STRATEGIES AND POLICIES OF PARTIES AND SIGNATORIES TO THE CONVENTION FOR THE ABATEMENT OF AIR POLLUTION

2010 QUESTIONNAIRE FOR PRIORITY COMPLIANCE REVIEW

Answer CROATIA

I. 1985 SULPHUR PROTOCOL[1]

1. **The question in this section refers to the following Parties: Austria, Belarus, Belgium, Bulgaria, Canada, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Liechtenstein, Lithuania, Luxembourg, the Netherlands, Norway, the Russian Federation, Slovakia, Sweden, Switzerland and Ukraine.**

2. **Question 1: With reference to article 6 of the Protocol, please provide details of your country's national programmes, policies and strategies that specifically address the reduction of sulphur emissions. If your country is a Party to the 1994 Sulphur Protocol[2] and/or the 1999 Gothenburg Protocol[3], you may cross-refer to question 13 and/or 39.**

II. NITROGEN OXIDES PROTOCOL[4]

3. **The questions in this section are based on the reporting obligation of Parties in accordance with article 8 and enable Parties to provide information on the implementation of the obligations under articles 2, 4 and 7 of the Protocol.**

4. **They refer to the following Parties to the Protocol: Austria, Belarus, Belgium, Bulgaria, Canada, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Liechtenstein, Lithuania, Luxembourg, the Netherlands, Norway, the Russian Federation, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, the United Kingdom of Great Britain and Northern Ireland, the United States of America and the European Community.**

5. **Question 2: With reference to article 7, please provide up-to-date information on the national programmes, policies and strategies your country has developed to implement the obligations under the Protocol that serve as a means of controlling and reducing emissions of nitrogen oxides (NO_x) or their transboundary fluxes. If your country is a Party to the Gothenburg Protocol, you may cross-refer to question 39.**

Croatian Parliament ratified the Protocol to the 1979 Conventionon Long-Range Transboundary Air Pollution Concerning the Control of Emissions of Nitrogen Oxides or Their Transboundary Fluxes in October 2007, published in Official Gazette – International Treaties (OG-IT 10/07), and it come into force with respect to the Republic of Croatia on 01 June 2008, and the effective date was published in OG-IT 02/08.

Croatian Parliament also ratified Protocol to the 1979 Convention on Long-range Transboundary Air Pollution Abate Acidification, Eutrophication and Ground-level Ozone in May 2008, published in Official Gazette – International Treaties (OG-IT 04/08), and it come into force with respect to the Republic of Croatia on 05 January 2009, and the effective date was published in OG-IT 07/08.

According to obligation from the Gothenburg Protocol emission ceiling for NOx is 87 kt in 2010.

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[1] 1985 Helsinki Protocol on the Reduction of Sulphur Emissions or their Transboundary Fluxes by at least 30 per cent.

[2] 1994 Oslo Protocol on further Reduction of Sulphur Emissions.

[3] 1999 Gothenburg Protocol to abate Acidification, Eutrophication and Ground-level Ozone.

[4] 1988 Sofia Protocol concerning the Control of Emissions of Nitrogen Oxides or their Transboundary Fluxes.

The emission of NOx in 2007 was 82.1 kt which is 3.4% higher than the year before and 6.7% lower compared to 1990. The structure of NOx emission has not changed significantly in the period from 1990 – 2007. The main source of NOx emission is still road transport (34.5% of total emission), but its contribution has been decreasing steadily since 1990 (-14.1%), as a result of vehicles gradually being equipped with catalytic converters. Sector 08 - other mobile source and machinery also significantly contributes to national total of NOx emissions (24.9%). Emission of NOx from stationary combustion accounted with 29.1% to the national total, mainly from the sector combustion in energy transformation industry (16.3%). The rest of the emission comes essentially from production processes (10.4% of the national total) and the agriculture sector (1.0%). It can be concluded that NOx emission is mainly the result of fossil fuel consumption.

Croatia's obligation is accordance with the NOx Protocol to remain on the same level as it was in 1990. This obligation has already been fulfilled in advance.

Policies and measures

In 2002, **National Environmental Strategy with National Environmental Action Plan** passed by Parliament **(OG 46/2002)**. Within the framework of this Strategy Croatia has determined its long-term emission reduction objectives for the main air pollutants. The objectives are determined in accordance with existing and future obligations under the Convention on long-range transboundary air pollution and its protocols.

The general objective of Croatia's air protection policy is to achieve the first category of air quality – clean or slightly polluted air – over the entire territory within the next ten years.

