Republic of Croatia

**Ministry of Environmental Protection,
Physical Planning and Construction**

INITIAL REPORT OF THE REPUBLIC OF CROATIA UNDER THE KYOTO PROTOCOL

Calculation of Assigned Amount under Article 7, Paragraph 4, of the Kyoto Protocol, in accordance with Decision 13/CMP.1

Zagreb, August 2008

CONTENTS

1. INTRODUCTION

According to decision 13/CMP.1 *Modalities for the accounting of assigned amounts under Article 7, paragraph 4, of the Kyoto Protocol* each Party included in Annex I with a commitment inscribed in Annex B shall submit to the Secretariat, prior to 1 January 2007 or one year after the entry into force of the Kyoto Protocol for that Party, whichever is later, the report referred to in paragraph 6 of the annex of decision 13/CMP.1.

Croatian Parliament ratified the Kyoto Protocol on 27 April 2007 (Official Gazette, International Treaties No. 5/07). The Kyoto Protocol has entered into force for Croatia on 28 August 2007. Ministry of Environmental Protection, Physical Planning and Construction has prepared this Initial report of the Republic of Croatia in accordance with requirements of paragraph 7 of the annex of decision 13/CMP.1 which specifies the information which shall be provided by the Party, divided in two parts:

Part I

- Complete inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases not controlled by the Montreal Protocol from base year to the most recent year available
- Identification of selected base year for hydrofluorocarbons, perfluorocarbons and sulphur hexafluoride in accordance with Article 3, paragraph 8 of the Kyoto Protocol
- Calculation of assigned amount pursuant to Article 3, paragraph 7 and 8 of the Kyoto Protocol

Part II

- Calculation of commitment period reserve in accordance with decision 11/CMP.1
- Identification of its selection of single minimum values for tree crown cover, land area and tree height
- Identification of its election of activities under Article 3, paragraph 4 of the Kyoto Protocol, for inclusion in its accounting for the first commitment period
- Identification of whether, for each activity under Article 3, paragraph 3 and 4 of the Kyoto protocol, it intends to account annually or for the entire commitment period
- A description of its national system in accordance with Article 5, paragraph 1 of the Kyoto Protocol
- A description of its national registry

PART I

2. COMPLETE INVENTORY OF ANTHROPOGENIC EMISSIONS BY SOURCES AND REMOVALS BY SINKS OF GREENHOUSE GASES NOT CONTROLLED BY THE MONTREAL PROTOCOL FOR ALL YEARS FROM BASE YEAR TO THE MOST RECENT YEAR AVAILABLE

A complete inventory of anthropogenic emissions by sources and removals by sinks of greenhouse gases for the base year 1990 and for all years from base year to 2006 is provided in the Croatian National Inventory Report 2008 (NIR 2008). The NIR is prepared in accordance with the UNFCCC reporting guidelines on annual Inventories as adopted by the COP by its Decision 18/CP.8. The methodologies used in the calculation of emissions are based on the *Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC Guidelines)* and the *IPCC Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories (IPCC Good Practice Guidance)* prepared by the Intergovernmental Panel on Climate Change (IPCC). The calculation includes the emissions which are the result of anthropogenic activities and these include the following greenhouse gases: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), halogenated carbons (HFCs, PFCs) and sulphur hexafluoride (SF_6) and indirect greenhouse gases: carbon monoxide (CO), oxides of nitrogen (NO_x), non-methane volatile organic compounds (NMVOCs) and sulphur dioxide (SO_2). Greenhouse gas emission sources and sinks are divided into six main sectors: Energy, Industrial Processes, Solvent and Other Product Use, Agriculture, Land Use, Land-Use Change and Forestry and Waste.

As recommended by the IPCC Guidelines, country specific methods have been used where appropriate and where they provide more accurate emission data. For the submission of the NIR 2008, Croatia made improvements recommended by ERT from previous reviews. Improvements were made in all sectors. The recalculations have resulted in the following changes: the trend in the total national emissions decreased by 2.44 percent including LULUCF and 1.42 percent excluding LULUCF compared to NIR 2007.

The important part of the inventory preparation is uncertainty assessment of the calculation and verification of the input data and results, all this with the aim to increase the quality and reliability of the calculation. General (Tier 1) and source-specific (Tier 2) QC procedures for each QC activity outlined in *Good Practice Guidance and Uncertainty Management in National GHG Inventories* were followed. For the purposes of transparency of the emission calculation, inventory team has continued with preparation of Inventory Data Record Sheets which were introduced in 2001 submission.

2.1. OVERVIEW OF SOURCES AND SINK CATEGORY EMISSION ESTIMATES AND TRENDS

Total emissions/removals of greenhouse gases for the period 1990-2006 and their trend in sectors are given in table 2.1-1. The largest contribution to the greenhouse gas emission in 2006 has the Energy sector with 73.1 percent, followed by Industrial Processes with 13.0 percent, Agriculture with 11.4 percent, Waste with 1.9 percent and Solvent and Other product Use with 0.6 percent. This structure is with minor changes consistent through all the observed period from 1990 to 2006. In the year 2006 the amount of removed emissions of the greenhouse gases by CO_2 from LULUCF sector was 24.3 percent.

Table 2.1-1: Emissions/removals of GHG by sectors for the period 1990-2006 (Gg CO_2-eq)

Source	Emissions and removals of GHG (Gg CO_2-eq)									
	Base year[1]	**1990**	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Energy		22882	16400	18907	19953	21074	22580	22048	22411	22548
Industrial Processes		4609	2785	3400	3271	3148	3346	3659	3833	4004
Solvent and Other Product Use		80	80	69	75	99	108	135	155	182
Agriculture		4558	3191	3285	3485	3400	3348	3549	3560	3507
Waste		399	475	567	599	633	663	697	601	591
Total emission (excluding net CO_2 from LULUCF)	**36027**	**32527**	**22930**	**26228**	**27383**	**28353**	**30045**	**30088**	**30561**	**30834**
Removals (LULUCF)		-4185	-9154	-5281	-8214	-8206	-6276	-7900	-7726	-7490
Total emission (including LULUCF)		**28342**	**13776**	**20947**	**19169**	**20148**	**23768**	**22189**	**22835**	**23344**

The CO_2 is the largest anthropogenic contributor to total national GHG emissions. In 2006 the shares of GHG emissions were as follows: 76.9 percent CO_2, 10.1 percent CH_4, 11.7 percent N_2O and 1.4 percent HFCs. The contribution of the individual gases is given in table 2.1-2.

Table 2.1-2: Emissions/removals of GHG by gases for the period 1990-2006 (Gg CO_2-eq)

Source	Emissions and removals of GHG (Gg CO_2-eq)									
	Base year[1]	**1990**	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Carbon dioxide (CO_2)		24069	17007	20102	21018	21994	23577	23180	23595	23699
Methane (CH_4)		3390	2684	2638	2785	2847	2953	3070	2962	3110
Nitrous oxide (N_2O)		4079	3197	3465	3531	3463	3352	3649	3654	3594
HFCs, PFCs and SF_6		989	43	23	49	49	164	189	349	431
Total emission (excluding net CO_2 from LULUCF)	**36027**	**32527**	**22930**	**26228**	**27383**	**28353**	**30045**	**30088**	**30561**	**30834**
Removals (LULUCF)		-4185	-9154	-5281	-8214	-8206	-6276	-7900	-7726	-7490
Total emission (including LULUCF)		**28342**	**13776**	**20947**	**19169**	**20148**	**23768**	**22189**	**22835**	**23344**

[1] Decision 7/CP.12 Level of emissions for the base year of Croatia

2.2. BRIEF DESCRIPTION AND INTERPRETATION OF EMISSION TRENDS FOR AGGREGATED GREENHOUSE GAS EMISSIONS

The total GHG emissions in 2006, excluding removals by sinks, amounted to 30.834 mill. t CO_2-eq (equivalent CO_2 emissions), which represents 5.2 percent emissions reduction compared to GHG emission in the year 1990.

