of waste management in the City of Zagreb. Paper, glass and PET and metal packaging, as well as batteries and bio waste are collected in a total of about 6,000 bins and skips and there are 5 recycling yards for 20 types of household waste.

Zagreb is served by the landfill Prudinec close to Jakuševac, south from the City centre. The landfill is operated by the company ZGOS, subsidiary of Zagreb Holding and complies with standard requirements on sanitary landfill operation. Except of disposal of mixed municipal waste, the landfill includes a recycling facility for construction waste and a composting facility. To minimise the impact on the surrounding residential areas, the landfill has installed system for collection of landfill gas and rehabilitated slopes of the landfill body by installation of final cover with grass layer. There are plans to further develop the facility by introducing mechanical and biological treatment (MBT) plant or preparation of refuse derived fuel.

Source: Company Čistoća Zagreb

The long Croatian coastline with many islands is visited by many tourists mostly in the summer and this creates a challenging situation to ensure safe and regular collection of waste. Larger islands are developing their own waste management infrastructure based on separate collection and composting, while residual waste will be sent after completion of waste management centres on the mainland. On smaller islands waste is collected and accumulates into ROLO containers, which are then taken by ferry to the mainland for disposal.

Landfilling

Disposal of municipal waste started moving from traditional local disposal towards regional landfills. Regional self-governments are carrying initiative for this change thus development depends on their activity. Besides large regional landfills, they are small local disposal sites in operation. Operation of a site which receives less than 5,000 t/y (or about 20 t/day which could be 3-4 trucks per day) is not effective and may be very costly for serviced population.

According to 2010 data, 146 disposal sites were in operation in Croatia (Table 6.3) and these received 1,858,127 tons of waste. The infrastructure and prevention measures on landfills are mostly inadequate and monitoring of at least one environmental component (water, air or soil) is conducted on only a small number of disposal sites. The Ministry of Environmental and Nature Protection is aware of the fact, that uncontrolled municipal waste disposal sites are a danger to health, can lead to ground water contamination and also have a negative impact on landscape and tourism. The situation began improving through municipal waste landfill remediation programme financed by the Environmental Protection and Energy Efficiency Fund (EPEEF) since 2004. Under this programme, remediation means implementation of measures, aimed on minimizing impact of a disposal site on the environment. These measures may range from modernisation and upgrade of the site to comply with legal requirements and continued operation, to site decommissioning including control of potential sources of future pollution. At the beginning of 2012, 107 official municipal waste disposal sites have been remediated, 48 sites were in the process of remediation and 146 locations in preparatory stages of the remediation process.

Table 6.3: Disposal sites by amount of received waste in 2010

Amount received (t/yr)	Number
1 - 5,000	79
5,000 - 50,000	60
50,000 and more	7
Total	**146**

Source: CEA, 2013.

The 2005 Waste Management Strategy states that there are 3,000 illegal dumpsites in Croatia. The Environmental Protection and Energy Efficiency Fund (EPEEF) is assisting municipalities also with the clean-up of 767 selected illegal dumpsites. At the beginning of 2012, 750 dumpsites have been cleaned up and waste from these sites was transferred to permitted disposal sites.

Municipal waste recycling and composting

The share of municipal waste diverted from disposal is still low in Croatia. Only about nine per cent of all generated municipal solid waste was recycled or composted in 2011. Categories of municipal solid waste which are collected separately are shown in Table 6.4, but about half of the total separated amount is sent for disposal.

Table 6.4: Separately collected municipal solid waste in 2011

Waste type	Amount (t)
Bulky waste	80 560
Paper and cardboard	49 144
Metals	31 336
Green waste from parks and gardens	26 905
Glass	15 589
Street sweepings	10 402
Plastics	10 139
Waste Electrical and Electronic Equipment (WEEE)	9 147
Soil and stones	6 247
Waste from markets	4 816
Biowaste from restaurants and catering	2 373
Waste equipment containing halogenated hydrocarbons	1 690
Other	19 705
Total	**268 053**

Source: CEA, 2013.

Waste paper is processed in PAN Paper mill in Zagreb and Belišće in Belišće, plastic waste in companies Brković and Drava International. Rubber waste is received by a number of companies and is recovered by the companies Gumiimpex-Grp, Našicecement and Holcim. The capacity of these companies to process recyclables is growing and is able to satisfy the recycling needs not only for Croatia, but also for a part of Balkan region, where the recycling industry is less developed than in Croatia.

Only about 24,000 t of compostable municipal waste was delivered to 7 composting plants. This represents only 1.6 per cent of generated waste and Croatia has potential to increase this amount significantly, but there is a lack of composting infrastructure. Composting needs strong support to achieve the targets set in the legislation.

EU is supporting policy of reducing biodegradable waste disposal and EU targets are binding also for Croatia. The objective of reducing the biodegradable component of waste directed to landfills is set in the Waste Management Strategy, the Waste Management Plan, and the Ordinance on the methods and conditions for the landfill of waste, categories and operational requirements for waste landfills. Compared to the base year 1997, share of biodegradable municipal waste deposited to landfills must be reduced to 75 per cent by 31 December 2013, then to 50 per cent by 31 December 2016 and finally to 35 per cent by 31 December 2020.

Industrial waste

Manufacturing waste in Croatia is recorded using the EU classification. Since 2003, CEA collects data on industrial waste from companies. The total amount of manufacturing waste is close to 1.5 million tons, while hazardous waste is about 60,000 tons, or less than 5 per cent of total manufacturing waste (Table 6.5). Waste from industrial activities is mainly disposed with municipal waste, used as secondary fuel or exported for treatment abroad.

Table 6.5: Generation of industrial waste in tons

	2005	2006	2007	2008	2009	2010	2011
Total manufacturing waste	1,512,990	1,796,488	2,004,061	1,493,485	1,257,802	1,592,609	1,536,607
of which,							
Hazardous manufacturing waste	35,543	39,878	52,520	66,478	47,855	58,314	63,615

Source: CEA, 2013.

The largest waste generators in the period 2003-2009, responsible for generation of ca. 16 per cent of manufacturing waste used to be from the sector of inorganic chemical processes, mainly oil processing. Other industrial sectors which contribute more than 10 per cent of total manufacturing waste are construction, agriculture and food processing, energy generation, waste management and water management. About 20 per cent of hazardous waste is generated by the oil industry.

In 2010 the biggest share of manufacturing waste went to group 19 (wastes from waste management facilities, off-site waste water treatment plants and the preparation of water intended for human consumption and water for industrial use), followed by group 10 (waste from thermal processes), group 02 (wastes from agriculture, horticulture, aquaculture, forestry, hunting and fishing, food preparation and processing), and group 17 (construction waste).

Box 6.2: Waste management in oil and gas in Croatia

The main company in exploration and extraction of oil and gas in Croatia is INA Group. It has a waste management strategy for the period 2011-2015, which is aimed on improving waste inventory, waste reduction and generation by implementation of modern technologies and remediation of old waste-related pollutions depending on their environmental impact and economic possibilities. INA Group reported a generation of 5,000 tons of hazardous waste and 7,000 tons of non-hazardous waste in 2011. Large part of hazardous waste from oil extraction is injected into deep boreholes.

On INA petrol stations 15.58 tons of packaging containing hazardous substances residues or contaminated by hazardous substances were collected during 2011. Also, in 2011 INA added containers for waste batteries and accumulators collecting, as well as notification to consumers that waste lubricant oils can be delivered to the authorized concessionaire, free of charge.

Source: INA Group Sustainability Report 2011

Medical waste

Medical waste comprises of infectious, pathological, pharmaceutical and chemical waste. Hospitals, ambulances and other health care facilities in Croatia generated 3,633 tons of medical waste, of which 2,475 tons of hazardous waste and 1,158 tons of non-hazardous waste in 2010. The largest share of medical waste (64 per cent, 2,318 tons, in 2010) is potentially infectious waste which is treated by sterilization/autoclaving after which it is sent to the landfill. Certain types of non-hazardous medical waste are also sent to the landfills. A total of 296 tons of medical waste were exported, mostly for incineration in Austria and Germany.

Waste is separated in health care facilities by categories and collected by contracted companies. Usually collection systems are organised on the level of counties.

Special waste streams

Croatia implements EU waste policy aimed on diverting waste from disposal and increasing recycling rate of selected waste streams. These are known as special waste streams and include packaging waste, end-of-life vehicles, waste batteries and accumulators, waste from electric and electronic equipment (WEEE), waste oils and waste tyres.

Developing infrastructure for effective treatment of these waste streams requires substantial financing and Croatia implemented a system of fees for special wastes based on principle of producers responsibility, when producers or importers of selected goods are required to pay fees for these goods and collected funds are used for covering investment and operation costs of recycling facilities through the EPEEF (chapter 5). An overview of development in collected amounts of special waste is shown in Table 6.6.

An improvement in separately collected quantities and recovered (recycled) quantities has been achieved, which reduced the pressure to environment and allowed more effective use of landfill space. The most significant progress is noted in waste electrical and electronic system and end-of-life vehicles' system.

Packaging waste (paper, glass, plastic) is accumulated through separate collection schemes and delivered for processing to PAN Paper mill in Zagreb, Belišće, Drava International, Unija Nova and Vetropack. Waste oils are used mainly as fuel in brickyards and cement plants. Waste batteries and accumulators are collected by eight authorized companies. Three companies are authorized for disassembling of accumulators. Lead plates from accumulators and waste batteries are exported for processing or disposal to abroad.

Table 6.6: Collected amounts of special waste streams in tons

	2006	2007	2008	2009	2010	2011
Packaging waste	198,225	248,144	267,944	248,411	187,631	125,258
End-of-life vehicles	..	6,737	7,887	16,617	22,756	35,104
Waste batteries/accumulators	..	6,484	10,737	7,180	8,290	8,480
WEEE	..	..	5,719	13,522	17,748	17,518
Waste oils - lubricant	..	6,115	7,068	6,784	6,640	6,391
Waste oils - edible	..	1,132	1,606	2,145	1,260	1,196
Waste tyres	15,139	22,265	21,126	20,233	20,028	16,754

Source: CEA, 2013.

Radioactive waste

Radioactive waste in Croatia is generated from research activities, health treatment and industrial use. It is estimated that about 1 m^3 of radioactive waste is generated annually. This includes about 30 sealed radioactive sources of category 3 and 4 according to the International Atomic Energy Agency (IAEA), 1,000 smoke detectors, and some low level radioactive waste generated in medical sector. In addition orphan sealed sources

are stored in the radioactive waste storage facility operated by the Radiation Protection Department of Ruđer Bošković Institute (2-5 orphan sources are found on average every year). This facility accommodates all radioactive waste that has been generated in the territory of Croatia.

The total available storage capacity is nearly 100 m³. Only one third has been used so far. Based on expert missions organized by IAEA, this storage facility would need a number of improvements, e.g. installation of a new ventilation system, refurbishment of the rooms, improvement of the tightness (sealing) of the building, installation of a drainage system, stabilization of the surrounding soil slopes, monitoring of the possible contamination of the surroundings, modernization of a laboratory for handling radioactive materials, and installation of a modern security system.

Transboundary movement of waste

Transboundary movement of waste is an integral part of the waste management system. It is considered a rational option which allows safe management of waste for which there is no existing appropriate treatment or disposal capacities within the country. Croatia exports hazardous and non-hazardous waste and also imports non-hazardous waste (Table 6.7).

Table 6.7: Transboundary movement of waste in tons

	2005	2006	2007	2008	2009	2010	2011
Export of hazardous waste	13 265	16 711	13 742	19 161	17 878	18 937	21 049
Export of non-hazardous waste	389 077	572 437	501 798	637 317	472 831	603 955	787 654
Import of non-hazardous waste	472 054	416 664	543 269	482 917	215 820	225 224	304 328

Source: CEA, 2013.

Hazardous waste exported from Croatia to Serbia, Slovenia, and the former Yugoslavia Republic of Macedonia for recycling includes lead from car batteries and accumulators. Exports to Austria, Germany and Poland included hazardous waste for safe disposal, for example construction waste containing asbestos, waste paints, solvents, varnish and resins, waste railway sleepers and packaging contaminated with hazardous substances.

Non-hazardous waste exported from Croatia in 2011 was from three quarters metal scrap, followed by waste wood and waste from thermal processes. Also some separated waste fractions (glass, plastic, paper) are exported. Majority of exported non-hazardous waste, about 80 per cent, went to Slovenia,Turkey and Italy.

Import of non-hazardous waste is only for recycling. Imported is paper, glass, metallurgic slag and in smaller amount also metals, fly ash and tires. Majority of imported non-hazardous waste, about 70 per cent, came from Bosnia and Herzegovina, Serbia and Slovenia.

All exports and imports are monitored by the Ministry of Environmental and Nature Protection, which is issuing relevant permits. CEA is publishing annual reports on transboundary movement of waste, which include details on amounts of transported waste, origins and destinations, companies involved in transboundary movement and information on final treatment or disposal of waste.

6.2 Environmental pressures from waste

The information on impact of waste management on the environment is limited. Concrete data are not yet available due to the fact that many currently operated disposal sites do not have installed environmental monitoring systems for air and groundwater pollution. However the risk of ground water pollution is high, due to missing lining systems at older sites and prevailingly karst type bedrock, which allows free movement of potential pollution.

Environmental inspectors are making visits to disposal sites, but their work is aimed at verifying if the landfill is operating according to permit conditions and these are focused on techniques of waste disposal and not on the impact on surrounding environment.

Complains from public were voiced towards the Jakuševac landfill in Zagreb, because the site is located close to the Capital and residential areas were extended towards the disposal site. The site was the target of a number of studies on its environmental impact. A comprehensive assessment was done in "Jakuševac Landfill", Zagreb BAT Site Inspection Report, prepared under the CARDS 2004 Project "Support for The Further Approximation of Croatian Legislation with the Environmental Acquis" in 2010, after implementation of remediation measures. This assessment concluded that the site complies with all existing emission limit values except wastewater, which fails to meet the current limits on nitrogen, but it is planned to upgrade the on-site waste water treatment plant. Additionally, the final closure plan of the landfill is not complete as it includes only post closure monitoring and litter control should be better managed.

6.3 Legal framework

Municipal solid waste management in Croatia is going through transformation to comply with modern disposal practices and achieve recycling targets set by the EU. This is a challenge for any country, but Croatia was able to develop strong legal and institutional structures which introduced a number of measures improving situation in collection, recovery and disposal of municipal solid waste. However, implementation of these measures is not fully effective yet.

As a response to the EU Directive No. 2008/98/EC on waste, Croatia adopted the Waste Act (OG 178/04) replacing the 1995 Waste Act. The Waste Act defines basic terms and principles of waste management, lays down provisions which regulate responsibilities and obligations with respect to waste management, defines costs of waste management according to polluter pays principle, formulates content of waste management information system, responsibilities of persons generating or managing waste for supplying data to the system and requires authorities to maintain this system. This act also sets principles for siting, designing, financing of facilities for storage, recovery and disposal of waste.

Technical and organizational details needed for implementation of these principles are stipulated in the Ordinance on waste management (OG 23/07, 111/07) which deals with waste storage, recovery and disposal, the Ordinance on the methods and conditions for the landfill of waste, categories and operational requirements for waste landfills (OG 117/07, 111/11, 17/13, 62/13), in the Ordinance on methods and requirements for thermal treatment of waste (OG 45/07) and in the Instruction on the method of calculating the municipal waste management charge (OG 129/11, 137/11).

People living up to 500 m from a waste management facility and municipality in which the facility is located are entitled to receive compensation from the facility operator, due to decreased property value. Further details are set in the Regulation on the criteria, procedure and manner of determining compensation to real estate owners and local self-government units (OG 59/06, 109/12).

The Waste Act also defines principles for waste recovery and disposal, recovery has priority to disposal. Obligations and responsibilities of product producer and waste generator include minimisation of waste, creating options for consumers to return used products or packagings. The act also introduces licences for the collection, recovery and disposal of waste and stipulates information which must be included in a licence.

Paragraphs on transboundary transport of waste ban import of hazardous waste, except in cases of recovery when material recovery is used to create a new product or raw material which ceases to be waste after recovery, stipulate a system of permits for import, transit and export of non-hazardous waste in line with principles of Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal and EU. Details are given in the Regulation on supervision of transboundary movement of waste (OG 69/06, 17/07, 39/09)

The section on concessions introduces a system of concessions for performing collection, treatment and disposal activities. A concession must state purpose, area of activity, duration, special requirements and supporting documentation. Conditions for issuing and cancelling a concession are also defined.

Administrative supervision for implementation of the Waste Act is assigned to the Ministry of Environmental and Nature Protection. The Act defines also how to perform inspection of waste management activities rights and responsibilities of inspectors and level of penalties for illegal actions.

The 2005 Regulation No. 50 on categories, types and classification of waste defined in waste catalogue and list of hazardous waste, introduces in Croatian legislative system the EU Waste Classification as a tool on which reporting of waste is based and defines which types of waste must be considered hazardous.

Legislation on special wastes includes packaging waste, waste tyres, on waste batteries and accumulators, waste oils, end-of-life vehicles and waste electrical and electronic appliances and equipment is setting collection and recycling targets for these wastes, defines system of licences for persons performing collection transport and processing of them and sets reporting requirements. The generators' responsibility principle is applied on special wastes, where generator or importer has to pay a fee per ton of product put on the market. Income from these fees is then used to finance management of these wastes. The following legislative norms cover management of special wastes:

- Ordinance on packaging and packaging waste (OG 97/05, 115/05, 81/08, 31/09, 156/09, 38/10, 10/11, 81/11, 126/11, 38/13, 86/13), supported by the Decision on conditions for packages labelling (OG 155/05, 24/06 and 28/06) This ordinance contains National targets for the share of returnable packaging per product for years 2009 to 2013.
- Ordinance on waste tyres management (OG 40/06, 31/09, 156/09, 111/11, 86/13). In 2006 and 2007 decisions on the allowed quantity of waste tyres to be used for energy purposes were issued as a temporary measure until the conditions for recycling at least 70 per cent of waste tyres were achieved.
- Ordinance on waste batteries and accumulators management (OG 133/06, 31/09, 156/09, 45/12, 86/13) set targets for recycling;
- Ordinance on end-of-life vehicles management (OG 136/06, 31/09, 156/09, 53/12, 86/13, 91/13)
- Ordinance on waste oil management (OG 124/06, 121/08, 31/09, 156/09, 91/11, 45/12, 86/13).
- Ordinance on the management of waste electrical and electronic appliances and equipment (OG 74/07, 33/08, 31/09, 156/09, 143/12, 86/13)

There is another group of waste legislation aiming at waste types which require specific regulation due to their hazard to the human health or environment, or due to their amount or specific use. These specific regulations reflect individual hazards and provide detailed guidance on their management. These legislative norms include:

- Ordinance on medical waste management (OG 72/07);
- Ordinance on the management of polychlorinated biphenils and polychlorinated terphenils (OG 105/08);
- Ordinance on management of waste from the titanium dioxide industry (OG 70/08);
- Ordinance on the method and procedures for managing waste containing asbestos (OG 42/07) supported by Instruction on handling waste containing asbestos (OG 89/08)
- Ordinance on managing waste from research and mining of mineral raw materials (OG 128/08);
- Ordinance on construction waste management (OG 38/08);
- Ordinance on management of wastewater treatment sludge when used in agriculture (OG 38/08).

International movement of waste, regulated by the 1994 Act No. 3 on Ratification of the Basel Convention, was supported in by the 2006 Regulation No. 69 on supervision of transboundary movement of waste (amended in 2007 No. 17 and in 2009 No. 39).

Additionally, other acts include specific requirements regarding waste management. The Act on Environmental Protection includes uncontrolled events during waste management and disposal to industrial accidents, and defines waste management as measures for preventing waste generation and reducing waste quantities, without using procedures and/or methods which might damage the environment and measures for preventing the adverse effects of waste on human health and the environment. It also stipulates that strategic environmental assessment is mandatory for waste management plan. It requires companies minimising waste generation and recovering where possible, the remaining waste must be disposed without harm to the environment. Additionally, data on waste management are defined as part of the environmental information system.

The Act on Air (OG 130/11) requires operators to record waste used as fuel. The Act on Environmental Protection and Energy Efficiency Fund defined fee for generation and disposal of waste as one of the funds incomes and allows financing disposal site remediation, prevention and reduction of waste, waste processing and utilization of waste. The Act on Physical Planning and Building (OG 76/07, 38/09, 55/11, 90/11, 50/12) sets limitation to locating waste management facilities in protected coastal areas and requires investors to dispose construction waste according to the Waste Act. Failing to remove waste from construction site may result in refusal of commissioning. Also, plan for building demolition must include method of disposal of construction waste.

The Act on Utility Services (OG 26/03) defines conditions for establishing company providing waste collection services. The Maritime Act (OG 181/04) and the Act on Maritime Domain and Ports (OG 158/03 and 141/06) define requirements on management of waste generated on ships and in ports.

A new act on sustainable waste management was adopted in July 2013 and entered into force 23rd July 2013. The adoption of the new Act on Sustainable Waste Management means further alignment of Croatian legislative with the EU acquis. It was also necessary to rectify certain imprecisions in order to enhance and further establish a sustainable waste management system. Responsibilities for waste management have been regulated, especially for municipal waste management through local self-governments, in order to reach the targets (reducing the amount of biodegradable waste going to landfills and the amount of untreated waste landfilled in existing non-compliant landfills) from the Accession Treaty.

The new Act introduced new definitions on waste management (e.g. by-product), determined the basic end-of-waste criteria for when certain waste ceases to be waste and set up basic recycling targets for certain types of waste (paper, plastics, glass) that can be viewed as valuable materials. The Act introduced an enhanced special waste categories' management system which is aligned with the EU practices. Also, the Act brought to force all other measures and provisions necessary for the development and functioning of the waste management system in Croatia, such as waste hierarchy, a simpler waste management permits' procedure, transboundary movements of waste permitting and control, a registration procedure for dealers, brokers and transporters of waste, waste management plans, waste prevention plans, locations and establishments for waste management, waste management information system, record keeping, responsibilities of legal and natural persons and local self-governing and governing units, inspectional and administrative supervision and provisions concerning penalties. The new Act also includes provisions referring to the waste management in marine environment and specifically refers to management of the waste produced by offshore activities, management of marine litter and regulating dumping activities. The Act proposes a large number of regulations to be adopted for its implementation. The new Act foresees concessions only for municipal waste management and biodegradable municipal waste; the decision is made by the local administrative unit.

6.4 Policy and institution framework

Transition periods

Two transition periods were defined for Croatia during EU accession negotiations:

- By 31 December 2018 Croatia has to bring its landfills for waste in compliance with EU requirements;
- By 31 December 2020 Croatia has to reduce the amount of biodegradable waste going into landfills to 35% of the total amount (by weight) of biodegradable municipal waste produced in 1997, with intermediate deadlines of 31 December 2013 and 31 December 2016.

Considering the changes in waste management infrastructure, the waste legislation is enforced and has positive impact on development of the waste sector. However there are deficiencies in the management of industrial waste.

Waste Management Strategy

Long term vision of waste management targets is well developed in Croatia. The Waste Management Strategy was adopted in 2005 as a constituent part of the National Environmental Strategy. The Strategy defined

strategic waste management objectives, quantitative objectives (targets to be achieved) and measures for achieving these objectives.

Key principles of this strategy were based on waste management hierarchy, which requires reduction of waste generation supported by recycling and safe disposal. Further it called for use of best available technologies, based on their cost-effectiveness and environmental acceptability, for introduction producers responsibility, polluters pay principle and also for increased access to information and public awareness in waste management.

The following strategic waste management objectives are emphasized in the Strategy:

- Avoidance and reduction of waste generation at source, reduction of disposed waste and increase of material and energy recovery of waste;
- Development of infrastructure for integrated waste management system;
- Waste hazard reduction;
- Contribution to higher employment rate;
- Education of administrative officials, experts and general public.

As stated in the Strategy, these are long term objectives and reaching them will take considerable time. However, actions taken by the Ministry of Environmental and Nature Protection are toward achieving them.

Quantitative targets related to waste amounts focus on increase of population covered by the organized collection of municipal waste, quantity of separately collected and recycled municipal waste and quantity of treated waste as well as reduction of quantity of waste disposed in landfills and quantity of disposed bio-degradable municipal waste. Quantitative targets related to landfill sites include development of regional centres for waste management, county-level centres for waste management, decrease of landfills operating without permits and percentage of remedied landfills from number determined in 2000. These targets were achieved except for the reduction of biodegradable waste disposal, as 92 per cent of this waste was disposed in 2011, instead of 85 per cent planned for 2010. This was caused by the lack of biodegradable waste treatment facilities.

Waste Management Plan

Based on the Waste Management Strategy, the Waste Management Plan for the period 2007-2015 was prepared and approved by the Government in July 2007, amended in 2010 and 2011. This plan aimed to implement strategic goals by focusing on establishment of an integrated waste management system, remediation and closing of existing landfills, remediation of hot spots, development of waste management centres, with pre-treatment of waste before final disposal or landfilling and computerization of the waste management information system.

In the area of waste generation prevention, the Waste Management Plan aims at the implementation of economic instruments motivating waste generators to reduce waste generation and introduction of systematic public education and campaigns changing consumers' behaviour. Attention is given to separate waste collection, where the Plan recommends introduction of special containers for collection of recyclables and development of recycling yards, including criteria for their capacity and location.

Regarding municipal waste the Plan focuses on the decrease of biodegradable waste disposal, recommends best methods for treatment of individual fractions present in municipal solid waste and support introduction of regional waste management centres in combination with transfer stations.

Also for hazardous waste a network of hazardous waste centres is proposed by the Waste Management Plan in which hazardous waste should be safely accumulated, stored, treated and disposed or prepared for export.

Waste management plan includes costs of financing of landfill rehabilitation and closure of dumpsites, hot spot remediation, and construction of waste management centres and transfer stations. It highlights the importance of sources collected in the EPEEF, availability of EU funds and necessity of domestic co-financing. A model example in the plan expects a cost of €350 million for the development of the network of waste management centres.

Besides setting deadlines for investment activities, the Plan is focused on explanation of modern waste management principles and techniques and defines general objectives, which should guide waste generators to step-by-step improving their current practices. This type of waste management planning provides higher flexibility and creativity in its implementation.

The implementation of the Waste Management Plan is in progress. Implementation of the integrated waste management system has started by providing support to development of recycling sector. In several counties smaller dumpsites were closed and waste was redirected to larger sites. Hot spots were targeted in the period 2005-2008 and environmental risks related to hot spots are under control. Development of regional waste management centres is supported by National and EU funds and three centres are in various stage of completion. The quality of information on waste has improved and covers most types of waste generated in Croatia. The achieved progress is indicating that Croatia is on the right track in modernisation of its waste management infrastructure. But, additional attention should be given to phasing out small dumpsites, increase of composting and maintaining support to development of regional waste management centres.

Strategy for Radioactive Waste and Spent Nuclear Fuel Management

Croatia adopted the Strategy for Radioactive Waste and Spent Nuclear Fuel Management in July 2009. The Strategy covers highly radioactive waste, medium level and low level radioactive waste, sources of ionising radiations that are no longer going to be used, and orphan sources. The Strategy also includes an option of disposing radioactive waste and spent fuel, which was generated during the operating lifetime of the Krško NPP, on Croatian territory should it not be possible to dispose it in Slovenia or in a third country.

Croatia has joint responsibility with Slovenia for the decommissioning and waste management liabilities relating to the Nuclear Power Plant Krško. According to a 2003 agreement between the two countries, specific segregated funds were set up in Croatia and Slovenia to cover its share of liabilities to allocate required financial resources to the funds to ensure availability of adequate resources for implementation of decommissioning and waste management programme.

Implementation of this strategy started by only recently, by Governmental decision declaring the radioactive waste storage facility operated by the Radiation Protection Department of Ruđer Bošković Institute for National repository of low activity radioactive waste. This caused public opposition and further works on upgrade are delayed. Croatia is cooperating with Slovenia on preparation of documentation and allocating funds for decommissioning of NPP Krško.

Waste management plans of counties, cities and individual waste generators

The Waste Management Plan for the period 2007-2015 requires counties, cities and municipalities to prepare waste management plans for a period of eight years. Additionally individual waste generators producing more than 150 tons of non-hazardous waste or 200 kg of hazardous waste have to prepare their individual waste management plans.

Odraz[6] prepared a publication in 2007 in electronic form which serves as a methodological guidance for preparation of local waste management plans by counties and cities as a part of the project financed by the Ministry. According to the data from 30 April 2012, twenty counties adopted their waste management plans. Additionally, 36 cities (10 of which are large cities) and 60 municipalities adopted waste management plans. Eight counties, 20 cities (8 of which are large cities) and 41 municipalities published reports on the implementation progress of the waste management plan. The number of municipalities which prepared their plans is low and also feedback on implementation of waste management plans is not satisfactory. CEA in cooperation with the Ministry will intensify communication with those who did not yet submit waste management plans.

[6] ODRAZ (Croatian abbreviation for Sustainable Community Development) is a non-governmental, non-profit organization gathering professionals from various fields, who design and apply the sustainable development concept for the local community benefit.

By 30 April 2012, a total of 2198 legal entities prepared a waste management plan.. However, the number of waste generators implementing a waste management plan is growing from year to year.

Waste management plans are an important tool in countries which are in the process of transforming their waste management systems. Waste management plans support exchange of information between central authorities, counties, cities and individual waste generators, thus support implementation of appropriate and effective measures for modernisation of waste management system,

Sustainable Development Strategy

The Sustainable Development Strategy prepared by the Ministry of Environmental and Nature Protection in 2009 is setting objectives also for waste management in the chapter on Sustainable Consumption and Production.

The overall objective: "Achieve balanced and stable economic growth which would have less impact on further environmental degradation and waste generation than it has now. Growth must be followed by a change in unsustainable behaviour patterns in households and in both public and private sectors," should be achieved by integration of cleaner production programmes in production processes, products and services. Further, by reduction of quantities of finally landfilled waste as well as generated hazardous waste in 2010 by approx. 20 per cent in comparison to 2000 and by breaking the link between waste production and economic growth and achieve significant reduction in quantities of produced waste via initiatives for preventing waste generation, increase the recycling rate, remediate the existing landfills and build waste management centres, establish an integrated waste management information system by 2015.

Institutional arrangements

The Ministry of Environmental and Nature Protection is the central waste management administration body and has implementing and regulating offices in the counties. In the waste sector, the Ministry is responsible for:

- Preparing new primary legislation, standards and implementing legislation;
- Preparing the Waste Management Strategy and Waste Management Implementation Plan;
- Issuing permits for hazardous waste management and the incineration of waste; and concessions for specific waste category management (used tyres, packaging waste, waste oils etc.);
- Implementing measures in hazardous waste management;
- Inspecting, supervising and enforcing laws and secondary legislation;
- Supervising activities of CEA and EPEEF.

The EPEEF is operating since the beginning of 2004 as an extra-budgetary institution, with the purpose to finance environmental protection programmes and projects. The Fund collects environmental charges, which include charges for burdening the environment with hazardous and non-hazardous industrial waste. The Fund is a key investment facility in development of waste management infrastructure in Croatia (chapter 5).

CEA is responsible to provide reliable and comparable waste data and information to decision-makers and general public and therefore:

- Collects data according to the waste legislation;
- Maintains the waste information system;
- Prepares indicators on waste;
- Prepares reports on waste and waste management;
- Improves quality, quantity, availability and comparability of waste data;
- Provides waste information on the CEA web pages.

Counties and City of Zagreb are regional self-governments, which are responsible for managing all types of waste generated, treated or disposed in their areas of responsibility, issuing waste management plans for their jurisdictions; gathering and submitting data on waste (cadastre of emissions into the environment), except permits for hazardous waste management and for thermal treatment of non-hazardous waste. Towns and

municipalities are local self-governments that are responsible for managing municipal waste, preparing waste management plans and determining locations for facilities for waste management in their areas for facilities other than waste management centers, incineration facilities and landfills of hazardous waste (responsibility of the state) and other landfills of waste or cells for asbestos disposal (responsibility of the county).

The Public Utility Services Act stipulates that public utility services, including municipal waste management, can be performed by:

- Public utility companies established by local self-government units (local self-government units should own at least 51 per cent of the company);
- Public institutions established by local self-government units;
- Organizational unit of local self-government units;
- Legal and natural persons on the basis of a concession or contractual agreement.

The State Office for Radiological and Nuclear Safety is the regulatory body in charge of nuclear issues and financed from the State budget, and reports directly to the Government. Its responsibilities are set down in the 2010 Act No. 28 on Radiological and Nuclear Safety. Its administrative capacity is not sufficient for the implementation of all its obligations including the provisions of the €atom Treaty, and needs to be strengthened.

The availability of funding from EU accession funds resulted in developing the concept of waste management centres. The waste management centres will become the backbone of the new system for waste management. Each centre should include a landfill complying with EU standards, MBT facility and composting plant. The first waste management centre being developed is Bikarac, Šibenik-Knin County, where a modern sanitary landfill was put in operation in 2011 and recycling facility will follow. Preparatory works in the development of the waste management centre in Marišćina, Primorje - Gorski Kotar County, where construction permit has been issued, were carried out and full operation should start in 2014. The site of the waste management centre in Kaštijun, Istria County was decided and contract forecast notice on supply of equipment was announced in January 2013. Also, the preparation of documentation for the construction of three additional waste management centres was agreed with EU. After completion, the network will comprise of up to 20 waste management centres, serving the whole territory of Croatia with municipal waste recovery, treatment and disposal.