Primary objectives of the air quality protection policy are:

O1: Reduction of traffic-related emissions;

O2: Reduction of major pollutant emissions from industrial plants;

O3: Reduction of major pollutant emissions from thermal power plants and heating plants;

O4: Reduction of major pollutant emissions from household combustion plants and large-scale combustion plants;

O5: Reduction of greenhouse gas emissions;

O6: Reduction of agents causing photochemical smog and tropospheric (ground-level) ozone.

O7: Phasing out the consumption of ozone depleting substances

Framework objective for NOx is stabilization of the total emission to the level as prescribed by international treaties; by the year 2010 the emission to be kept at the 1990. The total emission from existing stationary sources to be reduced to the level of prescribed limit values.

In 2008 the **Air Quality Protection and Improvement Plan in the Republic of Croatia for 2008 – 2011 (OG 61/08)** was adopted.

The Plan is an implementing document of the strategy for air protection which is a constituent part of the Strategy for Environmental Protection and contains: principles and criteria for determining objectives and priorities, assessment of the state of air quality, priority measures and activities, preventative measures for preservation of air quality, short-term measures, when there exists a risk of exceeding the alert threshold, short-term measures, when there exists a risk of exceeding the tolerance values, with the aim of achieving limit values within a set period of time, measures for achieving limit values within a set period of time if they have been exceeded, measures for the reduction of pollutant emissions and greenhouse gases by activity types, measures for the gradual elimination of substances which deplete the ozone layer, measures for the reduction of emissions of persistent organic pollutants and heavy metals, measures for encouraging an increase in energy efficiency and use of renewable energy, measures for reducing total emissions from traffic, measures for reducing the adverse effects of acidification, eutrofication and photochemical pollution, manner of implementing measures, order of realisation of measures, deadline for the carrying out of measures, subjects under the obligation of implementing measures, international obligations of the State,

estimate of funds for the implementation of the Plan and analysis of expenses and benefits achieved in regards to air quality.

According to the new legislation adopted in 2007, owner or user of a existing large combustion plant or gas turbine was obliged to submit to the Ministry of the Environmental Protection, Physical Planning and Construction the Emission Reduction Programme for air emissions of pollutants and compliance of emissions from existing large combustion plants and gas turbines with the ELVs prescribed in the regulation until 31 December 2007.

The Programme contains the following information for each large combustion plant and gas turbine:

– technical data on the large combustion plant or gas turbine (fuel type, plant capacity, number of operating hours in a calendar year and similar);

– annual emissions of SO_2, NOx and solid particles for the period from the period 2000 to 2006;

– annual emissions of sulphur dioxide from the period 2000 to 2006 prior to the desulphurisation process (in cases where desulphurisation is used);

– rate of desulphurisation used;

– total annual flow of waste gases from the period 2000 to 2006;

– measures taken to achieve emission reduction (e.g. changes in fuel type, management of combustion process, introduction of new fuel combustion equipment, use of abatement equipment for emission reduction, shut-down of plant operations etc.);

– time schedule for the implementation of measures from the Programme;

– evaluation of funds required for achieving the measures from the Programme;

– analysis of costs and benefits achieved thereof.

On the basis of Emission Reduction Programmes, 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 the Republic of Croatia (OG 151/08)** was adopted.

Aims and measures of **Strategy for energy development in the Republic of Croatia (OG 130/09)** contribute to decrease of air pollution in urban areas, where air is moderate or effusively polluted. Air pollution is resulted from emission from traffic and small combustion plants in the household and services with exceptions of pollution from specific pollutants from industrial processes. Measures of energy efficiency in buildings, use of renewable energy sources, increase of natural gas use, expanding of centralized heating system, use of biofuel and natural gas in transport, measure for reduction of air pollution at local level. By implementing this measure emission of SO_2, NOx, VOC, and the most important reduction on PM emission will decrease.

Use of low sulphur fuel and decrease of use of liquid fuel in electrical energy production. NOx emission will rise up to 2015. because of increase overall volume of transport. After that slight decrease will happen, because of higher percent and lower specific use of new vehicles. Big energetic installations will use installations for desulphurization and DeNox installations. Energy will contribute to overall level of SO_2 and NOx emission bellow ceilings prescribed by the Gothenburg protocol.