Overall decline of economic activities and energy consumption in the period 1991-1994, which was mainly the consequence of the war in Croatia, had directly caused a decline in total emissions of greenhouse gases in that period. With the entire national economy in transition, some energy intensive industries reduced their activities or phased out certain productions which were considerably reflected in GHG emissions reduction. Emissions have started to increase in the 1995 at an average rate of 2.8 percent per year. The largest contribution to the GHG emission increase has Energy and Industrial Processes.

2.2.1. EMISSION TRENDS BY GAS

The shares of GHG emission have not significantly changed during the entire period. In 1990, CO_2 emission represented 74.0 percent of overall emissions of greenhouse gases, followed by N_2O with 12.5 percent, CH_4 with 10.4 percent and F-gases (HFCs and PFCs) with 3.0 percent. In 2006 the shares of GHG emissions were as follows: 76.9 percent CO_2, 11.7 percent N_2O, 10.1 percent CH_4, and 1.4 percent HFCs. The trend of aggregated emissions/removals, divided by gasses, is shown in the Table 2.2-1 and the Figure 2.2-1.

Table 2.2-1: Aggregated emissions and removals of GHG by gases (1990-2006)

Gas	Emissions and removals of GHG (Gg CO_2-eq)								
	1990	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
CO_2	24069	17007	20102	21018	21994	23577	23180	23595	23699
CH_4 as CO_2-eq	3390	2684	2638	2785	2847	2953	3070	2962	3110
N_2O as CO_2-eq	4079	3197	3465	3531	3463	3352	3649	3654	3594
HFCs as CO_2-eq	53	43	23	49	49	164	189	349	431
PFCs as CO_2-eq	937	0	0	0	0	0	0	0	0
SF_6 as CO_2-eq	NE	NE	NE	NE	NE	NE	NE	NE	NE
Total GHG emission	**32527**	**22930**	**26228**	**27383**	**28353**	**30045**	**30088**	**30561**	**30834**
Removals (CO_2)	-4185	-9154	-5281	-8214	-8206	-6276	-7900	-7726	-7490
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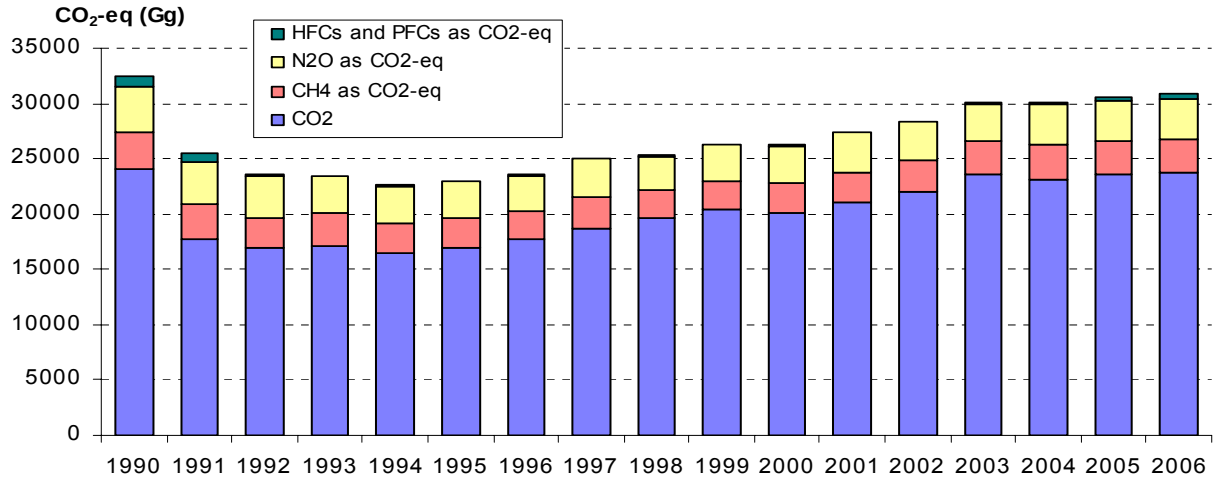

Figure 2.2-1: Trend of GHG emissions, by gases

Carbon dioxide (CO_2)

The most significant anthropogenic greenhouse gas is carbon dioxide (CO_2). In 2006, CO_2 emission was 2 percent lower than in 1990. Removals of CO_2 by sinks were almost 79 percent higher then removals in 1990. The largest increase in CO_2 emission was in Energy sector (Road Transport; Public Electricity and Heat Production) and Industrial Processes. There was a permanent increase in mobility (number of road vehicles) and therefore increase in motor fuel consumption in last ten years. There was also a significant increase in electricity demand and supply. Consequently, two new thermal power plants were installed (210 MW coal burned thermal power plant in 1999 and 200 MW combined cycled gas turbine in 2001). The highest increase of CO_2 emission in Industrial Processes has occurred in Mineral Production (Cement and Lime Production) and Chemical industry (Ammonia Production).

Methane (CH_4)

The emission of CH_4 in 2006 was 8 percent below the emission in 1990, largely due to decrease in emission in Agriculture sector (Enteric Fermentation and Manure Management), as a consequence of lower number of domestic animals.

Nitrous oxide (N_2O)

The emission of N_2O in 2006 was 12 percent lower than emission in 1990. Decrease of emission was in Energy Sector (Manufacturing Industries and Construction and Other Sectors), Industrial Processes (Nitric Acid Production) and Agriculture (N_2O Emission from Manure Management; Direct Emission from Agriculture Soils; Direct N_2O Emissions from Animals; Indirect N_2O Emission from Nitrogen used in Agriculture).

Fluorocarbons (HFCs and PFCs)

PFCs emissions were generated in the production of primary aluminium. The Croatian aluminium industry was still operational in 1990/1991, but production was stopped in 1992. HFCs are used as substitutes for cooling gases in refrigerating and air-conditioning systems

that deplete the ozone layer[2]. According to provided calculations, the contribution of F-gases in total national GHG emission in 2006 was 1 percent. The F-gases emission in 2006 was 56 percent below the emission in 1990.

Sulphur hexafluoride (SF_6)

The SF_6 emission estimation is still not included in the inventory, because the input data is not reliable.

2.2.2. EMISSION TRENDS BY SECTORS

According to the UNFCCC reporting guidelines and IPCC methodological guidelines, total national emission are divided into six sectors: Energy, Industrial Processes, Solvent and Other Product Use, Agriculture, Land Use, Land-Use Change and Forestry and Waste. The total national GHG emissions and removals, divided by sectors, are presented in the Table 2.2-2 and the Figure 2.2-2.

Table 2.2-2: Aggregated emissions and removals of GHG by sectors (1990-2006)

Source	Emissions and removals of GHG (Gg CO_2-eq)								
	1990	**1995**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Energy	22882	16400	18907	19953	21074	22580	22048	22411	22548
Industrial Processes	4609	2785	3400	3271	3148	3346	3659	3833	4004
Solvent and Oth.Prod.Use	80	80	69	75	99	108	135	155	182
Agriculture	4558	3191	3285	3485	3400	3348	3549	3560	3507
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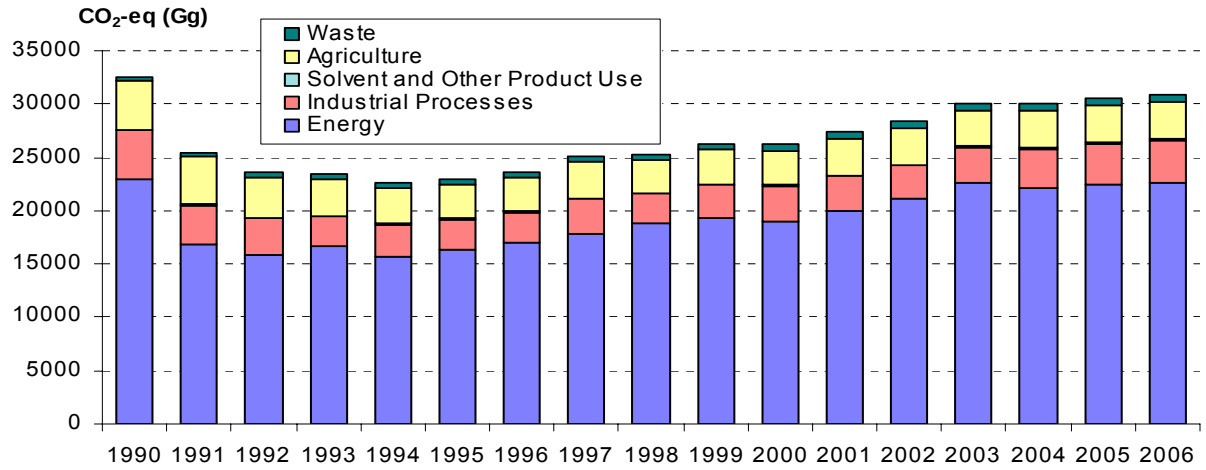