Permitting system

Companies involved in waste management must register and obtain permit for collection and transport, recovery and/or disposal of waste, or for the management of special categories of waste. State administration offices in the counties issue permits for non-hazardous waste management (other than thermal treatment of non-hazardous waste).

Collection companies servicing population of Croatia are mostly municipally owned and the number of licensed legal and natural persons registered for the performance of waste collection of non-hazardous waste reached 461 in June 2011. This is a high number and indicates that the market of waste services is very fractioned.

Implementation of permitting system is going on and number of companies with permit is starting to stabilize, after growth in previous years (Table 6.8). On the other hand, the number of companies with registration keeps growing, due to inclusion of smaller waste companies into the register.

Table 6.8: Trends in waste management permitting, number of companies

	2006	2007	2008	2009	2010	2011	2012
Permit for non-hazardous waste management	245	333	414	525	545	555	576
Collection	228	303	363	451	464	484	493
Treatment	59	98	75	195	197	249	275
Disposal	47	51	79	97	106	107	101
Permit for hazardous waste management	18	49	111	130	134	128	118
Collection	16	39	94	110	115	105	95
Treatment	10	27	34	70	51	59	63
Registration as carrier	19	118	228	348	499	632	863
Registration as holder	26	35	84	127	177	208	294
Registration as exporteur	256	348	457	523	586	625	742

Source: CEA, 2013.

These trends reflect the situation in waste management sector of Croatia. The number of issued licenses for collection and disposal of non-hazardous and hazardous waste is stabilizing from 2008/2009 after a fast growth in the previous years. This indicates that majority of waste generators and disposal facilities were identified. The non-hazardous waste management infrastructure is still developing and this is reflected by the growing number of licences for treatment. The number of hazardous waste management treatment licenses is stable what indicates that this infrastructure is not extensively developing. Number of licences issued for waste carriers, holders and exporters is growing, which indicates development of service sector for waste generators.

6.5 Conclusions and recommendations

Waste management in Croatia is going through a period of transformation. Implementation of waste management policy led to positive changes, but several drawbacks need to be addressed in the future. Positive changes include wide use of waste management plans on regional and local level, efficient system of financing investments in waste recycling infrastructure through the Environmental Protection and Energy Efficiency Fund, integrating export of waste in the national system of waste management and development of systems of regional waste management centres. Also, hot-spots cleanup or management of hazardous waste accumulated in the past is not a critical issue for the country.

The most significant drawback of the current setup of municipal waste management system is fractioned collection and disposal system. The plan to redirect waste from more than 146 landfills to 20 waste management centres is challenging. Successful implementation of this plan requires not only initiative from the Government to raise needed financing and organize tendering for works and equipment but also support from individual cities and municipalities – their willingness to give up current local collection and landfilling practices.

Recommendation 6.1
The Ministry of Environmental and Nature Protection, in cooperation with the Croatian County Association, the Association of Cities and the Association of Municipalities, should assess the socioeconomic impact of the transformation towards regional/county waste management-based collection and disposal sites systems on individual cities and municipalities, and consider devising incentives for the successful implementation of this transformation.

Additionally, high number of small landfills is not effective and the Government should explore possibilities for phasing them out. Experience from other countries with similar problem have successfully applied time limited permits, which expire if landfills operation conditions are not met or providing financial support only to large landfills.

Recommendation 6.2
The Ministry of Environmental and Nature Protection, in cooperation with the Environmental Protection and Energy Efficiency Fund, should continue implementing options for reducing the number of local landfills.

Information on impact of waste management on the environment in Croatia is limited. Considering the value of Croatia as a tourist destination and potentially easy transport of pollution through the karst bedrock, improvement of knowledge on environmental impact of waste management is needed.

Recommendation 6.3
The Ministry of Environmental and Nature Protection, in cooperation with other relevant ministries, should strengthen controls over groundwater and air pollution caused by landfills, in accordance with the requirements set out in EIA decisions and environmental permits.

Material recovery systems have been implemented in Croatia and they are able to capture about half of waste suitable for material recovery. On the other hand, composting is not widely used and requires expansion to meet targets set in the legislation.

Recommendation 6.4
The Ministry of Environmental and Nature Protection, in cooperation with the Croatian County Association, the Association of Cities and the Association of Municipalities, should prepare a regulatory framework (ordinance) on biodegradable waste, and, in cooperation with the Environmental Protection and Energy Efficiency Fund, should promote development of biodegradable waste management facilities, with the aim to reduce landfilling of biodegradable waste

Chapter 7

SUSTAINABLE MANAGEMENT OF WATER RESOURCES

7.1 Water supply and demand – current situation and trends

Current status of water supply services

The total volume of water abstracted annually over the period from 2005 to 2012 increased from 511 million m³ to almost 570 million m³ per year (Table 7.1). In average, about 50 per cent of abstracted water for public water supply comes from groundwater. Since 2005 a 13 per cent increase of the abstraction for water supply is noticeable due to a higher connection ratio. Statistical data on water abstraction do not include water abstracted by individual water intake structures, which are currently not recorded.

Table 7.1: Abstracted water in thousand m³

By water sources	2005	2006	2007	2008	2009	2010	2011	2012
Total	**511 058**	**518 992**	**525 868**	**527 594**	**555 072**	**570 942**	**576 985**	**569 436**
Groundwater	254 107	265 486	267 669	265 981	281 858	296 784	280 290	278 593
Springs	160 524	156 304	161 573	165 896	192 749	175 195	180 344	164 111
Water courses	43 236	44 178	42 871	48 617	45 246	43 699	49 893	51 625
Reservoirs	7 975	8 351	9 374	5 242	2 024	1 934	849	7 871
Lakes	9 576	9 131	10 043	15 983	11 897	11 402	10 947	10 754
Other water supply systems	35 640	35 542	34 338	25 875	21 298	41 928	54 662	56 482

Source: Statistical Yearbook, 2012.

In the period 2005-2011, water losses amounted in average to about 40 per cent of total abstracted water (Table 7.2). In 2012 estimated water losses were around 37 per cent, which is extremely high. The losses in the water network differ from region to region and are the result of poor maintenance, illegal tapping and a leaky distribution system (pipes). In general the network grew up in the last years. In 2005, the length of the distribution network was 24,792 km and reached 36,292 km in 2012.

In total the amount of delivered water varied between 305 million m³ in 2005 and almost 358 million m³ in 2012. In average, around 185 million m³ per year are used by households while economic activities use around 100 million m³ per year. There was a visible increase since 2007 in the business sector, while the amount in the household sector remains stable.

The connection ratio is estimated at 74 per cent on average in the country. There are significant differences in the level of coverage between regions but there was visible improvement since 1997 (connection ratio was 63). The differences are even larger between the counties and in particular between towns and municipalities.

Water supply on the islands, such as islands of Brač, Hvar and Šolta, is ensured mostly by transport of water from the land and to a certain degree it is solved by the supply from their own sources, (e.g., on islands of Cres and Vis), by means of ships – tranships (mostly for small islands or emergency situations), by processing the brackish water through the desalinization process (e.g., on islands of Lastovo and Mljet), or the combination of different sources (e.g., on islands of Krk, Pag and Korčula).

The volume of water delivered by the public water supply system in the coastal area and on the islands increased in the years 2008-2011 from around 100 million m³ to 130 million m³. The amount of water supplied on the islands increased over the same period from 10 and 15 million m³, what can be related to the tourism pressure.

Table 7.2: Water supply and losses in thousand m^3

	2005	2006	2007	2008	2009	2010	2011	2012
Total abstracted	**511,058**	**518,992**	**525,868**	**527,594**	**555,072**	**570,942**	**576,985**	**569,436**
Total supplied, of which	**305,819**	**318,180**	**323,453**	**354,434**	**355,016**	**365,281**	**349,692**	**358,311**
Households	181,353	182,275	188,393	183,469	183,469	189,332	182,646	184,408
Economic activities	89,472	87,951	81,192	107,421	119,389	118,907	107,762	97,984
Distributed non charged water [1)]				18,432	20,557	22,323	26,347	19,437
Other	34,994	47,954	53,868	45,112	31,601	34,719	32,937	56,482
Water losses	205,239	200,812	202,415	173,160	200,056	205,661	227,293	211,125

Source: Statistical Yearbook, 2012.
Note: non-charged water - water that is taken from the water-supply network by unauthorized connections and subsequently unpaid by the end users.

In general, drinking water quality from public water supply systems is satisfactory, but there are great regional differences. The share of non-complying samples overall in Croatia was 0.4 per cent in terms of chemical parameters and 5.3 per cent in terms of microbiological parameters. This is a slight downward trend in the percentage of non-complying samples. The most frequent cause of non-compliance with chemical parameters is related to natural properties of water, such as visible amount of arsenic in the eastern part of Croatia, presence of nitrogen salts, iron or manganese higher total quantities of organic compounds and, in summertime, intrusion of brackish water in coastal zone.

Provision of water for water supply

To ensure the protection of ground and surface water for use as drinking water resource it was necessary to establish protection zones. Especially river basins in the karst area require a special protection regime. Since 2005 there has been significant progress to reach good protection level. The areas intended for abstraction of water for drinking water purposes are protected by designating sanitary water source protection zones. The decisions on the protection of such sources pursuant to the Water Act have been taken for around two thirds of active sources. Registered sanitary protection zones cover a total of 11,468 km² or some 20 per cent of Croatia's mainland (Map 7.1), covering a larger area in the Adriatic Sea river basin district (5,899 km², including 172 km² on the islands) and in the Danube River basin district (5,569 km²). The major parts of the water protection zones are the restriction and control zones (zone III).

7.2 Management of water use and prevention of pollution

Industrial use

EIA procedure applied in Croatia includes also impacts on water resources related to water abstraction and water pollution. More detailed emission control is provided through the issuing of environmental permits and water permits.

Pollution pressures coming from industries are more noticeable in the Danube River basin district catchment area than in the Adriatic Sea catchment area because of the higher population density and the higher level of industrial development. In the Drava and Danube rivers sub-basins textile, wood and food industries are dominating, while in the Sava River sub-basin the most important activities are metal processing, chemical and petrol industries. The Adriatic River basin district is specialized in tourist industry activities.

The average annual amount of water abstracted from the water courses for needs of cooling facilities in Croatia is about 205 million m^3, while 10-20 per cent is lost in technological process and the rest is drained back into the water courses heated. The largest users are thermo-electric power plants on the Sava River.

Thermo-electric power plants near the Adriatic coast use sea water as the cooling medium and in the area of the Littorial-Istrian basins more than 650 million m^3 of sea water is used for cooling. Also if there are no particular limitations in the available water amounts of Croatia, it is necessary to continue taking into consideration all

adverse impacts on the water regime in the waterways, especially in the drought periods, as well as thermal pollution of inland and coastal water and related adverse impact on the fish population and the aquatic organisms.

Map 7.1: Overview map of zones of sanitary protection of water sources

Source: Register of protected zones, September 2012. Draft River Basin Management Plan, 2012.
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Agricultural use

There is no systematic study of environmental impacts of agriculture on water resources.

Until the beginning of 21th century, agriculture in Croatia was oriented to the production of the cultures for which irrigation is not dominant (cereal and corn), so the official records from 2004 showed that on the entire territory of Croatia 9.264 ha were irrigated, which is only 0.86 per cent of the then used agricultural land. With the implementation of the National Project of Irrigation and Land and Water Management, the area of irrigated land in Croatia was increased by more than 60 per cent in two years, so that 15,000 ha of agricultural surfaces were irrigated in 2007. The irrigation water is abstracted mainly from rivers and lakes, but uncontrolled abstraction of groundwater is wide-spread. In the continental parts, irrigation is mostly used for vegetable and fruit growing. The biggest irrigated areas in the continental part of Croatia are in Varaždin, Virovitica-Podravina and Osijek-Baranja counties, whereas in the coastal areas the irrigation is most represented in Istria and Dalmatia, especially in the valley of Neretva River and in the areas of Kaštela in Split. In the areas of the Drava and the Danube basins surface water from the waterways are most often used, but in Međimurje and

Podravina groundwater is also used for irrigation, although several multifunctional reservoirs were built in that area, that for now do not serve their purposes.

In the Adriatic Sea basin, water from open waterways (Neretva) or from mixed land-improvement drainage systems is used for irrigation systems and irrigation inside closed karst fields, and to a lesser extent even groundwater, especially in the area of Istria, Kaštela and Ravni kotari. regions Profitable vegetable and fruit growing in the Adriatic basin is impossible without irrigation.

The amount of water used for irrigation shows differences. In 2008, water used for irrigation amounted to some 6.33 million m³, reached around 10.6 million m³ in 2009 and dropped to 8.65 million m³ in 2011. Water for irrigation is mostly abstracted from watercourses, although since 2010 the share of water from reservoirs increased to 25 per cent in 2011. As the result of the development of irrigation infrastructure, the number of pumping plants went from 5 in 2008 to 13 in 2010, while the number of sprinkling generating units increased from 27 to 52 in this period. The total capacity of irrigation system increased from 750 l/h to around 2,400 l/h. Also the system of canals and pipelines grew up. There is a trend to use effective techniques like drop to drop (117 ha of irrigated area in 2010 compared to 46 ha in 2008) or sprinkling technique used on some 1,200 ha in 2008 and some on 1,600 ha in 2010.

On average, 400,000 tons of various mineral fertilizers are annually, mainly of domestic production. Maximal consumption was recorded in 2007 and 2008. After that period a reduction trend of consumption was noticed. According to the data of the ministry responsible for agriculture, in 2007 9,600 tons of pesticides were marketed. A considerable part of nutrient impact results also from breeding farms, especially in the Danube river basin district. Cumulative input of farming activities amounts to about 56 kg nitrogen and 14 kg phosphorus per one hectare of agricultural area (63 kg N and 16.5 kg P in the Danube River basin district; 37 kg N and 8.3 kg P in the Adriatic River basin district). In the Danube River basin district nutritive substances of organic origin are predominant and in the Adriatic River basin district more than two thirds consist of nitrogen and phosphorus from mineral fertilizer.

For the purpose of protection according to the Water Act, there are vulnerable zones in preparation, which means to identify sensitive areas to protect rivers and lakes from impacts from agriculture.

Hydropower energy production

There is no systematic study of environmental impacts of the energy sector on water resources.

In Croatia there are 17 large hydropower plants (> 10 MW) of storage and run-of-river type, 15 small hydropower plants (0.5 – 10 MW), 4 mini hydropower plants (0.1 – 0.5 MW) and several micro hydropower plants between 5 and 100 kW. Large artificial lakes represent a total volume of 1 billion m³ and serve primarily as reservoirs for hydropower plants. There are seven artificial lakes in Croatia.

The overall water energy potential in Croatia which is technically exploitable in hydropower plants (without building new plants or efficiency) has been estimated at 12,450 GWh/year. In 2011, power plants used some 41 per cent of the total water energy potential of the country, what was about 5,097 GWh/year. Locations most suitable for the development of hydropower plants are already used. The establishment of further hydropower plants would be located in valleys with a potential impact on the regime of surface and ground water. In that sense improving efficiency should be the first necessary step before building new hydropower plants. The construction and design of water structures and plants for the use of water power underlies requirements concerning negative effects on water regime in rivers, flood protection measures, health, infrastructure, wildlife and forests.

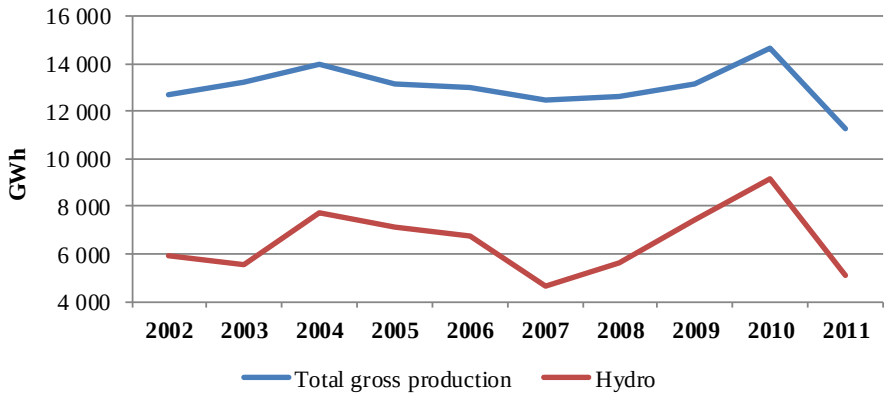
Main environmental aspects of hydropower plant construction and main impacts on the environment coming from existing hydropower plants have on the one hand the significant impact on the hydro-morphological and ecological state of water bodies and, on the other hand, the significant impact on the downstream flow and the loss of bed load. As consequence deepening of the original river bed, reduced sediment transport and erosion activate processes on the banks occur. With the lower water level also lowering of the groundwater follows. Upstream the material is deposited and the velocity of the water flow is slow-going. These dynamics are not in accordance with the natural conditions and therefore the ecological state of waters is affected. Another main

consequence of dams and other constructions is the effect on the linear pass ability for aquatic organism and fish. As consequence the population could be reduced or the formation of native species is affected.

The Croatian energy sector is potentially vulnerable to intensive drought periods. For example, the 2003 and 2007 droughts caused significant losses in production compared to the average. This resulted in increased costs for electricity production from €39-46 million in 2003 to €102-120 million in 2007.

There are some planned projects of hydropower industry concerning flood management in reservoirs and improving capacity of hydropower plants. In this context, three existing hydropower plants located in Varaždin, Čakovec and Dubrava in the north of Croatia on the Drava River are expected to be renewed.

Figure 7.1: Production of electricity, GWh



Source: Statistical Yearbook, 2012.

Transport (inland and marine)

Th Danube River is an international waterway and part of the European navigation system along its whole course through Croatia. Also Drava (70 km) and Sava (376 km) rivers are international waterways. Ports of international significance are Osijek on Drava River, Vukovar on Danube, Slavonski Brod on the Sava River and Sisak on the Sava and Kupa rivers. The most important negative effects of waterways are hydro-morphological impacts on the water regime and the aquatic ecosystem as well as pollution from ships.

Illegal construction of banks and breakwaters in the Croatian coastal area probably has the most important negative effect on specific coastal landscapes and ecosystems (including marine and land part). Particular problem is the fact that these are often irreversible changes as the backfilled shores are almost never returned to their original initial "natural" state. Artificial expansion of the coastal area including breakwater construction leads to the changes of the physical and chemical characteristics of the coastal region. Land-based sources of pollution are still the major source of pollution in the Adriatic Sea, specially related to the nutrient load from the Po River (transboundary impact) and in the vicinity of bigger coastal cities. The input of pollution from the inland into Croatian transitional and coastal waters happens mostly through river inflows and it is controlled only at the estuaries of larger rivers. Nevertheless, due to the undertaken activities in the framework of the Coastal Cities Water Pollution Control Project, environmental improvements in coastal areas in Croatia are observed. In addition sources of biological load are significantly present in transitional and coastal waters in form of invasive organisms from other parts of the world (e.g., the ones transported by ships ballast waters). An important issue related to maritime navigation is illegal waste into the marine environment and illegal operational discharges from ships. There is also the growing impact of nautical tourism to the marine environment.

Tourism

Tourism is the main economic activity in the coastal area and on the islands, and as a result, during several months of the touristic season, significant pressures on the coast and the islands of the Adriatic were recorded through regular monitoring programmes. Tourism affects the marine and coastal environment, e.g., through the

construction of marinas and berths in inappropriate locations situated in the most beautiful and most vulnerable parts of the coast. Some problems resulting from nautical tourism such as waste and bilge, and water from ships still need to be addressed. Supply with drinking water in regions with big seasonal differences also cause severe problems. At the peak of the tourist season water shortages occur in some areas and as a result water rationing has to be implemented. See Chapter 9.

7.3 Water management

River basin management

The Government adopted the River Basin Management Plan for the first planning period (2012-2015).

Flood protection

Croatia is subject to periodic flooding because of water and climate variability which causes considerable economic damage. In the period 2001-2007, floods caused damage amounting to €74 million.

Investments in the maintenance of flood protection systems were insufficient until the introduction of water protection charges for the water system in 2005. Since then, revenues have grown significantly, but are still insufficient for all necessary investments to develop the protection system from water. The safety of the population and assets in many potentially flood-exposed areas is not yet ensured. However, works are carried out (Table 7.3). There are regional differences in this respect and the protection is generally much better in larger settlements and along large rivers. In the Danube River basin, the flood protection system has not been completed and there are still some unresolved issues even on the major rivers, such as Sava and Drava rivers. In the Adriatic Sea basin, protection against storm water requires substantial improvement. Zagreb is the only city that is properly protected against floods from the Sava River. Other areas along the Sava River are mostly insufficienty protected.

The concept of the flood protection of Danube, Drava and Mura rivers is based on embankments and wide inundation belts along watercourses. Dams were completed in almost all the required areas, except in some sections along the old beds of hydroelectric power plants of Varaždin, Čakovec and Dubrava. The experience showed that on some sections their height is not satisfactory. It is expected that they will be gradually reconstructed. Flood protection is also a matter of international cooperation. At the Mura River a flood protection project of Croatia, Hungary and Slovenia was completed in 2011. The protection level of 100-year period is ensured with one meter of security zone.

Risks of artificial floods caused by unexpected collapsing or overflowing of high dams are considered in the 2008 Strategy on Water Management. Documentation on the consequences of eventual collapsing of dams impacted by floods has been provided, the areas of eventual flooding were marked and alarm systems have been implemented. The total surface of potentially threatened areas in Croatia amounts to approximately 680 km^2, of which the biggest part is situated in the water region of the rivers' Drava and Danube drainage basins.

Table 7.3: Assets and resources protected from floods

	2005	2006	2007	2008	2009	2010
Setlements, number	764	624	505	495	520	644
Buildings, number	964	684	669	521	748	832
Railroads, km	380	380	487	343	423	423
Roads, km	2 608	2 396	1 799	1 619	2 021	3 116

Source: Statistical Yearbook, 2012.

Also the operational flood protection was implemented in compliance with the Croatian National Plan for Flood Protection which includes the ice protection activities and measures on watercourses. The operational flood protection in Croatia is functioning well, which has been proved by evacuations of numerous big waters in the Danube River in 2002 and in 2006. For the purpose of monitoring and forecasting hydro-meteorological conditions Croatian Waters have implemented and automatized several authentic water gauges in compliance

with the Croatian National Plan for Flood Protection. Thus, data on water levels are available to the head offices for flood protection in real time and the water-level data are available for the public, e. g. on the Croatian Waters website. Data on measured precipitation levels are not available in real time, which can cause problems in operational flood protection activities in smaller drainage basins with shorter times of the outflow concentration. Also the number of forecasting points on some characteristic locations is insufficient.

7.5 Wastewater management

In Croatia 103 wastewater treatment plants of a total capacity of 3.7 million person equivalent, exist, which collected an average of 282 million m³ of wastewater annually during the period 2005 – 2012 (Table 7.4). There is a significant increase concerning wastewater from households. In 2005 around 126 million m³ of wastewater originated from households and in 2012 about 184 million m³. An increase of wastewater generated was observed due to an increasing connection ratio.

Table 7.4: Wastewater collected in thousand m³

	2005	2006	2007	2008	2009	2010	2011	2012
Total	**213 691**	**214 268**	**211 346**	**322 718**	**324 781**	**301 030**	**342 800**	**328 553**
Households	126 316	131 938	131 939	128 403	127 033	189 332	182 646	184 408
Activities	85 281	79 743	76 726	100 803	99 883	54 656	86 335	62 447
Public utilities services	2 094	2 587	2 681	..	..	..	..	..
Other waters	..	..	..	93 512	97 865	57 042	73 819	81 668

Source: Statistical Yearbook, 2012.

In general the wastewater treatment plants are with preliminary, first and second level treatment. There are two wastewater treatment plants with third level treatment (Zagreb City and Karlovac). Significant breakthroughs in wastewater treatment occurred in 2004 and 2007, when the first and second level treatment was put into operation. The largest quantity of wastewater until 2007 was treated only mechanically.

Approximately one third of the collected wastewater quantity is discharged into the environment, for example discharge into sea water without any treatment (Table 7.5). In general the ratio between treated and untreated wastewater is better in the Adriatic Sea watershed than in the Black Sea watershed, but both areas are in development and a clear improvement has been visible since 2007.

Table 7.5: Discharge of waste water from public sewage system in thousand m³

	2005	2006	2007	2008	2009	2010	2011	2012
Total	**213 691**	**214 268**	**211 346**	**322 718**	**324 781**	**301 030**	**342 800**	**328 553**
Untreated water	81 411	73 362	71 118	130 685	118 739	95 321	133 650	69 418
Treated water	132 280	140 906	140 228	192 033	206 042	205 709	209 150	259 135

Source: Statistical Yearbook, 2012.

A general characteristic of the water utility sector in Croatia is that the development of wastewater sewage services largely lags behind water supply services.

There is also a significant gap between the percentages of population provided with a wastewater treatment service (around 28 per cent or about 1.4 million inhabitants) and of the population connected to the public sewerage system (43.6 per cent or about 1.95 million inhabitants). By regarding the capacity of wastewater treatment plants it is obvious that the number of connected people is extremely small and there are possibilities to reach better connection ratio. Only 61 per cent of the people connected to public sewerage system are also provided with wastewater treatment service.

A concern in wastewater sector is the sewage sludge formation. Sewage sludge is generated as waste at wastewater treatment plants by cleaning urban or industrial wastewater. It contains nutrients like nitrogen and phosphorus as well as contaminants like heavy metals, organic substances, pathogens and hormonally active substances, which can be harmful to the environment and health. For pre-treatment, stabilization (odor reduction) and volume reductions (thickening) are main tasks. In Croatia around 8,000 tons of sewage sludge

were generated and used in agriculture, discharged into the sea and ended at disposal on landfill-sites. The optimal technique under such circumstances is thermal treatment because of several advantages like mineralization and best-possible inertisation, destruction of organic pollutants, sanitation and energy recovery.

To protect the environment from influences of wastewater some areas were declared sensitive areas with special regard on collection and treatment of wastewater. In the Danube River basin district the effort is to reach higher standards of treatment for collected wastewater. Transitional periods for implementation have been elaborated in detail with regard to the sensitivity of a basin and the size of an agglomeration. The smaller cities in sensitive areas (2,000 – 10,000 person equivalent) will get the second treatment level.

7.6 Legal, policy and institutional framework

Legal framework

The Constitution defines water as a resource of public interest and guarantees therefore special protection. Other legal foundations of water management are defined by the Water Act (OG 153/09, NN 130/11, 56/13), the Water Management Financing Act (OG 153/09) and related secondary legislation, with individual provisions related to water found also in several laws which regulate other legal areas. The amendments of these acts have been adopted in line with the harmonization process to reach the EU Aquis. The provisions of the Water Management Financing Act were incorporated into the 2013 Water Act.

The Water Act regulates and defines the legal status of water and water bodies as well as water works, the preconditions for their use and protection, and the activities and organization of water management. It defines water management revenues, the most significant of these are water charges, that were provided before in the Water Management Financing Act. It determines the source of funds for water management financing, in particular water fees, which include payment obligation, fee payers and the purpose of spending funds (see chapter 5).

In addition to these two acts, water management in Croatia is regulated by 48 by-laws, which concern different sectors, e. g., the Decision on designation of sensitive areas (OG 81/10), the Decision on the designation of vulnerable areas in Croatia (OG 103/12), the Ordinance on sanitary quality of drinking water (OG 47/08), the Ordinance on defining sanitary protection zones (OG 66/11), the Regulation on bathing waters (OG 51/10), the Regulation on sea bathing waters (OG 73/08; under the competence of the Ministry of Environmental and Nature Protection), the Regulation of water quality standards (OG 89/10) and the Regulation on fees for water protection (OG 82/10; 83/12).

The procedure of identifying sanitary protection zones is laid down by the Ordinance on the conditions for establishing sanitary protection zones (OG, 66/11, 47/13). They were determined predominantly on the basis of hydrogeological and hydrological conditions and investigation which have to be performed before adoption related decision of responsible authorities (local self-government units). After that, the designated areas have to be important part of physical planning document and by that is ensured implementation of protection of water bodies identified of drinking water.

The Ordinance on Management of Sewage Sludge (OG 38/08) provides requirements for the use of Sewage sludge in agriculture with strict limit values on heavy metals and organic substances. The new Act on Water for Human Consumption (OG 56/13) and the Ordinance on sanitary quality of drinking water (OG 47/08) provide requirements for drinking water quality.

Strategic documents, policies and programmes

One of the most important strategic documents concerning sustainable management of water resources is the 2008 Water Management Strategy (OG 91/08). It is a long-term planning document setting out the vision, the mission, the goals and tasks of the State policy in water management and a number of indispensable implementing rules and regulations. Main points of this strategy are the provision of sufficient quantity and good quality of drinking water for the population and also for economic purposes as well as protection of people against floods and protection of aquatic ecosystem.

In the beginning of 2013 the Ministry of Agriculture adopted an action programme for the protection of water against pollution caused by nitrates from agricultural sources in areas designed as vulnerable zones under the Water Act. It defined the permitted application of livestock manure on agricultural land, period when the land application of certain types of fertilizers is prohibited, limitation of land application of fertilizers according to soil type and slope, climatic conditions, rainfall and irrigation, conditions for land applications near water courses, land use and agricultural practice. The action programme is still not adopted.

An Implementation Plan for Water Utility Directives was adopted by the Government in November 2010. The plan contains cost estimates and defines dynamics of construction of public water supply as well as wastewater collection and treatment systems. The strategic goal in the development of public water supply is to reach a connection ratio of 85-90 per cent by 2020 and to increase the connection level of population to public sewerage systems, including wastewater treatment, around 60 per cent by 2023. The investment plan for the implementation of the plan goes up to around €4.5 billion. This challenge leads to a reform of the utility sector. Public water supply, wastewater collection and treatment activities are carried out as a public service. A project on institutional options in the water supply and waste water sector was completed in 2012 and led to the draft regulation on the same topic that is expected to be adopted.

Regulatory, economic, fiscal and information measures

According to the Register of Concessions for the economic use of water kept by Croatian Waters (Water Act, Article 137), over 600 concessions have been issued for the use of water. The right to use water power for production of electricity and for devices driven by water power is awarded on the basis of a concession contract and a water rights permit. The basic principle in making the decision on awarding the right to use water power is the principle of greater public interest and a more rational use of water power.

Additionally 500 active water intakes have been recorded for the purpose of public water supply mainly of groundwater. 245 systems of public sewerage have been recorded on the basis of a water permit for the collection of wastewater. Water permit for wastewater discharge is issued for all discharges to which the regulations on the limit values of wastewater emissions apply.

In total, 285 water permits have been issued to economic entities for wastewater sewerage, 91 of these permits refer to the plants that are subjects to integrated pollution prevention and control permits. For other activities 49 water permits were issued, the main part refers to the industrial sector. On the islands there are no recorded business subjects with water right permits, or with prescribed limits for wastewater discharge. Emissions to water from industrial plants are dealt with own pre-treatment in wastewater treatment plants. The treated wastewater can be discharged either into public sewerage systems with a further wastewater treatment plant or into a natural water body, most often a surface water body, depending on available options. The conditions for wastewater discharge into a natural water body are much stricter and these are laid down specifically for each particular industry.

More than half of the permits refer to wastewater discharge into public sewage systems. Such way of industrial wastewater sewage is characteristic for the Danube river basin district, where two third of legal permits refers to the discharge of industrial wastewater into public sewage systems. Some 223 wastewater discharges from economic activities go into watercourses and 35 to coastal waters either through direct discharge or through the public sewage system. So far, 19 plants have been registered that discharge water into underground.

Professional training programmes for operators of wastewater treatment units are in process to be established. The first wastewater treatment plant with possibility for on-site training is created.

Institutional framework

Within the Ministry of Agriculture the Directorate for Water Management is the competent authority for implementation of national policy of water management as well as transposition and coordination of implementation of EU legislation like Water Framework Directive. Also the adoption of the Implementation Plan for Water Utility Directives and the development and supervision of urban wastewater management strategies and plans are in the competence of the Directorate for Water Management.

The legal entity for water management is Croatian Waters that is a Government agency, non–profitable and non-budgetary funded. It is responsible for managing water and public water estate, protective and hydro-ameliorative water structures. It is managed by the Management Board and the General Manager, both appointed by the Government. Croatian Waters provides expertise and technical, economic and legal assistance.

The main tasks of Croatian Waters are the preparation of draft water management strategies, river basin management plans and water management programmes and plans, which form the basis for the supply of water for different use, protection from water pollution, regulation of watercourses and other water bodies and protection from adverse effects of water. Water quality monitoring, collecting water-related data and issuing water permits are in the competence of Croatian Waters. The implementation of measures to ensure rational water use, water protection and flood protection as well as construction, co-financing and development of water infrastructure are also carried out by Croatian Waters.

For the purpose of water management, Croatian Waters established six water management departments. There are branch offices for smaller watersheds within the water management departments.

The general responsibilities of the water management departments are the implementation of the River Basin Management Plan on each river basin district, monitoring and supervising implementation as well as coordination, monitoring, supervising and providing instructions and guidelines to water management branch offices. Departments also ensure communication and cooperation with regional and local self-governments, regional units of Government bodies and State administration organizations, public institutions of regional and local significance, users of water, payers of water charges, users of funds of Croatian Waters and representation before courts.