Programme for gradual emission reduction of certain pollutants in the Republic of Croatia for the period until the end of 2010, with emission projections for the period 2010-2020 (OG 152/08) (Program for emission reduction) prescribed emission ceilings for pollutants that cause eutrophication, acidification and ground-level ozone formation. In Program sectors relevant for pollutants emission is denominate, and projection for emission is calculated based on the input from the Strategy for development in the Republic of Croatia (OG 130/09) and other strategic documents.

The aim of the Programme for pollutants SO_2, NO_2, HOS and NH_3 is to provide measures for the relevant sectors in line to fulfil the requirements from the Regulation on emission quotas for certain pollutants in the

Republic of Croatia (OG No. 141/08) until the end of 2010. and prepare emission projection for period 2010 to 2020 with proposal for emission ceilings for those pollutants for 2015 and 2020.

Based on the new Environmental Protection Act (OG 110/07) prior to starting construction and operation, as well as prior to a significant change in operation or reconstruction of the installation intended for performing an activity, which may cause emissions which pollute the soil, air, water and sea, the company shall **obtain integrated environmental protection requirements**. Integrated environmental protection requirements shall be determined with the aim of integrated environmental protection through prevention, reduction and removal to the greatest possible extent of pollution, primarily at the source, and through ensuring prudent management of natural assets by supervising pollution and establishing a sustainable balance between human activity and social and economic development on the one hand and natural assets and nature's regenerative capacity on the other.

Regulatory measures

The Air Protection Act (OG 176/2004 60/08) gives legal framework for transposition of numbers of sectoral EC directives into the Croatian legislation.

Based on the Act and the new Act on Environmental Protection (OG 110/07) the following Ordinances/Regulations that have impact on the reduction of NOx emissions were adopted:

- Regulation on emission limit values of pollutants into the air from stationary sources (OG 21/07, 151/08)

- Ordinance on emission pollutants monitoring from stationary sources into the air (OG 1/06),

- Regulation on unit charges, corrective coefficients and detailed criteria and benchmarks for determination of the charge for emission into the environment of SO_2 and NOx (OG 71/04),

- Ordinance on the method and terms for calculation and payment of charges for emission into the environment of sulphur oxides, in the form of sulphur dioxide, and nitric oxides, in the form of nitric dioxide (OG 95/04),

- Regulation on environmental impact assessment (OG 64/08, 67/09),

- Ordinance on the environmental pollution register (OG 35/08),

- Regulation on the quality of petroleum-derived liquid fuels (OG 53/06, 154/08),

- Regulation on limit values of pollutants in ambient air (OG 133/05),

- Regulation on alert thresholds of pollutants in ambient air (OG 133/05),

- Regulation on ozone in ambient air (OG 133/05),

- Regulation on determining locations of stations in the national network for continuous air quality monitoring (OG 4/02)

- Regulation on the procedure for establishing integrated environmental requirements (OG 114/08)

- Regulation on emission quotas for certain pollutants in the Republic of Croatia (OG 141/08)

Question 3: With reference to <u>article 2, paragraph 2 (a)</u>, please specify the national NO_x emission standards applied to major stationary sources and/or major source categories in your country, taking into consideration the <u>technical annex</u> to the Protocol. For the purpose of this question, "major stationary source" means any stationary source, the construction or substantial modification of which commenced after 14 February 1993 and which has a thermal input of at least 50 MW_{th}. Please complete the table below.

NOx emission limit values from stationary sources into the air are prescribed by the Regulation on ELV of pollutants into the air from stationary sources (OG 21/07, 151/08) and are as the follows (ELV Regulation).

Table 1: Question 3

Major stationary sources or major source category[2]/ for NOx	**National emission standards[1/] mg/Nm[3]**	**National legislation and comments (e.g. BAT[5] applied)**
1. Public power, cogeneration and district heating plants:		ELV Regulation
Boilers, new installations, heat input, solid fuel:: >50 to 100 >100 - biomass: >50 to 100 >100 to 300 >300	 400 200 400 300 200	
Boilers - Existing installations, heat input, solid fuel: >50 to 500 >500	 600 500	
New installations, liquid fuel, heat input: >50 to 100 >100 Existing installations, liquid fuel, heat input: >50 to 500 >500	 400 200 450 400	
New installations, gas fuel, heat input: >50 and more Natural gas: >50 to 300 >300 Existing installations, gas fuel, heat input: >50 to 500 >500	 200 150 100 300 200	

[5] Best available technologies.