Figure 2.2-2: Trend of GHG emissions, by sectors

[2] Emissions from Foam Blowing and Fire Extinguishers have been calculated for year 2006 because activity data for the period 1990-2005 are not available

Energy

The Energy sector accounted for some 73 percent of the total national GHG emissions (presented as equivalent emission of CO_2). In 2006 the GHG emission from Energy sector was 1 percent lower than emission in 1990. The total energy consumption in 2006 was 0.8 percent lower than in the previous year 2005, whereat the total largest increase was in consumption of liquid fuels (0.4 percent). The largest increase of liquid fuels consumption in the year 2006 occurred in Manufacturing Industries and Construction sector (9.3 percent). The emission of CO_2 from Electric and Heat Power Production in thermal power plants, public heating plants and public cogeneration plants was 62.6 TJ in 2006, representing 20.3 percent in total greenhouse emission in the Republic of Croatia.

Industrial processes

Industrial Processes contributes to total GHG emission with approximately 13 percent, depending on the year. There was a significant decrease of GHG emission from Industrial Processes. The GHG emission in 2006 was 13 percent lower than emission in 1990. In Industrial Processes sector the key emission sources are Cement Production, Lime Production, Ammonia Production, Nitric Acid Production and Consumption of HFCs in Refrigeration and Air Conditioning Equipment, which combined contributes with 98.8 percent in total sectoral emission in 2006. The cement production in the period from 1997-2005 was constantly increasing. The ammonia production in 2006 was 1.8 percent lower in comparison to the previous year. Also, the nitric acid production in 2006 was 1.1 percent lower in comparison to 2005 (the level of emissions from these sub-sectors strongly depends on consumer's demand for particular type of mineral fertilizer at the market). The iron production in blast furnaces and aluminium production were ended in 1992, and ferroalloys production ended in 2002.

Solvent and Other Product Use

Solvent and Other Product Use contributes to total GHG emission with some 0.3 - 0.6 percent of the total national GHG emissions (presented as equivalent emission of CO_2). The GHG emission in 2006 was still 56 percent larger than emission in 1990.

Agriculture

The GHG emissions from Agriculture have a decreasing trend. Emission of CH_4 and N_2O in this sector is conditioned by different agricultural activities. For the emission of CH_4 the most important source is livestock farming (Enteric Fermentation). The number of cattle showed continuous decrease in the period from 1990 to 2000. As a consequence, this led to CH_4 emission reduction. In the year 2000, the number of cattle has started increasing and this trend was retained until 2006. The emission of N_2O is considered as a direct emission from cultivation of agricultural soils, emission from the animal manure (Manure Management) and indirect emission and since 2000 has been more or less stabile. The GHG emission in 2006 was 22 percent lower in comparison with 1990 emission. In 1990 Agriculture contributed to the total GHG emissions with 14.0 percent, while in 2006 Agriculture contributed with 11.4 percent in total GHG emissions.

Waste

Waste sector includes waste disposal, waste water management and waste incineration, whereas the waste disposal represents dominant CH_4 emission source from that sector in the Republic of Croatia. It should be emphasized that Solid Waste Disposal on Land contributes with 70.5 percent in total sectoral emission in 2006. Emissions from Waste sector have been constantly increasing in the period 1990-2006. Increasing emissions are the consequence of larger quantities of waste, activities in wastewater handling and waste incineration. The GHG emission in 2006 was 33 percent larger in comparison with 1990 emission. Contribution of Waste sector to total GHG emission is approximately 1 - 2 percent.

3. IDENTIFICATION OF SELECTED BASE YEAR FOR HYDROFLUOROCARBONS, PERFLUOROCARBONS AND SULPHUR HEXAFLUORIDE IN ACCORDANCE WITH ARTICLE 3, PARAGRAPH 8 OF THE KYOTO PROTOCOL

In accordance with Article 3.8 of the Kyoto Protocol any Party included in Annex I may use 1990 or 1995 as its base year for hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF_6) for the purpose of calculating its assigned amount.

Croatia has decided to use the year 1990 as its base year for HFCs, PFCs and SF_6.

- HFCs emissions have calculated from Consumption in Refrigeration and Air Conditioning Equipment for entire time series. Emissions from Foam Blowing and Fire Extinguishers have calculated only for 2006, because the data for the period 1990-2005 are not available.
- PFCs emissions were generated in the production of primary aluminium. The Croatian aluminium industry was still operational in 1990/1991, but production was stopped in 1992[3].
- SF_6 emission still not included in the inventory because the input data for emission calculation are not available.

The time series of HFCs and PFCs emissions, expressed in Gg CO_2-eq, are presented in the Table 3-1.

Table 3-1: Emissions of HFCs and PFCs (Gg CO_2-eq) (1990 – 2006)

Gas/Emission	1990	1991	1992	1993	1994	1995	1996	1997	1998
HFCs	52.90	51.71	50.52	49.34	48.15	43.20	60.26	91.29	17.64
PFCs	936.56	642.44	-	-	-	-	-	-	-

Table 3-1: Emissions of HFCs and PFCs (Gg CO_2-eq) (1990 – 2006), cont.

Gas/Emission	1999	2000	2001	2002	2003	2004	2005	2006
HFCs	9.18	23.16	48.99	49.31	163.71	188.87	349.18	415.03
PFCs	-	-	-	-	-	-	-	-

[3] It should be noticed that primary aluminium production (electrolysis) were closed mainly due to war activities near the location of aluminium plant.

4. CALCULATION OF THE ASSIGNED AMOUNT PURSUANT TO ARTICLE 3, PARAGRAPH 7 AND 8 OF THE KYOTO PROTOCOL

The assigned amount is calculated pursuant to Article 3, Paragraph 7 and 8 of the Kyoto Protocol, and is presented in table 4-1.

Table 4-1: Calculation of assigned amount

Total GHG emissions without LULUCF in 1990 (t CO_2 eq)	32.527.324,66
Allowed amount of emissions to be added to 1990 level according to Decision 7/CP.12 Level of emissions for the base year of Croatia (t CO_2 eq)	3.500.000,00
Total GHG emissions without LULUCF in the base year for the calculation of the assigned amount (t CO_2 eq)	36.027.324,66
Quantified emission reduction commitment for Croatia according to Annex B of the Kyoto protocol (percentage of base year)	95
Period (years)	5
Croatia's assigned amount (t CO_2 eq)	**171.129.792,14**

PART II

5. CALCULATION OF THE COMMITMENT PERIOD RESERVE IN ACCORDANCE WITH DECISION 11/CMP.1

Each Party included in Annex I shall maintain, in its national registry, a commitment period reserve (CPR) which should not drop below 90 per cent of the Party's assigned amount calculated pursuant to Article 3, paragraphs 7 and 8, of the Kyoto Protocol, or 100 per cent of five times its most recently reviewed inventory, whichever is lowest.

(a) 90 per cent of the Party's assigned amount:

CPR = 171.129.792,14 t CO_2-eq x 0,9 = 154.016.812,93 t CO_2-eq

(b) 100 per cent of five times its most recently reviewed inventory[4]:

CPR = 29.431.859,48 t CO_2-eq x 5 = 147.159.297,40 t CO_2-eq

Considering the provisions of decision 11/CMP.1, the lower value, i.e. 147.159.297,40 t CO_2-eq is Croatia's commitment period reserve.