A special role in water management rests with the National Water Council, a special body established pursuant to the Water Act, with members appointed by Croatian Parliament. Its duties include systematic analysis of water management issues, coordination of different needs and interests, and proposing measures for development and improvement of the water system.

The Water Services Council is established for the purpose of ensuring the legality of the pricing of water services and determining the socio-economically acceptable price of water for households in Croatia. Members of the Council are appointed by the Croatian Parliament upon the proposal of the Government. The Council proposes regulations specifying the base price of water services and the price paid by socially disadvantaged people for the necessary amount of water supplied for basic household needs.

The Ministry of Health through the National Institute of Public Health performs quality sanitary control of drinking water. In the water supply system network the water is under constant supervision by the National Institute of Public Health and the sanitary inspection, which is responsible for monitoring of drinking water sources (raw water). The Ministry of Environmental and Nature Protection is in charge of monitoring sea bathing water quality on beaches as well as implementing obligations from Marine Strategy Framework Directive (2008/56/EC) and the Ministry of Transport, Maritime Affairs and Infrastructure is in charge of maritime transport and sea protection from it. Waterways and inland water ports are in the competence of the Ministry of Maritime Affairs, Transport and Infrastructure as well as harbour administrations (management of ports and harbours).

7.8 Conclusion and recommendations

With the implementation of the Water Act and related regulations, the methodology to assess water quality has changed completely. There are much more monitoring points and other ways of measuring. This is resulting in huge amount of different data captured, used and needed from different institutions. There are different actors in water management dealing with inland and sea water, bathing and drinking water. Responsibilities are also split at different levels.

Recommendation 7.1
The Ministry of Agriculture, the Ministry of Environmental and Nature Protection, the Ministry of Health, Croatian Waters and CEA and other relevant institutions should improve information exchange by ensuring that:

(a) Communication channels and contact persons are clearly defined on the horizontal and vertical levels;

(b) All institutions in the water management sector regularly provide water-relevant data in an agreed format to a designated institution in charge of gathering water-related data.

Water losses are very high and reach 40 per cent of abstracted water. The reasons are different, like poor maintenance, illegal tapping and a leaky distribution system. In order to reduce negative influences on water quality and system efficiency (intrusion and extrusion), efficient measures such as application of modern techniques, better maintenance and new construction would minimize loses.

Recommendation 7.2

The Ministry of Agriculture, in cooperation with Croatian Waters and public water suppliers, should reduce water losses in the water supply network and ensure effective maintenance of the water supply systems.

The connection ratio of population to wastewater treatment plants is very low with 28 per cent. Additionally there are still significant discharges of untreated wastewater into water bodies. Also unsatisfactory sludge management, with usage in agriculture and landfilling sites affects the quality of water bodies.

Recommendation 7.3

The Ministry of Agriculture should:

(a) Increase the number of population connected to the wastewater treatment plants to use full capacity of the plants;

(b) Continue ensuring that untreated wastewater is not discharged into water bodies;

(c) Improve management of sludge produced by wastewater treatment plants by the development of a coherent policy on sludge use.

Measures were taken with the implementation in legislation of vulnerable zones and protection measures against erosion on agricultural land. Nevertheless, The amount of nutrients from point and diffuse sources is still significant and has an impact on surface waters.

Recommendation 7.4

The Ministry of Agriculture should further promote sustainable farming practices.

Chapter 8

BIODIVERSITY AND PROTECTED AREAS

8.1 Trends in species and ecosystems

Croatia is endowed with 3 of the 11 biogeographical regions present in €ope: Alpine, Continental and Mediterranean, but also there are some elements of the Pannonian region. The number of known taxa (species and subspecies) is almost 38,000 (Table 8.1). Many species are under threat or at different levels of threat. The most vulnerable are freshwater fish, reptiles, amphibians, dragonflies and birds (Table 8.2).

Table 8.1: Number of known and endemic taxa

	Total number of know taxa	Number of endemic taxa	Share of endemic taxa, %
Total	**38 266**	**1 093**	2,86
Plants	8 871	523	5,90
Fungi	4 500	0	0,00
Mammals	101	5	4,95
Lichens	1 019	5	0,49
Breeding birds/total[1)]	387	0	0,00
Reptiles	41	9	21,95
Amphibians	20	7	35,00
Freshwater fish	152	17	11,18
Saltwater fish	442	6	1,36
Terrestrial invertebrates	15 228	350	2,30
Freshwater invertebrates	1 850	171	9,24
Marine invertebrates	5 655	0	0,00

Source: Biodiversity of Croatia, State Institute for Nature Protection, 2009.
1) Recorded total of 387 bird species, of which 233 nesting birds

Table 8.2: Number of plant and animal taxa included in red list by group and IUCN categories

Group	EX	RE	CR	EN	VU	NT	LC	DD	Total
Total	**1**	**43**	**314**	**332**	**473**	**427**	**266**	**600**	**2 456**
Vascular plants	1	10	90	62	71	186	0	340	760
Fungi	0	0	55	77	119	0	0	63	314
Lichens	0	0	3	11	32	8	2	0	56
Mammals	0	5	0	4	3	21	1	8	42
Birds - nesters	0	13	17	23	14	36	34	10	147
Birds - non-nesters	0	2	3	10	2	19	9	1	46
Reptiles	0	0	2	2	0	6	0	6	16
Amphibians	0	0	1	1	2	3	0	1	8
Freshwater fish	0	6	15	20	29	11	2	8	91
Marine fish	0	3	5	8	11	28	36	32	123
Butterflies	0	0	5	2	4	10	0	17	38
Dragonflies	0	2	6	5	5	12	0	6	36
Ground beetles	0	0	38	35	63	76	143	40	395
Stoneflies	0	2	1	3	11	4	26	35	82
Corals	0	0	8	20	37	7	13	31	116
Cave fauna	0	0	65	49	70	0	0	2	186

Source: Statistics Yearbook, 2012.

IUCN categories - EX-extinct; RE-regionally extinct; CR-critically endangered; EN-endangered; VU-vulnerable; NT-near threatened; LC-least concern, DD-data deficient

During the last 10 years Croatia has produced its red books and red lists according to the International Union for Conservation of Nature (IUCN) criteria. The State Institute for Nature Protection (SINP) has produced a new red list for flora. Red lists for freshwater crustaceans, algae, sea grass, terrestrial and freshwater gastropods and a red book of corals are in development. The first red data book was published in 2003 and the second edition is expected to be published online in 2014.

The SINP has also produced a "green" list and a "green" book for indigenous or autochthonous breeds/species connected to some habitats that are endangered. This is in response to the Convention on Biological Diversity (CBD) obligations on habitats (Aichi Target 13). In Croatia, autochthonous breeds have developed over hundreds of years of use and practices; 26 breeds are at risk because of the increased mechanization of agriculture. These breeds generally have low productivity and, therefore, there is little interest in maintaining them on farms. But for the management of grasslands and the conservation of biodiversity, they are of great importance. Almost 17 per cent of grasslands on the Croatian territory depend on extensive farming using traditional breeds. Many of these species are used as food because of the quality of their meat; they are adjusted to the climate and surroundings, have stronger resistance, and they are useful for habitat maintenance. They often feed themselves on invasive species plants and as a result there are long term savings for the country.

The National classification of habitats (made according to the European Union Nature Information System (EUNIS) classification) defines ten main classes of habitats (Table 8.3), and is prescribed by the 2006 Ordinance on the classes of habitat types, habitat map, threatened and rare habitat types and by the measures for the preservation of habitat type. This Ordinance protects all habitat types protected by the EU Habitats Directive, Resolution No. 4 of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention), and those threatened on the national level.

Table 8.3: Habitat types according to the EUNIS classification

Habitat type	EUNIS code	Surface km^2	share %
Total		**56 608**	**100**
Marine habitats	A	20	0,04
Coastal habitats	B	20	0,04
Inland surface waters	C	588	1,04
Mires, bogs and fens	D	..	..
Grassland and lands dominated by forbs, mosses or lichens	E	9 972	17,62
Heathland, scrub and tundra	F	1 925	3,40
Woodland, forest and other wooded land	G	24 928	44,04
Inland unvegetated or sparsely vegetated habitats	H	60	0,11
Regularly or recently cultivated agricultural, horticultural and domestic habitats	I	8 973	15,85
Constructed, industrial and other artificial habitats	J	2 651	4,68
Habitat complexes	K	7 471	13,20

Source: Fourth National Report to the Convention on Biological Diversity, Ministry of Culture, 2009. ECE secretariat calculations.

8.3 Trends in development and management of protected areas and ecological networks

Protected Areas

In 1999 Croatia established eight national categories of nature protection. A new category of regional parks was introduced in the Nature Protection Act in 2003.

The total country area (mainland and sea) under permanent protection in Croatia was steadily increasing over the period 2009-2012 (Table 8.4 and Map 8.1). By end of 2012, there were 431 nature sites protected in nine

categories (Table 8.5). Among the national protected areas, there are internationally recognized protected areas including five Ramsar sites (Crna Mlaka, Lonjsko polje and Mokro polje, Kopacki rit, Neretva River Delta and Vransko Lake), two biosphere reserves (Mura-Drava-Danube Regional Park, and Kopački Rit Nature Park), and a World Heritage site (Plitvice Lakes National Park).

Map 8.1: Protected areas

Source: SINP, 2013.
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

There were no management plans for national parks or nature parks in 1999. National parks had a "physical plan" which the Government recognized was inadequate in providing management solutions. It is now the responsibility of the management authority and protected area directors to develop protected area management plans. Protected areas in Croatia are obliged to have management plans. Out of the eight national parks, five have management plans, two have their plans in the phase of final consultations and one is requiring a draft management plan. Eight out of eleven nature parks have management plans. SINP is tasked with reviewing management plans and providing an opinion on their suitability; the Ministry then approves the management plans. Visitor management has been included as part of the management plan framework. Some protected areas authorities have developed visitor management plans but it is not an obligation to do so.

Table 8.4: Percentage of protected areas

	Total protected area km^2	Per cent of total national territory
2009	6 624,14	7,56
2010	6 626,83	7,56
2011	7 486,67	8,54
2012	7 486,67	8,54

Source: Register of Protected Areas of the Ministry of Environmental and Nature Protection. 2013.
Note: National territory includes land and sea.

Table 8.5: Protected areas, 2012

	Number	Total area km^2	Mainland km^2	Sea km^2
Total	**431**	**7 486,68**	**6 870,40**	**616,28**
National park	8	976,66	756,96	219,70
Nature park	11	4 196,22	4 008,33	187,89
Strict reserve	2	24,73	24,73	0,00
Special reserve	79	426,04	305,96	120,07
Regional park	2	1 027,92	1 027,92	0,00
Forest park	32	34,21	34,21	0,00
Significant landscape/seascape	85	1 373,57	1 280,66	92,91
Nature monument	84	2,27	2,27	0,00
Horticultural monument	128	8,59	8,59	0,00

Source: Register of Protected Areas of the Ministry of Environmental and Nature Protection, 2013.

Ecological networks

Croatia established its national ecological network (map 8.2) in 2007. It covered 47 per cent of the mainland area and 39 per cent of the marine area. The network included 1,510 important sites for species and habitat types, 40 areas important for birds and 2 ecological corridors (migration corridors for birds and marine turtles).

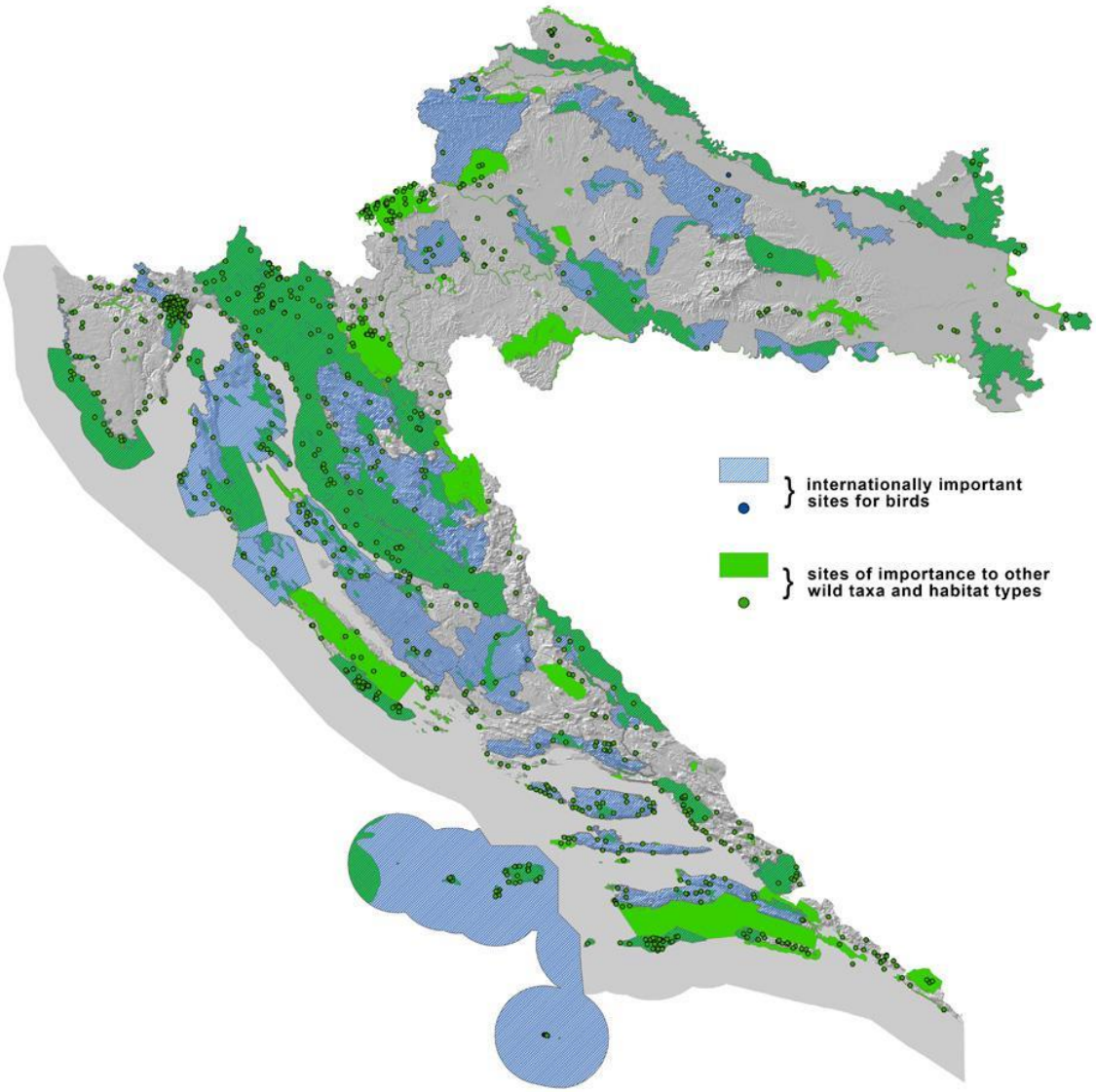
The basis of the national ecological network was originally the work carried out by Croatia to identify Areas of Special Conservation Interest (ASCI) that form the Emerald Network of the Bern Convention. The Resolution No. 5 of the Bern Convention states that "for contracting Parties which are Member States of the European Union Emerald Network sites are those of the Natura 2000" which links the Emerald Network with the Natura 2000 Network. Croatia first established the Emerald Network sites and subsequently these are included in the proposal for the Natura 2000 sites.

Since 2007 Croatia has been carrying out the activities under the EU Natura 2000 network of protected areas. The final list of Natura 2000 sites was adopted in September 2013 by the Government following a period of public consultation which ended on 5 June 2013. The final list contains over 700 proposed sites of community importance (pSCIs) (of which 174 sites are caves) and 38 special protected areas (SPAs). Altogether, they cover over a third of the country and around a sixth of the territorial sea, putting Croatia at the top of the league table along with Slovenia and Bulgaria in terms of percentage of the territory included in Natura 2000.

The SINP hosts a website devoted to Natura 2000 with an interactive map and an explanation of the consultation process concerning the establishment of the national Natura 2000 ecological network (http://www.natura2000.hr/Home.aspx).

There is a challenge in the future in terms of enforcement and monitoring and management of the Natura 2000 network. There is a lack of a national level systematic monitoring and a lack of capacity and equipment. Some species are being monitored: large carnivores and some birds species. A regionally dispersed team is needed to be able to monitor all Natura 2000 species and habitats at the national level. The nature protection information system is also challenging since it is continuous work and requires financial and human investments. However, Croatia is planning to ensure adequate financing to fully implement obligations deriving for Natura 2000 requirements for the next programming period.

Map 8.2: Croatian Ecological Network in 2007



Source: SINP, 2013.
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

8.4 Pressures on species and ecosystems

Fisheries

Concerning marine ecosystems, there is overfishing of some species in the sea, with no monitoring even though there are quotas.

The total amount of catches and production of sea fish, crustaceans, oysters and other mollusks and shellfish in Croatia increased from 44,111 tons in 2005 to 69,748 tons in 2012 (+58%) (Figure 8.1). However, the trends for different groups are opposite. For instance, the catches of oysters and other mollusks and shellfish decreased from 4,184 tons in 2005 to 1,680 tons in 2012 (-59%). At the same period the catches of pelagic fish increased from 32,046 tons in 2005 to 58,687 tons in 2012 (+83%) (Table 8.6).

Table 8.6: Catches and production of sea fish, crustaceans, oysters, other mollusks and shellfish

	Total	Pelagic fish		Other fish	Crustaceans [1]	Oysters [1] other molluscs and shellfish
		Total	of that pilchard			
2005	44 111	32 046	16 521	7 623	258	4 184
2006	52 037	38 346	16 950	8 357	298	5 036
2007	51 819	37 221	16 900	8 893	451	5 254
2008	60 187	46 399	21 194	9 331	461	3 996
2009	66 619	53 659	28 815	9 137	529	3 294
2010	63 252	50 303	26 749	9 298	543	3 108
2011	77 759	66 618	46 051	9 026	505	1 610
2012	69 748	58 687	43 527	8 894	487	1 680

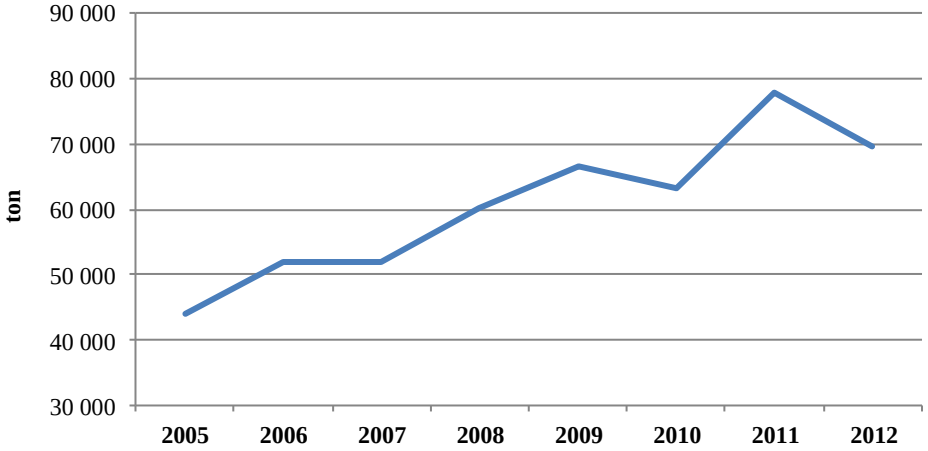
Source: Statistics Yearbook, 2012.
1) Data refer to edible and non-edible fish.

Economic development

Nowadays, 35.84 km^3 of water is being used for production of electrical energy annually, of which 97.4 per cent is used from waterways, 2.2 per cent is used from accumulations and the rest from other resources. By construction of hydropower plants and accumulation pools, river flows have been significantly changed, which has a negative impact on the whole series of habitats and life communities that belong to them. The country lacks an estimation of the impact on environment including nature impact assessment, in order to identify which of the planned hydropower plants have significant negative impact on species and their habitats.

One of the most difficult problems to address in the country is related to hydropower and energy investments. Croatia has adopted an Energy Development Strategy until 2020 with the objective of increasing investments in the construction of energy infrastructure for the next seven years in order to cut its dependence on energy imports. An example of such a hydroelectric project is the planned construction of a 68 MW underground power plant, close to the Vilina Cave – Ombla Spring. An environmental impact assessment prepared after mounting pressure from civil society was published in March 2013, identifying the potential to harm a large number of cave species. As a result, the EBRD decided to withdraw the loan approved to finance the project. In addition, Croatia is supporting the construction of small hydropower plants of less than five MW on six watercourses. There is a proliferation of these small hydropower plants resulting in a considerable impact on the surrounding nature, including valuable ecosystems and species.

Figure 8.1: Total of catches and production of sea fish, crustaceans, oysters, other mollusks and shellfish



Source: Statistics Yearbook, 2012.

Agriculture

The main pollution problem is related to nitrogen and potassium emissions from agriculture. However, the total consumption of mineral fertilizers decreased from 401,164 tons in 2008 to 278,872 tons in 2011 (-30%) (table

8.7). Another concern related to species and habitats is the loss of autochthonous species, abandonment of certain farming practices that support biodiversity and conversion to more intensive agriculture.

One third of the proposed Natura 2000 ecological network is agricultural land. Statistics show that Croatia has a significant number of very small farms that will not change to intensive agriculture. Bigger farms which have been established in the last few years prefer to be in compliance with EU legislation, including that related to the environment in order to have access to subsidies, and are aware of their obligations. For example, many farmers are aware that grasslands need to be maintained for grazing, and will mow it once a year to receive a payment.

Table 8.7: Consumption of mineral fertilizers in tons

	Total [1]	Quantity of fertilizers used				Active ingredients			
		Total [2]	Type			Total	N	P_2O_5	K_2O
			Nitrogen	Phosphorous	Potassium				
2005	366 534	135 534	58 005	2 808	9 438	61 360	25 841	15 096	20 423
2006	364 476	114 476	49 285	3 969	9 909	50 118	20 789	12 188	17 141
2007	413 900	133 614	59 944	4 658	10 003	60 088	26 316	14 372	19 400
2008	401,164 [3]	198 434	73 810	388	3 062	94 674	37 683	23 557	33 434
2009	337,028 [3]	139 988	63 089	560	4 389	61 872	28 399	13 593	19 880
2010	307,255 [3]	132 795	58 623	4 258	9 147	61 260	28 162	14 231	18 867
2011	278,872 [3]	122 023	55 336	3 639	9 316	53 216	24 603	12 390	16 223

Source: Statistics Yearbook, 2012, 2011, 2010.
1) Data on mineral fertilizers used by legal entities and parts thereof include estimated data on consumption on private family farms.
2) Difference to total amount refers to mixed and composite fertilizers.
3) Data have been taken over from administrative sources.

The Ministry of Environmental and Nature Protection staff in interviews highlighted that cooperation with the Ministry of Agriculture in the area of agriculture has increased significantly and they are developing together agri-environment measures, will revise cross compliance conditions, and will have trainings across Croatia to help farmers to apply for the incentives. There is a working group with the Payment Agency (the agency that provides the payments to the farmers), the Ministry of Agriculture and other relevant institutions in the sector of agriculture to work on agri-environment measures. These measures are needed to provide benefits to farmers for implementing voluntary measures that are beneficial for nature protection, but may affect agricultural production.

Regarding seeds and genetic resources, Croatia has been following OECD and FAO advice on the use of plant species. Effectively, GMOs cannot be planted, not even for testing purposes, and GMO products cannot be sold in the country (0.2 per cent of GMO content in a product is the maximum allowed).

Hunting

There are a total of 1,061 hunting grounds in Croatia. Around 315 are State owned and managed and the rest of them are jointly managed by the State and county authorities. The State provides concessions or leases of its hunting grounds to legal and natural persons (hunting associations). At the county level, the hunting grounds (also known as common hunting grounds) only can be leased.

Each hunting ground is managed according to the hunting management plan spanning ten years. According to Nature Protection Act, natural resources management plans contain nature protection conditions. Keeping in mind different species and habitats, management measures can vary. There are game species which cannot be hunted and instead have a management plan for their protection. In the area of game management there is good cooperation through the committees for the development of management plans and the inclusion of protective measures in those plans. The Hunting Act (OG 140/05 and 75/09) provides for the collection of fines if measures are violated.

Since 1999 the number of game bagged significantly increased for some game species (Table 8.8). However, this is explained by the fact that the central hunting records database was established in 2005. In 1999, available data were based mostly on certain hunting grounds and by no means covered all grounds on Croatian territory. Since 2005, the database has been filled with more accurate data.

For wild boar it increased from 9,827 in 2005 to 24,496 in 2012; for bear from 23 in 2005 to 86 in 2011; for roe deer from 8,127 in 2005 to 14,211 in 2012; for other deer from 1,405 in 2005 to 3,542 in 2012. The number of hunters has also increased from 43,110 in 2005 to 64,617 in 2012 (+50%).

Table 8.8: Hunting

	2005	2006	2007	2008	2009	2010	2011	2012
Number of hunters	43 110	49 232	54 763	56 049	57 870	57 766	62 129	64 617
Game bagged								
Roe deer	8 127	8 764	11 175	11 689	11 388	11 284	13 373	14 211
Other types of deer	1 405	1 599	2 738	2 139	2 520	2 916	3 394	3 542
Bear	23	58	61	76	88	99	86	..
Wild boar	9 827	10 445	17 527	18 679	18 243	18 409	21 871	24 496
Hare, rounded	14 000	7 000	10 000	21 000	21 000	22 000	24 000	23 000
Common pheasant, rounded	65 000	77 000	70 000	84 000	54 000	68 000	58 000	56 000
Fox, rounded	11 000	11 000	11 000	9 000	10 000	10 000	10 000	..
Waterfowl, rounded	6 000	9 000	19 000	15 000	21 000	23 000	19 000	24 000

Source: Statistics Yearbook, 2012, 2011, 2010.

Forest fires

High forests cover 37 per cent of national territory and the rest are different degrees of degraded forest vegetation. The majority of the area is covered with broad-leaved trees, namely 81 per cent. Coniferous forests cover some 14 per cent and the rest is covered by different types of degraded forests (table 8.9).

Forests in Croatia today belong to the first or second generation after the natural restoration of vast primary forests in the area between the Sava and Drava rivers and karst region south of Kupa River. No less than 95 per cent of forest vegetation is in its natural composition, which is rare and extremely valuable at both European and global level. Almost all the forest habitats in Croatia belong to the Natura 2000 habitat types protected by the EU Habitats Directive.

One of the main threats to forests in Croatia is forest fires especially in the Mediterranean part of Croatia. The statistical data varies from year to year (table 8.10) and largely depends on weather patterns.

Urbanization

The conservation of landscape diversity is affected by the increased trend of urbanization and numbers of people populating the Adriatic coast. Lowland and coastal landscapes are some of the most endangered landscapes in Croatia, but there are also impacts on landscape diversity in rural areas with migration to the cities and land abandonment, in particular in the grassland areas.

Table 8.9: Forest area in hectares

	Forest area at the end of			
	2008	2009	2010	2011
Total	**2 227 416**	**2 233 354**	**2 231 883**	**2 231 764**
Broad-leaved trees	1 801 630	1 810 890	1 817 934	1 816 031
Conifers	317 182	313 351	303 892	303 495
Degraded forest (maquis, garigue, shrub, serub)	108 604	109 113	110 057	112 238

Sources: Statistical yearbooks 2010, 2011 and 2012

Table 8.10: Forest damages caused by fire, in hectares

	2005	2006	2007	2008	2009	2010	2011
Total burned-over area	629	2 981	12 628	3 449	2 789	1 900	3 277
of which in State forests	579	2 981	5 647	2 879	2 300	1 455	2 788

Sources: Statistical yearbooks 2010 and 2012

Alien species

As a country with specific geographical position and a great number of islands and waterways, Croatia is particularly vulnerable to biological invasions and experiences serious problems with both the intentional and unintentional introductions of alien species. It is known that over 350 alien species occur in the country and some of them have become invasive. Their negative impacts on biodiversity, human health and many socio-economic interests have increased due to the human activities such as trade, mobility and different economic sectors, coupled with global climate change.

Historically, problems with Invasive Alien Species (IAS) in Croatia have been known beginning in 1910 when 11 specimens of the Indian mongoose - Herpestes auropunctatus were introduced to the island of Mljet where they have exterminated most of the snake population over 20 years and attacked a number of other small animals and birds. Invasive species on the islands present a special problem since island ecosystems are particularly sensitive due to their isolation. Allochtonous game species, such as fallow deer – Dama dama, spotted deer – Axis axis or wild boar – Sus scrofa, were introduced to islands and continental hunting grounds, and today present a special problem too.

Nowadays, lists of IAS for many taxonomic groups still do not exist or are partial. However, a preliminary list of invasive alien plants was established with 64 taxa, which is available on the Flora Croatica Database web page http://hirc.botanic.hr/fcd/. A well-known terrestrial invasive species is Ambrosia artemisifolia which affects grassland habitats and native plant species, and is also the cause of allergies. The Amorpha fruticosa species was purposefully introduced due to its honey giving properties but is now outgrowing lowland wet grassland areas.

SINP and the Croatian central State administration body competent for nature protection in 2006 published the Red book of freshwater fish of Croatia which contains a list of 19 alien freshwater fish species. In addition to that, four new species have been recorded since 2012. Freshwater biodiversity is highly threatened by invasive alien invertebrates, such as the mussels Corbicula fluminea, Dreissena polymorpha, Anodonta woodiana, snail Potamopyrgus antipodarum or crayfish Orconectes limosus and Pacifastacus leniusculus.

The pressure of IAS in the Adriatic Sea is increasing. The tropical green algae Caulerpa taxifolia and Caulerpa racemosa are spreading rapidly across the Adriatic Sea coastal benthic habitats. C. taxifolia was initially observed at two locations in 1994 and at another one in 1996. Also invasive, green algae Caulerpa racemosa was first found in autumn 2000 near Pakleni Islands. By the end of 2005, this algae was observed at 43 locations from Cavtat to the island of Vis, including one near Vrsar (Istria). At least 35 new species became new elements of the Adriatic ichthyofauna up until 2007, represented by 22 families, out of which eight families are new to the Adriatic: Hemiramphidae, Leiognathidae, Haemulidae, Siganiidae, Ipnopidae, Zoarcidae, Monacanthidae, Cylopteridae. Since 2007 two new fish species have been recorded: Terapon theraps and Fistularia commersonni.

Several projects and activities on IAS were conducted in the last years or are on-going:

- The project “Estimated level of bio-contamination of the Sava River basin - a step towards the common strategy for monitoring the status of invasive alien species into transboundary watercourses of Croatia and Slovenia” started in 2012, as a result of the collaboration between the Faculty of Science of the University of Zagreb - Division of Biology and the National Institute of Biology, Ljubljana, Slovenia.

- Through the EU Natura 2000 Integration Project (NIP), lists of alien species for bryophyte, fungi, algae and lichens and for all vertebrates and 15 invertebrate taxonomic groups will be compiled until 2014.
- In 2010, the project of development and implementation of faunistic database (CRO fauna) started as part of NPIS (Nature Protection Information System), financed from the IPA 2007 – TAIB/TAF programme, led by SINP. The CRO-fauna database will be designed to store all the relevant information about the IAS, needed for the efficient early warning and rapid response system.
- In June 2012, with the support of the Global Environment Facility – GEF, Croatia started the project National Biodiversity Planning to Support the implementation of the CBD 2011-2020 Strategic Plan in Croatia in order to update and revise the contemporary Strategy and Action Plan for the Protection of Biological and Landscape Diversity (NBSAP). The draft outline for the new NBSAP will have been prepared by the 2014. This strategic document will also define some strategic objectives and action plans in relation to IAS.
- Related to the promotion of nature conservation and raising awareness among the interested public, the Ministry of Environmental and Nature Protection has established a new web portal for nature protection www.zastita-prirode.hr to provide the public with easy access to information on nature protection issues in Croatia.
- As part of an educational and awareness raising campaign, SINP has established the new website on IAS www.invazivnevrste.hr This website should become a part of the Croatian early warning and rapid response system on IAS and contains lots of information about IAS in Croatia.
- In 2012, through cooperation of SINP with the GEO magazine, every month an article on invasive alien species had been prepared and published in GEO magazine.
- In 2013 SINP will work on the development and testing of the risk assessment system. Assessment for minimum 10 species will be done and the preparation of "white" and "black lists" of alien species will start.
- In February 2012 one specimen of signal crayfish was recorded in the river Korana, after which a rapid response was initiated. Eradication action with 150 crayfish traps, done by 20 local volunteers, were coordinated by SINP and involved Ministry of Environmental and Nature Protection, Faculty of Science of the University of Zagreb, Public Institution for Governing Protected Natural Assets in the Karlovac County "Natura Viva" and volunteers from local NGO's Sedra, RK Žabac and KPA Karlovac. The project will continue in the coming years.