Stationary combustion turbines and internal combustion engines: 1. NEW TURBINES Nitrogen oxides expressed as NO_2: (with the load above 70%): - Liquid fuel: – gas fuel (excluding natural gas): – natural gas:[1/] -	 120 120 50[2/]	[1/] Natural gas is naturally occurring methane with not more than 20% (by volume) of inerts and other constituents. 2/ The ELV is 75 mg/m^3 in the following cases, where the efficiency rate is determined in line with base load conditions according to ISO standards: - for gas turbines used in combined heat and power production systems having an overall efficiency greater than 75%, - for gas turbines for mechanical drives, - for gas turbines used in combined cycle plants having an annual average overall electrical efficiency greater than 55%.
Internal combustion engines: Compression ignited engines (=Diesel engines), 5 and more MW_t: – fuel: natural gas (spray ignition engines) – fuel: heavy fuel oil fuel: diesel oil or gas oil Spark ignited engines (Otto engines), 4-stroke, > 1 MW_t: – lean-burning engines – all other engines	 500 600 500 250 500	
2. Commercial, institutional and residential combustion plants:		ELV Regulation
(a) Commercial boilers		
(b) Domestic heaters		
(a) and (b) heat input 0,1 to 1 MWth: solid fuel - blackening from a stack liquid fuel: gas fuel:	 1 250 gas oil 350 liquid oil 200	

and (b) Heat input 1 to 50 MWth: Solid fuel: Liguid fuel: Gas fuel:	 500 250 gas oil 350 liquid oil 200	
3. Industrial combustion plants and processes with combustion		ELV Regulation
(a) Boilers and process heaters (no direct contact between flue gas and products)	Same as for the boilers	
(b) Processes (direct contact); (e.g. calcinations processes in rotary kilns; production of cement, lime, etc.; glass production; metallurgical operation; pulp production)	Cement production:500 (new) and 800 (existing) 1500 (glass production) For induction and electroarc furnaces and vacuum installations for production of steel up to 20 t/batch and more: 400	
4. Non-combustion processes, e.g. nitric acid production	New installation: 350 Existing; 450	ELV Regulation
5. Extraction, processing and distribution of fossil fuels	-	
6. Waste treatment and disposal, e.g. incineration of municipal and industrial waste	200 (average daily values) 400	ELV Regulation Nitrogen compounds expressed as NO_2, for existing incineration plants with a nominal capacity exceeding 6 tonnes of waste per hour or new incineration plants Nitrogen compounds expressed as NO_2, for existing incineration plants with a nominal capacity of 6 tonnes of waste per hour or less

1/ Specify the units and statistical treatment.
2/ For the definition of major source category see article 1, paragraph 10.

6. **Question 4: With reference to <u>article 2, paragraph 2 (c)</u>, please provide details of the pollution control measures for NO_x emissions introduced in your country for major stationary sources with a thermal input of at least 100 MW_{th}, the construction of which commenced on or before 14 February 1993, taking into consideration the <u>technical annex</u> to the Protocol. Please complete the table below.**

Directive 2001/80/EC (large combustion plan directive) has been transposed into Croatian legislation through the Regulation on limit values for pollutant emissions from stationary sources into the air (OG 21/07, 151/08).

There is currently a total of 35 large combustion plants in Croatia that are located at 14 industrial or energy facilities, two of which are coal-fired and the rest use liquid or gas fuel. Only one large combustion plant, which was constructed in 1999, PLOMIN II with thermal input of 525 MW, uses modern equipment to reduce emissions of certain pollutants into the air and thus complies with the limitation of emissions of existing combustion plants, as stipulated by the Regulation, i.e. are in accordance with provisions of Directive 2001/80/EZ.

For the purpose of implementing the Regulation, 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 the Republic of Croatia was adopted in 2008 (OG 151/08).

Air quality protection and improvement plan for the 2008-2011 period is to define, among other things, the measures aimed at reducing the emissions of major pollutants from existing stationary sources.

Reconstruction of operating system, embedding of DeNOx equipment and new generation of low NOx burners, or closing the installations if it is not financially worth to reconstruct are the measures to achieve the reduction of NOx emission. It is estimated that few power blocks in existing plants will not work longer than 2015.

Republic of Croatia transposed NEC directive (2001/80/EC) to national legislation true Regulation on emission quotas for certain pollutants in the Republic of Croatia (OG 141/08). According the regulation total pollutant emission ceilings, to be attained by 31 December 2010 for NOx is 87 kilotonnes. For the purpose of attainment of the emission ceilings Programme for gradual emission reduction of certain pollutants in the Republic of Croatia for the period until the end of 2010, with emission projections for the period 2010-2020 (OG 152/08) was adopted (Programme for emission reduction).