[4] National Inventory Report 2006

6. ACTIVITIES UNDER ARTICLE 3, PARAGRAPH 3 AND 4 OF THE KYOTO PROTOCOL

6.1. DEFINITION OF ACTIVITIES IN LAND USE, LAND USE CHANGE AND FORESTRY

Activities in land use, land-use change and forestry are defined by decision 16/CMP.1:

Afforestation is the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources.

Reforestation is the direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land.

Deforestation is the direct human-induced conversion of forested land to non-forested land.

Revegetation is a direct human-induced activity to increase carbon stocks on sites through the establishment of vegetation that covers a minimum area of 0.05 hectares and does not meet the definitions of afforestation and reforestation contained here.

Forest management is a system of practices for stewardship and use of forest land aimed at fulfilling relevant ecological (including biological diversity), economic and social functions of the forest in a sustainable manner.

Cropland management is the system of practices on land on which agricultural crops are grown and on land that is set aside or temporarily not being used for crop production.

Grazing land management is the system of practices on land used for livestock production aimed at manipulating the amount and type of vegetation and livestock produced.

6.2. DEFINITION OF FOREST FOR THE PURPOSE OF REPORTING UNDER ARTICLE 3, PARAGRAPH 3 AND 4 OF THE KYOTO PROTOCOL

Croatia has identified the following values for definition of forest for reporting under the Kyoto Protocol, Article 3, paragraphs 3 and 4:

- Minimum value for tree crown cover: 10%
- Minimum land area: 0.1 ha
- Minimum tree height: 2 m

6.3. CONSISTENCY OF THE DEFINITIONS

According to Croatian legislation forest is land overgrown with forest trees in a form of a stand with a surface area larger than 0.1 ha (Forestry Act, Official Gazette 140/05, 82/06).

According to the Food and Agricultural Organization (FAO) of the United Nations forest is defined as "Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ" (*Global Forests Resources Assessment 2006*). Croatia uses different single minimum values compared to those of FAO in order to ensure consistency with national legislation.

Forests defined under the Kyoto Protocol and reported to the UNFCCC are consistent with forests defined by Forestry Act and reported to FAO.

7. ELECTION OF ACTIVITIES UNDER ARTICLE 3, PARAGRAPH 3 AND 4 OF THE KYOTO PROTOCOL

A Party of the Kyoto Protocol, under the Article 3 paragraph 3, in the first commitment period shall report greenhouse gas emissions by sources and removals by sinks resulting from direct human-induced activities limited to afforestation, reforestation and deforestation.

Under Article 3 paragraph 4 of the Kyoto Protocol a Party may choose to account for additional activities, forest management, cropland management, grazing land management and revegetation, in the first commitment period.

Croatia has decided to account for Forest Management under Article 3 paragraph 4 of the Kyoto Protocol during the first commitment period.

8. ACCOUNTING PERIOD FOR ACTIVITIES UNDER ARTICLE 3, PARAGRAPH 3 AND 4 OF THE KYOTO PROTOCOL

Croatia has chosen to account for the activities under Article 3 paragraph 3, and elected activities under Article 3 paragraph 4 for the entire commitment period.

9. DESCRIPTION OF NATIONAL SYSTEM IN ACCORDANCE WITH ARTICLE 5, PARAGRAPH 1 OF THE KYOTO PROTOCOL

9.1. INTRODUCTION

According to Article 5 paragraph 1 of the Kyoto Protocol each Party included in Annex I shall have in place, no later than one year prior to the start of the first commitment period, a national system for the estimation of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol.

Decision 19/CMP.1 defines national system as institutional, legal and procedural arrangements made within a Party for estimating anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, and for reporting and archiving inventory information.

9.2. SINGLE NATIONAL ENTITY

Ministry of Environmental Protection, Physical Planning and Construction is a designated single national entity with overall responsibility for the national inventory. The designated representative of the national entity is the Head of Department for Atmosphere Protection within the Directorate for Environmental Management.

The postal and electronic addresses of the single national entity are:

Ministry of Environmental Protection, Physical Planning and Construction[5]
Ulica Republike Austrije 14, 10000 Zagreb, Hrvatska/Croatia
URL: http://klima.mzopu.hr
Contact e-mail: visnja.grgasovic@mzopu.hr

9.3. LEGAL AND INSTITUTIONAL FRAMEWORK FOR PREPARATION OF THE NATIONAL ANNUAL GREENHOUSE GAS INVENTORY

Taking into consideration requirements stipulated by Article 5 paragraph 1 of the Kyoto Protocol and decision 19/CMP.1, and previous experience in preparation of annual inventory submissions, Ministry of Environmental Protection, Physical Planning and Construction as a national focal point has decided to enforce regulation which shall stipulate institutional and procedural arrangements for greenhouse gas monitoring and reporting in Croatia. In this regard, under the Article 46 of the Air Protection Act (Official Gazette No. 178/04, 60/08), the Regulation on Greenhouse Gas Emissions Monitoring in the Republic of Croatia has been adopted by the Croatian Government on 21 December 2006 (Official Gazette, No. 2/07). Institutional arrangement for inventory preparation in Croatia is regulated in Part II of the Regulation on greenhouse gas emissions monitoring in the Republic of Croatia, entitled National system for the estimation and reporting of anthropogenic greenhouse gas emissions by sources and removals by sinks. Institutional arrangements for inventory management and preparation in Croatia could be characterized as decentralized and out-sourced with clear tasks breakdown between participating institutions including Ministry of Environmental Protection, Physical Planning and Construction, Croatian Environment Agency and competent governmental bodies

[5] In Croatian: Ministarstvo zaštite okoliša, prostornog uređenja i graditeljstva

responsible for providing of activity data. The preparation of inventory itself is entrusted to Authorized Institution which is selected according to public tendering procedure for three year period.

Ministry of Environmental Protection, Physical Planning and Construction (MEPPPC) is a national focal point for the UNFCCC, with overall responsibility for functioning of the National system in a sustainable manner, including:

- mediation and exchange of data on greenhouse gas emissions and removals with international organizations and Parties to the Convention;
- mediation and exchange of data with competent bodies and organizations of the European Union in a manner and within the time limits laid down by legal acts of the European Union;
- control of methodology for emission calculation and greenhouse gas removal in line with good practices, UNFCCC and IPCC guidelines, and national circumstances;
- consideration and approval of the Greenhouse Gas Inventory Report prior to its formal submission to the UNFCCC Secretariat.

Croatian Environment Agency (CEA) is responsible for the following tasks:

- organization of greenhouse gas inventory preparation with the aim of meeting the due deadlines referred to in Article 12 of the Regulation;
- collection of activity data referred to in Article 11 of the Regulation;
- development of quality assurance and quality control plan (QA/QC plan) related to the greenhouse gas inventory in line with the guidelines on good practices of the Intergovernmental Panel on Climate Change;
- implementation of the quality assurance procedure with regard to the greenhouse gas inventory in line with the quality assurance and quality control plan;
- archiving of activity data on calculation of emissions, emission factors, and of documents used for inventory planning, preparation, quality control and quality assurance;
- maintaining of records and reporting on authorized legal persons participating in the Kyoto Protocol flexible mechanisms;
- reporting on modifications in the National System;
- selection of Authorized Institution (in Croatian: *Ovlaštenik*) for preparation of the greenhouse gas inventory.
- provide to technical body of the UNFCCC Secretariat an insight into all data and documents for the purpose of technical reviews.