8.5 Legal framework

Nature Protection Act

The first Nature Protection Act was adopted in 2003; then a subsequent one was adopted in 2005, which was revised in 2008 and 2011. The nature protection acts were subsequently amended to take into account, for example, Croatia's international obligations under the biodiversity related conventions such as CBD and CITES and the relevant EU regulations that had to be introduced into the national legislation. The 2005 Act has the same concept for the conservation and sustainable use of biodiversity but provisions on genetically modified organisms (GMOs) were removed to be placed in a new, separate act, as well as some provisions that were considered non-viable in practice.

A new Nature Protection Act was adopted by the Croatian Parliament in July 2013. Among the improvements, the new act is:

- Fully transposing and harmonizing with EU legislation, especially in the context of appropriate assessment procedure as well as species protection regime;
- Setting clearer and more systematic protected areas and Natura 2000 management;
- Establishing conditions for future ratification and implementation of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity;
- Improving protection and prevention of the import, placing on the market, and the introduction of invasive alien species in line with good international practice and experience;
- Applying CITES and EU regulations by proclaiming the Act on transboundary movement and trade in endangered wild species.

Environmental Protection Act

The Environmental Protection Act (OG 80/13) contains general environmental protection policies to fulfill the requirements for sustainable development including the protection of soil, water, sea, flora and fauna.

Other legislation

Forest genetic biodiversity preservation is part of the 2005 Forest Act and subsequent revisions (OG 140/05, 82/06, 129/08, 80/10, 124/10, 25/12 and 68/12) and forest management plans. In addition, there is a separate forest reproductive material act (OG 75/09, 61/11 and 56/13).

In order to combat IAS, actions include, inter-alia, the issuance of:

- Order for eradication of ambrosia (Ambrosia artemisiifolia L.) (OG 72/07) by the Ministry of Agriculture;
- Order for eradication of signal crayfish (Pacifastacus leniusculus) from inland waters (OG 39/12) by the Ministry of Environmental and Nature Protection in order to prevent the further spread of signal crayfish and its negative impact to the Croatian biodiversity.
- Order for eradication of wild boar (Sus scrofa) from the Adriatic islands (OG 49/12) by the Ministry of Environmental and Nature Protection in order to prevent further spread of wild boar and its negative impact to the Croatian biodiversity.

8.6 Policy framework

National strategies and action plans for the protection of biological and landscape diversity

1999 Strategy

The 1999 First National Strategy and Action Plan for the Protection of Biological and Landscape Diversity spanned the years 1999 to 2008. In terms of a review of the achievements from 1999 to 2008 in the area of protection of biological and landscape diversity, the Government, in its fourth National Report to the CBD, points to the following achievements, amongst others:

- Strengthening of State and county/local level nature protection institutions;
- Establishment of the Nature Protection Directorate and the State Institute for Nature Protection;
- Establishment and operationalization of county institutions for protected areas management;
- Accession, ratification and implementation of all biodiversity-related MEAs;
- Establishment of the national nature protection legislative framework largely aligned with the EU acquis;
- Establishment of the national legislative framework concerning genetically modified organisms;
- Systematic process for inventorying the components of biodiversity and the publication of Red Lists of threatened fungal, plant and animal species and Red Books for certain groups of plants and animals;
- Mapping of habitats;
- Successful implementation of a large number of international projects financed from different sources, including EU funds, focusing on nature protection strategies and activities, as well as institutional strengthening.

The Report on the State of Nature for the period 2000-2007 was accepted by the Croatian Parliament in 2008. It provides a further detailed analysis of achievements from 2000-2007. The review of the implementation of the 1999 Strategy reveals at the same time that there was a lack of attention to the actual implementation of action plans.

2008 Strategy

The 2008 Strategy took into account a great number of changes that had occurred since the adoption of the 1999 Strategy. The Conference of the Parties to the Convention on Biological Diversity agreed to reduce the rate of loss of biodiversity by the year 2010; numerous new programmes of work, new activities and guidelines were promoted under the CBD as well as other biodiversity-related conventions to which Croatia had acceded and these needed to be addressed. And at the national level, the EU accession process mandated Croatia to adopt new legislative and institutional frameworks for the conservation and sustainable use of biodiversity, resulting in a revision of the previous biological and landscape diversity strategic objectives and guidelines.

In 2014 the Ministry will start preparing a new national biodiversity strategy to address new obligations under both the EU and the CBD, such as the Aichi Biodiversity targets and the CBD Strategic Plan 2011-2020 agreed in 2010. The CEA, separately in accordance with the 2009 Sustainable Development Strategy (OG 30/09), is also preparing action plans for the protection of the Adriatic Sea, coastal area and islands.

Large carnivores' management plans

The second lynx management plan for the period 2010-2015 was prepared under the auspices of the Ministry of Environmental and Nature Protection based on the implementation of the 2004 plan. The population of the lynx has declined in the last 15 years and is considered one of the most endangered mammal species of Croatia; it is strictly protected. The lynx is the least scientifically researched of the large carnivores and, as a predator at the top of the food chain, its protection is complex. It is in direct competition with human beings and the management plan has as its ultimate goal to conserve Croatian biodiversity by ensuring the protection of the lynx.

Wolf management also requires a complex protection plan given that it is in great conflict with human beings and its actions may affect livelihoods and cause economic losses. The wolf management plan covers the period from 2010-2015 and was prepared under the auspices of the Ministry of Environmental and Nature Protection.

The brown bear management plan was prepared under and published in 2008 by the Ministry of Agriculture.

8.7 Institutional framework

Ministry of Environmental and Nature Protection

There has been institutional strengthening at the national and county level by raising nature protection activities to the ministerial level: the establishment of the Nature Protection Directorate in 2000, currently as part of the Ministry of Environmental and Nature Protection, establishment of the State Institute for Nature Protection (SINP) as the central expert institution for nature protection (2002), and of public institutions for the management of protected natural values (CPIs-20 in total) at the county level. Since 2008 counties are in charge at the regional level for environment and nature protection and there are administrative bodies in place at the county level.

The Ministry develops policy and legislation on nature protection. The majority of focal points for biodiversity related MEAs are staff of the Ministry. Scientific committees are hosted by the SINP, while enforcement is with the inspection authorities.

The supervision of nature protection occurs at two levels. At the ministerial level, in the nature protection inspection sector, there are senior inspectors and inspections that are carried out at the national level, currently with 15 inspectors. At local level there are chief supervisors and inspections that are carried out at the county level, currently with 163 supervisors. In this way, enforcement and inspection authorities have branches at the local level.

Management of protected areas

Public institutions or authorities for the management of nature parks and national parks are financed primarily by the State budget. They are able to keep the profits they make; the most profitable parks being Krka and Plitvice Lakes. For the other 7 categories, management has been delegated to county authorities; 21 counties each with a public institution which has as its main task the management of protected areas on their territory.

Local level authorities do have difficulties managing protected areas due to lack of capacity, of knowledge, and of staff. However, there are projects financed by EU and other international financial sources to support those counties for capacity building activities and for management, although not for hiring new staff. Some institutions have too few staff to manage all the protected areas under their responsibility.

Ministry of Agriculture

The Ministry of Agriculture, through its Directorate of Fisheries, develops the legislative and economic framework and regulations related aquaculture and fisheries.

Croatian Environment Agency

The Croatian Environment Agency maintains the national information system for environment protection and prepares the environment status reports (Chapter 3).

State Institute for Nature Protection

The State Institute for Nature Protection (SINP) is the central institution carrying out expert tasks of nature protection. It carries out expert tasks of nature protection, in particular, tasks pertaining to: carrying out inventories; monitoring and assessing the state of nature; preparing expert base proposals for the protection of natural values; conserving parts of nature; establishing the conditions for nature protection; managing protected areas and the use of natural resources; developing expert base proposals for the assessment of acceptability of interventions in nature; reporting on the state of nature; participing in the implementation of international agreements on nature protection and organizing and implementing educational and promotional activities in nature protection.

Croatian Forests

Croatian Forests is the State owned company in charge of the management of State owned forests and implements the forest management plans. Croatian Forests only manages forest areas and the public authority for nature protection manages protected areas. Annual inspections are carried out by both the Ministry of Environmental and Nature Protection and the Ministry of Agriculture at the county level but independently; there are ad hoc inspections occasionally if for some reason it is deemed necessary. The sector for forestry and hunting inspections of the Ministry of Agriculture is involved in these inspections. The inspection checks if the forest management plan, which also includes some issues of forest biodiversity, is being followed as required. But it is the nature protection local or national authorities (depending on the category of protected area) that are responsible for the environmental and biodiversity aspects of the management of the protected area. Sometimes both forest and nature protection authorities work together in the field for checking and approving management plans.

Other institutions

With regard to genetic resources there exists a national gene bank with samples only for autochthonous species. The Museum of Natural History and the Veterinary University have tissue banks for wolves, lynx, bears and dolphins and there is a Falcon Centre in Šibenik. The Agronomy University and the Croatian Agriculture Agency have seed banks.

Current forest practice in Croatia supports the preservation of genetic biodiversity by establishing different categories of seed sources as well as a seed bank. The basis for the successful preservation of forest genetic resources are strictly defined regions of provenance, for example, seeds are allowed to be collected by registered official operators only in one ecological area and placed in a similar ecological condition for preserving. Biodiversity is also supported through compliance with the Forest Stewardship Council (FSC) standards in State forests, such as the introduction of fruit trees.

Cooperation with NGOs

National NGOs do participate in the nature protection working groups of the Ministry of Environmental and Nature Protection and give data for the reports or their data is used for reports. There is an NGO coalition working on river watching, bird watching, monitoring of certain species and winter counting. Most of the bird monitoring is carried out by national NGOs and the ornithological institute. From 2006 to 2012 there were inventories for collecting data for Annex 2 of the Birds Directive, in which national NGOs were engaged. In general NGOs consider that their main job is to oppose the Government's actions rather than work as a stakeholder in nature protection activities in collaboration with the Government.

8.8 Economic instruments

To address the problem of fear of wolves and damages to livestock, the Government provides payments to farmers for wolf damages and the Ministry of Environmental and Nature Protection is exploring innovative mechanisms such as using autochthonous mountain dog breeds donated to the farmers to keep away the wolves.

8.9 Selected projects

The SINP carries out monitoring projects (Box 8.1) in order to obtain data for the evaluation (or re-evaluation) of the conservation status of the species and the creation of Red Lists. According to the established practice, five years after the evaluation of a conservation status of a species, a re-evaluation is carried out for some groups of species. The SINP engages experts for certain taxonomic groups to do the revision as part of the existing cooperation and/or through contracts. This financing comes through the Ministry of Environmental and Nature Protection. There are one or two projects supported by funds allocated to monitoring or inventorying of species of importance to Natura 2000. In the last decade, for example, funds have been heavily invested in the preparation of the Natura 2000 proposals. It is an obligation of the State to finance this work and a number of Funds were accessed, including the Environmental Protection and Energy Efficiency Fund.

Box 8.1: Large carnivore monitoring in Croatia

Monitoring of wolves is carried out by the SINP with the assistance of the Veterinary Faculty. The role of the SINP is to gather the data on the state of the wolf population and prepare annual reports. Such reports represent basis for decision about quotas. Currently the wolf is allowed to be hunted in Croatia only in small numbers according to quotas as derogation to the regulation. The population must be stable in order to allow hunting quotas. There is a yearly contract with the Veterinary Faculty to do this type of work. The wolf management plan was produced with a highly participatory approach, holding workshops with different stakeholders and decisions taken using consensus. Wolf management plans are prepared every five years, and quotas are estimated by the large carnivore committee each September. Wolf mortality has to be reported and measured using DNA; extra permission must be sought from the CITES authorities to keep a trophy. Croatia is cooperating with Slovenia for a first transboundary management and monitoring plan for wolves. The two countries are currently monitoring data jointly to have a better idea of what occurs around the borders with wolves, especially as there have been some incidences of mortality of wolves carrying collars. It is estimated that there are around 50 packs of wolves in Croatia, with 25 packs on the border with Slovenia and Bosnia and Herzegovina.

Bears are currently allowed to be hunted according to the management plan and set quotas. Hunters are able to keep bear trophies but a tissue sample and blood for analysis must be provided as part of the regulations before releasing the trophy. Also according to the regulations, the meat of the hunted bear cannot be exported; therefore the trophy consists of the fur and head of the animal. There is evidence of illegal hunting, but there seems to be no certainty if it is in addition to the applied quota and the SINP experts believe it is not affecting the sustainability of the population. Since 1 July 2013 bears became a strictly protected species, and are only allowed to be hunted as derogation, as with the wolves.

The lynx is the most endangered mammal species in Croatia, with a very small population. It is not allowed to be hunted. There are problems with in-breeding, and bringing in new samples is being considered. It is the least known out of all large carnivores with only sporadic monitoring and camera traps with identification of individuals using their spots. The first monitoring report of the lynx population is in preparation with recommendations on management.

Source: State Institute for Nature Protection

In 2011, the Croatian Parliament ratified an agreement with World Bank for a €20.8 million loan to finance the Natura 2000 Integration Project (NIP).

Biodiversity projects

The project National Biodiversity Planning to Support the Implementation of the CBD 2011-2020 Strategic Plan in Croatia (2012-2014) (financed by GEF through UNDP) builds on the current status and achievements of Croatia with respect to its obligations related to the Convention on Biological Diversity (CBD), in particular the country's biodiversity planning and Convention reporting processes, and its commitment to implement, at the national level, the CBD's Strategic Plan for the period 2011-2020. Activities began in late 2012 and will end by the middle of 2014.

8.10 Conclusions and recommendations

Croatia has made significant efforts for strengthening relevant nature conservation related legislation and subordinate regulations and ordinances; establishing required compliance mechanisms; and strengthening of the institutional framework for biodiversity conservation.

The Ministry of Environmental and Nature Protection and the Ministry of Agriculture have increased their cooperation in the area of agri-environment schemes under the Common Agricultural Policy (CAP) in support of the nature protection, including Natura 2000 habitats and species. However, in the area of water management, in an area of high risk to biodiversity, especially threatened species, and the area of forests, there is a weaker record of cooperation and enforcement of nature protection measures. In addition, in the field of hunting, with the changes in the status of the bear in Croatia as an EU member State, there is an opportunity for a more coordinated approach in the development of the new bear management plan.

Recommendation 8.1:
The Ministry of Environmental and Nature Protection should:

(a) Together with relevant institutions, enforce nature protection measures and address the major threats to biodiversity caused by the introduction of invasive species;
(b) Work with the Croatian Forests to put in place mechanisms to raise awareness on the need to protect biodiversity in forests;
(c) Together with the hunting authorities at the Ministry of Agriculture, revise the bear-management plan following the new status of "strictly protected species" granted to bears.

The objectives of economic development and increasing the use of hydropower energy sources seems to be in conflict with the objectives and obligations of the Government to ensure the conservation and sustainable use of biodiversity, especially the protection of habitats and species against unsustainable development threats.

Recommendation 8.2:
The Ministry of Environmental and Nature Protection, together with the Ministry of Agriculture and Croatian Waters and the energy sector, should ensure implementation of nature protection measures in order to reduce the pressures on biodiversity caused by hydroelectricity generation.

There are some small projects that are addressing the economics of ecosystems and biodiversity and valuing natural capital. The Government has not yet achieved sustainable financing for biodiversity conservation and protected areas management as well as ensuring that biodiversity values are mainstreamed in decision-making processes.

Given that Croatia depends greatly on the tourism industry, especially tourists attracted to the coast, the costs of not investing in nature or of the loss of biodiversity due to unsustainable development and economic pressures on natural resources should be made evident to policy-makers.

Recommendation 8.3:
The Ministry of Environmental and Nature Protection should:
(a) Carry out studies related to the valuation of biodiversity and ecosystems;
(b) Promote public and private investments in nature conservation.

Natura 2000 is considered as one of the most important tools to ensure favourable conservation status of threatened species and habitat types. There is some good progress in implementation. Croatia proposes a

network of over thousand sites which are the key ground for long term conservation of endangered species and habitats. A great number of sites and surface they cover shows Croatia's exceptionally rich biodiversity.

However, the management of these sites is a challenge. Some sites may be very small, just a few hectares (e.g., a bog), others may be huge and already protected as a Nature park like the Velebit Mountain, others still may be underground (bat caves) or far out at sea (underwater reefs). Adequate monitoring is not yet in place. The development of the nature protection information system is not finalized and long-term maintenance of such system requires financial and human investments.

Recommendation 8.4

The Ministry of Environmental and Nature Protection should strengthen efforts to:

(a) Continue ensuring adequate management of the Natura 2000 network;

(b) Ensure adequate monitoring of biodiversity;

(c) Complete the development of a functional nature protection information system and ensure its long-term maintenance and updating.

Chapter 9

TOURISM AND ENVIRONMENT

9.1 Current situation

Tourism potential

Sun and sea tourism

The most important tourism potential in Croatia is the Adriatic Sea. The 6,278 km long coastline, 4,398 km of which belong to the islands coastlines, and with 1,244 islands, islets and cliffs, 50 islands being inhabited together with a mild climate, have long been recognized and used as the main comparative advantages of Croatian tourism. "TOMAS" study by the Institute of Tourism has revealed that the basic motif for coming to Croatia is for the sun and sea – for over 90 per cent of guests. Few tourists come to Croatia because of its other attractions and offerings, which confirms the necessity to define, shape and adequately promote these forms of tourism offer.

Continental Croatia, from a tourism point of view, still remains insufficiently and/or inefficiently utilized, even though potential tourist attractions exist there. For example, there are many towns with rich and interesting history and architecture; shrines; thermal water springs with healing properties; rivers; ski resorts with regional significance; old memorial and scenic roads; vineyard drives; national parks, and other protected areas.

Ecotourism

There are two important segments in ecotourism: small groups with special interests in ecotourism who spend their whole vacation this way; and the large number of tourists who spend their vacation, for example, on the beach, but also take part in "short nature excursions".

Croatia has 8 national parks, 11 nature parks and countless arboretums, botanical gardens, wetlands, and other valuable habitats. Bird-watchers in Croatia have multiple opportunities to observe a variety of feathered phenomena. The Caput Insulae Ecology Centre on Cres Island has been an educational centre devoted to protecting the rare griffon vulture.

The Lonjsko Polje Nature Park is home to numerous wetlands and bird sanctuaries. The village of Cigoc and villages in the surrounding area not only comprise habitats for hundreds of species of insects, fish, amphibians, and birds, including Cigoc's famous storks, but, as historic settlements, protect collections of ethnographic artefacts.

The Kopački Rit Nature Park in Slavonia on Croatia's eastern border is the country's most fascinating wetland. Besides huge bird populations, the area is beginning to attract cyclists, hikers, and wine lovers thanks to redevelopment of bike trails, removal of land mines, and a rebirth of the region's vast vineyards.

Croatian national parks, and other protected areas that have great attractiveness, are a huge potential for ecotourism development, rural tourism, year-round mountain holidays, as well as excursion tourism. The significant obstacles to development lies in the fact that areas which have a special natural value are not yet organized or equipped to accept and offer a quality stay to a large number of guests. Development of a trekking infrastructure, a system of signposts, rest areas, and an adequate transportation system, would improve the tourism potential of these areas. However, it is imperative to stress the preservation of nature, as well as the control of traffic through these protected areas.

Ecologically produced food has also become an important factor in defining the tourism product and its differentiation in the market. Opportunities for the production of ecologically-grown food and its sale in

catering facilities which offer services to tourists could be further developed and used in light of the fact that the importance of this segment of the tourist supply is increasing.

Cultural tourism

The term "cultural tourism" is used for journeys that include visits to cultural resources, regardless of whether they are tangible such as archaeology, architecture, paintings and sculptures or intangible cultural resources, such as folklore, interpretative arts, storytelling and drama, and regardless of the primary motivation. Cultural tourism is more and more becoming a significant part of the supply. During their vacation in Croatia some 70 per cent guests participate in one of cultural event or visit a cultural monument.

Croatia has a number of places under UNESCO World Heritage Sites, such as Plitvice Lakes, Šibenik Cathedral, Euphrasian Basilica in Poreč, the old towns of Trogir, Dubrovnik and Split with its Diocletian palace. The country has 175 museums and collections with an inventory of domestic and world heritage with 2.1 million visitors per year.

Cultural offerings in Croatia are inadequately and inferiorly presented (Box 9.1). Improving the identification of and signs pointing to cultural and historical monuments, placing information charts, adjusting the hours of operation of museums and castles, and creating an attractive presentation would significantly increase the quality of cultural tourism offerings. The organization of a wide spectrum of events and an imaginative presentation of cultural values would be conducive to the development of tourism geared towards different experiences on the basis of Croatia's cultural potential. One of the components of cultural and historical heritage, which may likely broaden tourism offerings, is traditional food and cuisine. The diversity of indigenous Croatian meals may be one of many components that will contribute to the development of culinary tourism.

Box 9.1: Research of cultural tourism in Croatia

A research of cultural tourism in Croatia was carried out in 2008. It was the first comprehensive study of visitors' attitudes and consumption to cultural attractions and events in Croatia after eight years of implementation of the Strategy of Development of Cultural Tourism. The research aimed at collecting data on the characteristics of tourism demand and consumption of cultural visitors to cultural attractions and events in Croatia. It also aimed at finding out the motivation and the satisfaction of the visit to cultural attractions/events and travel characteristics of cultural tourists.

Most foreign cultural tourists identified Croatia with a rich cultural and historical heritage (84%), unique customs, traditions and gastronomy (72%) and with the richness of museums and galleries (71%). Between 50 to 60 per cent of tourists identified Croatia with festivals and events, rich cultural and artistic life and a pleasant destination for travels motivated by culture.

Finally, the results of the popularity of Croatian cultural-tourism offer have shown that visitors most visit cultural and historical sights and attractions (64.9%), churches and monasteries (64.1%), museums and galleries (58.6%), festivals (42.2%), thematic routes and roads (33.2%), musical events and shows (32.5%). On the continent is the higher popularity of festivals, which was shown by 65 per cent of visitors, while on the coast 42 per cent of visitors are engaging in festivals. In Croatia, 20.4 per cent of tourists coming on vacation with the aim of exploring the culture, and 26.4 per cent of tourists as the main reason for traveling states visit cultural attraction and event. Thus, a large percentage of visitors can be considered as targeted, culture motivated tourists who travel specifically for visits to cultural attraction and event or they are on vacation motivated by culture.

The vast majority was satisfied with the visit: for the 48 per cent visit exceeded expectations, while for the 47 per cent met expectations.

Source: Tomljenović, R., Marušić, Z. (2009). Attitudes and Consumption of Cultural Attractions and Events in Croatia: Tomas Cultural Tourism 2008, Institute for Tourism, Zagreb.

Thematic tourism

Thematic tourism has become one of the most important catalysts of development. It is mainly based on the 3-E principle: entertainment, excitement, and education, and therefore includes tourism offerings and contents which combine these three elements.

Croatia has enormous potential because of its cultural heritage and natural beauties which can be combined in a countless number of ways to tempt tourists seeking unique experiences.

Adventure tourism

Adventure tourism in Croatia is still a small market niche with the potential for growth. Croatia has the natural potential to develop many very diverse aspects of adventure tourism, such as white water rafting, canoeing, kayaking, paragliding, hot air balloon flights, free climbing, off-road racing, and many other activities.

Religious tourism

Croatia has the potential for religious tourism, which, until now, has been active in Marija Bistrica.

Nautical tourism

Owing to the length of the coast and the number of islands, the Croatian coast is the adequate setting for the intensive development of nautical tourism, as well as package tours. Fulfilling the needs of this demanding segment has the potential to become an important contribution to the whole of tourist traffic in Croatia. One of today's unexploited potentials is to make use of the rivers as a package tour selection.

Wellness tourism

Wellness tourism, one of the most significant trends in tourism today, also finds its place in Croatian tourism offerings. In the past few years wellness has become a must for the hotel and tourist offer in Croatia. There are more and more hotels, especially on the coast, that introduce wellness arrangements into their offer. The sea air and thalassotherapy, as well as innumerable sources of healing thermal springs in the hinterland, require an adequate infrastructure in order to position themselves in the market as a quality tourism offering. One of the greatest advantages of such tourism is that it is a year-round business activity.

Other types of tourism

Corporate travel, conventions and incentive tourism, are becoming increasingly significant. This segment is lucrative, and primarily takes place out of the summer peak season. Closely associated with conventional tourism, but specific in terms of its dynamics and the image it generates, Croatia is also developing scientific tourism. Support given to institutions in their efforts to organise international scientific gatherings and research projects, would influence Croatia's development as a regional academic and scientific centre. This would attract an increasing number of foreign experts, scientists, professors and researchers. The necessary prerequisite for developing convention and scientific tourism is the construction of quality convention centres, both in Zagreb and Dubrovnik.

Development in tourism activities

In 2012 Croatia had a successful touristic season with a total of 11.835 million tourist arrivals and 62.743 million overnight stays (table 9.1). The largest travel market in Croatia in 2012 was Germany with 1.853 million arrivals, followed by Slovenia (1.054 million), Italy (1.051 million), Austria (0.946 million) and the Czech Republic (0.647 million). Other important tourist generating markets include France, Hungary, the Netherlands, Poland, Slovakia, and United Kingdom.

The total accommodation capacities remained pretty stable (table 9.2). Ninety per cent of the capacities are concentrated in seaside resorts. As for the types of accommodation facilities in 2011 the largest number of tourists (8.521 million) stayed in collective accommodation facilities (hotels, villas, resorts, tourist apartments),. A large number of tourists stay in private accommodation facilities (households, rooms, apartments, summer houses, rural households), 2.935 million, followed by camping sites, 2.231 million. Statistics are incomplete as a number of guests who come on holiday, are not recorded individually. Also, the Croatian Bureau of Statistics does not specifically categorize the other types of accommodation (e.g., farm houses), which could be relevant to create an image on the profile of cultural tourists coming to Croatia.

Regarding the geographical diffusion, according to data from 2012, Istria County had the highest number of tourists (2,985,042), followed by Primorje-Gorski Kotar County (2,353,404), and Split-Dalmatia County (1,834,876), Dubrovnik-Neretva County count 1,122,420, Zadar County 1,074,192 tourists, and Šibenik-Knin County 657,371. Dubrovnik-Neretva, Zadar and Šibenik-Knin counties have traditionally a large number of mass tourist types. Istria and Primorje-Gorski Kotar counties offer a combination of coastal tourism and content tourism, where tourism policy is focused on diverse offer, which record a very large number of overnight stays, Istria County 19,877,368 and Primorje-Gorski Kotar County 11,974,337, compared to other destinations that are primarily kept mass type of tourism.

Table 9.1: Tourist arrivals and nights

Year	Tourist arrivals, thousands			Tourists nights, thousands		
	Total	Domestic	Foreign	Total	Domestic	Foreign
2005	9 995	1 528	8 467	51 421	5 434	45 987
2006	10 385	1 726	8 659	53 007	5 985	47 022
2007	11 162	1 856	9 306	56 005	6 431	49 574
2008	11 261	1 846	9 415	57 103	6 478	50 625
2009	10 935	1 600	9 335	56 300	5 799	50 501
2010	10 604	1 493	9 111	56 416	5 424	50 992
2011	11 456	1 529	9 927	60 354	5 603	54 751
2012	11 835	1 466	10 369	62 743	5 221	57 522

Source: Statistical yearbook, 2012.

Table 9.2: Accommodation capacities (rooms), by types of facilities, situation as on 31 August

	2007	2008	2009	2010	2011
Total	326 792	332 060	333 237	315 864	321 417
Zagreb	4 927	5 472	5 137	5 479	5 551
Bathing resorts	2 060	2 126	2 310	2 369	2 297
Seaside resorts	305 801	309 705	310 491	291 758	295 647
Mountain resorts	2 975	3 032	3 044	3 057	3 133
Other tourist resorts	1 975	2 160	2 131	2 147	1 953
Non-tourist resorts	9 054	9 565	10 124	11 054	12 836

Source: Statistical yearbook, 2012.

Table 9.3: Accommodation capacities (beds), by types of facilities, situation as on 31 August

	2007	2008	2009	2010	2011
Total	944 076	968 610	969 726	909 951	934 564
Zagreb	9 911	10 977	10 243	11 008	10 706
Bathing resorts	3 881	4 124	4 608	4 784	4 601
Seaside resorts	890 358	911 420	911 035	847 072	863 565
Mountain resorts	8 839	9 018	8 934	9 078	9 191
Other tourist resorts	4 432	4 835	4 893	4 809	4 262
Non-tourist resorts	26 655	28 236	30 013	33 200	42 239

Source: Statistical yearbook, 2012.

As far as travel organizing, data show that a total of 10.604 million tourists registered in Croatia in 2010, 6.659 million came individually and 3.945 million organized. While the number of tourist arrivals has not changed significantly in the period 2007-2012, the number of tourist nights increased by some 6.7 million from 56 million in 2007 to 62.7 in 2012 (table 9.4).

Seasonality and extra capacity

In Croatia tourism faces high seasonality. The hotels on the coast are fully booked during July and August. During May, June and September the hotels have an occupancy rate between 60 and 70 per cent, while during the rest of the year the occupancy is averagely below 25 per cent. In November, part of December, January and February many hotels are closed. The main reasons for this are too little guests, the habit to renovate the hotel

during the winter months and the employees consume accumulated vacation days. Most hotels open again in March in order to be ready for Easter.

Overnight Stays in Marinas

The number of overnight stays in marinas continues to rise. In the period 2005-2008 the average annual growth rate was eight per cent. Of the total number of overnight stays in marinas recorded in 2008 (1.4 million), the highest number of the boaters visited Šibenik-Knin County (27%), Zadar County (22%) and Istria County (19%), accounting for two-thirds of the tourist traffic relating to boaters. This is due to a concentrated offer of accommodation capacities for boaters and the number of moorings. The majority of the 18,000 moorings in Croatian marinas are located in the Zadar County (25%), Istria County (24%) and Šibenik-Knin County (18%); the only littoral county with no marinas is Lika-Senj County.

Table 9.4: Tourist arrivals and nights, by types of tourist resorts, thousands, 2007-2011

		2007	2008	2009	2010	2011	2012
Total	Arrivals	11 162	11 261	10 935	10 604	11 456	11 835
	Nights	56 005	57 103	56 300	56 416	60 354	62 743
Zagreb	Arrivals	613	649	578	609	666	701
	Nights	1 057	1 102	969	1 007	1 092	1 157
Bathing resorts	Arrivals	123	124	104	107	110	106
	Nights	435	443	384	363	365	357
Seaside resorts	Arrivals	9 586	9 608	9 406	9 029	9 749	9 978
	Nights	52 649	53 573	52 911	52 869	56 439	58 102
Mountain resorts	Arrivals	277	283	274	275	280	300
	Nights	432	444	430	430	448	469
Other types of tourist resorts	Arrivals	163	171	152	155	150	158
	Nights	340	374	351	357	341	362
Other resorts	Arrivals	400	426	420	429	501	592
	Nights	1 092	1 167	1 255	1 390	1 669	2 297

Source: Statistical yearbook, 2012.

Developments in 2013

The number of tourist arrivals in Croatia was 3 per cent higher from January to July (6.6 million). These visitors stayed for a total of 36.5 million nights, which is an increase of 2.5 per cent. Of these numbers, almost six million were foreign visitors to the country (up 4%), who stayed for 33 million nights (up 3.3%).The month of July alone also saw increases in visitor numbers. Almost 1.1 per cent more tourists visited the Croatian coast and Zagreb than in July 2012, 3 million visitors in total. They stayed for a total of 21.3 million nights (an increase of 1.1% on the same month last year), including 2.8m foreign visitors (an increase of 1.7%) who stayed a total of 19.3 million nights (up 2.5%).[7]

The majority of the Adriatic counties all posted increases in visitor numbers and nights stayed for the month of July, although there were also some falls. Istria, in particular, received 3.2 per cent fewer visitors who stayed for 2.2 per cent less nights. Zadar County was the only one in Dalmatia to record a fall in visitor numbers and nights stayed – of 1.6 per cent and 3.5 per cent respectively – whilst the other Dalmatian counties recorded relatively healthy increases. Split-Dalmatia County saw 6 per cent more tourists who stayed for 5 per cent more nights, whilst Dubrovnik-Neretva County received 4.4 per cent more visitors and 3.6 per cent more nights. Šibenik-Knin County got 3.8 per cent more visitors who stayed for 4.7 per cent more nights. 14.6 per cent more visitors came to Zagreb in July 2013 than in the same month last year, staying for 18.6 per cent more nights.

Economy and employment of the tourism sector

Contribution of the travel and tourism sector to GDP

[7] http://www.visit-croatia.co.uk/blog/index.php/tag/tourism-stats

In Croatia the direct contribution[8] of the travel and tourism sector to GDP was HRK 34,474.5 million (11.9 per cent of total GDP) in 2012, and is forecast to rise by 0.4 per cent in 2013, and to rise by 6.1 per cent per annum, over 2014-2023, to HRK 62,839.4 million in 2023 (in constant 2012 prices). The total contribution[9] of the sector to GDP was HRK 80,684.6 million (27.8% of GDP) in 2012, and is forecast to fall by 0.2 per cent in 2013, and to rise by 5.9 per cent per annum to HRK142,820.0 million in 2023.

In 2012, inbound and domestic leisure travel spending generated 92.2 per cent of direct GDP (HRK 67,945.7 million) compared with 7.8 per cent for business travel spending (HRK 5,752.5 million). Business travel spending is expected to grow by 2.7 per cent in 2013 to HRK 5,909.8 million, and rise by 3.5 per cent per annum to HRK 8,342.1 million in 2023. Leisure travel spending is expected to grow by 1.5 per cent in 2013 to HRK 68, 989.4 million, and rise by 5.9 per cent per annum to HRK 122,313.0 million in 2023.