According to the Programme until 2020 vehicles that are not comply with EURO standards will be gradually get out from use, and percentage of vehicles with EURO IV and EURO V standards will increase.

The main source of SO_2, NO_2, PM2,5 and heavy metals emission is from Energetic sector. Measures for reduction of those emissions are following:

Measure 1 Increasing of energy efficiency in energy consumption

Measure 2 Increasing of renewable energy content

Measure 3 Implementation of distributed energy sources

Table 2: Question 4

Major stationary source	**Pollution control measures applied**	**Comments (national legislation, relevant plant characteristics e.g. age, utilization rate)**
1. Public power, cogeneration and district heating plants:		ELV Regulation, National Emission Reduction Plan, Programme for emission reduction
(a) Boilers		
(b) Stationary combustion turbines and internal combustion engines		
2. Commercial, institutional and residential combustion plants:		
(a) Commercial boilers		
(b) Domestic heaters		
3. Industrial combustion plants and processes with combustion		
(a) Boilers and process heaters (no direct contact between flue gas and products)		

(b) Processes (direct contact); (e.g. calcinations processes in rotary kilns; production of cement, lime, etc.; glass production; metallurgical operation; pulp production)		
4. Non-combustion processes, e.g. nitric acid production		
5. Extraction, processing and distribution of fossil fuels		
6. Waste treatment and disposal, e.g. incineration of municipal and industrial waste		

7. **Question 5: With reference to <u>article 2, paragraph 2 (b)</u>, please specify the national NO_x emission standards applied to newly registered mobile sources in all major source categories, taking into consideration the <u>technical annex</u> to the Protocol and the relevant decisions taken within the framework of the Inland Transport Committee of the United Nations Economic Commission for Europe (UNECE). If your country is a Party to the Gothenburg Protocol, you may cross-refer to questions 51–56. Please complete the table below.**

Table 3: Question 5

Mobile source category	**NO_x emission standards (unit: g/km or g/kWh)**		**Date**	**National legislation**
	Petrol	**Diesel**		
1. Road vehicles				Homologation of vehicles
(a) Passenger cars:	0,08 g/km	0,25 g/km	01.10.2008.	Regulation on homologation of motor vehicles regarding measures for reducing the emission from motor/engine **TPV 102**
(b) Light commercial vehicles				
Class I	0,08 g/km	0,25 g/km		
Class II	0,1 g/km	0,33 g/km		
Class III	0,11 g/km	0,39 g/km		
(c) Heavy-duty vehicles (HDV)	--	3,5 g/kWh	01.04.2008.	Regulation of homologation of gas engine with compression ignitation for used in vehicles and vehicles equipped with this types of engines depending on the reduction of emission of gaseous and solid ingredient from engines **TPV 141**

(d) Motorcycles and mopeds	0,15 g/km 1,20(1) g/km	-	01.04.2008. -	Ordinance on the type-approval procedure for certain components and characteristics of two- or three-wheeled motor vehicles TPV 212 (edition 01) – part 5: measures against air pollution caused by two- or three-wheeled motor vehicles **TPV 212-5**
(e) Tractors (agricultural and forestry)	-	9,20	Type approval: 1.10.2009 New tractors: 1.04.2010	Ordinance on the type-approval procedure for agricultural and forestry tractors with regard to the emission of hazardous substances from their motors **TPV 323**
2. Non-road engine applications: agricultural, mobile industrial and construction machinery ≤ 18 kW 19 ≤ kW ≤ 37 37 ≤ kW ≤ 75 75 ≤ kW ≤ 130 130 ≤ kW ≤ 560		 - - 9,20 9,20 9,20	Type approval: 1.10.2009 New engines: 1.04.2010	Ordinance on measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery **TPV 401**
3. Other mobile sources (a) Rail transport Self-propelled rail cars Locomotives 130 < kW < 560 > 560 kW > 2000 kW and > 5 litres/cylinder (b) Ships and other marine craft Recreational craft Inland shipping (c) Aircraft		 4,00 4,00 6,00 7,40 7,2-11,0	Type approval: 1.10.2009 New engines: 1.04.2010	Ordinance on measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery **TPV 401**

Note: (1) $HC + NO_x$

8. **Question 6: With reference to <u>article 4</u>, has your country made unleaded fuel sufficiently available, in particular cases as a minimum along main international transit routes, to facilitate the circulation of vehicles equipped with catalytic converters?**

Yes x No □

Leaded petrol is prohibited to be placed on the market from 1 January 2006.