Authorized Institution is responsible for preparation of inventory, which include:

- emission calculation of all anthropogenic emissions from sources and removals by greenhouse gas sinks, and calculation of indirect greenhouse gas emissions, in line with the methodology stipulated by the effective guidelines of the Convention, guidelines of the Intergovernmental Panel on Climate Change, relevant EU reporting documents and instructions for reporting on greenhouse gas emissions as published on the Ministry's website, and on the basis of the activities data referred to in Article 11 of the Regulation;
- quantitative estimate of the calculation uncertainty referred to in indent 1 of the Article 9 of the Regulation, for each category of source and removal of greenhouse gas

emissions, as well as for the inventory as a whole, in line with the guidelines of the Intergovernmental Panel on Climate Change;
- identification of key categories of greenhouse gas emission sources and removals;
- recalculation of greenhouse gas emissions and removals in cases of improvement of methodology, emission factors or activity data, inclusion of new categories of sources and sinks, or application of coordination/adjustment methods;
- calculation of greenhouse gas emissions or removal from mandatory and selected activities in the sector of land use, land-use change and forestry;
- reporting on issuance, holding, transfer, acquisition, cancellation and retirement of emission reduction units, certified emission reduction units, assigned amount units and removal units, and carry-over, into the next commitment period, of emission reduction units, certified emission reduction units and assigned amount units, from the Registry in line with the effective decisions and guidelines of the Convention and supporting international treaties;
- implementation of and reporting on quality control procedures in line with the quality control and quality assurance plan;
- preparation of the greenhouse gas inventory report, including also all additional requirements in line with the Convention and supporting international treaties and decisions;
- cooperation with the Secretariat's Expert Review Team for the purpose of technical review and assessment/evaluation of the inventory submissions.

EKONERG – Energy Research and Environmental Protection Institute was selected as Authorized Institution for preparation of inventory submissions.

It is important to emphasize that process of inventory preparation has been improved in recent submissions mainly as a result of activities carried out under the framework of two capacity building projects, i.e.:

- UNDP/GEF regional project "Capacity building for improving the quality of GHG inventories" in which following inventory related documents were prepared:
    - National GHG Inventory Improvement Strategy
    - National QA/QC plan
    - National QA/QC guidance
    - Manuals of procedures for compiling, archiving, updating and managing GHG Inventory
    - Description of inventory archives
    - Description of awareness-raising campaign
    - Improvement of GHG emission calculation from road transport
    - Improvement of methane emission calculations from waste disposal
- EC LIFE Third Countries project "Capacity building for implementation of the UNFCCC and the Kyoto Protocol in the Republic of Croatia" in which following inventory related documents were prepared:
    - Draft of National implementation strategy and action plan
    - Regulation on Greenhouse Gas Emissions Monitoring in the Republic of Croatia

9.4. PREPARATION OF THE NATIONAL INVENTORY

Process of inventory preparation encompasses several steps starting with activity data collection and followed by emissions estimation and recalculations in accordance with the IPCC methodology and recommendations for improvements from the ERT review reports, compilation of inventory including the NIR and the CRF and in parallel implementation of general and source-category specific quality control procedures.

9.4.1. ACTIVITY DATA COLLECTION

Activity data collection is under responsibility of the CEA which represents a hub between governmental and public institutions responsible for providing activity data and Authorized Institution responsible for inventory preparation. The scope and due dates for delivering activity data to CEA are prescribed by the Regulation. It should be emphasized that activity data collection is organized in such a manner that for each sector there are a designated competent state administrative bodies, state administration organizations and/or public institutions which are responsible for collecting and providing official data which are consistent with data provided for other international organizations (e.g. IEA, FAO). In that regard Ministry of Environmental Protection, Physical Planning and Construction had organized a series of meetings with representatives of competent bodies and institutions to further explain importance of providing accurate, complete and consistent data for inventory preparation. Central Bureau of Statistics agreed to initiate additional researches in their official programme to enable implementation of higher tier methodology for emissions estimation.

In addition several operators from energy and industrial sector are directly approached by the CEA and Authorized Institution for more detailed activity data in cases when higher tier methods are recommended (see table 9-1 for details).

Table 9-1: Activity data sources for GHG inventory preparation

CRF Sector/Sub-sector	*Type of data*	*Source of data*
Energy	*Energy balance*	*Ministry of Economy, Labour and Entrepreneurship with assistance of Energy Institute Hrvoje Požar*
	Registered motor vehicles database	*Ministry of Interior*
	Fuel consumption and fuel characteristic data for thermal power plants	*Voluntary survey of HEP - Croatian Power Utility Company*
	Fuel characteristic data	*Voluntary survey of INA - Oil and Gas Company*
	Natural gas processed (scrubbed), CO_2 content before scrubbing and CO_2 emission	*Voluntary survey of INA - Central Gas Station MOLVE*
Industrial Processes	*Activity data on production/consumption of material for particular industrial process*	*Central Bureau of Statistics, Department of Manufacturing and Mining*
	Activity data on production/consumption of halogenated hydrocarbons (PFCs, HFCs) and sulphur hexafluoride (SF6)	*Ministry of Environmental Protection, Physical Planning and Construction*
	Data on consumption and composition of natural gas in ammonia production	*Voluntary survey of ammonia manufacturer (Petrokemija Fertilizer Company Kutina)*
Solvent and Other Product Use	*Activity data on production for particular source category and number of inhabitants*	*Central Bureau of Statistics, Department of Manufacturing and Mining*
Agriculture	*Livestock number*	*Central Bureau of Statistics*
	Production of N-fixing crops and non N-fixing crops	*Central Bureau of Statistics*
	Area of histosols	*Faculty of Agriculture*
	Activity data on mineral fertilizers applied in Croatia	*Voluntary survey of Petrokemija Fertilizer Company Kutina*
LULUCF	*Activity data on areas of different land use categories, annual increment and annual cut, fuel wood and wildfires*	*Ministry of Regional Development, Forestry and Water Management with assistance of public company "Hrvatske šume"*
Waste	*Activity data on municipal solid waste disposed to different types of SWDSs*	*Ministry of Environmental Protection, Physical Planning and Construction; Croatian Environment Agency*
	Activity data on wastewater handling	*State company Croatian Water Resources Management (Hrvatske vode)*
	Activity data on waste incineration	*Croatian Environment Agency*

9.4.2. APPLIED METHODOLOGIES

The methodologies from *Revised 1996 IPCC Guidelines for National GHG Inventories* and *Good Practice Guidance and Uncertainty Management in National GHG Inventories, recommended by the UNFCCC* were used for emission estimations of greenhouse gases which are result of anthropogenic activities, i.e. CO_2, CH_4, N_2O, HFCs, PFCs, SF_6, CO, NO_x, NMVOCs, and SO_2.

Generally, methodology applied to estimate emissions includes the product of activity data (e.g. fuel consumption, cement production, wood stock increment and so forth) and associated emission factor. The use of country-specific emission factors, if available, is recommended but these cases should be based on well-documented research. Otherwise, the *Revised 1996 IPCC Guidelines* provides methodology with default emission factors for different tiers. The emission estimates are divided into following sectors: Energy, Industrial Processes, Solvent and Other Product Use, Agriculture, Land Use, Land-Use Change and Forestry and Waste. Detailed description of the applied methodologies is described in sector specific chapters of the NIR from 3 to 9 and overview is given in the CRF tables 3s1 - 3s2.

9.4.3. ESTIMATION OF INVENTORY UNCERTAINTY

The uncertainties associated with both annual estimates of emissions, and emission trends over time are reported according to the *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories*. The Croatian inventory team estimates uncertainties using Tier 1 method described by the IPCC, which provides estimates of uncertainties by pollutant. The uncertainties are estimated for both excluding LULUCF and including LULUCF due to the *Good Practice Guidance for Land Use, Land-Use Change and Forestry*.

9.4.4. ARCHIVING INVENTORY INFORMATION

For the purposes of archiving inventory information in a transparent manner, *Inventory Data Record Sheets* (IDRS) were introduced in the year 2001 which contain details of the person and/or organization responsible for an emission estimate, the primary or secondary sources of activity data and emission factors used, the methodology applied, data gaps, ways to cross-check, suggestion for future improvement in the estimates and relevant bibliographic references. The information provided in *Inventory Data Record Sheets* is available for each source category and for the entire time-series. An example of Inventory Data Record Sheet for 2006 in Waste sector is presented in Annex 2.

9.4.5. ANNUAL INVENTORY REPORTING CYCLE

Annual inventory reporting cycle is prescribed by Regulation on Greenhouse Gas Emissions Monitoring in the Republic of Croatia and presented on figure 9-1.