Domestic travel spending generated 14.9 per cent of direct GDP in 2012 compared with 85.1 per cent for visitor exports (i.e., foreign visitor spending[10] or international tourism receipts). Domestic travel spending is expected to grow by 0.2 per cent in 2013 to HRK 10,979.1 million, and rise by 3.4 per cent per annum during the period of 2014-2023 to HRK 15,358.6 million in 2023. Visitor exports are expected to grow by 1.9 per cent in 2013 to HRK 63,920.1 million, and rise by 6.1 per cent pa to HRK 115,297 million in 2023.

Contribution to employment

In 2012 the sector directly supported 138,500 jobs (13.1 per cent of total employment). This is expected to remain unchanged in 2013 and rise by 2.3 per cent pa to 174,000 jobs (15.6 per cent of total employment) in 2023. In 2012, the total contribution of the sector to employment, including jobs indirectly supported by the industry, was 30.2 per cent of total employment (319,000 jobs). This is expected to fall by 0.5 per cent in 2013 to 317,500 jobs and rise by 2.2 per cent pa to 396,000 jobs in 2023 (35.4 per cent of total).

9.2 Pressures from tourism on environment

There is no comprehensive information on pressures from tourism on environment in Croatia. However, some sporadic data and indicators are scattered over different institutions and publications. For instance, the Croatian Environment Agency every year publishes a brochure “The Environment in Your Pocket”. Using selected indicators, the brochure presents an overview of the state of the environment and the trends of changes in Croatia. Each brochure includes two selected indicators relating to tourism. However, tourism is also a topic that is addressed in each State-of-Environment Report.

There are no estimates of energy and resource use in tourism in Croatia. However, some case studies have been carried out with some tangible results.

For instance, the case study on Rovinj was part of the Plan Bleu project "Sustainability profiles in some Mediterranean tourist destinations". It was based on an experimental method, and involved measuring and assessing the impacts of tourism from the perspective of the key goals of the Mediterranean Strategy for

[8] The direct contribution of Travel & Tourism to GDP reflects the total spending within a particular country on Travel & Tourism by residents and non-residents for business and leisure purposes plus- spending by government on Travel & Tourism services directly linked to visitors, such as cultural (e.g. museums) or recreational visitors (e.g. national parks).

[9] The total contribution of Travel & Tourism includes its wider impacts on the economy (i.e. the indirect and induced impacts), in addition to direct impacts. The indirect contribution includes the GDP and jobs supported by: Travel & Tourism investment spending –includes investment activity such as the purchase of new aircraft and construction of new hotels; Government 'collective' spending, which helps Travel & Tourism activity in many different ways as it is made on behalf of the ‘community at large’ – e.g. tourism marketing and promotion, aviation, administration, security services, resort area security services, resort area sanitation services; Domestic purchases of goods and services by the sectors dealing directly with tourists - including, for example, purchases of food and cleaning services by hotels, of fuel and catering services by airlines, and IT services by travel agents. Imported purchases are not included as part of the indirect contribution as these represent leakages. The induced contribution measures the GDP and jobs supported by the spending of those who are directly and indirectly employed by the Travel & Tourism industry.

[10] Visitor exports – spending within the country by international tourists for both business and leisure trips, including spending on transport

Sustainable Development (MSSD), taking into account environmental, social and economic issues in the destinations studied. A "profile of sustainability" has been produced using the DPSIR approach (Drivers–Pressures– State – Impacts – Responses).

According to the study, the daily water consumption of a tourist is roughly 0.27 m^3 per overnight stay. The daily electricity consumption due to tourism is currently around 40.4 kWh per overnight stay but there is a risk it may increase, further accentuating the dependence of the country on imported electricity. The estimated production of solid waste due to tourism is 1.99 kg per visitor per day. The estimated wastewater production is 2.2 m^3 per visitor per day. Based on these estimates the water consumption, wastewater generation, electricity consumption and solid waste generation were calculated for the country in total and for particular types of tourist resorts (table 9.5).

Table 9.5: Tourism and environment

		2007	2008	2009	2010	2011	2012
Total	Tourist nights, thousands	56 005	57 103	56 300	56 416	60 354	62 743
	Water consumption, million m^3	15,1	15,4	15,2	15,2	16,3	16,9
	Wastewater generation, million m^3	123,2	125,6	123,9	124,1	132,8	138,0
	Electricity consumption, million kWh	2 262,6	2 307,0	2 274,5	2 279,2	2 438,3	2 534,8
	Solid waste generation, thousand tons	111,4	113,6	112,0	112,3	120,1	124,9
Zagreb	Tourist nights, thousands	1 057	1 102	969	1 007	1 092	1 157
	Water consumption, million m^3	0,3	0,3	0,3	0,3	0,3	0,3
	Wastewater generation, million m^3	2,3	2,4	2,1	2,2	2,4	2,5
	Electricity consumption, million kWh	42,7	44,5	39,1	40,7	44,1	46,7
	Solid waste generation, thousand tons	2,1	2,2	1,9	2,0	2,2	2,3
Bathing resorts	Tourist nights, thousands	435	443	384	363	365	357
	Water consumption, million m^3	0,1	0,1	0,1	0,1	0,1	0,1
	Wastewater generation, million m^3	1,0	1,0	0,8	0,8	0,8	0,8
	Electricity consumption, million kWh	17,6	17,9	15,5	14,7	14,7	14,4
	Solid waste generation, thousand tons	0,9	0,9	0,8	0,7	0,7	0,7
Seaside resorts	Tourist nights, thousands	52 649	53 573	52 911	52 869	56 439	58 102
	Water consumption, million m^3	14,2	14,5	14,3	14,3	15,2	15,7
	Wastewater generation, million m^3	115,8	117,9	116,4	116,3	124,2	127,8
	Electricity consumption, million kWh	2 127,0	2 164,3	2 137,6	2 135,9	2 280,1	2 347,3
	Solid waste generation, thousand tons	104,8	106,6	105,3	105,2	112,3	115,6
Mountain resorts	Tourist nights, thousands	432	444	430	430	448	469
	Water consumption, million m^3	0,1	0,1	0,1	0,1	0,1	0,1
	Wastewater generation, million m^3	1,0	1,0	0,9	0,9	1,0	1,0
	Electricity consumption, million kWh	17,5	17,9	17,4	17,4	18,1	18,9
	Solid waste generation, thousand tons	0,9	0,9	0,9	0,9	0,9	0,9
Other types of tourist resorts	Tourist nights, thousands	340	374	351	357	341	362
	Water consumption, million m^3	0,1	0,1	0,1	0,1	0,1	0,1
	Wastewater generation, million m^3	0,7	0,8	0,8	0,8	0,8	0,8
	Electricity consumption, million kWh	13,7	15,1	14,2	14,4	13,8	14,6
	Solid waste generation, thousand tons	0,7	0,7	0,7	0,7	0,7	0,7
Other resorts	Tourist nights, thousands	1 092	1 167	1 255	1 390	1 669	2 297
	Water consumption, million m^3	0,3	0,3	0,3	0,4	0,5	0,6
	Wastewater generation, million m^3	2,4	2,6	2,8	3,1	3,7	5,1
	Electricity consumption, million kWh	44,1	47,1	50,7	56,2	67,4	92,8
	Solid waste generation, thousand tons	2,2	2,3	2,5	2,8	3,3	4,6

Source: ECE Secretariat calculations based on Statistical yearbook, 2012

Water

The biggest threat to long-term development of nautical tourism is the uncontrolled use of naturally formed areas and natural resources.

Implementation regulations obligate nautical ports to implement the system of reception facilities for the purpose of collection of waste products from vessels (foul sewage, oils, communal waste), which, along with the compliance with international environmental standards, effectively contributes to environmental protection.

There are no estimates of pressures from tourism on water resources in Croatia. Data on water consumption by tourists are not collected and subsequently are not published in any reports such as statistical yearbooks. One particular case of water shortages linked to tourism is presented in Box 9.2.

Croatia is among countries with the highest-quality bathing waters in €ope, according to the 2013 report on bathing water quality in 2012 by the European Environment Agency (EEA) covering the 27 EU member states, Croatia and Switzerland. The report reveals that of 919 coastal bathing sites in Croatia, 876 of them, or 95.3 per cent, have excellent bathing water, at 27 of them have good and sufficient quality, 3 have poor quality while data from 13 sites was insufficient.

Volume of GHG emissions

There are no estimates of the volume of greenhouse gases emissions from the tourism sector in Croatia. The 2010 Fifth National Communication of Croatia under the United Nation Framework Convention on Climate Change does not contain any particular data for the tourism sector. The Communication includes a greenhouse gases inventory for 1990-2007. The inventory is structured in a conventional way and the sources and sinks of greenhouse gas emissions are divided into six main sectors: energy, industrial processes, dissolvent use, agriculture, land-use change and forestry, and waste management. The emission data from the tourism sector are largely hidden in energy sector and waste management. However, due to the economic importance of tourism and at the same time, as a source of emissions, a special attention is given to this sector while preparing the low carbon development strategy.

Air

Most of the energy consumption related to tourism industry, about 90 per cent, falls on energy needed for travel to and from destination while the rest of the energy consumption occurs in the destination itself. If looking closely to the energy consumption of destination, the largest share of energy demand is related to accommodations – hotel industry. Hotels are dominantly using electricity as energy form (heating/cooling, lighting, refrigerators and coolers, lifts, escalators) followed by much smaller share of liquid fuels and natural gas or coal (cooking and water heating).

Croatian hotel industry follows that pattern where service sector is second largest consumer of electric energy in total electric energy demand. Annual occupancy rate varies from 25 to 29 per cent indicating the seasonality of seaside tourism and its dominance as tourist profile. Tourist-resident ratio is 8.4 meaning that, in average; one coastal inhabitant and 8 tourists are staying in the same destination at the same time.

There are no estimates of air emissions from tourism sector in Croatia. At the same time the energy production industry is the main source of major part of the air pollution.

Box 9.2: Water shortages in Croatia

In 2008 at the peak of the tourist season, coastal regions of Croatia were plagued with water shortages. Rainfall in Dalmatia has been scarce, and the existing water supply systems were not adequate for large settlements, nor capable of handling the growing influx of people. As a result, water rationing has been implemented in some areas.

In one district, water use was curtailed from 11 am to 5 pm. As a result of it some tourists have left. They did not want to pay for an apartment or hotel where they cannot take a shower. To remedy the situation, the military intervened and helped to bring water from other Croatian cities. As a result, the crisis has been averted.

As Croatia can expect water shortages each year, the problem has to be addressed by overhauling the water system.

Source: http://setimes.com/cocoon/setimes/xhtml/en_GB/features/setimes/features/2006/08/01/feature-02

Land

Land uptake by moorings

Croatia has sovereignty over approximately 12.2 per cent of the coastline and 33 per cent of the islands coastline in the Mediterranean Sea[11], which indicates its natural potential for development of nautical tourism. Croatian share in the overall coastline length, including islands, of all Mediterranean countries amounts to about 16 per cent. As for the offer of nautical vessel moorings in Croatia, as compared to other Mediterranean countries, the Croatian share amounts to about 6.9 per cent, whereas that of France is 47.3 per cent, of Italy 10.4 per cent, of Greece 6.4 per cent, of Turkey 4.9 per cent.

With regard to the coastline length, Croatia has about 2.7 nautical moorings per kilometer of coastline, while France has 64, Greece 1.1, Italy 3.1, Spain 20.2, and Turkey 2.2. Croatian share in the coastline length is twice as large as its share in the number of moorings. This difference is even more apparent in the Greek example, where the relationship is 1:5. However, France, Slovenia and Spain, despite of the small percentages, have the opposite situation – a much larger share in the number of moorings than in the length of the coastline.

The county physical plans envisage expansion of the existing and construction of new capacities for reception of vessels on about 300 potential locations, which is one and a half times more than existing capacities. For the purpose of expansion and construction of the mentioned facilities, it is necessary to conduct an analysis of those locations and accordingly determine the most adequate potential locations, by modifying, amending or providing new county physical plans for a ten-year period.

By 2015 the new physical plans envisage construction of new capacities on 33,655 locations, of which 25,755 moorings at sea and 7,900 locations ashore. In the future, according to the county physical plans, after construction of the newly planned capacities in addition to the existing ones, the total capacity for nautical tourism would be 54,675 locations, of which 41,589 at sea and 13,086 ashore.

Waste generation

According to the 2007 Waste Management Plan for the period 2007-2015, total waste induced from tourism related activities amounts to 97,700 tons of municipal waste per year. The total tourism waste yield in most counties is not particularly significant in a quantitative sense but its share may be relatively large if a tourist municipality or even county is looked at separately. Apart from that, it is also significant that quantity of waste is generated only in one particular period of the year, so in planning the system of disposal and management that fact also has to be taken into account (Box 9.3).

Box 9.3: Tourism and environment in Hvar

Tourism has a significant impact on the environment in Hvar. It places a large burden on wastewater services, on waste collection and on other services provided by the municipality. In the peak season, the ratio of tourists to locals is three to one, which is indicative of the significant burden of peak loads on wastewater and other facilities. Tourist-related litter is an issue on the island. In addition, other discharges from boats pollute the water and coastline.

It would be wrong to categorize Hvar as heavily polluted, but in the peak season some negative impacts of tourism can reduce the enjoyment of the town and the surrounding area. The likely growth of tourist volume indicates that resources are needed to create an environment in which tourism can develop sustainably.

Source: Sustainable Tourism and Economic Instruments: the case of Hvar, Croatia. In *Sustainability of SAP: Development of Economic Instruments for the Sustainable implementation of the Strategic Action Programme to address marine pollution from land-based activities in the Mediterranean (SAP MED).*

[11] http://www.mppi.hr/UserDocsImages/Strategija%20razvoja%20nautickog%20turizma%20ENGL%201.pdf

Although, collection of waste in most communities is organized once a week (and in larger communities two to three times a week) according to a set schedule, in certain counties which are active in the tourism industry, during tourist season waste is collected on a daily basis.

Since waste collection fee is calculated per square meter of a household or spatial area of a hotel or restaurant, it is difficult to provide an exact number for municipal waste generated, let alone the share of its organic component.

Data on municipal waste generated by the tourism sector are hidden in the total data on municipal waste generated in the country (chapter 6).

In Croatia it is prohibited to dispose waste on the islands. The country makes efforts to relocate existing waste and unregulated landfills away from coastal areas in the so-called centers for waste management (chapter 6).

9.5 Legal, policy and institutional framework

Legal framework

Since 1999 the following laws related to tourism activities have been enacted:

- The 2007 Act of the Provision of Tourism Services
- The 2006 Hospitality and Catering Industry Act
- The 2008 Tourist Boards and Promotion of Tourism Act
- The 2008 Tourist Boards Membership Fee Act
- The 2011 Tourism and Other Construction Land Act

The laws regulate economic and fiscal aspects of the tourism sector and do not contain any provisions on environment.

The Ordinance on conditions and methods of maintaining order in ports and in other parts of the internal maritime waters and territorial sea (OG 90/05) among other issues defines waste management in maritime ports. According to the Ordinance port authorities are responsible for keeping the coast and sea clean from pollution from maritime facilities, for cleaning the port from debris endangering navigation safety and polluting the sea, and for organizing the waste management system in maritime ports. The port authorities provide waste reception facilities in the port. The Ordinance also prescribes procedure for reporting and reception of waste from vessels and cargo residues. All ports open for public traffic and special purpose ports are obliged to develop and apply a plan for receiving and handling waste and cargo residues which may also be developed on a regional level.

Policy framework

Tourism Development Strategy until 2020

In 2013 Croatia has adopted the Tourism Development Strategy until 2020, thus setting a clear direction of the country's tourism sector and presenting a guideline for the development of all its regions. The Ministry of Tourism is already working on the realization of the strategy and developing action plans to determine priorities and the dynamics of the process.

The Strategy sets an objective to increase the competitiveness of the tourism sector on the international market, and provides clear instructions to initiating investments in the sector. It serves as a basis on which to draw funds from EU, and its main goal is to position Croatia amongst the top 20 most competitive countries of the world.

According to the Strategy, by 2020, Croatia is expected to be a globally recognizable tourist destination, competitive and attractive for investments, which creates work places and in a sustainable way manages development of its whole territory, nourishing the culture of quality, and providing hospitality, safety and a unique variety of authentic content and experiences to its visitors throughout the year.

Over 2013- 2020, a total of €7 billion of new investments are anticipated in the country's tourism sector, and it is set to have 955,000 beds in its commercial accommodation establishments (up 7%). It is also to see around 30,000 new employment opportunities in tourism and supporting industries, 86,000,000 tourist nights (up 43%) and €14.3 billion of tourist spending. Seven per cent increase of a number of beds and forty three per cent increase in a number of tourist nights will ensure a higher occupancy rate of the accommodation facilities.

The Strategy contains 26 priority measures which relate to clearly defining the necessary legislative amendments; action plans for the development of certain tourism products; creation of a new strategic marketing plan.

Strategy of Development of Cultural Tourism

In 2003 Croatia adopted the Strategy of Development of Cultural Tourism. According to the Strategy at the end of 2008 realization of following goals was expected:

1. Cultural tourism became a priority strategic orientation;
2. There is a critical mass of human resources with knowledge and skills of development of modern cultural-tourism product;
3. Established culture of partnership, strong organizational structure and a good flow of information;
4. Secured stable sources of financing of development of cultural-tourism projects;
5. Created cultural-tourism products at local, regional and national level.

In 2008, the first research on the changes and progress related to the development of the state of cultural tourism in Croatia was made.

According to the research the greatest success was achieved with goals 1 and 4. Goal 3 was slightly less accomplished. Although there is a firm organizational structure for carrying out the Strategy, which has proven to be effective in implementation of government incentives and support for initiatives/ programs/projects of cultural tourism, as well as a relatively adequate flow of information, still there is a lack of satisfactory culture of partnership.

There is only declarative inter and intra sectoral cooperation among sectors, and a lack of cooperation between State and private sector. The realization of goals 2 and 5 has proven to be inadequate. There is still a lack of human resources with knowledge and skills necessary for development of modern cultural-tourism products, due to an inadequate number of staff with expertise in cultural management, and because the realization of this goal has be considered to be a constant, continuous process. Goal 5 can merely be given a passing grade as there is no evidence of an increasing number of examples of established cultural-tourism products at local, regional and national levels, which should have resulted from following implementation of the action plan designed in the Strategy of development of cultural tourism.

Nautical Tourism Development Strategy for the period 2009-2019

The 2008 Nautical Tourism Development Strategy for the period 2009-2019 established the basic principle of managing nautical tourism development based on sustainable development. The Strategy contains a vision and strategic goals of further development of nautical tourism in accordance with the principles of sustainable development, as well as the Action Plan for the Strategy implementation which elaborates measures, activities, carriers and deadlines of the Strategy implementation for the period 2009 - 2019. A strategy implementation report for the period 2009-2012 was not available at the time of review.

Energy Strategy

The 2009 Energy Strategy considers the use of geothermal energy for tourism recreational purposes in Croatia. According to the Strategy Croatia will follow the European Union Energy Security and Solidarity Action Plan. The Plan envisages that nine per cent decrease of final energy consumption in a period by 2016 applying energy efficiency measures. A strategy implementation report for the period 2009-2012 was not available at the time of review.

Programme Heritage in Tourism

The Programme Heritage in Tourism contributed to development of continental tourism, and from 2005 to 2009 co-financed 595 projects with the total amount of €3,556,057.92 per cent of the projects were realized in the continental and coastal hinterland. With the implementation of these projects has been revived economic activity such as the increased number of tourist services providers in underdeveloped tourist areas, reconstruction of traditional facilities made possible the revival of ancient arts and crafts, and open new sales channels of domestic products and services. Many buildings of architectural heritage (folk architecture, mills, and others) have been saved from further deterioration through new tourism purposes. Better protection of natural heritage was realized by co-financing the educational trails, viewpoints and observation points in protected areas/ regions.

Programme Theme Routes

The 2007 Programme Theme Routes aimed at better recognition of Croatia in whole as a diversified tourist country, raised interest and decision in travellers/day trippers to take a short break, circular trip, short holiday or combined holiday/summer holiday by visiting continental and Adriatic hinterland destinations, encouraged foreign tourists/ travellers already staying at a famous tourist destination or on circular trip to explore theme routes and less familiar tourist destinations in order to enlarge consumption and create thematically integrated and organized tourist attractions throughout the year by connecting natural, cultural and historical heritage of Croatia. From 2007 to 2009, there were 182 projects within the Programme, which spent €1,371,222 in total.

Programme Original Souvenir

The 2007 Programme Original Souvenir aimed at reliving the production of traditional and artistic crafts, encouraging additional activities (the production of homemade product – souvenir), confirming values of unique handmade production, encouraging the creation of reproductions, redesigns and new designs of products, protection and preservation of heritage in utilizing traditional techniques and materials. From 2007 to 2009, there were 278 projects in total amounting to €704,993.

Institutional framework

Ministry of Tourism

The Ministry of Tourism is the State body with competences for tourism policy and the Tourism Development Strategy, the system of tourist boards, the accommodation facilities classification, monitoring and analysis of the tourism market, and international cooperation in tourism.

The 2012 budget allotted to the Ministry of Tourism within the State budget was HRK 226.64 million (€30.63 million) which is 0.20 per cent of the overall State budget. Out of the ministerial budget HRK 112 million (approximately €15.14 million) was donated to the Croatian National Tourist Board for their promotional activities.

Croatian National Tourist Board

The Croatian National Tourist Board is the national tourist organization founded for creation and promotion of Croatian tourism identity, its promotion at home and abroad, as well as raising the overall quality of Croatian tourism offer (http://business.croatia.hr). The mission also includes planning and implementation of a common strategy and the conception of its promotion, proposal and the performance of promotional activities of mutual interest for all subjects in tourism in the country and abroad, as well as raising the overall quality of the whole range of tourist services on offer in Croatia. The members of the Croatian National Tourist Board are the county tourist boards and Zagreb Tourist Board.

Based on the Strategy of Development of Cultural Tourism, the Croatian National Tourist Board established the Office for Cultural Tourism, with the intention of presenting Croatian cultural heritage to tourists in an acceptable and interesting way, and of creating cultural-tourism products. The Office for Cultural Tourism main tasks are a systematic encouragement, development and coordination of development initiatives of cultural-

tourism products and its basic goals are to: create image of the destination rich in meaningful and substantial cultural-tourism offer, enrich satisfaction of existing visitors, stimulate consumption, extend the season and encourage off-season demand, attract new market segments, and stimulate domestic demand. However, its most important task is to foster the creation of cultural-tourism products. For this purpose, each year the Office finances projects and events with a modest amount of about €160,000.

Institute for Tourism

The Institute for Tourism was established in 1959 and it is the only scientific public institute in Croatia specializing in research and consultancy services in tourism. With 30 staff, including 20 scientists, the Institute's activities are governed by an integrated approach to tourism development and management, which takes into account the development aspects of a company or a tourist destination, as well as the national tourism policies. The Institute for Tourism works together with tourism industry players. The Institute's long-term scientific research projects include:

- Tourism and economic development;
- Spatial, environmental and socio-cultural aspects of tourism.

For the last 50 years the Institute publishes a renowned Croatian academic journal Tourism. Since 2000, it is published in both a domestic and an international edition (in English). Other publication activities of the Institute include the publication of scientific books and manuals.

Information instruments

The Croatian Portal on Sustainable Tourism (http://www.odrzivi.turizam.hr/) provides an entry point to all concerned stakeholders on laws and other regulations, awards, certificates, best practices, knowledge, events, existing resources, but also on projects aimed at sustainable tourism development. It additionally provides a direct access to the European site DestiNet that posts, in English, the most important pieces of information of all the Croatian stakeholders involved in the project.

Blue Flag

The Blue Flag programme is an exclusive eco-award given to beaches and marinas that meet strict criteria for both water quality and environmental management. The programme is run by the Foundation for Environmental Education[12]. Today, Blue Flag has become a truly global programme with an ever-increasing number of countries participating in the programme. The programme promotes sustainable development in freshwater and marine areas. It challenges local authorities and beach operators to achieve high standards in the four categories of: water quality, environmental management, environmental education and safety.

Croatia prides itself on the number and quality of its Blue Flag beaches, which numbered 102 in July 2013 and marinas, which numbered 18.

9.6 Conclusions and recommendations

There is no comprehensive information on pressures from tourism on environment in Croatia. Only some sporadic data and indicators are scattered over different institutions and publications. There are no estimates of pressures from tourism on water resources and air in Croatia. There are also no estimates of the volume of greenhouse gases emissions from the tourism sector in Croatia. The 2010 Fifth National Communication of the Republic of Croatia under the United Nation Framework Convention on the Climate Change does not contain any particular data for the tourism sector. Data on municipal waste generated by the tourism sector are hidden in the total data on municipal waste generated in the country.

Recommendation 9.1:

[12] http://www.fee-international.org/en

The Ministry of Tourism, together with the Institute of Tourism and in cooperation with the Ministry of Environmental and Nature Protection and the Croatian Bureau of Statistics, should undertake a continuous assessment of the impact from the tourism sector on the environment.

Croatia has a great natural potential for development of nautical tourism. The country possess over approximately 12.2 per cent of the coastline and 33 per cent of the islands coastline in the Mediterranean. With regard to the coastline length, Croatia has 25 times less nautical moorings per kilometre than France, 8 times less than Spain. The county physical plans envisage expansion of the existing and construction of new capacities for reception of vessels on about 300 potential locations, which is one and a half times more than the existing capacities.

However, the unsustainable development of nautical tourism could pose threats to naturally formed areas and natural resources. The uncontrolled use of could be one of the biggest threats to long-term.

Recommendation 9.2:
The Government should ensure that the necessary environmental protection measures are implemented during the expansion of the existing and construction of new nautical moorings.

Over 90 per cent of tourists come to Croatia for sun and sea. Few tourists come to the country for other types of tourism, such as ecotourism, cultural tourism, thematic tourism and adventure tourism. It confirms the necessity to define, shape and adequately promote these forms of tourism offer.

Continental Croatia, from a tourism point of view, still remains insufficiently and/or inefficiently utilized, even though there is no lack of potential tourist attractions there. To provide for a more dynamic development of tourism in continental areas, an adequate tourism infrastructure development is needed that takes into account environmental considerations.

Recommendation 9.3:
The Government should further promote the development of continental tourism in the country, paying special attention to ecotourism and applying the principles of sustainability.

Annex I

*IMPLEMENTATION OF THE RECOMMENDATIONS IN THE FIRST REVIEW**

PART I: THE FRAMEWORK FOR ENVIRONMENTAL POLICY AND MANAGEMENT

Chapter 1: Legal instruments and institutional arrangements for environmental protection

Recommendation 1.1:
The organization of environmental protection, physical planning, tourism and water protection, hunting, fisheries and forest protection in a combined ministry should be considered. This ministry should also include an organizational unit to coordinate environmental education projects and raise environmental awareness among the public.

Recommendation was partially implemented. The Ministry of Environmental Protection and Physical Planning was established in 2000 on the basis of the State Directorate for Environment Protection. Currently, responsibilities on environmental management are spread among several ministries: the Ministry of Environmental and Nature Protection for air, waste, nature, soil, sea and coastal areas, the Ministry of Agriculture for water, hunting, fisheries and forestry and the Ministry of Health for genetically modified organisms (GMO), chemicals and noise. Tourism and environment is under competence of the Ministry of Tourism and the Ministry of Construction and Physical Planning is competent for physical planning.

The Ministry of Environmental and Nature Protection has established the Department for General Environmental Policy, which is coordinating the implementation of the National Action Plan for Education for Sustainable Development. The Intersectoral Coordination for Implementation of the Action Plan for Education for Sustainable Development has been established.

Recommendation 1.2:
The Environmental Protection Law should be revised to meet, inter alia, the requirements of the Aarhus Convention. Improvements in public access to information, public participation and access to justice in accordance with the Convention will also strengthen enforcement mechanisms for environmental protection.

The Aarhus Convention as well as EU directives related to the same topics have been transposed into Croatian legislation by the EPA and by several implementing regulations such as the Regulation on information and participation of the public and public concerned in environmental matters (OG 64/08), the Regulation on environmental impact assessment (EIA) (OG 64/08), the Regulation on strategic environmental impact assessment (SEA) of the plans and Programmes (OG 64/08), the Regulation on the establishment of the Croatian Environment Agency (OG 75/02) and the Regulation on environmental information system (OG 68/08).

Recommendation 1.3:
The public should receive further information on the EIA procedure, encouraging it as well as NGOs to make use of the public participation procedure. Information about planned developments should be published at an early planning stage to facilitate public participation.

Recommendation was partially implemented. The legal provisions to inform and ensure the participation of the public concerned in the EIA procedure are in place: the 2007 EPA, the Regulation on environmental impact assessment (OG 64/08, 67/09), the Regulation on strategic environmental assessment of plans and programmes

* The first review of Croatia was carried out in 1999. During the second review, progress in the implementation of the recommendations in the first review was assessed by the EPR Team based on information provided by the country.

(OG 64/08), the Regulation on information and participation of the public and public concerned in environmental matters (OG 64/08). However, there are no evidences that these provisions have been implemented.

Recommendation 1.4:
Inspections should be systematically combined as much as possible. This is particularly true for environment and water protection inspections. An environmental inspector should also be appointed in the county of Zagreb.

In 2008, the agreement on cooperation between inspection services on environment was signed by the Ministry of Environmental Protection, Physical Planning and Construction, the Ministry of Culture, the Ministry of the Sea, Transport and Infrastructure, the Ministry of Regional Development, Forestry and Water Management, the Ministry of Agriculture, Fisheries and Rural Development, the Ministry of the Interior, the Ministry of Health and Social Welfare and State Inspectorate. Based on this agreement, a manual was developed on the implementation of coordinated inspection control in line with recommendations from EU acts on setting minimum criteria for environmental inspections.

Inspection services cooperate by exchanging data which have an impact on environmental protection, particularly on the preparation and performance of coordinated inspection controls, and by using services of authorized persons (professional institutions, laboratories, agencies, etc.) for purposes of inspection control, remediation of consequences of major accidents and other activities within the scope of international cooperation of inspection services.

Coordinated inspection controls are carried out on the basis of a mutually coordinated annual work plan for the following year, published at the web site of the Ministry of Environmental and Nature Protection, as well as a work programme. Joint reports on the performed coordinated inspection controls and on other activities within the framework of joint cooperation are prepared each year.

The Department for Environmental Inspection for the City of Zagreb and Zagreb County with headquarters in Zagreb is established as a branch unit within the Ministry of Environmental and Nature Protection.

Recommendation 1.5:
The level of the fines legally prescribed should be examined and adapted, taking into account the economic situation. The fining procedure should be simplified.

The level of fines stipulated in the current environmental legislation that applies since 1999 has been increased. The legislation has been changed in the part dealing with penalty provisions. These changes have been made in the way to impose penalties to natural persons. Now it is possible to impose penalties to individuals and hand crafts in an adequate way. Furthermore, judges are allowed to sentence minimum penalties, reprimand, and the judge during sentencing is allowed to take into account any mitigating circumstances, including the financial situation of the accused.

Recommendation 1.6:
Legal provisions should be developed to exempt NGOs from paying taxes and allow donors to deduct their financial contributions to NGOs from their taxable revenues. The SDEP should clearly define its funding policy towards NGOs and improve its transparency.

The 2001 Income Tax Act introduced the possibility for donations for cultural, scientific, educational, health, humanitarian, sports, religious, environmental and other public benefit purposes made to associations and other persons that conduct listed activities in accordance with special regulations, to be deducted from their taxable revenues, if the donations are less than two per cent of donor's revenue achieved in the previous year (Article 7. paragraph 7, OG 177/04, 90/05, 57/06, 146/08, 80/10, 22/12). This possibility is made both for natural and legal persons. According to the same law, non-profit organizations are not subject to paying profit taxes and majority of non-profit organizations are not liable to pay value added tax (VAT). Non-profit organization becomes a subject to value added tax if the value of the sales of goods and provided services, which are not exempt from VAT, exceeds the sum of HRK 85,000 per year.

The Ministry of Environmental and Nature Protection is supporting financially NGOs on environment and nature protection through inviting tenders for financial support of their project. The number of programmes and projects financed by the Ministry has increased significantly over the last years (in 1999 - 11, in 2009 - 51).

The Environmental Protection and Energy Efficiency Fund is also funding programmes, projects and similar activities of NGOs determined in accordance with the National Environmental Strategy and the National Environmental Action Plan.

Recommendation 1.7
Periodic and "state-of-the-art" representative opinion polls should be carried out on questions regarding environmental protection, including the general relative ranking of environmental protection among the priorities of the population (nationally, regionally, by age group and socio-economic category of the respondents), and the most pressing specific environmental problems.

There is no information on the implementation of this recommendation.

Chapter 2: Economic and regulatory instruments

Recommendation 2.1:
A time schedule for the full enforcement of all environmental payments should be set and published, including the social conditions that have to be met for the implementation of its steps. Creating an environmental fund with a clear and transparent management is recommended as a measure for improving the funding and efficiency of environmental payments and expenditures during the transition period.