You may provide further details. However, if your country is a Party to the Heavy Metals Protocol, you should provide further details under question 37.

III. PROTOCOL ON VOLATILE ORGANIC COMPOUNDS[6]

9. **The questions in this section are based on the reporting obligation of Parties in accordance with article 8 and enable Parties to provide information on the implementation of the obligations under articles 2.3(a)(i–iii), 2.3(b) and 7 of the Protocol on Volatile Organic Compounds (VOCs).**

10. **They refer to the following Parties to the Protocol: Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Liechtenstein, Lithuania, Luxembourg, Monaco, the Netherlands, Norway, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.**

Croatian Parliament ratified the Protocol to the 1979 Convention on Long-Range Transboundary Air Pollution Concerning the Control of Emissions of Volatile Organic Compounds or Their Transboundary Fluxes in October 2007, and is published in Official Gazette – International Treaties (OG-IT No. 10/07), entered into force with respect to the Republic of Croatia on 01 June 2008, and the effective date was published in OG-IT No. 2/08.

11. **Question 7: With reference to article 7, please provide up-to-date information on the national programmes, policies and strategies your country has developed to implement the obligations under the Protocol that serve as a means of controlling and reducing emissions of VOCs or their transboundary fluxes. If your country is a Party to the Gothenburg Protocol, you may cross-refer to question 39.**

Croatian Parliament also ratified Protocol to the 1979 Convention on Long-range Transboundary Air Pollution Abate Acidification, Eutrophication and Ground-level Ozone in May 2008, published in Official Gazette – International Treaties (OG-IT 04/08), and it come into force with respect to the Republic of Croatia on 05 January 2009, and the effective date was published in OG-IT 07/08.

Non methane volatile organic compounds (NMVOC) are important because they are precursors in formation of tropospheric ozone. Anthropogenic NMVOCs emissions were 114.4 kt in 2007 which was 1.3% higher than the year before and 4.3% lower than in 1990.

In 1990, sector “solvent use” was the dominant sector of NMVOCs emissions (59.4 % of national total emission). Sector “road transport” contributed with 15.8, while sectors “production processes” and “Extraction and distribution of fossil fuels” contributed in NMVOCs emissions with respectively 8.2% and 6.2%.

The highest emission decrease in 2007, compared to 1990, was achieved in sector “production processes” (-64.8%). In presented period following sectors were also decrease their NMVOC emission: “road transport” (-55.7%) and “non-industrial combustion plants” (47.8%).

According to obligation from the Gothenburg Protocol to reduce NMVOC emission for 14%. Croatia has the obligation under MPME Protocol and Regulation on emission quotas for certain pollutants in the Republic of Croatia (OG No. 141/08) to reach ceiling of 90 kt. The recalculated value of NMVOCs emissions in base year (1990) is 24.7% higher (119,5 kt) then the target value set under the Gothenburg Protocol.

In the period from 2001 to 2007, continuous increase in NMVOC emission is present (+33.5 %). This is mainly due to increase in sector “solvent use” by 2.3 times and “combustion in manufacturing industry” by 5 times.

[6] 1991 Geneva Protocol concerning the Control of Emissions of Volatile Organic Compounds or their Transboundary Fluxes.

Policies and measures

- **National Environmental Strategy with National Environmental Action Plan (OG 46/02)**

Framework objective for VOC is reduction of the total emission to the level prescribed by international treaties; by the year 2010 the emission to be reduced by 14% in relation to 1990

- **The Air Quality Protection and Improvement Plan in the Republic of Croatia for 2008 – 2011 (OG 61/08)**
- **Strategy for energy development in the Republic of Croatia (OG 130/09)**
- **Programme for gradual emission reduction of certain pollutants in the Republic of Croatia for the period until the end of 2010, with emission projections for the period 2010-2020 (OG 152/08)**

According to the Program increase of fuel usage in sub-sector Transport and General consumption is expected, but those increasing will not negatively influenced VOC emission. Overall decreased in the whole period up to 2020 is expected. Emission will be decreased from 20, kt (2007) to 6,7 kt (in 2020). That decrease is equivalent to reduction of 67%. Reason for this is improvement of vehicle fleet. Gradually, vehicles that satisfy EURO I and EURO II norms will be replaced by vehicles that are satisfy EURO III and EURO IV norms, where VOC emission are 10 times lower, in some cases. Emission in the sub-sector Household will decrease for 60% prior to switch coal with natural gas for heating.