Annual reporting cycle encompasses several steps (*note that steps 8. and 9. will be mandatory when Croatia becomes the EU member state*):

1. Activity data collection
2. Preparation and approval of QA/QC plan
3. Submission of activity data to Croatian Environment Agency
4. Additional activity data collection and analysis

5. Emissions estimates, recalculations, uncertainty evaluation, key source analysis
6. Implementation of QA/QC plan
7. Submission of inventory report to the MEPPPC
8. *Evaluation and approval of inventory report by the MEPPPC prior to submission to the EC*
9. *Submission of inventory report to the EC*
10. Additional analysis and corrections, reporting on QA/QC and inventory information archiving
11. Evaluation and approval by the MEPPPC prior to submission to the UNFCCC
12. Submission of inventory report to the UNFCCC

Figure 9-1: Annual inventory reporting cycle

Activity	Responsibility	Year N-1 (months)												Year N (months)			
		01.	02.	03.	04.	05.	06.	07.	08.	09.	10.	11.	12.	01.	02.	03.	04.
1. Activity data (AD) collection	CAB																
2. Preparation and approval of QA/QC plan	CEA + AI																
3. Submission of AD to the CEA	CAB						15.										
4. Additional AD collection and analysis	CEA + AI																
5. Emissions estimates, recalculations, uncertainty evaluation, key source analysis	AI																
6. Implementation of QA/QC plan	CEA + AI																
7. Submission of inventory report to the MEPPPC	CEA												31.				
8. Evaluation and approval by the MEPPPC	MEPPPC + NEG																
9. Submission to the EC	MEPPPC													15.			
10. Additional analysis and corrections, reporting on QA/QC and inventory information archiving	CEA + AI																
11. Evaluation and approval by the MEPPPC	MEPPPC + NEG																
12. Submission to the UNFCCC	MEPPPC																15.

CAB – Competent Administrative Bodies
CEA – Croatian Environment Agency
AI – Authorized Institution
MEPPPC – Ministry of Environmental Protection, Physical Planning and Construction
NEG – Nominated Expert Group

9.4.6. INVENTORY REVIEW BY THE EXPERT REVIEW TEAMS

Since the introduction of annual technical reviews of the national inventories by experts review teams (ERT), Croatia has undergone three reviews so far, in-country review in 2004 and centralized reviews in 2005 and 2006. Issues recommended by the ERT have been included in this report as far as possible. In the latest review "Report of the individual review of the greenhouse gas inventory of Croatia submitted in 2006" the main findings of the ERT are that the inventory is well documented and that NIR and CRF are in conformity with the *Guidelines for the preparation of national communications by Parties included in Annex I to the Convention, Part I: UNFCCC reporting guidelines on annual inventories* and the *IPCC good practice guidance*.

9.5. QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC) PLAN

According to Good Practice Guidance and Uncertainty Management in National GHG Inventories, QA/QC plan is an internal document to organize, plan, and implement QA/QC activities. Croatia has prepared QA/QC plan for 2008 reporting cycle following the recommendations from document Quality Assurance and Quality Control Plan, Samples and Manual for Development which was prepared under regional UNDP/GEF project Capacity building for improving the quality of GHG inventories (RER/01/G31).

QA/QC plan follows the proposed cycle of activities including:

- Development and approval of QA/QC plan;
- Data checking and inventory reviewing activities;
- Compilation of findings;
- Recommendations for corrective actions;
- Implementing and reporting corrective actions;
- Reporting.

Quality control activities are focused on following elements of inventory preparation process:

- Activity data gathering and handling activities;
- Activity data documentation and archiving;
- Choice of emission factors and emissions estimation.

General (Tier 1) and source-specific (Tier 2) QC procedures for each QC activity outlined in *Good Practice Guidance and Uncertainty Management in National GHG Inventories* were followed. In that regard Manuals of procedures for Compiling, Archiving, Updating and Managing of GHG Inventory were prepared for all IPCC sectors[6] in order to support inventory team with comprehensive guidelines for choice of methodology, emission factors and activity data, uncertainty estimates, QA/QC activities, reporting and documentation and inventory improvement plan. These guidelines also contain detail information on national circumstances particularly related to status of activity data, data gaps and short- and medium-term actions for improvement of the inventory.

[6] UNDP/GEF regional project "Capacity building for improving the quality of GHG inventories"

During the preparation of the NIR a number of checks were carried out by sector experts related to completeness, consistency, comparability, recalculation and uncertainty of activity data, emission factors and emission estimates. The details on these issues are elaborated in the NIR and the CRF.

Finally, before submitting this NIR an audit has been carried out by designated QA/QC manager. The audit covered all IPCC sectors in the NIR with purpose to check which quality control elements, both general and specific, as defined in the *IPCC Good Practice Guidance*, are already implemented by sector experts and which improvements and corrective actions should be carried out in the future submissions. It is also important to mention that EKONERG - Energy Research and Environmental Protection Institute as Authorised institution is certified against ISO 9001:2000 and that all activities should be conducted in line with internal quality management system procedures.

9.6. EVALUATION AND APPROVAL OF THE INVENTORY BY THE MINISTRY OF ENVIRONMENTAL PROTECTION, PHYSICAL PLANNING AND CONSTRUCTION

According to Article 7 paragraph 4 of the Regulation on Greenhouse Gas Emissions Monitoring in the Republic of Croatia, Ministry of Environmental Protection, Physical Planning and Construction is responsible for consideration and approval of the Greenhouse Gas Inventory Report prior to its formal submission to the Convention Secretariat.

For that purpose, Ministry of Environmental Protection, Physical Planning and Construction is in process of establishing a Nominated Expert Group in a capacity of 7-9 members, as an independent technical body not directly involved in inventory preparation process which will support the Ministry in approval process and assurance of the inventory quality.

10. CROATIAN NATIONAL REGISTRY

The following description of the Croatian national registry was prepared in accordance with paragraph 32 of the annex to decision 15/CMP.1 *Guidelines for the preparation of the information required under Article 7 of the Kyoto Protocol*. Description is intended to demonstrate how Croatian national registry performs the functions defined in the annex to decision 13/CMP.1 and the annex to decision 5/CMP.1, and how it complies with the requirements of the technical standards for data exchange between registry systems as adopted by the COP/MOP.

10.1. REGISTRY ADMINISTRATOR

The following table contains the name and contact information of the registry administrator designated to maintain Croatian registry.

Title	Registry Administrator
Name	Bernarda Rožman
Organization	Agencija za zaštitu okoliša / Croatian Environment Agency
Address	Ksaver 208 - 10 000 Zagreb, Croatia
E-mail	ghgregistry.admin@azo.hr
Phone	+385 1 4693 091
Fax	+385 1 4886 850
Website	www.azo.hr

10.2. IMPLEMENTATION OF THE NATIONAL REGISTRY

Croatia has established national greenhouse gas emissions (GHG) registry in order to ensure accurate accounting of the assigned amount and to meet monitoring, reporting and review commitments under Article 7 and 8 of the Kyoto Protocol. The maintenance of a national registry is also an eligibility requirement for participation in the flexible mechanisms of the Kyoto Protocol: Joint Implementation (JI), Clean Development Mechanism (CDM) and International Emissions Trading (IET).

Brief overview of GHG registry implementation activities

Activities for implementation of Croatian GHG registry started back in 2005 when report "Development of national greenhouse gas emissions registry in the Republic of Croatia" was prepared under the LIFE funded project "Capacity building for the implementation of the UNFCCC and the Kyoto Protocol in the Republic of Croatia". In this document general information about national registries were provided, technical issues were explained, national circumstances for the implementation were described and recommendation for the next steps of the registry establishment were given. Two basic options were discussed regarding registry software: self development and software license purchase. Second option was chosen since it was estimated that it implied less cost, less implementation risk and was less time consuming.

As another output of the LIFE project, "Technical Specification for the Supply of GHG Emissions Registry Software and Hardware" was drafted in order to define technical requirements for registry establishment. Those requirements were intended to serve also as a set of technical information for bidders under international tender for procurement of registry hardware and software.

European Commission offered to Ministry of Environmental Protection, Physical Planning and Construction its Community Registry (CR) software. The Ministry decided to accept the offer and, since CR software is distributed free of charge to all Member States and Member States candidates, there was no tender for supply of the registry software. CR has technical capabilities to serve both as a registry under the Kyoto Protocol and under the European Emissions Trading Scheme (EU ETS). Funds from EU CARDS 2004 programme were used for purchase of the registry hardware, software installation and technical support services.