Recommendation was implemented. The Environmental Protection and Energy Efficiency Fund (EPEEF) was established in 2004 in order to secure additional resources for financing programmes and projects on conservation, sustainable use, protection and improvement of the environment and on energy efficiency and use of renewable energy sources. The resources of the Fund are primarily used to finance programmes and projects determined in accordance with the National Environmental Protection Strategy, the Implementation Programme for the Energy Development Strategy and other acts and regulations on environmental protection and energy efficiency.

EPEEF is established as an extra-budgetary fund. The management structure of the Fund consists of the Director and the Management Board. The Director manages operations of the Fund and performs duties as prescribed by the Act on the Environmental Protection and Energy Efficiency Fund and its Statute. The Director is appointed by the Management Board, which comprises two representatives from the Ministry responsible for environmental and nature protection; one representative from the Ministry responsible for energy; one representative from the Ministry responsible for finance; one representative from the Croatian Parliament; one representative from the Croatian Chamber of Economy; and one representative among experts on environmental protection. The Management Board adopts the work programme and financial plan for each fiscal year. The Fund also adopts the long-term work programme.

Recommendation 2.2:
The necessary and sufficient economic instruments and their levels should be identified with regard to those measures that are already envisaged in existing legislation.

Resources for financing activities of the Fund are specific-purpose revenues of the Fund from:

- Charges on polluters to the environment are charges for emissions of emissions of carbon dioxide (CO_2), sulphur dioxide (SO_2) and nitric dioxide (NO_2). The parties subject to payment of these charges for emissions into the environment are owners and/or users of individual sources of emissions of CO_2, SO_2 or NO_2.
- Charges on environmental users are the charges for owners of buildings subject to procedure for assessment of their environmental impact.

Charges for burdening the environment with waste are charges for municipal waste and/or non-hazardous technological (industrial) waste and for hazardous waste. The parties subject to payment of these charges are owners/users of landfills for disposal of municipal and/or non-hazardous technological (industrial) waste. The

charge is calculated and paid according to the volume of waste disposed of at the landfill. The charge for hazardous waste is calculated and paid according to the volume of produced and untreated or non-exported hazardous waste, as well as according to the characteristics of such waste. The charges for burdening the environment with waste are paid for one calendar year.

- Special environmental charges for motor vehicles (special charge) are charges for owners/authorised holders of rights on motor vehicles. The special charge is paid at the time of the registration of the vehicle, i.e. at the time when the vehicle is certified to be roadworthy. The special charge is calculated and paid according to the type of the vehicle, type of the engine and motor fuel, piston displacement or power-rating of the engine and the age of the vehicle.

Recommendation 2.3:
A special mechanism should be designed to help create a market for secondary products. The charges related to industrial waste collection, transport and disposal could be increased, if refunds are introduced at the same time for recycling and reuse.

The Ministry of Environmental and Nature Protection has adopted a number of ordinances which regulate measures and economic instruments used to encourage recycling and reuse of waste for economic purposes. These are:

- Ordinance on Packaging and Packaging Waste;
- Ordinance on Waste Tyre Management;
- Ordinance on the Management of End-of-life Vehicles;
- Ordinance on the Management of Waste Electrical and Electronic Appliances and Equipment;
- Ordinance on Waste Batteries and Accumulators Management;
- Ordinance on Waste Oil Management.

Within its core activities EPEEF also supports the organization and financing of a system for the management specific waste stream. Revenues generated by Fund from charges by users of the environment, importers and producers of packaging waste, waste tyres, vehicles, oil, batteries and accumulators and electrical and electronic waste and equipment are used to pay the expenses of collection and recycling of these waste streams to licensed collectors and recovery operators.

Recommendation 2.4:
The statistics on environmental expenditures as well as their sources of funding should be improved as a matter of priority.

Statistics on environmental expenditures has improved and is annually reported in a dedicated section of Croatia's National Statistical Yearbook.

Chapter 3: Environmental consequences of armed conflict

Recommendation 3.1:
The effects of the armed conflict on the environment should be quantified to the maximum possible extent, to become the basis for a comprehensive remediation strategy. Monitoring practices should be widely extended to prepare the strategy.

Recommendation was partially implemented. There are cartographic maps of suspected hazardous areas by counties on the territory of Croatia. Thanks to demining operations conducted by demining companies, general and technical survey operations, suspected hazardous area has been reduced from the initially estimated 13,000 m^2 to currently precisely defined to 695 km^2 (on October 30, 2012). The National Mine Action Strategy for the period 2009-2019 defines the prerequisites for the solution of mine problem including the capacities and funds needed.

Recommendation 3.2:
Local capabilities should be strengthened to cope with the environmental consequences of the armed conflict on a medium- to long-term basis. Strengthening should involve making finances available as required, including possibly from international assistance.

Recommendation was partially implemented. The central Government and local authorities cooperate in regard to defining goals of scientific research projects focusing on remediation. Many local and national documents define how to find innovative financial resources to address the issue of lands affected by the armed conflict, including those that are burdened by contamination from the mines. There are no evidences that local capabilities to cope with the environmental consequences of the armed conflict have been strengthened.

Recommendation 3.3:
Scientists should evaluate xenobiotic and metabolic processes occurring in underground strata used for the extraction of drinking water, in order to ascertain the microbiological processes that may be causing degradation of chemicals polluting such water. These metabolic processes are of particular importance when such metabolites increase the toxicity of the pollutants. Expertise in anaerobic metabolism will have to be developed.

The network of institutes in Croatia, as part of their regular activities, performs control and analysis of drinking water. Over the years, Croatia has developed expertise on analysis of xenobiotics in an aquatic environment by working in scientific research projects, which have been co-financed by State funds and international funding. Institutes and universities have worked also on projects of anaerobic metabolism.

Recommendation 3.4:
Training in environmental health risk assessment, ecotoxicology and related topics should take place, specifically at regional and local levels. It should be extended to both industrialists and academics.

Courses related to environmental health risk assessment and ecotoxicology are part of the university curriculum. In the meantime, a pollutant release and transfer register (PRTR) has been developed with an interactive application available to the public.

Recommendation 3.5:
Ground contaminated with incompletely burnt pesticides or related products (including PCBs) should be examined and, as necessary, remediation measures proposed, and no new warehouses, production units nor, in particular, any dwellings should be built in those areas.

There is no information on the implementation of this recommendation.
Recommendation 3.6:
Croatia should be invited to actively contribute to the regional assessment of environmental impacts of armed conflicts, in the context of the Stability Pact for South Eastern €ope.

Croatia has actively participated in the activities of the Stability Pact since its establishment in 1999, and as a presiding the South-East European Cooperation Process (SEECP) in 2006/2007, had a leading role in the transformation of the Stability Pact into the Regional Cooperation Council. One of the initiatives launched by the Stability Pact in Zagreb was the International Sava River Basin Commission. The International Sava River Basin Commission (ISRBC) seated in Zagreb, Croatia, has been established for the purpose of implementation of the Framework Agreement on the Sava River Basin (signed at Kranjska Gora, Slovenia. on 3 December 2002), and realization of the mutually agreed goals: establishment of the international navigation regime on the Sava River and its navigable tributaries, establishment of the sustainable water management and undertaking of measures to prevent or limit hazards, such as floods, ice hazards, droughts and accidents involving substances hazardous to water, and to reduce or eliminate their adverse consequences.

Chapter 4: International cooperation

Recommendation 4.1:
Implementation, compliance and enforcement of environmental norms and action plans following existing international commitments should be a priority for all actors in Croatia's environmental policy. National priorities should be defined for international environmental cooperation, preferably as part of the National Environmental Strategy and the National Environmental Action Plan, which are currently being developed.

National priorities for international environmental cooperation were defined and incorporated in the NES and the NEAP, which were adopted in 2002. The NEAP is currently under revision.

Recommendation 4.2:
An analysis of all existing international cooperation for environmental protection should be undertaken. A strategy for attracting funds involving all governmental bodies related to environmental protection should be developed. The creation of a unit for project management in the State Directorate for Environment should be considered.

Recommendation was partially implemented. For that purpose, the Ministry of Environmental and Nature Protection has established an independent sector for EU which is, among other things, in charge of coordination of all activities related to the results of the negotiation process for Chapter 27 Environment, as well as part of Chapter 22 relating to the Operational Environment Programme for the period 2007-2013. The Sector performs expert and administrative work in coordinating the preparation and implementation of strategic documents and operational programmes for the use of EU funds related to infrastructure projects and technical assistance projects. It is in charge of tasks related to the preparation and project proposals and providing information to end recipients. It performs tasks related to providing financial resources for the implementation of projects, preparation and analysis of the implementation of the bilateral agreements for individual projects, and supervises the implementation of strategies, operational programmes and projects. It is responsible for updating the manual for the implementation of operational programmes and coordinates the programme of all the environmental components of the Operational Programme Environment. There are three units within the Independent Sector: Department for European Integration, Department for Coordination of Operational Programmes and Department for Project Development and Implementation. However, a strategy for attracting funds involving all governmental bodies related to environmental protection has not been developed yet.

Recommendation 4.3:
The State Directorate for the Protection of Nature and the Environment should consider creating a national coordination body which can serve as a forum for information exchange, coordination and cooperation on sustainable development.

The Government established permanent working bodies in order to provide with their opinions, suggestions and expert clarifications. All issues related to environmental protection are discussed within the working group Coordination for Economy. The working group includes representatives of all ministries. Also, an inter-ministerial coordination group could be established in case of certain specific issues and will consist of experts nominated on behalf of their ministries.

Recommendation 4.4:
The ratification procedures for the Bern Convention on the Conservation of European Wildlife and Natural Habitats and the Bonn Convention on the Conservation of Migratory Species of Wild Animals should be initiated.

Croatia is Party to the Bern Convention on the Conservation of European Wildlife and Natural Habitats and the Convention on the Conservation of Migratory Species of Wild Animals (CMS) since 2000.

Recommendation 4.5:
Awareness about international environmental conventions and policies and their importance for social and economic issues at the national and regional levels should be raised, with special programmes targeting decision makers as well as the public.

The Ministry of Environmental and Nature Protection publishes regularly on its official web site information regarding international treaties and projects.

Recommendation 4.6:
The forthcoming action plan on climate change should include suitable economic instruments in order to support the respective objectives.

Recommendation was partially implemented. The National Strategy for the Implementation of the United Nations Framework Convention on Climate Change and Kyoto Protocol in the Republic of Croatia with the Action Plan was prepared in 2007. Objectives and measures listed in the action plan are an integral part of the 2008 Air Quality Protection and Improvement Plan for the period 2008 – 2011, OG 61/08. However, there are no evidences that the respective objectives are adequately supported by suitable economic instruments.

PART II: MANAGEMENT OF POLLUTION AND OF NATURAL RESOURCES

Chapter 5: Air management

Recommendation 5.1:
The National Environmental Strategy, the National Environmental Action Plan and the Industry Development Strategy should be drafted in broad collaboration with all those concerned. An implementation strategy taking into account the generally accepted priorities and a realistic assessment of the available resources should be included in the strategic documents. Whenever possible, economic and legislative instruments should support the strategies' implementation.

The 2002 NES and the NEAP were the basis for the development of supporting implementation documents, such as the Strategy for Sustainable Development, the Air Quality Protection and Improvement Plan for the period 2008 – 2011, the Plan on reduction of emissions of sulphur dioxide, nitrogen oxides and particulate matter from major combustion plants and gas turbines in the territory of Croatia, the Plan on allocation of greenhouse gas emission quotas in Croatia (National Allocation Plan), and the Programme for gradual emission reduction of certain pollutants for the period until the end of 2010, with emission projections for the period 2010-2020.

Recommendation 5.2:
Sufficient funds for the county offices and inspectorates should be secured from the county budgets. Priorities should be set on the national level, and their implementation on the local level coordinated systematically. The staff of the offices and inspectorates should be strengthened at least in counties with a high concentration of industry.

Recommendation was partially implemented. County environment inspectorates do not exist as such any more. They are now under the competence on the Ministry of Environmental and Nature Protection. Within the inspection there are two levels of competences, one central division for the whole country with 20 inspectors and 5 local branches with 15 offices and 60 inspectors. However, there are no evidences that sufficient funds for inspectorates are secured from the national budget.

Recommendation 5.3:
A detailed concept for a national air quality monitoring network should be established. If appropriate, automatic continuous measuring devices could be used for monitoring traffic-related pollution. The introduction of benzene measurement is essential.

The national network for continuous air quality monitoring consists of a total of 21 monitoring stations, 20 of which were established pursuant to the regulation on siting of national network stations for continuous air quality monitoring and one station in Slavonski Brod in line with the Air Quality Protection and Improvement Plan for the period 2008 – 2011. Air monitoring stations for traffic pollution are located in several cities across the country. Benzene is included in monitoring in some of the air monitoring stations (at the State level at six monitoring stations).

Recommendation 5.4:
The by-law on the methodology of measuring pollutant emissions from stationary sources into the air should be prepared in collaboration with expert institutions as well as industry, and, prior to its adoption, the cost of applying it should be assessed. For sulphur dioxide, also mass balance estimation should be possible.

Recommendation was implemented. Legislation regarding measurement of pollutant emission from stationary sources into the air has been constantly harmonized with the EU legislation. All stakeholders have been included in the drafting of those regulations. Each installation is obliged to measure emission from the

stationary sources. The ordinance on monitoring pollutant emissions from stationary sources into the air prescribed, among others, way how to measure the emission into the air from stationary sources, extent and measurement types, reference measuring methods and sampling. In the manual for pollutant emission into the air based on the Environmental Pollutant Register, is given the procedure for calculation of emissions from stationary sources that do not perform measurement, and for the reporting of the annual overall releases of the pollutants in Croatia.

Recommendation 5.5:
Remedial programmes for particular non-compliance sources should be set up in accordance with local environmental protection documents, with which the local physical plans should comply.

The Air Protection Act (OG 178/04, 60/08) lays down a number of obligations and assigns a significant role to local self-government units in the implementation of air protection policy. Local self-government units adopted an action plan for the reduction of air pollution, in order to gradually reach the limit value (LV). The also decided to develop a rehabilitation programme for stationary sources and the period within which it must make to achieve II.

Based on these obligations rehabilitation programmes and plan of measures for Sisak - INA Refinery Sisak (H2S and SO2), Rijeka - INA Refinery Hearted (H2S and SO2), Rijeka - Kostrena (PM10), Kutina-factory soot (H2S) and Zagreb - the western part of the city (PM10) were implemented. Implementation of prescribed measures from plans and programmes to protect and improve air quality and reduce emissions of certain pollutants has impact on significant improvements in air quality (for example, the town of Sisak and Rijeka - SO2).

Based on the new Air Protection Act (OG 130/11) according to pollution levels, given the prescribed limit values (LV), target values and long-term objectives, the following categories of air quality have been determined:

- First category of air quality – clean or negligibly polluted air: the limit values (LV), target values and long-term objectives for ground level ozone have not been exceeded,
- Second category of air quality – polluted air: the limit values (LV), target values and long-term objectives for ground level ozone have been exceeded.

Responsibilities of local self-government units is, among other things, the implementation of specific measures for the protection of human health, establishment of air quality monitoring stations if they consider that the pollution levels are higher than the prescribed limit, adoption for the zone or agglomeration in question an air quality action plan for that zone and agglomeration, in order to achieve the limit values or target values as soon as possible, adoption of a short-term action plan in a given zone or agglomeration, where is a risk that the levels of pollutants will exceed the alert thresholds, indicating the measures to be taken in the short term in order to reduce the risk or duration of such an exceedance.

In order to achieve the prescribed obligations the project "Support to the preparation of a national action plan to reduce particulate matter (PM) and nitrogen oxides (NOx) in Croatia (Directive 2008/50/EC)," under the programme between of Flanders and Croatia was completed in 2012. Under this programme was drafted short-term action plan for the cities of Sisak, Kutina and Split. City of Sisak in accordance with the draft has been started drafting their Action Plan.

Recommendation 5.6:
Economic incentives encouraging the purchase of cleaner technologies, abatement techniques, monitoring devices, techniques for the development and use of renewable energy sources, waste recycling, rational energy production/use etc. should be introduced in the taxation and custom system.

Various economic instruments have been adopted to provide economic incentives for environmental improvements. Those instruments include charges to industrial and energy installations for emission of SO_2, NO_x and CO_2 into the air, and the special environmental charge for motor vehicles. The Environmental Protection and Energy Efficiency Fund uses those financial resources for financing projects and programmes in environmental protection, renewable sources and energy efficiency.

Recommendation 5.7
Croatia should ratify the VOC Protocol to the Convention of Long-range Transboundary Air Pollution. Croatia should actively prepare for the possible implementation of the new Protocol to Abate Acidification, Eutrophication and Ground-level Ozone. Its first national communication should be drawn up in broad collaboration with the economic sectors concerned, and realistic baseline emissions negotiated with the responsible international body.

Croatia ratified the VOC Protocol was in 2007 and the Gothenburg Protocol in 2008.

Chapter 6: Management of freshwater resources and quality

Recommendation 6.1:
The National Water Council should be revived. It should be representative of Parliament, and involve water management experts and scientists as well as NGOs. It should coordinate its decisions with the Committee of Environmental Protection and Physical Planning in matters regarding waters and environmental protection.

The recommendation was implemented. According to the provisions of the Water Act (OG 153/09, 63/11, 130/11 and 56/13) the National Water Council has been established for the purpose of discussing systematic issues of water management, coordinating needs and interests, and proposing measures for the development and improvement of the water system in Croatia. The National Water Council has a chairperson and 10 members appointed by the Croatian Parliament to a term of four years from among representatives of the Croatian Parliament and from distinguished scientists and experts on water management and similar fields. The country followed EU directives and the structure of the water sector was adapted to integrated water management in the manner which suits Croatia, with appropriate participation of all actors at different levels ensured. For the purpose of water management, Croatian Waters establishes water management departments and branch offices. The water management departments are in charge of implementing the Water Management Plan in their respective river basin district by, among other things, communicating and cooperating with the bodies of local and regional self-government, users of water and the water estate, payers of the water fees, and users of funds provided by Croatian Waters.

Public and NGOs have been involved during the process of information and public consultation on preparation and adoption of the first RBMP .

The Water Services Council was established to ensure legality on determining the price of water services. Members of the Council are appointed and suspended by the Parliament upon the proposal of the Government, and are appointed to a term of five years. The Council comprises nine members that are experts on water supply and wastewater sewerage, water management, economy, public finance or other fields.

Recommendation 6.2
Basin water management plans should be urgently completed. Basin agencies should obtain greater autonomy, in particular regarding the spending of the financial resources collected in their basin. Basin committees should be created or their role strengthened in decision-making. These committees should be equally made up of representatives of local territorial authorities, users (or their associations) and the State.

The recommendation has for the most part already been implemented in practice with regard to the development and adoption of River Basin Management Plan and the Water Management Strategy. Public was involved in the 2 processes. The Decision on River Basin Management Plan has been adopted on 26 June 2013. The integration of elements of environmental and nature protection into water management is ensured through the implementation of strategic environmental impact assessment of the river basin management plans, the basic planning document of water management, and other development planning documents (e.g. multiannual construction programs), before the adoption and during the implementation of such documents.

The Danube River and the Adriatic River basin districts were established. Characterization reports have been prepared for both river basin districts, including an analysis of characteristics of the river basin districts, i.e. identification of the natural characteristics of all water bodies, a review of the impact of human activities on the status of waters, and an economic analysis of water use. Based on these, water bodies have been identified as

the main units for which the objectives and measures for water management are defined, in accordance with the Water Framework Directive (WFD).

A river basin management plan with a programme of measures makes it possible to coordinate the management of measures to reduce impacts on the aquatic environment and to monitor the way in which human activities impact waters through an integrated and comprehensive approach. The objectives of the river basin management plan reflect the objectives of the WFD.

Recommendation 6.3:
The efficient protection of complete river catchments in the karstic area deserves a special protection regime.

Recommendation was implemented. Due to the importance of karst aquifers for the wider region Croatia with neighboring countries implement the project DIKTAS. The DIKTAS Project (2010 – 2014) was initiated by the aquifer-sharing States and is a full-size GEF regional project, implemented by UNDP and executed by UNESCO. The activities of the project focus on Albania, Bosnia and Herzegovina, Croatia and Montenegro.
The objective of the Project is to introduce sustainable integrated management principles in a transboundary karst freshwater aquifer of the magnitude of the Dinaric Karst System. It is a collective effort to: facilitate the equitable and sustainable utilization of the transboundary water resources of the Dinaric Karst Aquifer Systems shared by several countries. Its goal is to protect the unique groundwater dependent ecosystems that characterize the Dinaric Karst region of the Balkan Peninsula. However, the areas intended for the abstraction of water for human consumption (drinking water) are protected by designating sanitary water source protection zones. This is within the competence of appropriate bodies on the local or regional level. The decisions on the protection of such sources pursuant to the Water Act have been reached the most of active sources.

The registered sanitary protection zones cover a total of 11,468 km^2 or 20 per cent of Croatia's territory. Water protection zones cover a larger area in the Adriatic River basin district (5.899 km^2 or 28% of the RBD area, including 172 km^2 on the islands) than in the Danube River basin district (5.569 km^2 or 16% of the RBD area).

The major part of the water protection zones are restriction and control zones, accounting for 83 per cent of the total area of the designated water protection zones in the Danube River basin district and for 51 per cent of the total area of the designated water protection zones in the Adriatic River basin district. The procedure of identifying sanitary protection zones is laid down by the Ordinance on defining sanitary water source protection zones (OG 66/11, 47/13). The Ordinance also includes the preparation of reports on the basis of performed water research works, and reserving the area for sanitary protection zones in a physical planning document pursuant to the legislation on physical planning and construction. Once the required conditions are met, the relevant bodies on the local or regional level reach, under the prescribed procedure and with participation of all interested stakeholders, a decision identifying a sanitary water source protection zone.

Beside mentioned, other protected areas have been designated according to the Water Act, *inter alia*, sensitive areas, vulnerable areas, ecological network.

Recommendation 6.4:
Funds collected from charges, or obtained from other sources, and earmarked for water protection at the basin level should be allocated case by case depending on the results of a cost-effectiveness analysis.

The revenue collected from the water protection fee is used for:

- Preparing water protection plans and making arrangements for their implementation;
- Monitoring and identifying water quality and taking measures for their protection;
- Financing the construction of main public sewerage facilities: main sewers, pumping stations, wastewater treatment plants, discharges into a recipient, plants for the treatment of sludge generated in the process of wastewater treatment, and facilities of the sewerage network.

A representative body of the local self-government may introduce a development fee when increased investments in water utility facilities are needed for protecting water sources within the sanitary protection zones. The revenue from the development fee is used for the construction of water utility facilities or for financing their construction. The criteria for financing individual projects are particularly the following:

- Cost-effectiveness;

- Affordability;
- Feasibility;
- Appropriate for environment;
- Appropriate for nature;
- Full cost recovery.

Recommendation 6.5:
Economic incentives and a command-and-control approach toward industry should be strengthened to encourage (i) the introduction of cleaner technology, and (ii) industrial investments in waste-water treatment units.

Industry pays a water protection fee based on the polluter pays principle, which encourages the polluter to introduce cleaner technologies and to invest into its own WWTPs for the pretreatment of its own wastewater.

Recommendation 6.6:
Professional training programmes should be set up for operators of waste-water treatment units. Engineers and experts employed in such units should be trained in water management, including all technical and policy-making issues, or adequate measures should be taken to retain chartered or other well qualified staff in these units.

Training of WWTP managers and employees has been intensively dealt with in recent years in order to achieve cost-efficient and effective plant operation e.g., Training centre in Karlovac.

Recommendation 6.7:
Once the Environmental Emission Cadastre will be reliable and complete, it should fully integrate the existing water emissions registers and should be used as a common decision-making tool, in particular in the introduction of an integrated permitting system.

Croatia Waters keeps emission data in the cadastre of water protection. This cadastre contains data on water emissions as part of the Water Information System, which is integral part of the Croatian Environmental Information System hosted by CEA and which is in turn part of the Water Information System of €ope (WISE).

Recommendation 6.8:
The existing monitoring system for waters should be harmonized and improved. The use of automatic monitoring should be increased. Integration and processing of data should be upgraded. The data should be processed and disclosed.

Recommendation was partially implemented. Since 2009, the monitoring plan has been gradually harmonized with the requirements of the EU Water Framework Directive with the aim of establishing systematic supervision over the status of water that will make it possible to establish long-term changes (surveillance monitoring), monitor the impacts of implementation of water protection measures (operational monitoring), and identify unknown phenomena in the water system (investigative monitoring). The appropriate monitoring of ecotoxicological, biological as well as hydromorphological indicators is missing.

Recommendation 6.9:
Cooperation between Croatia and all countries in the region concerned by transboundary water management and protection should be improved. The status of cooperation with Bosnia and Herzegovina and Yugoslavia should be clarified from the legal point of view, and a technical programme of cooperation should be defined in order to prepare the ground for the necessary international support and investments.

Recommendation was implemented. Multilateral and bilateral cooperation, particularly with the neighbouring countries (Hungary, Slovenia, Bosnia and Herzegovina, and Montenegro) has been established and is developed further with the aim of addressing controversial issues. There are currently negotiations on an agreement on water management with Serbia.

Chapter 7: Waste management

Recommendation 7.1:
The enforcement of the existing waste legislation should be considered the first priority for waste management. It should be facilitated by clearly committing sufficient resources to the task, including money to train inspectors and other public and private staff involved in waste management.

Recommendation was partially implemented. There are no evidences that the existing waste legislation is properly enforced. Human resources for waste management within the State authorities are slowly, but continually growing. See also Recommendation 7.4

Recommendation 7.2:
A national waste management policy plan –currently under preparation as part of the National Environmental Action Plan - should be implemented, including legal and economic priorities and instruments that actually achieve the intended goals. A subsequent national programme of action for the various sectors should be adopted, making budgetary and other financial commitments. Special attention should be given to financing hazardous waste management.

The 2005 Waste Management Strategy, as a constituent part of the National Environmental Strategy (OG 46/02), includes an evaluation of the present state in waste management, strategic and quantitative goals and measures for achieving those goals, guidelines, investment estimates and sources of funding. Waste Management Plan for period 2007-2015 was adopted in 2007 with the basic task of organizing the implementation of the main goals of the Strategy.

Management of special categories of waste is regulated by ordinances. For six special categories of waste (packaging waste, waste tyres, end-of-life vehicles, waste oils, waste electrical and electronic appliances and equipment, waste batteries and accumulators) those ordinances regulate compensations for collectors and treatment operators. Producers/importers of special categories pay to the Environmental Protection and Energy Efficiency Fund a fee, which later serves as a compensation fee to the collector and treatment operator. Since the application of the aforementioned systems began, new treatment and recovery capacities have been put to action. An improvement in separately collected quantities has been noted which reduced the pressure to environment which allowed more rational use of space on landfills. The most significant progress is noted in waste electrical and electronic system and end-of-life vehicles' system.

According to the Waste Act, the State is responsible for hazardous waste management. The Ministry of Environmental and Nature Protection issues permits for hazardous waste management. The waste producer must hand over the waste to the authorized person with the adequate permit. Costs of waste management are calculated according to the amount and properties criteria in accordance with the “polluter pays” principle.

Recommendation 7.3:
The SDEP should consider establishing a small administrative unit to (a) propose streamlining administrative practices in waste management, and (b) facilitate dialogue with and between local waste management authorities. This dialogue should include exchanges on such issues as socially acceptable fees for the collection and disposal of waste.

There is no information on the implementation of this recommendation.

Recommendation 7.4:
Both the Inspectorate and the Waste Register should give particular attention to the import, export and transit of wastes. It is recommended that detailed data on the permits and the actual import, export and transit of wastes, and in particular hazardous wastes, should be made accessible to the public. The permitting and control functions for the import, export and transit of waste should be separated and made transparent.

The Directorate for Environmental Protection and Sustainable Development of the Ministry of Environmental and Nature Protection issues administrative decisions concerning waste import, hazardous waste export, non-hazardous waste export in cases when the waste is planned to undergo disposal operations, hazardous waste transit and non-hazardous waste transit in cases when the waste is planned to undergo disposal operations. The Directorate for Inspectional Affairs of the Ministry of Environmental and Nature Protection is responsible for

the inspection supervision of the enforcement of the Waste Act and its subordinate legislation. While in the same Ministry, the two directorates are separate.

Exporters and importers of waste are required to submit yearly reports to the Ministry on the imported/exported amounts and types of waste. The Ministry coordinates data flow with the CEA which provides data on waste in accordance with the Waste Act and subordinate legislation. Waste management permits register and transboundary waste movement database are, amongst others, available to the public via web, as well as yearly reports on various subjects in waste management, such as special categories of waste, municipal waste, transboundary movement of waste.

Recommendation 7.5:
The SDEP should consider assisting municipalities to develop their waste management master plans, by launching a pilot programme in one county for capacity building in municipal waste management and inspection.

Municipalities and towns are responsible for municipal waste management. A few pilot projects on separate waste collection were launched by municipal companies in their designated areas and the results of those projects will help identify weak spots of the system and help improve it. Some towns in Croatia (Krk, Čakovec) already have a successful separate waste collection system in place and should be looked upon as positive examples for other towns/municipalities.

Recommendation 7.6:
A sufficiently complete and reliable waste information system should be developed between all institutions concerned, starting from the completion of the waste cadastre. The public should be informed of possibilities for waste reduction, recycling and similar issues through suitable campaigns.

CEA collects, integrates and provides waste data. It maintains the Waste Management Information System, develops and sets up indicators which are used to monitor the state in waste sector, creates reports on different waste topics, participates in EIONET (European Environment Information and Observation Network), participates in preparation and implementation of projects in waste sector and provides and facilitates access to information on waste. CEA also offers information to the public on ways of minimizing their waste generation and on responsible ways of waste management. In recent years, a few campaigns with the aim of promoting responsible waste management and educating the public were launched (e.g. campaign on hazards of waste containing asbestos; end-of-life vehicles' campaign; electric and electronic waste equipment campaign) but a lot more effort is needed in that sense.

Recommendation 7.7:
The adequate elimination of obsolete pharmaceuticals, hazardous industrial chemicals, as well as medical wastes should be seen as the most urgent problem in hazardous waste management, which should be considered the most important part of waste management in general.

The 2007 ordinance on medical waste management establishes methods and procedures for the management of medical waste that is generated in healthcare provided to people and animals, and in the research pertaining thereto. Medical waste must be separately collected, registered and temporarily stored in a specially separated area until treatment or delivery to the authorized person having the relevant permit for medical waste management. Healthcare institutions mostly dispose of their infectious waste by handing it over to authorized persons with treatment/sterilizing appliances or by sterilizing it themselves in their own appliances. After the treatment, the remaining waste is deposited on municipal waste landfills. The recovery and disposal of pharmaceutical, cytotoxic, chemical or similar hazardous medical waste is conducted in facilities authorized for the recovery and/or disposal of hazardous waste by incineration.

In 2010 73.6 per cent of medical waste was sterilized in autoclaves after which the waste was destined for landfills. Additionally, 7.89 per cent of non-hazardous medical waste was sent to landfills without prior treatment. A total of 2.93 per cent of medical waste was treated by procedures of incineration (waste incineration on land and use of waste principally as a fuel or other means to generate energy). About 5.87 per cent remained stored at the treatment facility, while the rest (9.73%) was exported, mostly for incineration in Austria and Germany. As far as hazardous industrial chemicals are concerned, the producer/holder of the

chemicals has to hand them to the person authorized for the collection, recovery and/or disposal of the waste when they become waste.

Chapter 8: Nature conservation, forest and biodiversity management

Recommendation 8.1:
The State Directorate for the Protection of Nature and the Environment should put a higher priority on nature protection, starting with increasing the expert staff in its relevant departments.

The current institutional framework in nature protection sector is defined by the Nature Protection Act (NPA) (OG 80/13) The Government has recognised a need to strengthen institutional capacity to perform expert tasks of nature protection. In this regard, the State Institute for Nature Protection (SINP) was established in 2002, pursuant to the first National Strategy and Action Plan for the Protection of Biological and Landscape Diversity (OG 81/99). The Institute carries out expert tasks pertaining to: inventory; monitoring; establishment and coordination of the nature protection information system; assessing the state of nature; preparing expert base proposals for the protection of natural values and for inclusion of nature conservation measures into natural resource management plans and physical plans; preparing opinions regarding protected areas management plans; developing expert base proposals for the assessment of acceptability of interventions in nature; reporting on the state of nature; participation in the implementation of international agreements on nature protection and organising and implementing educational and promotional activities in nature protection.

Recommendation 8.2:
An academic advisory committee under the responsibility of the Director of the SDEP should be set up to assist in the decision-making and evaluation processes regarding biodiversity conservation.

Recommendation was partially implemented. With the establishment of the SINP, the collaboration with the scientific community improved, at the same time giving momentum to the research and development of scientific data on the biodiversity. SINP actively cooperates with State administration institutions, but also with scientists at universities and institutes, as well as nature history museums, non- governmental organisations, schools and other interest groups.