Regulatory measures

Republic of Croatia prescribed measures in implementing legislation as the following.

Directive 94/63/EC was transposed into Croatian legislation through the Ordinance on technical standards of environmental protection from volatile organic compounds resulting from storage and distribution of petrol (OG 135/06).

The Ordinance provides for technical measures for reduction of emissions of volatile organic compounds at petrol storage installations at terminals, while loading and unloading of mobile containers at terminals, at mobile containers and storage at petrol stations.

Regulation on emission limit values of pollutants into the air from stationary sources (OG 21/07, 151/08) has been fully harmonized with Directive 1999/13/EC.

Pursuant to the Regulation, MEPPPC sets up a Register of legal and physical persons that, within their scope of activity, use organic solvents or products containing volatile organic compounds. Legal and physical persons must be entered into the Register by 30 May 2007. According to the Regulation deadline for attaining prescribed waste gas emission limit value or prescribed value limits of fugitive emissions or total emission value limits is 31 December 2015. By the end of 2009. target emission levels was violated three times. In the period from 31 December 2009 to 31 December 2015 they can be violated 1,5 times.

For existing plants not complying with emission limit values of volatile organic compounds from vents/stacks, limit fugitive emission values or total emission limit values, owners and/or users of the plant was obliged to draw up an Emission Reduction Programme and submit it to the Ministry of Environmental Protection, Physical Planning and Construction (MEPPPC) by 31 December 2007.

Directive 2004/42/EC on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products is to be transposed into Croatian legislation through adoption of the Regulation on limitation of emissions of volatile organic compounds in certain paints and varnishes and vehicle refinishing products from September 2007 (OG 96/07).

Maximum VOC content level limit values for paints and varnishes and for vehicle refinishing products had to be reached by 31 March 2008. Paints and varnishes maximum VOC content level in the second phase has to be reached by 1 January 2010 (as it is prescribed in the Directive).

Based on the new Environmental Protection Act (OG 110/07) prior to starting construction and operation, as well as prior to a significant change in operation or reconstruction of the installation intended for

performing an activity, which may cause emissions which pollute the soil, air, water and sea, the company shall **obtain integrated environmental protection requirements**. Integrated environmental protection requirements shall be determined with the aim of integrated environmental protection through prevention, reduction and removal to the greatest possible extent of pollution, primarily at the source, and through ensuring prudent management of natural assets by supervising pollution and establishing a sustainable balance between human activity and social and economic development on the one hand and natural assets and nature's regenerative capacity on the other.

Directive 2001/81/EC on national emission ceilings for certain atmospheric pollutants is transposed to the national legislation in Regulation on emission quotas for certain pollutants in the Republic of Croatia (OG 141/08). This Regulation stipulates pollutants, their emission ceilings in the specified period in the Republic of Croatia and the method of preparation of annual emission inventories. Emission ceiling, to be attained by 31 December 2010, for VOC is 90 kt, as it is prescribed by the Gothenburg protocol.

12. **Question 8: With reference to article 2, paragraph 3 (a) (i), please specify the national or international emission standards applied in your country to control and reduce VOCs emissions from stationary sources, the construction or substantial modification of which commenced after 29 September1999, taking into consideration annex II to the Protocol. Please complete the table below.**

Table 4: Question 8

Stationary source	**Emission standards for VOCs[1/]**	**National legislation**
1. Use of solvents	1999/13/EC 1. ELV in waste gasses and the fugitive emission values, or the total ELV for activities 2. requirements of the reduction scheme 2004/42/EC the content limit values for volatile organic compounds in vehicle refinishing products which may be placed on the market	Regulation on emission limit values of pollutants into the air from stationary sources (OG 21/07, 151/08); Chapter VI (ELV in waste gasses and the fugitive emission values, or the total ELV for activities) - the content limit values for volatile organic compounds in vehicle refinishing products which are placed on the market and which must be achieved by 31 March 2008