In 2006 Croatia submitted to the UNFCCC Secretariat "Official communication of Registry System Administrator" with required information on national registry system administrator. Representatives of Croatian Registry System Administrator have been participating in Registry System Administrators Forum (RSA Forum) since its first meeting in April 2006.

10.3. BRIEF TECHNICAL DESCRIPTION OF THE NATIONAL REGISTRY

Croatian Environment Agency – CEA (Agencija za zaštitu okoliša – AZO) established for its national registry a system of 2 dedicated physical server computers on the main location and 1 dedicated physical server with support of one virtual server machine on the back-up location as shown on Figure 10-1 below.

The Croatian national registry is supported by Community Registry software of the European Commission, which is also used in several other countries for the same purpose (e.g. Portugal, Belgium, Luxembourg, and Germany) and as such it is approved by UNFCCC and EU.

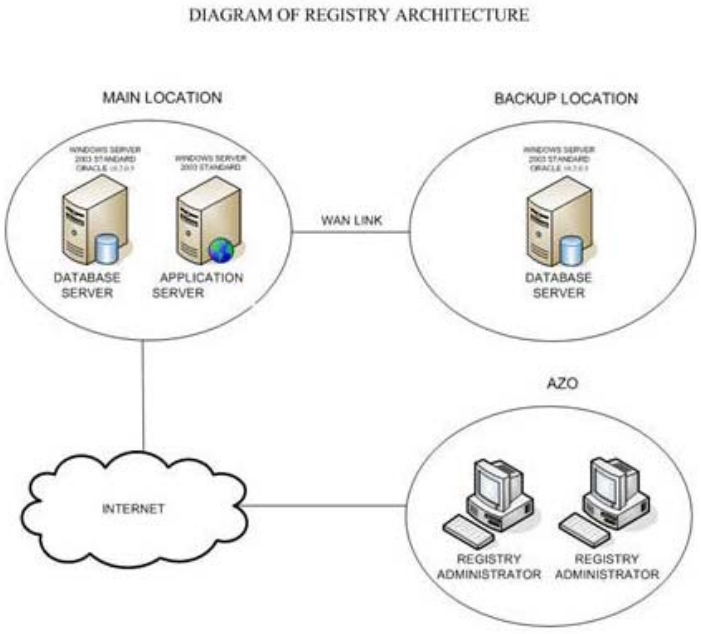

Figure 10-1: The graphical presentation of Croatian Registry system.

10.4. CONSOLIDATED REGISTRY SYSTEM

Croatia does not cooperate with any other Parties in maintaining their national registries in a consolidated system.

10.5. DESCRIPTION OF DATABASE STRUCTURE AND CAPACITY OF THE NATIONAL REGISTRY

The Croatian Registry system is implemented using an Oracle Server relational database management system, ver. 10.2.0. Enterprise Edition with a dedicated data model for supporting registry operations.

The absolute maximum size of the Oracle Server database is 2000 Terabytes. At the moment Croatian registry system database has 40 Gigabytes of reserved disc space for registry database witch can be easily upgraded if necessary.

The Oracle database ver. 10.2.0, Enterprise Edition is capable of processing 2000 transactions per second.

Annual database growth has been calculated based on information from other EU Member States. A prediction was made for increase in number of transactions for ETS participants as well as for Kyoto accounts holders.

According to calculation of increase in number of ETS based transactions, increase rate of the database storage would be approximately 50 MB per year. Based on this result it was concluded that the present capacity of the registry is sufficient to ensure safe operation of the registry under the EU rules.

Database growth resulting from transactions involving accounts managed by the Party is expected to be even lower than growth resulting from EU transactions, so it can be concluded that the capacity of database system is sufficient for all registry operations.

10.6. CONFORMITY WITH DATA EXCHANGE STANDARDS (DES) BETWEEN REGISTRY SYSTEMS

The Croatian registry has been developed for compliance with the UNFCCC Data Exchange Standards (DES) specified under the Kyoto Protocol. The Registry is also developed for operation under EU Emissions Trading Scheme (ETS) since Croatia is a candidate for an EU membership. Croatia has formally applied to join the EU and once it receives a full EU membership it will link to ETS. However, it should be noted there is an option of linking Croatian emissions trading system to ETS in 2010 regardless of Croatian EU membership. Therefore it is envisaged the registry will be connected to both ITL and CITL, with CITL acting as a supplemental transaction log. The European trading scheme also requires its Member States' registries to be compliant with the DES.

The system contains the functionality to perform issuance, conversion, external transfer, cancellation, retirement, carry-over and reconciliation processes using XML messages and web

services as specified in the UNFCCC document DES ver.1.1 for coordinating the electronic messaging between registries.

The system also contains: Transaction Status enquiry, Time Synchronization, Data Logging requirements (including Transaction Log, Reconciliation Log and Message Archive) and the different identifier formats as specified in the DES document.

At the time of completion of this Initial Report the registry administrator has undertaken preparatory activities for the process of initialization with ITL in order to demonstrate registry compliance with DES.

10.7. PROCEDURES FOR MINIMIZING DISCREPANCIES

The National Registry software, CR, has implemented the checks of Kyoto Protocol and EU ETS to minimize the discrepancies in the registry transactions and rules to terminate them whenever a discrepancy is identified.

Moreover, all transactions performed by the Croatian Registry will be verified by ITL (and CITL) and a reconciliation process will be run daily to identify potential discrepancies. After every reconciliation process, and in case of discrepancy, the registry administrator will intervene to remove detected discrepancies in coordination with ITL administrator. Every transaction causing a discrepancy will be automatically terminated. It will be allowed to execute only if all the discrepancies have been removed before the transaction was initialized again. In the event of discrepancy and a failure to terminate the transaction, the registry administrator will refer to the transactions log and intervene manually if necessary to set the accounts status prior to the transaction.

To make sure the Croatian Registry software is synchronized with the ITL the time discrepancy will be checked every day by the ITL. If the time discrepancy is exceeding 60 seconds the server time in the registry will be set by the host. To minimize the time discrepancies, Croatian servers run the Network Time Protocol (NTP) service and they are connected to Microsoft time server.

Currently installed version of CR software in Croatian registry is ver. 1.2.2. For every further upgrade of the software (including localization changes) Croatian Registry Administrator will appoint the Release Manager that will coordinate the upgrade processes.

The Release Manager will regularly check web pages created for CR software users for any new release of software fixes and updates and will install those fixes and updates when necessary, so as to comply with any change of DES or checks implemented in CR software.

10.8. AN OVERVIEW OF SECURITY MEASURES EMPLOYED IN THE NATIONAL REGISTRY

Croatian Environment Agency cooperates with a professional hosting company “B.net Croatia, Ltd.” concerning the technical administration of the Croatian National Registry. B.net is responsible for hosting registry servers and maintaining server availability and security on main location as well as on back-up location.

The physical security of the building and computer rooms on both locations is carried out by the hosting company in Zagreb for 24 hours a day, 7 days a week. Visitors are only allowed after invitation by one of the authorized Registry staff or authorized B.net employees. Access to the computer rooms is restricted and it is only possible after showing proof of identity.

As a primary security measure, username and password requirements for each of registered users of the registry is build into the registry software. Unauthorized access to restricted actions is prevented by a permission system, thereby minimizing operator errors. Also, operation instructions are published on registry website.

An account holder needs to sign a contract with Croatian Registry to be granted access to the registry. By signing this contract, the account holder becomes aware of its obligations towards the registry, including the ones regarding security issues, and assumes the responsibility for fair use of the registry.

The number of persons with administration authorities is restricted to a minimum and all are under a confidentiality agreement. Written procedures are in place to ensure a common and tested way of dealing with all issues regarding the registry maintenance.

10.9. LIST OF INFORMATION PUBLICLY ACCESSIBLE BY MEANS OF THE USER INTERFACE TO THE NATIONAL REGISTRY

The user interface to the Croatian registry itself has a feature to show a set of publicly accessible information. Users always need to log on to their account first, before they have access to their specifically authorized information.