During first 10 years of operations, SINP has, among all, carried out tasks such as: inventory of species and habitat types for many previously unstudied and poorly known parts of Croatia; development of a system for monitoring individual strictly protected species; development of management plans for the wolf, lynx and endemic freshwater fish species; publication of 25 red books and red lists of threatened plant and animal species; development of the proposed Croatian Ecological network and proposal for the Natura 2000 ecological network; preparation of draft management plans for four potential Natura 2000 areas; development of proposals for the protection of 30 areas; development of expert base proposals for several important pieces of subordinate legislation on nature protection; development of the Report on the State of Nature Protection (2000 to 2007); active participation in the drafting of the National Strategy and Action Plan for the Protection of Biological and Landscape Diversity from 2008; development of more than 1,300 expert base proposals for inclusion of nature conservation measures into natural resource management plans and physical plans; preparation of 700 opinions regarding appropriate assessment; publication of 70 publications for raising public awareness on the need for conservation.

Recommendation 8.3:
The responsibility of the Department for Protected Areas should be increased. In particular, it should oversee the implementation of the management plan more closely.

Recommendation was partially implemented. In 2007 the National ecological network was promulgated by the Government's Regulation. This network consists of ecologically important areas that are divided into areas important for conservation of wild bird species and areas important for conservation of wild taxa and habitats. The network of ecologically important areas covers 47% of the land and 39 per cent of the marine part of Croatia (all national parks, nature parks, strict and special reserves, in addition to areas so far not designated under national classification). Since the National Ecological Network is a relatively young conservation mechanism for Croatia, management framework is still not established on the whole territory. The most

extensive management is established in national and nature parks with very long tradition of conservation specifically through development of management plans for each PA.

Management of the protected areas in the categories: special reserve, national park, park and regional parks, and protected landscape are established through management plans which are prepared for a ten-year period. Spatial organisation in the national and nature parks is established on the basis of spatial plans. All National parks and nature parks have developed management plans or have them in advanced draft form. A management plan sets out development guidelines, the method of implementing protection, use and management of the protected area, as well as more detailed guidelines for protection and conservation of natural assets of a protected area, taking into consideration the needs of the local population. MP is implemented by an annual programme for protection, conservation, use and promotion of the protected area.

The protection of nature and planning land-use management are separated institutionally. The Law on Land-Use Management regulates physical planning and defines the obligation of making regulations on the protection and management of an area of special interest for the State. Nature protection requirements and measures are part of physical planning documents.

Recommendation 8.4:
Biodiversity protection measures should be incorporated into all spheres of human activities, and not only limited to the protection regime provided to certain species and areas. Protection of natural habitats in economically exploited areas should be improved by implementing specific guidelines for nature protection in agriculture, forestry, water management, physical planning and other activities.

The legislative framework for mainstreaming biodiversity into different policies and sectoral documents (e.g. spatial planning, forestry, hunting, agriculture, fishery) is in place and being implemented and will be further enhanced into other sectors.

Management plans for natural resources and physical planning documents (spatial plans) contain nature protection measures and requirements, which include review of protected and registered natural assets, ecologically important areas and particularly valuable landscapes, and guidelines for their protection and conservation. In this way nature is protected in parts that are economically used (in agriculture, forestry, fishing, hunting, construction, transport, energy, exploitation of mineral resources, etc.). With this concept, protection becomes an integral activity which is increasingly adjusted to the concept of sustainable development. Special nature protection requirements are issued in the procedure of obtaining a location permit for construction and execution of works and projects in the area of a national park, special nature reserve, nature monument and nature park.

Recommendation 8.5:
Each ecosystem should be used according to its specificity in an ecologically sound manner. The use of the coast for fish farming and marinas should be regulated. Urban sprawl along the coastline should be prevented, new constructions close to existing urban zones streamlined, a coastal strip protected from building and public access to the sea secured.

All projects and activities in the ecological network areas that could have a negative impact on the area conservation objectives are subject to the procedure of appropriate ecological network impact assessment, pursuant to the Ordinance on the appropriate assessment of the impact of plans, programmes and projects on the ecological network (OG 118/09). If an activity or a project is subject to EIA, then this impact assessment is carried out within EIA.

Croatia has ratified Protocol on Integrated Coastal Zone Management in the Mediterranean (OG IT 8/12) of the Barcelona Convention. The Protocol presents legal instrument aimed specifically at management of coastal zones taking into account the interrelationship between uses of the sea, land and the environment. EU Marine Strategy Framework Directive was transposed by Regulation on establishing a framework for acting of Croatia in the protection of a marine environment (OG 136/11). Requirements of MSFD call for development of an integrated marine strategy which shall apply an ecosystem-based approach to the management of human activities.

Croatian law gives special attention to coastal biodiversity. The 2009 Strategy for Sustainable Development (SSD) focuses specifically on the protection of the Adriatic Sea, coastal area and islands, highlighting the need to reduce the loss of marine and coastal biodiversity. At the legal level, this goal is reflected in the 2007 Physical Planning and Building Act (PPBA). According to the Act, the protected coastal area is an area, encompassing all islands, the continental belt 1,000 m in width from the coastline and the sea belt 300 m in width from the coastline, benefits from a specific legal mechanism aimed at ensuring its preservation. PPBA gives special attention to the use of the coast for fish farming and marinas and includes a number of provisions for regional planning. The spatial plan of the county determines in particular the areas intended for hospitality and catering and tourism purposes outside a settlement (location, type, maximum capacity and size) and the guidelines for determining detached building areas intended for those purposes. The spatial plan of the county determines in particular the areas intended for nautical tourism ports, golf grounds, and areas for mariculture and fishing infrastructure.

New detached building areas outside the settlement, which are intended for hospitality and catering and tourism purposes, may be established in the spatial plan of a county only if the existing areas with the same purpose have been built-up to 80 per cent or more of their surface area.

Recommendation 8.6:
Physical planning and its implementation should be based more strongly on joint actions and coordination between the national, county and local administrative levels.

The 2007 Physical Planning and Building Act introduced:

- Principle of Horizontal Integration in Spatial Protection – integrated approach to planning;
- Principle of Vertical Integration and Harmonisation of Interests adopting physical planning documents and other development documents (strategies, plans, programmes etc.). The State and local and regional self-governments are required to mutually cooperate in the spatial planning process, in spatial protection, building and urban regeneration and in the performance of other activities related to fulfilling physical planning obligations, for the purpose of realizing the objectives of physical planning;
- Harmonised development of physical planning documents.

A physical planning document for the narrower area must be harmonized with the physical planning document for the wider area.

Recommendation 8.7:
Coordination of actions regarding nature protection and biodiversity conservation between the SDEP and other ministries and directorates should be improved. A special unit in the SDEP should be entrusted with the responsibility for coordination.

Recommendation was partially implemented. In 2006, when the preparation of the new strategy on nature protection and biodiversity conservation started, 10 working groups were established with the aim of analysing the implementation of the former Strategy and determining strategic objectives, guidelines and priority action plans.

These working groups comprised representatives of relevant State administration bodies, professional institutions, public institutions for management of protected areas, inspection services, scientific institutions, the economic sector, and non-governmental organisations. The intention behind inclusion of a wide circle of participants in the preparation of the Strategy was to ensure an integrated approach to the issue of nature protection, thus creating the prerequisites for incorporation of biodiversity determinants into all relevant sectors. The draft strategy was made public on website, with the intention to collect comments, proposals and opinions of the public concerned. A public presentation of the draft strategy and of the draft Report on State of Nature and Nature Protection in Croatia was held. Working groups took into consideration all received comments and finalised the text of individual chapters, objectives, guidelines and action plans. Subsequently, the Ministry submitted the strategy to competent State administration bodies for comments prior to its submission to the parliamentary procedure.

Recommendation 8.8:

The monitoring of nature should be improved in particular with regard to biodiversity, soil and surface water. An inventory of the state of soil degradation and of the state of natural habitats should be envisaged.

Recommendation was partially implemented. The identification of the areas important for the conservation of endangered and rare species and habitat types is underway together with the preparation of the inventory and mapping of the habitats and species relevant to the Natura 2000 network. Work on establishing of such monitoring has started for all Natura 2000 species and habitats.

Recommendation 8.9:
Cooperation with neighbouring States on physical planning, biodiversity and water management should be intensified, including data exchange. Croatia should implement the international conventions and agreements relating to nature protection and biodiversity conservation that it has ratified, and it should join the main international ecological and development programmes.

Since 2000 Croatia has ratified 16 MEAs related to biodiversity and is implementing them. The NPA has been constantly aligned during the EU accession process with the provisions of the EU nature protection legislation.

Through the EU programme on cross-border cooperation, Croatia obtained funding for joint projects with Bosnia and Herzegovina, Hungary, Italy, Montenegro, Serbia and Slovenia, respectively. Croatia has also received international financial/technical assistance through EU funds, GEF donations and financial assistance from various countries and the World Bank..

Chapter 9: Management of marine resources and pollution

Recommendation 9.1:
An integrated coastal zone management plan should be prepared and implemented.

Recommendation has not been implemented.

Recommendation 9.2:
Technopoles should be established where medium and small-sized industries can share basic supply and treatment facilities so as to benefit from economies of scale in investment and operating cost.

There is no information on the implementation of this recommendation. Restructuring or consolidation of the water utility sector is planned. Also it will be defined service areas including small and medium-sized industries that are connected to the public sewerage systems.

Recommendation 9.3:
Operation centres should be set up to deal with emergencies and protection of the coastal sea and shoreline, where this is not yet the case.

Regional operational centers for implementation of Contingency Plan for Accidental Marine Pollutions in all seven coastal counties have been established.

Recommendation 9.4:
A waste management plan should be developed for the islands and the coastal area.

The Waste Management Plan for the period 2007-2015 was adopted in 2007. It covers the waste management system on islands and on the coast. As a result, a separate plan for islands and the coastal area has not been prepared.

Waste management in maritime ports is defined under the Ordinance on conditions and methods of maintaining order in ports and in other parts of the internal maritime waters and territorial sea (OG 90/05). The port authority is responsible for performing supervision over maintaining order in ports and in other parts of the internal maritime waters and territorial sea, especially for keeping the coast and sea clean from pollution from maritime facilities.

Recommendation 9.5:
It should be explored, whether navigation should be routed further away from the islands and the coast and to safer port approaches. Especially cargoes with hazardous substances, oil, etc., should follow special routes. Monitoring should take place in coordination with Italy, Croatia and Slovenia.

In 2003, the International Maritime Organization (IMO) has established mandatory ship reporting system in the Adriatic Sea with the aim of constant monitoring of the ships carrying dangerous or polluting substances. In 2004, IMO has identified in the driveway of the greatest Croatian, Slovenian and Italian ports in North Adriatic the scheme of separated and directed navigation "North Adriatic", which has reduced the risk of ship collisions, and determined a recommendation to avoid sailing ships in the area around the gas platforms in order to prevent damage.

The Vessel Service Traffic started in January 2011. It uses radar system and automatic identification system for ships to monitor maritime traffic in the Croatian part of the Adriatic and in real time, and is at all times ready to react if they spotted the dangerous movement of ships and warn them via VHF radio communication system.

Recommendation 9.6:
Croatia's national monitoring programme "Systematic Research of the Adriatic Sea as a Basis for the Sustainable Development of Croatia" should be approved and implemented.

The recommendation has not been implemented. Currently activities for the establishment of the monitoring and observation system for the assessment of the marine environment are undergoing in the framework of the implementation of the EU Marine Strategy Framework Directive.

Recommendation 9.7:
Any new installation should be allowed to operate only if it is monitored and found to comply with the appropriate pollution control. Old and highly polluting installations should be closed within a relatively short time unless they can be economically retrofitted to environmentally sound conditions.

Recommendation was partially implemented. According to the regulations on spatial planning, construction and protection of the marine environment, all new plants which are planned for construction must obtain all permits prior to starting operation. Special attention is focused on integrated environmental protection requirements and prevention of sudden events from the treatment of hazardous substances. In the last decade, on the basis of a Government decision, the sanitation of highly contaminated areas of the former pollution, resulting from the termination of the so- called dirty technologies has been done.

Particular attention is paid to infrastructural facilities on the coast and the coastal belt with the aim of recovery/disposal of wastewater from land, waste management and construction of traffic detours. As the law prohibits the disposal of waste on the islands, efforts have been made on relocating existing waste and unregulated landfills away from coastal areas in the so-called centers for waste management

Recommendation 9.8:
All municipalities and major tourist resorts should have proper sewage treatment and effluent systems. An acceleration of investment in waste-water treatment is needed to counteract the deterioration of inland and coastal water quality. Effective conservation of the coastal water quality depends on success in the protection of complete river catchments in the karstic areas.

According to the Plan of Implementation of Water Utility Directives in Croatia by the end of 2023 the investments in proper sewage treatment and effluent systems will be more than €3.2 billion. All agglomerations in major tourist resorts on Adriatic coast with a population higher 10,000 persons will be covered within this Plan by the end of 2020.

Recommendation 9.9:
Croatia should assess the tourist carrying capacity of its Adriatic region in coordination with the Ministry of Tourism, the Ministry of Physical Planning, Building and Housing, the State Directorate for the Protection of Nature and the Environment, the State Water Directorate and assistance from the Regional Activity Centre of the Priority Action Programme.

Envisaged assessment of tourist carrying capacity of the Croatian part of the Adriatic Sea area by relevant ministries has not been conducted yet.

PART III: ECONOMIC AND SECTORAL INTEGRATION

Chapter 10: Management of selected environmental issues in industry

Recommendation 10.1:
A legal framework promoting the development and implementation of cleaner technologies should be developed in cooperation with the State Directorate for the Protection of Nature and the Environment, the future national cleaner production centre, and other appropriate public and industrial institutions.

Recommendation was partially implemented. The Croatian Center for Cleaner Production was established in 2000.There is no information on the development of a legal framework regarding cleaner technologies.

Recommendation 10.2:
The State Directorate for the Protection of Nature and the Environment should undertake a large-scale information campaign on available assistance for industrial enterprises in their introduction of cleaner technologies. The promotion of the ISO 9000 and ISO 14000 series in Croatian industry should be a second major objective for the campaign. The campaign should also provide information on relevant demonstration projects for the actual introduction of cleaner technologies and products.

Recommendation was partially implemented. Since 2001, in Croatia the Eco-Management and Audit Scheme (EMAS) system is open to all economic sectors, including public and private services and is implemented in cooperation with the Ministry of Environmental and Nature Protection. Also, pursuant to the regulation on the control of product quality in order to reduce pressure on the environment in industrial activities, standards IS0 9000 and ISO 14000 are being introduced and implemented.

Recommendation 10.3:
The State Directorate for the Protection of Nature and the Environment, in cooperation with other governmental authorities represented in the Commission on the Safe Management of Chemicals, should develop a law for the safe management of chemicals, based on the relevant EU directives and practices. It should also strengthen its coordinating role in the safe management of chemicals.

The Chemicals Act was adopted in 2005 and the National Strategy for Chemical Safety in 2008. The existing legislation in this area is mostly harmonized with EU legislation as well as the relevant MEAs. Particular attention is given to the safe management of chemicals. The control is provided through coordinated inspections and reporting on safe management of chemicals.

Recommendation 10.4:
The Government, in cooperation with chemical companies, should define and apply economic measures that promote a wider introduction of environmental protection measures in the chemical and petrochemical industries, including both in-process and modern end-of-pipe technologies.

There is no information on the implementation of this recommendation.

Recommendation 10.5:
The development of an information system on industrial pollution should be started in the near future, beginning in the chemical industry. It should primarily focus on monitoring soil and groundwater pollution in the vicinity of refineries and chemical industrial sites.

The Ordinance on the Environmental Pollution (OG 35/08) was adopted in 2008. Pollutant Emission Register is a set of data sources, type, quantity, method and place of discharge, transfer and disposal of pollutants and waste into the environment. The main purpose of the Ordinance is to establish a unified register on discharge, transfer and disposal of pollutants and waste into the environment, in the form of publicly available databases

on pollutants and discharges of pollutants and waste into the environment (air, soil and water) from a single source.

Recommendation 10.6:
Restructuring and privatization in the energy sector to improve energy efficiency, taking into account national conditions and interests, should be seen as an urgent requirement for energy conservation.

Recommendation was partially implemented. The regulatory framework for implementing the Act on Energy End-Use Efficiency is fully completed. In the Regulation on contracting and implementation of energy services in the public sector the Government defined the methods for contracting energy services, more detailed obligations of energy service providers and customers, more detailed contents of energy efficiency contracts and budgetary monitoring of energy services for public sector customers, which will endorse the development of the Energy Service Companies (ESCO) market. There is no information if the restructuring and privatization in the energy sector did have place, and if so, if they resulted in improved energy efficiency in the energy sector.

Recommendation 10.7:
Government and energy enterprises should undertake further research and development of cleaner coal processes, as well as environmentally sound processes using renewable energy resources.

Coal is used only in one power plant and in a fairly modern facility that was granted with all permits and approvals from competent authorities, particularly integrated environmental protection requirements, measures to reduce pollution and risks to the environment and the prevention of major accidents involving dangerous substances. Energy fuel is the coal of satisfactory quality which guarantees meeting the criteria during combustion to reduce pollution and limits below the limit values for emissions into the air. Regulations for energy efficiency of plants that use coal are fully harmonized with the EU legislation and current inspectional and process control activities are intensified in order to avoid any possible contamination. The systems are equipped with modern techniques and technologies of continuous monitoring of pollution parameters. Total investments in the programme of renewable energy sources are envisaged to the amount of about €6.3 billion until 2030.

Chapter 11: Environmental concerns in agriculture and forestry

Recommendation 11.1
The draft law on soils should be finalized, and a land protection policy should be formulated, adopted and implemented. The management of soil erosion risks should be entrusted to a special administrative entity under the supervision of the State Directorate for the Protection of Nature and the Environment, which is currently responsible for soil protection.

Recommendation was partially implemented. The protection and maintenance of soil are implemented through different legislative instruments, depending on land use, whether it is agricultural land, forest or construction land. Requirements for the protection of soil for agricultural use are prescribed in the Agricultural Land Act (OG 39/13) and adjoined ordinances. Protection of agricultural land from erosion is prescribed through the Ordinance on agricultural measure (OG 43/10) and the Ordinance on good agricultural and environmental conditions (OG 65/13).

Recommendation 11.2:
Permanent monitoring of soil quality should be established – preferably on the basis of the law on soils proposed above - together with a land information system.

Recommendation has not been implemented. However, the new Act on Agricultural Land (OG 39/13) defines that the Agricultural Land Agency will establish, develop, manage and maintain the information system on agricultural land in Croatia.

Recommendation 11.3:

The existing legislation – Law on Heritage, Law on Cadastre, Law on Agricultural Land – should be harmonized in the framework of general environmental policy, and a new land register should be prepared, so as to improve the economic efficiency in agriculture and encourage privatization.

Recommendation no implemented yet.

Recommendation 11.4:
The finalization of the law on organic farming and its adoption by Parliament should be seen as a priority.

The Act on organic production and labeling of organic products (OG 139/10) was adopted in 2010. Several ordinances for each area of production – processing of organic products storage and transport, plant and animal production, control system, labeling of food and feed, aquaculture were adopted.

Recommendation 11.5:
Economic incentives and other means should be applied to encourage family farms to turn to various forms of sustainable agriculture and agro- and ecotourism.

Recommendation was partially implemented. According to the Act on State Support in Agriculture and Rural Development (OG 80/13), agricultural producers have to take specific measures in order to receive direct payments and rural development support (which includes support for ecological and integrated agricultural production). These measures include the protection of the environment, human health, animals and plants, animal welfare and good agricultural and environmental conditions (soil erosion, soil organic matter, soil structure, the minimum level of maintenance, water management and protection)..

There are no evidences if economic incentives and other means have been applied to encourage family farms to turn to various forms of sustainable agriculture and agro- and ecotourism.

Recommendation 11.6:
Developing national guidelines for good agricultural practices should be considered. Farmers should pay particular attention to preventing ground and surface water pollution by nitrates, heavy metals and pesticides and permanent monitoring should be established. The role of extension services should be strengthened in regard to the use of fertilizers and plant protection agents. The use of biological and other environmentally friendly pesticides should be encouraged.

The Ministry for Agriculture together with extension services published in 2009 a booklet on good agricultural practice. It contains chapters on measures for protection of soil, water, air and animal welfare. The booklet is accessible for all farmers in Croatia in printed and electronic versions. The Croatian extension service is providing farmers with information on their obligations concerning environmental protection and better usage of agro-chemicals on their holdings.

Recommendation 11.7:
Methods should be implemented to reduce water pollution by farm effluents, and to reduce the excessive water use in livestock facilities and the high water content of liquid manure. Systems for the collection of liquid manure and other effluents from major farms need to be built.

Croatia has adopted an action programme for protection of waters against pollution caused by nitrates from agriculture (OG 15/13). Provisions of this programme are obligatory on zones designated as vulnerable according to the Government Decision on designation of vulnerable zones in Croatia (OG 130/12) and are recommendation for farmers outside vulnerable zones.

The action programme includes measures on good agricultural practice in use of fertilisers, periods where use of fertilisers is prohibited, obligation on chemical analysis of agricultural soils, obligation on keeping records on fertilisation on holding, maximum amounts of manure allowed per hectare, ban on fertiliser use on buffer strips, water saturated, frozen or snow covered ground, storage capacities for all forms of manure and other ways for disposal of manure from agricultural holding.

Chapter 12: Environmental concerns in tourism

Recommendation 12.1:
Guidelines for sustainable tourism addressed to local communities, containing notably a checklist of important elements to take into account in tourism development and practical advice on how to resolve environmental problems in tourism, should be drawn up at the national level according to the principles of local Agenda 21.

Recommendation was partially implemented. Some guidelines for sustainable tourism have been proposed at local and regional level. Some are still in development.

Recommendation 12.2:
The national authorities should adopt legal instruments on protected tourist resources, defining a list of tourist resources and protecting them against other economic activities. The legal instruments should mention environmental requirements that protected tourist resources have to preserve, including the quality of bathing water in accordance with international practice.

Recommendation was partially implemented. The Sustainable Development Strategy defines tourism development in accordance with the criteria of construction, physical planning, carrying capacity and efficient adjustment to the limits and possibilities of protected areas, with the aim to preserve biodiversity, natural and cultural heritage. The Tourism Development Strategy aims, inter alia, to protect any tourism resources in accordance with sustainable development principles. The emphasis is on the tourism valorisation of forests, natural sites and cultural heritage.

Recommendation 12.3:
A permanent committee on sustainable tourism composed of representatives of State, county and local levels, and NGOs should be established. The committee should have permanent scientific staff at its disposal and should take part in international networks on sustainable (tourist) development.
See also Recommendation 12.1.

Recommendation has not been implemented. A permanent committee on sustainable tourism composed of representatives of State, county and local levels as well as NGOs has not been composed.

Recommendation 12.4:
The National Strategy of Tourism should include provisions for foreign and domestic investors in the tourism sector dedicating part of their investment to the building or renovation of public environmental protection facilities.

The Tourism Development Strategy includes measures aimed at accelerating investments in the tourism sector, in accordance with sustainable development, tourism valorisation of forests, natural sites, cultural property in accordance with environmental protection and sustainable development principles.

Recommendation 12.5:
At primary and secondary levels of education, courses should be introduced concerning tourism in general and the importance of developing an environmental friendly tourism in Croatia in particular.

Tourism in general has been introduced in the curriculums at primary and secondary of education levels.

Chapter 13: Human health and the environment

Recommendation 13.1:
An operational plan to implement the National Environmental Health Action Plan should be prepared in close coordination with the National Environmental Action Plan and accepted by the Government. The plan should set priorities, define methods of implementation, and assign responsibilities and resources.

Recommendation was partially implemented. The National Environmental Health Action Plan (NEHAP) was prepared in 1999 and adopted by the Ministry of Health. As there was no responsibilities and resources assigned with the NEHAP goals, implementation of the activities in the Plan were linked to strategies and plans other

than NEHAP (NEAP, sustainable development, etc.). A lot of activities were performed, but not directly linked with NEHAP.

Recommendation 13.2:
Collaboration should be clearly improved between the sectors and institutions involved in assessing and managing the health risks due to environmental exposure (administration, public health agencies, research and education).

Recommendation was partially implemented. There were some attempts to establish interdisciplinary committees at different levels to facilitate interdisciplinary collaboration, but without consistency and not action oriented. There are a lot of examples of good interdisciplinary cooperation but more linked to individuals then to institutions. Recently, the Ministry of Health has established interdisciplinary committee on environment and health with main goal to coordinate activities which are in the responsibility of different institutions and ministries.

Recommendation 13.3:
Existing data on health status should be analysed to gain insight into the geographical differentiation in health and its links with the environment. Geographical, region-specific analysis should be routinely used in health surveillance. The National Institute of Public Health may need additional capacity for this activity.

There is no information on the implementation of this recommendation.

Recommendation 13.4:
Time trends of several health indicators deserve closer scrutiny (e.g. drop in life expectancy at age 65, high mortality due to lung cancer, injuries). It is also necessary to assess to what extent the patterns can be related to environmental factors.

Recommendation was partially implemented. Health indicators are monitored, assessed and investigated continuously, according to financial and workforce capacities. They are also interpreted according to environmental factors.

Recommendation 13.5:
Efforts should be made to reduce the share of deaths with causes classified as "ill-defined conditions". Especially in a region-specific analysis, the large proportion of such deaths may obscure the spatial and temporal patterns of mortality.

Significant efforts were taken to improve the system of mortality statistics, including employment of medical stuff as coroners and their continuous education. Recently, the share of "ill – defined conditions" was around 1 per cent.

Recommendation 13.6:
The number of medical consultations caused by intestinal infectious diseases registered by the primary health care system is five times the number of digestive system infectious diseases registered by the communicable disease registry. It should be verified to what extent this difference is caused by the definition of diagnostic criterion applied by each system, or by systematic errors. If the quality of the data collected by the primary health care service is verified, this information can be considered for use in the surveillance of water-related health risks. As with the mortality data, the analysis must include a spatial component.

Although the reporting of infectious diseases is obligatory for medical doctors of first contact, not all of them are reporting it to the epidemiological service. That is the reason of underreporting, particularly with the mild diseases. Cases reported by primary health care doctors in their work reports can be interpreted only as use of medical services, from the reason that one cannot distinguish cases from visits. Recently the computerisation of primary health care is in place, but not yet finished in terms of predicted functions, which will significantly improve the situation.

Recommendation 13.7:

National air quality standards for thoracic particles (PM_{10}) should be re-considered and the recommended values may have to be markedly reduced. PM_{10} and $PM_{2.5}$ should be monitored to verify compliance with the standards and to assess the results of actions to reduce pollution and its health impacts.

The national network for continuous air quality monitoring has been established. Every year, CEA publishes air quality report and categorization of the air quality for the whole territory of Croatia. Based on these evaluations, action plans and measures for the improvement of air quality are being drafted.

Recommendation 13.8:
The level of population exposure to heavy metals, and in particular the blood lead level in children, should be assessed to verify if the high concentration of some metals in sedimented dust is also a health risk. The assessment should focus, in the first place, on people living in the vicinity of the larger waste sites and in areas with heavy traffic.

Recommendation has not been implemented. There are some studies on population exposure to heavy metals, but none on the national level. NIPH has not yet conducted survey on blood lead level in children.

Recommendation 13.9:
A programme should be established to reduce population exposure to radon, if further measurements show that there is a genuine health risk.

Recommendation has not been implemented. There is no programme to reduce population exposure to radon. Settlements are not highly isolated as since Croatia is located in the area of mild continental and Mediterranean climate. The Institute for Medical Research has done some measurements on radon in Zagreb basement flats.

Recommendation 13.10:
The national system of food contamination control should be improved to ensure more efficient actions on the part of the responsible services and to reduce the risk of food-borne disease.

Food safety system is harmonised with EU acquis. The competent authority is the Ministry of Agriculture. The Ministry of Health has some limited jurisdiction in legislation and official control on market level. Risk assessment is in the competence of the Food Agency.

Chapter 14: Environmental concerns in transport

Recommendation 14.1:
As a matter of priority, environmental factors should be considered in managerial decisions at State level on physical planning and related new transport policies. The State Directorate for the Protection of Nature and the Environment should have a role in the related decision-making process and the public should be involved earlier.

Recommendation 14.2:
Strategic environmental assessment should be established to provide a sound basis for a long-term transport strategy. It should cover all transport modes and include effects like shifts in traffic, changes in the choice of the means of transport and possible traffic-inducing conditions.

Both recommendations were partially implemented. The implementation of recommendations 14.1 and 14.2 is as follows.

The Ministry of Maritime Affairs, Transport and Infrastructure is currently developing the Transport Operational Programme (TOP). The general strategic objective of the TOP is to stimulate rapid economic growth based on the integration of market and sustainable transport development.

SEA was carried out for TOP. SEA results will be submitted to the Ministry of Environmental and Nature Protection in order to get the opinion on the performed strategic assessment of the Programme, necessary for its adoption.

Recommendation 14.3:
The environmental impact assessment of transport infrastructures should be improved.

Recommendation has not been implemented. Environmental impact assessment was carried out for individual transport infrastructure projects. However, there are no proofs that the quality of the EIA of transport infrastructure improved.

Recommendation 14.4:
A long-term plan in the transport sector, based on the results of a strategic environmental assessment, should be drawn up. In particular, a strategic plan for the future development of the national transport system should favour electrification of railways and improvement of both public and waterway transport.

Recommendation has not been implemented. However, a transport strategy is being drafted, in accordance with the directives given in the EU document €ope 2020.

Recommendation 14.5:
Environmental pressure from the transport sector should be controlled in particular in urban areas. In this regard, resources should be made available, and available instruments be used, for the following priority tasks:

- *promoting the use of less polluting vehicles and fuels, in particular the use of gaseous fuels in the transport sector both through incentives and by setting up a distribution network over the whole territory*
- *setting up inspection and maintenance programmes to enforce emission control standards*
- *monitoring benzene and particulate matter in urban areas.*
- *phasing out leaded petrol.*
  See also recommendation 5.3.

Recommendation was partially implemented. The Regulation on the quality of liquid petroleum fuels (OG 33/11) provides, among other things, limit values for components and characteristics of quality of liquid petroleum fuels and applies to groups of liquid petroleum fuels used for combustion in an internal combustion engines in vessels for navigation in internal waters, territorial sea and the sea over which Croatia has sovereign rights. The Regulation stipulates the limit values of the sulphur content of marine fuel used in navigation in internal waters, territorial sea and the sea over which of Croatia has sovereign rights. Regulation also stipulates that the ships at berth must use marine fuels with sulphur content up to 0.1% m/m.

There are no measures so far to encourage the use of gas as a fuel, but the coverage of Croatia with taprooms of gas is at a satisfactory level.

The use of lead as an additive was banned in 2006.

With the entry into force of the Ordinance on the technical inspection of vehicles, ECO testing of exhaust on the vehicles driven by gasoline engines started in 2001 and on the vehicles driven by a diesel engine in 2002.

Annex II

PARTICIPATION OF CROATIA IN MULTILATERAL ENVIRONMENTAL AGREEMENTS

	Worldwide agreements	Croatia	
		Date	Status
1958	(GENEVA) Convention on the Continental Shelf	1992	Ra
1958	(GENEVA) Convention on the Territorial Sea and the Contiguous Zone	1992	Ra
1958	(GENEVA) Convention on the High Seas	1992	Ra
1961	(PARIS) International Convention for the Protection of New Varieties of Plants	2001	Ra
1963	(VIENNA) Convention on Civil Liability for Nuclear Damage 1997 (VIENNA) Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage	1993	Ra
1968	Treaty on the Non-Proliferation of Nuclear Weapons (NPT) Agreement between Georgia and International Atomic Energy Agency for the Application of Safeguard in Connection with the Threat on the Non-proliferation of Nuclear Weapons	1994	Ra
1969	(BRUSSELS) Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties	1992	Ra
1971	(RAMSAR) Convention on Wetlands of International Importance especially as Waterfowl Habitat 1982 (PARIS) Amendment 1987 (REGINA) Amendments	1991	Ra
1971	(GENEVA) Convention on Protection against Hazards from Benzene (ILO 136)	1994	Ra
1971	(BRUSSELS) Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage	1992	Ra
1971	(LONDON, MOSCOW, WASHINGTON) Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-bed and the Ocean Floor and in the Subsoil thereof		
1972	(PARIS) Convention Concerning the Protection of the World Cultural and Natural Heritage	1993	Ra
1972	(LONDON) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1978 (TORREMOLINOS) Amendments (incineration) 1980 Amendments (list of substances)	1995	Ra
1972	(LONDON, MOSCOW, WASHINGTON) Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons, and their Destruction	1993	Ra
1972	(LONDON) International Convention on the International Regulations for Preventing Collisions at Sea	1992	Ra
1972	(GENEVA) International Convention for Safe Containers	1992	Ra
1973	(WASHINGTON) Convention on International Trade in Endangered Species of Wild Fauna and Flora 1979 (BONN) Amendment 1983 (GABORONE) Amendment	1999	Ra
1973	(LONDON) Convention for the Prevention of Pollution from Ships (MARPOL) 1978 (LONDON) Annex I on Prevention of Pollution by Oil 1978 (LONDON) Annex II on Control of Pollution by Noxious Liquid Substances in Bulk 1978 (LONDON) Annex III on Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form 1978 (LONDON) Annex IV on Prevention of Pollution by Sewage from Ships 1978 (LONDON) Annex V on Prevention of Pollution by Garbage from Ships 1997 (LONDON) Annex VI on Prevention of Air Pollution from Ships	1992	Ra

	Worldwide agreements	Croatia	
		Date	Status
1977	(GENEVA) Convention on Protection of Workers against Occupational Hazards from Air Pollution, Noise and Vibration (ILO 148)	1994	Ra
1979	(BONN) Convention on the Conservation of Migratory Species of Wild Animals 1991 (LONDON) Agreement Conservation of Bats in Europe 1992 (NEW YORK) Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBAMS) 1995 (THE HAGUE) African/Eurasian Migratory Waterbird Agreement (AEWA) 1996 (MONACO) Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)	2000	Ra
1980	(NEW YORK, VIENNA) Convention on the Physical Protection of Nuclear Material	1993	Ra
1981	(GENEVA) Convention Concerning Occupational Safety and Health and the Working Environment	1994	Ra
1982	(MONTEGO BAY) Convention on the Law of the Sea 1994 (NEW YORK) Agreement Related to the Implementation of Part XI of the Convention 1994 (NEW YORK) Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks	1995	Ra
1985	(GENEVA) Convention Concerning Occupational Health Services	1994	Ra
1985	(VIENNA) Convention for the Protection of the Ozone Layer 1987 (MONTREAL) Protocol on Substances that Deplete the Ozone Layer 1990 (LONDON) Amendment to Protocol 1992 (COPENHAGEN) Amendment to Protocol 1997 (MONTREAL) Amendment to Protocol 1999 (BEIJING) Amendment to Protocol	1992 1992	Ra Ra
1986	(GENEVA) Convention Concerning Safety in the Use of Asbestos	1994	Ra
1986	(VIENNA) Convention on Early Notification of a Nuclear Accident	1993	Ra
1986	(VIENNA) Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	1993	Ra
1989	(BASEL) Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal 1995 Ban Amendment 1999 (BASEL) Protocol on Liability and Compensation	1994	Ra
1990	(LONDON) Convention on Oil Pollution Preparedness, Response and Cooperation	1997	Ra
1992	(RIO) Convention on Biological Diversity 2000 (CARTAGENA) Protocol on Biosafety	1996 2003	Ra Ra
1992	(NEW YORK) United Nations Framework Convention on Climate Change 1997 (KYOTO) Protocol	1996 2007	Ra Ra
1993	(ROME) Agreement to Promote Compliance with International Conservation and Managament Measures by Fishing Vessels on the High Seas		
1993	(PARIS) Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction	1995	Ra
1994	(VIENNA) Convention on Nuclear Safety	1992	Ra
1994	(PARIS) United Nations Convention to Combat Desertification	2001	Ra
1997	(VIENNA) Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	1999	Ra
1997	(VIENNA) Convention on Supplementary Compensation for Nuclear Damage		
1998	(ROTTERDAM) Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade	2007	Ra
2001	(STOCKHOLM) Convention on Persistent Organic Pollutants	2007	Ra
2001	(LONDON) Convention on Civil Liability for Bunker Oil Pollution Damage	2006	Ra
2004	(LONDON) Convention for the Control and Management of Ships' Ballast Water and Sediments	2010	Ra

	Regional and subregional agreements	Croatia	
		Date	Status
1947	(WASHINGTON) Convention of the World Meteorological Organization		
1950	(PARIS) International Convention for the Protection of Birds		
1957	(GENEVA) European Agreement - International Carriage of Dangerous Goods by Road (ADR)	1993	Ra
	Annex A: Provisions Concerning Dangerous Substances and Articles		
	Annex B: Provisions Concerning Transport Equipment and Transport Operations		
1958	(GENEVA) Agreement - Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts.		
1968	(PARIS) European Convention - Protection of Animals during International Transport	2003	Si
	1979 (STRASBOURG) Additional Protocol		
1969	(LONDON) European Convention - Protection of the Archeological Heritage (revised in 1992)	2004	Ra
1976	(BARCELONA) Convention for Protection against Pollution in the Mediterranean Sea	1993	Ra
1976	(STRASBOURG) European Convention for the Protection of Animals Kept for Farming Purposes	1995	Ra
1979	(BERN) Convention on the Conservation of European Wildlife and Natural Habitats	2000	Ra
1979	(GENEVA) Convention on Long-range Transboundary Air Pollution	1992	Ra
	1984 (GENEVA) Protocol - Financing of Co-operative Programme (EMEP)		
	1985 (HELSINKI) Protocol - Reduction of Sulphur Emissions by 30%		
	1988 (SOFIA) Protocol - Control of Emissions of Nitrogen Oxides	2008	Ra
	1991 (GENEVA) Protocol - Volatile Organic Compounds	2008	Ra
	1994 (OSLO) Protocol - Further Reduction of Sulphur Emissions		
	1998 (AARHUS) Protocol on Heavy Metals	2007	Ra
	1998 (AARHUS) Protocol on Persistent Organic Pollutants	2007	Ra
	1999 (GOTHENBURG) Protocol to Abate Acidification, Eutrophication and Ground-level Ozone	2009	Ra
1991	(ESPOO) Convention on Environmental Impact Assessment in a Transboundary Context	1996	Ra
	2003 (KIEV) Protocol on Strategic Environmental Assessment	2009	Ra
1992	(HELSINKI) Convention on the Protection and Use of Transboundary Waters and International Lakes	1996	Ra
	1999 (LONDON) Protocol on Water and Health		
1992	(HELSINKI) Convention on the Transboundary Effects of Industrial Accidents	2000	Ra
	2003 (KIEV) Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters		
1993	(OSLO and LUGANO) Convention - Civil Liability for Damage from Activities Dangerous for the Environment		
1994	(LISBON) Energy Charter Treaty	1997	Ra
	1994 (LISBON) Protocol on Energy Efficiency and Related Aspects		
	1998 Amendment to the Trade-Related Provisions of the Energy Charter Treaty		
1997	(NEW YORK) Convention on Non-navigatory Uses of International Watercourses		
1998	(AARHUS) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters	2007	Ra
	2003 (KIEV) Protocol on Pollutant Release and Transfer Register	2008	Ra
1998	(STRASBOURG) Convention on the Protection of Environment through Criminal Law		
2000	(FLORENCE) European Landscape Convention	2002	Ra
2006	(SEMIPALATINSK) Treaty on a Nuclear-Weapon free Zone in Central Asia		

Ac = Accession; Ad = Adherence; At = Acceptance; De = Denounced; Si = Signed; Su = Succession; Ra = Ratification.

Annex III

KEY DATA AND INDICATORS AVAILABLE FOR THE REVIEW

Air pollution	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Emissions of SOx								
- Total (1,000 t)	63.6	59.8	67.3	57.4	59.6	43.0	38.8	..
- by sector (1,000 t)								
Energy production and distribution (1A1)	32.7	30.2	39.0	32.0	36.7	19.7	17.9	..
Industry and industrial processes	2.1	1.9	2.1	2.4	1.8	1.3	1.1	..
Transport	9.3	8.7	9.4	7.7	7.2	3.3	2.8	..
Other	..	..	..	..	..	..	..	..
- per capita (kg/capita)	14.3	13.5	15.2	12.9	13.5	9.7	9.1	..
- per unit of GDP (kg/1,000 US$ (2005) PPP)	0.9	0.8	0.9	0.7	0.8	0.6	0.6	..
Emissions of NO_X								
- Total (1,000 t)	81.4	81.6	85.5	83.1	74.9	70.0	66.3	..
- by sector (1,000 t)								
Energy production and distribution (1A1)	12.2	11.3	13.7	11.5	11.5	9.5	9.6	..
Energy use in industry (1A2)	10.1	10.6	11.8	12.7	9.7	10.0	9.4	..
Industry and industrial processes	8.8	9.5	10.0	9.2	7.0	5.8	4.1	..
Transport	35.9	35.9	35.9	35.1	32.3	30.6	29.0	..
- per capita (kg/capita)	18.3	18.4	19.3	18.7	16.9	15.8	15.5	..
- per unit of GDP (kg/1,000 US$ (2005) PPP)	1.2	1.1	1.1	1.1	1.1	1.0	1.0	..
Emissions of ammonia NH_3								
- Total (1,000 t)	40.4	39.8	40.7	38.1	37.0	38.1	36.8	..
- by sector (1,000 t)								
Energy production and distribution (1A1)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	..
Energy use in industry (1A2)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	..
Industry and Industrial processes	3.7	2.6	2.7	2.2	1.6	4.0	2.3	..
Transport	0.4	0.5	0.5	0.5	0.5	0.6	0.6	..
- per capita (kg/capita)	9.1	9.0	9.2	8.6	8.4	8.6	8.6	..
- per unit of GDP (kg/1,000 US$ (2005) PPP)	0.6	0.6	0.5	0.5	0.5	0.5	0.5	

Emissions of total suspended particles (TSP)	2005	2006	2007	2008	2009	2010	2011	2012
- Total (1,000 t)	35.3	33.2	32.6	34.4	31.0	28.3	28.4	..
- by sector (1,000 t)								
Energy	9.5	8.8	9.0	8.0	8.6	8.8	8.9	..
Industry	20.2	18.9	18.2	21.4	17.6	15.2	15.4	..
Transport	4.6	4.3	4.3	4.1	3.8	3.3	3.2	..
- per capita (kg/capita)	7.9	7.5	7.3	7.7	7.0	6.4	6.4	..
- per unit of GDP (kg/1,000 US$ (2005) PPP)	0.5	0.5	0.4	0.4	0.4	0.4	0.4	..
Emissions of non-methane volatile organic compounds (NMVOC)								
- Total (1,000 t)	101.7	110.5	114.1	109.3	78.5	77.8	73.1	..
- by sector (1,000 t)								
Energy production and distribution (1A1)	0.3	0.3	0.3	0.3	0.3	0.2	0.3	..
Energy use in industry (1A2)	1.8	1.9	2.0	2.1	1.7	1.6	1.5	..
Industry and Industrial processes	8.7	8.3	6.3	5.9	5.3	5.4	6.0	..
Transport	18.4	17.6	16.4	14.8	13.3	11.5	10.4	..
- per capita (kg/capita)	22.9	24.9	25.7	24.6	17.7	17.6	17.1	..
- per unit of GDP (kg/1,000 US$ (2005) PPP)	1.5	1.5	1.5	1.4	1.1	1.1	1.0	..
Emissions of persistent organic pollutants (PCBs, dioxin/furan and PAH)								
- Total (1,000 t)	0.010	0.010	0.009	0.010	0.009	0.011	0.013	..
- by sector (1,000 t)								
Energy	0.009	0.009	0.007	0.008	0.008	0.009	0.011	..
Industry	0.001	0.001	0.001	0.002	0.001	0.002	0.002	..
Transport	0.000	0.000	0.000	0.000	0.000	0.000	0.000	..
Other	..	..	..	..	..	..	..	..
- per capita (kg/capita)	0.002	0.002	0.002	0.002	0.002	0.002	0.003	..
- per unit of GDP (kg/1,000 US$ (2005) PPP)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	..
Emissions of heavy metals								
- Total cadmium (t)	0.600	0.582	0.510	0.464	0.450	0.601	0.577	..
- Total lead (t)	51.164	46.847	43.148	38.627	34.591	29.550	26.585	..
- Total mercury (t)	0.8	0.7	0.8	0.8	0.7	0.8	0.8	..

Climate Change	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Greenhouse gas emissions (total of CO2, CH4, N2O, CFC, etc.) expressed in CO_2 eq.								
- Total aggregated emissions (1,000 t) without LULUCF	30,453.8	30,896.1	32,430.1	31,166.7	29,158.7	28,615.5	28,256.4	..
- Total aggregated emissions (1,000 t) with LULUCF	22,302.4	22,821.4	24,705.8	23,343.2	21,093.0	20,743.8	21,224.7	..
- by sector (1,000 t)								
Energy	..	..	..	..	..	..	..	..
Energy industries	6,801.6	6,649.7	7,760.7	6,726.3	6,392.2	5,904.7	6,275.4	..
Manuafacturing industries and construction	4,098.3	4,199.6	4,222.9	4,214.7	3,393.6	3,379.4	3,153.3	..
Transport	5,681.2	5,992.1	6,418.2	6,261.8	6,265.6	6,039.6	5,888.7	..
Other sectors	3,979.1	3,740.8	3,395.6	3,512.9	3,530.6	3,596.2	3,393.0	..
Other	..	..	..	..	..	..	..	..
Fugitive emissions	2,112.2	2,263.1	2,370.1	2,186.9	2,068.6	2,089.3	2,004.9	..
Industry	3,294.5	3,446.1	3,629.3	3,592.4	2,983.5	3,211.2	3,000.1	..
Solvent and other product use	194.8	224.2	246.8	239.3	152.9	152.5	144.2	..
Agriculture	3,477.7	3,497.8	3,445.9	3,430.9	3,314.1	3,193.1	3,318.5	..
Land use, land use change and forestry	-8,151.4	-8,074.6	-7,724.3	-7,823.5	-8,065.6	-7,871.7	-7,031.8	..
Waste	814.4	882.6	940.6	1,001.5	1,057.4	1,049.5	1,078.3	..
Other	..	..	..	..	..	..	..	..
- per capita (t CO_2 eq/capita)	6.9	7.0	7.3	7.0	6.6	6.5	6.6	..
- per unit of GDP (t CO_2 eq/1,000 US$ (2005) PPP)	0.4	0.4	0.4	0.4	0.4	0.4	0.4	..
Total emissions								
- Carbon dioxide (CO_2) (1,000 t)	23,485.2	23,716.5	24,999.1	23,755.7	21,982.5	21,288.8	20,869.3	..
- Methane (CH_4) (1,000 t)	3,131.9	3,378.9	3,531.1	3,518.0	3,521.8	3,566.0	3,509.1	..
- Nitrous Oxide (N_2O) (1,000 t)	3,489.6	3,421.5	3,480.3	3,456.2	3,210.1	3,279.1	3,392.3	..
- Perfluorocarbons (PFCs) (1,000 t CO_2 eq.)	n/a	n/a	n/a	n/a	0.2	0.0	0.0	..
- Hydrofluorocarbons (HFCs) (1,000 t CO_2 eq.)	333.5	365.5	405.9	424.2	435.7	472.3	475.9	..
- Sulfur Hexafluoride (SF_6) (1,000 t CO_2 eq.)	13.7	13.6	13.7	12.6	8.4	9.3	9.8	..

Ozone layer	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
Consumption of ozone-depleting substances (ODS) (t of ODP)	53.9	-32.9	8.1	7.7	5.0	3.4	4.8	3.7

Water	2005	2006	2007	2008	2009	2010	2011	2012
Renewable freshwater resources (million m^3/year)	..	..	..	..	..	..	..	..
Gross freshwater (surface and groundwater) abstracted (million m^3/year)	511.1	519.0	525.9	527.6	555.1	570.9	577.0	569.4
- Share of water losses in total water abstraction (%)	40.2	38.7	38.5	32.8	36.0	36.0	39.4	37.1
Water exploitation index (water abstraction/renewable freshwater resources X 100)	..	..	..	..	..	..	..	..
Total water use by sectors (million m^3)	..	..	..	..	..	..	..	..
- Agriculture (ISIC 01-33)	6.1	5.3	3.2	6.3	10.6	8.6	..	..
- Households	181.4	182.3	188.4	183.5	183.5	189.3	182.6	184.4
- Industry (ISIC 10-33)	..	..	..	252.1	180.9	292.3	286.2	..
of which water used for cooling	..	..	..	199.5	131.1	236.6	237.1	..
- Services (ISIC 45-96)	..	..	..	..	..	..	..	..
Household water use per capita (l/capita/day)	111.9	112.5	116.4	113.4	113.5	117.4	116.8	117.5

Biodiversity and living resources	2005	2006	2007	2008	2009	2010	2011	2012
Protected areas								
- Total area (ha)	633,431	662,417	662,414	662,414	662,414	662,683	748,667	748,667
- Biosphere reserves (ha)	200,000	200,000	200,000	200,000	200,000	200,000	200,000	595,861
- Strict reserves (ha)	2,473	2,473	2,473	2,473	2,473	2,473	2,473	2,473
- National parks (ha)	97,666	97,666	97,666	97,666	97,666	97,666	97,666	97,666
- Special reserves (ha)	42,604	42,604	42,604	42,604	42,604	42,604	42,604	42,604
- Nature parks (ha)	400,039	419,622	419,622	419,622	419,622	419,622	419,622	419,622
- Regional parks (ha)	..	..	..	..	..	..	102,792	102,792
- Nature monuments (ha)	229	229	227	227	227	227	227	227
- Significant landscapes/seascapes (ha)	127,399	136,801	136,801	136,801	136,801	137,069	137,357	137,357
- Forest parks (ha)	3,500	3,500	3,500	3,500	3,500	3,500	3,421	3,421
- Horticultural monuments (ha)	861	861	861	861	861	862	859	859
- Wetlands of international importance (ha)	88,610	88,610	88,610	88,610	88,610	88,610	88,610	88,610
- Special avifaunistic protection area (ha)	..	..	..	..	..	..	..	..
- Sites of community interest (ha)	..	..	..	..	..	..	..	..
Area of forest land fund by land category, forest species	..	..	..	..	..	..	..	..
Total area (ha)	..	..	..	..	..	..	..	..
- Total area (% of total land area)	11.2	11.7	11.7	11.7	11.7	11.7	13.2	13.2
of which								
Forest land area (ha)	2,465,249	2,465,249	2,465,249	2,465,249	2,465,249	2,465,249	2,465,249	2,465,249
of which								
Resinous tree forests (ha)	13,631	13,631	13,631	13,631	13,631	13,631	13,631	13,631
Broad-leaved tree forests (ha)	2,451,617	2,451,617	2,451,617	2,451,617	2,451,617	2,451,617	2,451,617	2,451,617
Other land (ha)	3,196,216	3,196,216	3,196,216	3,196,216	3,196,216	3,196,216	3,196,216	3,196,216

Biodiversity and living resources (cont'd)	2005	2006	2007	2008	2009	2010	2011	2012
Share of threateaned species (IUCN categories) in total number of species:								
- mammals	0.0	6.9	6.9	6.9	6.9	6.9	6.9	6.9
- birds - breeding population	23.1	23.1	23.1	23.1	23.1	22.0	22.0	22.8
- birds - wintering population	5.8	5.8	5.8	5.8	5.8	5.8	5.8	5.8
- birds - flyway population	2.4	2.4	2.4	2.4	2.4	2.4	2.4	3.9
- fish	0.0	10.5	10.5	14.6	14.3	14.3	14.1	14.1
- reptiles	0.0	10.3	10.3	10.3	9.8	9.8	9.8	17.1
- vascular plants	4.2	4.2	4.2	4.2	4.0	4.0	4.0	4.0

Land resources and soil	2005	2006	2007	2008	2009	2010	2011	2012
Land area (km^2)	56,542	56,542	56,542	56,542	56,542	56,542	56,542	56,542
Agricultural land (ha)	2,796,100	2,789,800	2,784,500	2,779,100	2,773,800	2,767,500	..	..
Built-up and other related area (% of total land area)	4.3	4.4	4.4	4.5	4.5	4.6	..	..
Soil erosion	..	..	..	..	..	..	..	..
- % of total land	..	..	..	..	..	..	..	..
- % of agricultural land	..	..	..	..	..	..	..	..
Total consumption of mineral fertilizers per unit of agricultural land (kg/ha)	156.7	151.3	163.6	178.1	143.6	126.5	..	..
Total consumption of organic fertilizers per unit of agricultural land (kg/ha)	..	..	..	..	..	..	..	..
Total consumption of pesticides per unit of agricultural land (kg/ha)	..	..	..	..	..	..	..	..

Energy	2005	2006	2007	2008	2009	2010	2011	2012
Total final energy consumption (TFC) (Mtoe)	6,340.9	6,449.6	6,476.0	6,612.6	6,354.2	6,349.6	6,190.1	..
- by fuel (Mtoe)								
Solid fuel (Coal etc)	147.2	133.3	153.6	157.8	130.5	152.0	140.5	..
Petroleum products	3,110.2	3,231.0	3,256.3	3,233.1	3,074.8	2,901.9	2,814.2	..
Gas	12,250.0	1,185.8	1,188.1	1,273.3	1,223.0	1,283.4	1,183.7	..
Nuclear	..	..	..	..	..	..	..	..
Renewables	351.8	364.0	327.4	328.1	358.6	397.6	456.1	..
- by sector (Mtoe)								
Industry	1,572.8	1,631.6	1,672.0	1,694.1	1,427.5	1,380.9	1,292.4	..
Transport	1,923.0	2,042.2	2,166.3	2,148.7	2,141.9	2,069.2	2,026.3	..
Agriculture/Forestry	242.1	245.2	245.3	261.0	250.0	244.1	244.3	..
Services	678.3	674.5	672.7	717.1	724.6	765.2	755.2	..
Households	1,924.7	1,856.0	1,719.7	1,791.8	1,810.1	1,890.2	1,871.9	..
Electricity consumption (in GWh)	14,404.8	15,062.3	15,366.0	16,118.6	15,489.4	15,843.5	15,716.3	..
Energy intensity TPES/GDP (PPP) (toe/1,000 US$ (2005) PPP)	93.1	90.2	86.3	86.3	89.1	91.1	88.9	..

Transportation	2005	2006	2007	2008	2009	2010	2011	2012
Passenger transport demand (million passenger km) [2]								
by mode:								
road transport	3,403.0	3,537.0	3,808.0	4,093.0	3,438.0	3,284.0	3,145.0	3,249.0
rail	1,266.0	1,362.0	1,611.0	1,810.0	1,835.0	1,742.0	1,486.0	1,104.0
inland waterways	..	..	..	..	..	..	..	..
air transport (number of passengers)	2,099,000.0	2,148,000.0	2,288,000.0	2,329,000.0	2,053,000.0	1,861,000.0	2,078,000.0	1,961,000.0
Freight transport demand (million ton km) [3]								
by mode:								
road	10,244.0	11,096.0	11,429.0	11,042.0	9,429.0	8,780.0	8,926.0	8,649.0
rail	2,835.0	3,305.0	3,574.0	3,312.0	2,641.0	2,618.0	2,438.0	2,332.0
pipelines	1,774.0	1,533.0	1,781.0	1,677.0	1,797.0	1,703.0	1,477.0	1,216.0
inland waterways	119.0	117.0	109.0	843.0	727.0	941.0	692.0	772.0
Number of passenger cars	1,384,699.0	1,435,781.0	1,491,127.0	1,535,280.0	1,532,549.0	1,515,449.0	1,518,278.0	1,445,220.0
Average age of passenger cars	..	..	9.8	9.9	10.3	10.5	10.9	..

Waste	2005	2006	2007	2008	2009	2010	2011	2012
Total waste generation (1,000 t)	3,395.6	4,036.6	4,618.4	3,685.7	3,340.5	3,665.7	3,385.3	..
of which:								
- Hazardous waste (1,000 t)	37.0	43.3	54.2	71.6	51.2	61.2	68.3	..
- Non-hazardous industrial waste (1,000 t)	1,946.4	2,339.2	2,841.0	1,825.8	1,544.1	1,995.1	1,805.3	..
- Municipal waste (1,000 t)	1,412.2	1,654.1	1,723.2	1,788.3	1,745.2	1,609.4	1,511.6	..
of which from households (1,000 m^3)	..	..	..	..	..	..	..	..

Demography and Health	2005	2006	2007	2008	2009	2010	2011	2012
Total population (million inhabitants) [1]	4.4	4.4	4.4	4.4	4.4	4.4	4.3	4.3
Birth rate (per 1,000)	9.6	9.3	9.4	9.9	10.1	9.8	9.6	9.8
Total fertility rate	1.4	1.4	1.4	1.5	1.5	1.5	1.4	1.5
Mortality rate (per 1,000)	11.7	11.3	11.8	11.8	11.8	11.8	11.9	12.1
Infant mortality rate (deaths/1,000 live births)	5.7	5.2	5.6	4.5	5.3	4.4	4.7	3.6
Female life expectancy at birth (years)	78.8	79.3	79.2	79.6	79.6	79.6	79.9	80.1
Male life expectancy at birth (years)	71.8	72.5	72.3	72.4	72.9	73.5	73.8	73.9
Life expectancy at birth (years)	75.4	75.9	75.8	76.0	76.3	76.6	76.9	77.0
Population ages 0-14 years (% of total)	15.9	15.7	15.5	15.4	15.3	15.2	15.2	15.0
Population ages 15-64 years (% of total)	67.2	67.3	67.3	67.3	67.4	67.6	67.1	67.0
Population 65 or above (% of total)	16.9	17.0	17.2	17.3	17.3	17.2	17.7	18.0
Population with access to safe drinking water, total (%)	99.0	99.0	99.0	99.0	99.0	99.0	99.0	..
- Urban (%)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	..
- Rural (%)	97.0	97.0	97.0	97.0	97.0	97.0	97.0	..
Population with access to improved sanitation, total (%)	99.0	99.0	99.0	99.0	99.0	99.0	99.0	..
- Urban (%)	99.0	99.0	99.0	99.0	99.0	99.0	99.0	..
- Rural (%)	98.0	98.0	98.0	98.0	98.0	98.0	98.0	..

Macroeconomic context	2005	2006	2007	2008	2009	2010	2011	2012
GDP	266,651.5	291,044.0	318,307.8	343,412.1	328,672.4	323,807.0	330,171.0	330,232.0
- change over previous year (% change over previous year; in 2005 prices and PPPs)	4.3	4.9	5.1	2.1	-6.9	-2.3	0.0	-2.0
- in current prices and PPPs, (million US$)	68,104.0	74,568.0	82,895.0	89,634.0	84,850.0	81,934.0	84,827.0	87,610.0
- in prices and PPPs of 2005 (million US$)	68,104.0	71,466.0	75,082.0	76,647.0	71,322.0	69,701.0	69,669.0	68,292.0
Registered unemployment (% of labour force, end of period)	17.8	16.7	14.4	13.5	16.7	18.6	18.6	20.9
Net foreign direct investment (FDI) (million US$)	1,551.0	3,196.0	4,679.0	4,711.0	2,084.0	574.0	1,469.0	..
Net foreign direct investment (FDI) (as % of GDP)	2.3	4.3	5.6	5.3	2.5	0.7	1.7	..
Cumulative FDI (million US$)	10,661.0	13,857.0	18,536.0	23,247.0	25,331.0	25,905.0	27,374.0	..

Income distribution and poverty	2005	2006	2007	2008	2009	2010	2011	2012
GDP per capita at current prices and PPPs (US$)	15,332.0	16,820.0	18,721.0	20,308.0	19,819.0	19,335.0	..	..
Consumer price index (CPI) (% change over the preceding year, annual average)	3.3	3.2	2.9	6.1	2.4	1.1	2.3	3.4
Population below national poverty line	17.5	16.3	17.4	17.4	18.0	20.6 *	21.1	..
- Total (%)	17.5	16.3	17.4	17.4	18.0	20.6 *	21.1	..
- Urban (%)	..	..	..	..	..	..	..	..
- Rural (%)	..	..	..	..	..	..	..	..

Telecommunications	2005	2006	2007	2008	2009	2010	2011	2012
Telephone lines per 100 population	42.4	41.3	41.7	42.5	42.2	42.4	40.1	..
Cellular subscribers per 100 population	82.2	99.1	113.8	103.1	106.0	111.9	116.4	..
Personal computer in use per 100 population	..	..	..	..	..	..	..	..
Internet users per 100 population	33.1	38.0	41.4	50.6	56.3	60.3	70.7	..

Education	2005	2006	2007	2008	2009	2010	2011	2012
Literacy rate (%)	..	..	..	..	..	..	99.2	..
Literacy rate of 15-24 years old, men and women (%)	..	..	..	..	..	99.6	99.7	..

Gender Inequality	2005	2006	2007	2008	2009	2010	2011	2012
Share of women employment in the non-agricutlural sector (%)	28.2	27.1	26.6	26.9	26.0	24.6	26.3	28.0
Gender Parity Index in								
- Primary education enrolment (ratio)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
- Secondary education enrolment (ratio)	1.0	1.0	1.0	1.0	1.0	1.1	1.0	1.0
- Tertiary education enrolment (ratio)	1.2	1.2	1.2	1.3	1.3	1.3	1.3	..

Sources:
Ministry of Environmental and Nature Protection
Croatian Environmental Agency
Croatian Bureau of Statistics
Eurostat statistics (http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database
MDG database: http://mdgs.un.org/unsd/mdg/
UNECE statistical database: http://w3.unece.org/pxweb/

UNFCCC website: http://unfccc.int
World Bank Databank, http://data.worldbank.org/country/

Annex IV

LIST OF MAJOR ENVIRONMENT-RELATED LEGISLATION

Act on Education in Primary and Secondary Schools (OG 87/08)
Act on Financing of Units of Local and Regional Self-Government (OG 117/93, 33/00, 73/00, 59/01, 107/01, 117/01 - correction, 150/02, 147/03, 132/06, 73/08, 25/12)
Act on Implementation of the Regulation (EC) No. 1946/03 on transboundary movements of GMOs was proclaimed (OG 81/13)
Act on Maritime Domain and Ports (OG 158/03, 141/06)
Act on Physical Planning and Building (OG 76/07, 38/09, 55/11, 90/11, 50/12)
Act on Preschool Education (OG 10/97)
Act on radiological and nuclear safety (OG 28/10)
Act on Sustainable Waste Management (OG 94/13)
Act on transboundary movement and trade in wild species (OG 54/13)
Act on Utility Services (OG 26/03)
Act on Water for Human Consumption (OG 56/13)
Act on Water Management Financing (OG 153/09, 90/11, included in new Water Act 56/13)
Air Protection Act (OG 130/11)
Environmental Protection Act (OG 110/07, 80/113)
Excise Duties Act (OG 83/09, 111/12)
Forest Act (OG 140/05, 82/06, 129/08, 80/10, 124/10, 25/12, 68/12)
Forest reproductive material act (OG 75/09, 61/11, 56/13)
General Administrative Procedures Act (OG 47/09)
Hunting Act (OG 140/05, 75/09)
Maritime Act (OG 181/04)
Nature Protection Act (OG 80/13)
Noise Protection Act (OG 30/09, 55/13)
Waste Act (OG 178/04)
Water Act (OG 153/09, 63/11, 130/11, 56/13)

Regulation concerning the establishment of European Pollutant Release and Transfer Register (OG 166/06)
Regulation Establishing a Framework for Action of Croatia in the Field of Marine Environment Protection (OG 136/11)
Regulation Establishing a Framework for Action on Marine Environment Protection (OG 136/11)
Regulation of water quality standards (OG 89/10, 73/13)
Regulation on bathing water quality (OG 73/08, 51/10)
Regulation on categories, types and classification of waste with a waste catalogue and list of hazardous waste (OG 50/05, 39/09)
Regulation on Ecological Network (OG 124/13)
Regulation on emission quotas for certain pollutants (OG 141/08, 108/13)
Regulation on environmental impact assessment (OG 64/08)
Regulation on environmental information system (OG 68/08)
Regulation on environmental technical standards for reduction of volatile organic compounds emissions during refueling of motor vehicles at petrol stations (OG 5/11).
Regulation on Greenhouse Gas Emission Monitoring, Policy and Measures for their Reduction in Croatia (OG 87/12)
Regulation on information and participation of the public and public concerned in environmental protection issues (OG 64/08)
Regulation on information and participation of the public and public concerned in environmental matters (OG 64/08)
Regulation on levels of pollutants in ambient air (OG 117/12)

Regulation on limit values for pollutant emissions from stationary sources into the air (OG 117/12)
Regulation on limit values for volatile organic compound content of certain paints and varnishes used in construction and vehicle refinishing products (OG 69/13)
Regulation on Regulatory Impact Assessment (OG 66/12)
Regulation on strategic environmental impact assessment (SEA) of the plans and Programmes (OG 64/08)
Regulation on supervision of transboundary movement of waste (OG 69/06, 17/07, 39/09)
Regulation on technical standards of environmental protection from volatile organic compound emissions by storage of petrol and its distribution (OG 135/06)
Regulation on the conditions and methods of disposal of radioactive waste spent sealed radioactive sources and ionizing radiation sources which are not intended for further use (OG 44/08)
Regulation on the criteria, procedure and manner of determining compensation to real estate owners and local self-government units (OG 59/06, 109/12)
Regulation on the Environmental Information System (OG 68/08)
Regulation on the establishment of the Croatian Environment Agency (OG 75/02)
Regulation on the quality of biofuels (OG 33/11)
Regulation on the quality of petroleum-derived liquid fuels (OG 113/13)
Regulation on Water Classification (OG 137/08)
Regulation on fees for water protection (OG 82/10, 83/12)

Ordinance on conditions and methods of maintaining order in ports and in other parts of the internal maritime waters and territorial sea (OG 90/05)
Ordinance on construction waste management (OG 38/08)
Ordinance on defining sanitary protection zones (OG 66/11)
Ordinance on emission limit values of wastewater discharges (OG 87/13)
Ordinance on energy efficiency labeling of household appliances (OG 130/07)
Ordinance on management of waste from the titanium dioxide industry (OG 70/08)
Ordinance on management of wastewater treatment sludge when used in agriculture (OG 38/08)
Ordinance on managing waste from research and mining of mineral raw materials (OG 128/08)
Ordinance on medical waste management (OG 72/07)
Ordinance on methods and requirements for thermal treatment of waste (OG 45/07)
Ordinance on monitoring air quality (OG 3/13)
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