The user interface will be bilingual, so users will have choice of working on Croatian or English language.

The following information will be publicly available:

- General information about the registry and the purpose of the registry
- Information pursuant to II. Registry requirements – E. Publicly Accessible Information listed in Annex to decision 13/CMP.1 and information pursuant to Annex XVI to Commission Regulation 2216/2004 and Annex I to Commission Regulation 916/2007 of the EU
- List of legislative acts available for download
- Operation instructions
- User terms and conditions
- Links to relevant websites, including UNFCCC, EU ETS web pages, the Ministry of Environmental Protection, Physical Planning and Construction and CEA main website.

10.10. INTERNET ADDRESS OF THE INTERFACE TO THE NATIONAL REGISTRY

The public website of Croatian registry can be found at http://ghgregistry.azo.hr. User accounts are accessible from that site.

10.11. DESCRIPTION OF MEASURES TAKEN IN THE EVENT OF A DISASTER

The main location and back-up location are geographically separated. According to the Service Agreement with hosting company, back-up server is also operational 24 hours a day, 7 days a week and it can replace main production server within few hours.

Data from main database server is archived every 20 minutes to back-up database server. In case of loss of the data on main location, the back-up data from the latest back-up of maximum 20 minutes before the 'disaster' will be restored from the back-up location. The relevant data will be retrieved and installed on the back-up servers. Action will also have to be undertaken to transfer URL's and certificates to this server.

Full back-ups will be made on a weekly basis (52 times per year) on magnetic tape data storage. On weekly basis full back-up will be transferred from back-up location to a safeguarded location at the premises of the registry, where the back-up will be kept for minimum of one month under the safeguarding standards of the registry. During business hours restore time of back-up is no more than 4 hours and during non-business hours restore time is no more than 12 hours.

10.12. TEST PROCEDURES AND RESULTS

Community Registry software (CR) is approved registry software by the UNFCCC and EU, and in that sense a full scope of testing has been done.

A full test of the functionalities of the Croatian registry will be performed by the Croatian Registry Administrator in September-October 2008. Test scripts and results will be available at the premises of the registry administrator.

ANNEX 1. DECISION 7/CP.12

Decision 7/CP.12

Level of emissions for the base year of Croatia

The Conference of the Parties,

Recalling Article 4, paragraph 6, of the Convention,

Responding to the request of the Government of Croatia that its base year greenhouse gas emissions be considered in accordance with Article 4, paragraph 6, of the Convention,

Recalling decisions 9/CP.2, 11/CP.4 and 10/CP.11,

Taking into account the submission from Croatia contained in FCCC/SBI/2006/MISC.1,

Noting the report of the individual review of the greenhouse gas inventory of Croatia submitted in 2004 and contained in FCCC/WEB/IRI/2004/HRV, which, inter alia, recognized that the greenhouse gas inventory of Croatia does not contain emissions from power plants outside the boundaries of Croatia for 1990 or subsequent years,

Noting that this decision has no implications for historical emission levels of any other Party, in particular for Bosnia and Herzegovina, Serbia, and Montenegro,[1]

Considering that the flexibility under Article 4, paragraph 6, of the Convention to choose a base year different from 1990, in order to take into account the economic circumstances of countries undergoing the process of transition to a market economy, has previously been invoked by five Parties,

Considering the specific circumstances of Croatia with regard to greenhouse gas emissions before and after 1990, and the structure of the electricity generation sector of the former Yugoslavia,

Noting the intention that the approach taken should be conservative, and that unduly high flexibility should not be provided,

1. *Notes* that the inventory reported in 2004 showed the total greenhouse gas emissions in 1990 to be 31.7 Mt CO_2 equivalent;

2. *Decides* that Croatia, having invoked Article 4, paragraph 6, of the Convention, shall be allowed to add 3.5 Mt CO_2 equivalent to its 1990 level of greenhouse gas emissions not controlled by the Montreal Protocol for the purpose of establishing the level of emissions for the base year for implementation of its commitments under Article 4, paragraph 2, of the Convention.

7th plenary meeting
17 November 2006

[1] Montenegro is currently an observer State to the UNFCCC.

ANNEX 2. INVENTORY DATA RECORD SHEET

MODULE: WASTE	
SUBMODULE: METHANE EMISSIONS FROM SOLID WASTE DISPOSAL SITES	
WORKSHEET: 6-1	**SHEET**: 1 OF 1 CH_4 EMISSIONS
STEP: 1 TO 4	**PAGE**: 1 of 2
DIRECT DATA SOURCE: **A. ACTIVITY DATA:** *Cadastre of Waste - Municipal Solid Waste, Report 2006,* Croatian Environmental Agency. Assessment of inappropriate activity data on quantities of MSW disposed to different types of SWDs - *Guidelines Development for starting implementation of Waste Management Plan in the Republic of Croatia,* EKONERG Ltd. Quantities of MSW disposed to SWDSs: Managed: 680.55 Gg Unmamaged – deep: 501.37 Gg Unmanaged – shallow: 153.08 Gg Country-specific methane correction factor (MCF): 0.856 Country-specific fraction of degradable organic carbon (DOC): 0.16 Recovered methane: 4.19 Gg **B. METHODOLOGY/EMISSION FACTOR:** Publications: IPCC/UNEP/OECD/IEA (1997), *Greenhouse Gas Inventory Workbook*, Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 2. IPCC/UNEP/OECD/IEA (1997), *Greenhouse Gas Inventory Reference Manual*, Revised 1996 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 3. IPCC (2000), *Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories* Methodology: First Order Decay method (Tier 2) Methane generation rate constant k=0.05 Fraction of DOC which really degrades: 0.55 (0.5-0.6) Fraction of carbon released as methane: 0.5	
ORIGINAL DATA SOURCE: **A. ACTIVITY DATA:** Ministry of Environmental Protection, Physical Planning and Construction (2006) *Guidelines Development for starting implementation of Waste Management Plan in the Republic of Croatia,* EKONERG Ltd., Zagreb Ministry of Environmental Protection, Physical Planning and Construction (2007) *Waste Management Plan in the Republic of Croatia (2007-2015),* Zagreb	
METHOD: bottom-up (see publications in original data source)	
ADDITIONAL INTERCALCULATION: Evaluation and compiling of data coming from original data source and adjusting to recommended Intergovernmental Panel on Climate Change (IPCC) methodology.	
DATA ARCHIVATION: Publications: Fundurulja, D., Mužinić, M. (2000) *Estimation of the Quantities of Municipal Solid Waste in the Republic of Croatia in the period 1990 – 1998 and 1998 – 2010.* Potočnik, V. (2000), Report: The basis for methane emission estimation in Croatia 1990-1998, B. Data on Municipal Solid Waste in Croatia 1990-1998 Schaller, A. (2000), Republic of Croatia: First National Communication, Waste Management Review – Waste Disposal Sites.	
DATA GAPS: Quantities on MSW were in most cases gained by test weighing in order to estimate average volumes of waste delivered by vehicles and density of MSW.	
MODULE: WASTE	
SUBMODULE: METHANE EMISSIONS FROM SOLID WASTE DISPOSAL SITES	
WORKSHEET: 6-1	**SHEET**: 1 OF 1 CH_4 EMISSIONS

STEP: 1 TO 4	**PAGE**: 2 of 2
SUGGESTION FOR THE FUTURE: ▪ Equipping the major landfills with automatic weigh-bridges in order to accurately estimate the quantities of delivered MSW ▪ Providing methodology to determine country-specific MSW composition ▪ Periodic analysis of waste composition at major landfills according to provided methodology ▪ Modification of Environmental Emissions Inventory (KEO) Reporting Forms regarding to MSW with additional information on waste quantities and composition ▪ Adjustment of country-specific to IPCC SWDSs classification, in order to accurately MCF estimation.	
NOTES: -	
RESPONSIBILITY: Andrea Hublin, M.Sc. EKONERG address: Koranska 5, 10000 Zagreb tel.: +385 1 6000 134 fax.: +385 1 6171 560 e-mail: andrea.hublin@ekonerg.hr	