2. Petroleum industry, including petroleum product handling	94/63/EC Storage installations shall be designed and operated in accordance with the technical provisions of Annex I Loading and unloading equipment shall be designated and operated in accordance with technical provisions of Annex II Mobile containers shall be designed and operated so that residual vapours are retained in the container after unloading of petrol; mobile containers which supply petrol to service stations and terminals shall be designed and operated so as to accept and retain return vapours from the storage installations at the service stations or terminals; road tankers are regularly tested for vapour tightness and that vacuum/pressure valves on all mobile containers are periodically inspected for correct functioning	Regulation on technical standards of environmental protection from volatile organic compounds resulting from storage and distribution of petrol (OG 135/06) Storage installations at terminals shall be designed and operated in accordance with the technical environmental standards designed to reduce the total annual loss of petrol resulting from loading and storage at each storage installation at terminals to below the target reference value of 0.01 weight by weight (w/w) % of the throughput Terminals with loading facilities for road tankers - equipped with at least one gantry which meets the requirements of technical environmental standards for bottom-loading equipment. If vapour recovery is unsafe or technically impossible because of the volume of return vapour, a vapour incineration unit may be substituted for a vapour recovery which loads petrol unit at terminals onto vessels Mobile containers – designed in accordance with the requirements of technical environmental standards: – residual vapours must be retained in the container after unloading of petrol; – mobile containers which supply petrol to service stations and terminals shall be designed and operated so as to accept and retain return vapours from the storage installations at the service stations or terminals; – except for release through the pressure relief valves, the vapours mentioned in indents 1 and 2 shall be retained in the mobile container until reloading takes place at a terminal. Loading and storage installations and equipment at service stations shall be designed and operated in accordance with the technical environmental standards in order to reduce the total annual loss of petrol resulting from loading into storage installations at service stations to below the target reference value of 0.01 w/w % of the throughput. Technical environmental standards prescribe the following conditions: – vapours displaced by the delivery of petrol into storage installations at service stations must be returned through a connection line to the mobile container; – the connection line must be vapour-tight; – loading operations at service stations may not take place unless all required equipment is functioning properly and reliably.

3. Organic chemical industry		Regulation on emission limit values of pollutants into the air from stationary sources (OG 21/07, 151/08) Art 22-26. Emission limit values for organic substances Chapter V – emission limit values for chemical and food industry (Arts. 44-67)
4. Small-scale combustion sources (e.g. domestic heating and small industrial boilers)		
5. Food industry	Table 4. VOC-emission control measures, reduction efficiency and costs for the organic chemical industry of Protocol	Regulation on emission limit values of pollutants into the air from stationary sources (OG 21/07, 151/08) Chapter V – emission limit values for chemical and food industry (Arts. 68-71)
6. Iron and steel industry		
7. Handling and treatment of waste	Chapter G of the Protocol – handling and treatment of waste	Waste Management Plan of the Republic of Croatia for 2007-2015 (OG 85/07) Regulation on emission limit values of pollutants into the air from stationary sources (OG 21/07, 151/08)
8. Agriculture		Code of Good Practice

1/ Specify the units and statistical treatment.

13. **Question 9[7]: With reference to article 2, paragraph 3 (b) (i), please indicate BAT that are economically feasible and applied in your country to control and reduce VOCs emissions from the stationary sources in major source categories, the construction of which commenced on or before 29 September1999, taking into consideration annex II to the Protocol. Please complete the table below.**

[7] The question refers only to Parties in those areas in which national or international tropospheric ozone standards are exceeded or where transboundary fluxes originate or are expected to originate.

Table 5: Question 9

Stationary source in major source categories[1/]	**BAT applied**	**Source of BAT (provide reference of e.g. national legislation, guidance, documentation)**
1. Use of solvents	Table 2. VOC-emission control measures, reduction efficiency and cost for solvent-using sector;	Programme for emission reduction; Regulation on limitation of emissions of volatile organic compounds in certain paints and varnishes and vehicle refinishing products (OG 96/07); Emission Reduction Programme for installations that exceeded ELV according to ELV Regulation (installation owner or user information specific for installation/activity)
2. Petroleum industry, including petroleum product handling	Table 3. VOC-emission control measures, reduction efficiency and costs for the petroleum industry	Regulation on technical standards of environmental protection from volatile organic compounds resulting from storage and distribution of petrol (OG 135/06)
3. Organic chemical industry	Table 4. VOC-emission control measures, reduction efficiency and costs for the organic chemical industry	ELV Regulation Art. 49 – the waste gas containing hydrogen sulphide shell be fed to afterburning Art. 62 – process and waste waters containing hydrogen sulphide after devapourization shell be led to the furnace for incineration
4. Small-scale combustion sources (e.g. domestic heating and small industrial boilers)	Table 5. VOC-emission control measures for stationary combustion sources	ELV Regulation; Programme for emission reduction
5. Food industry	Table 6. VOC-emission control measures, reduction efficiency and costs for the food industry	ELV Regulation; Programme for emission reduction
6. Iron and steel industry		ELV Regulation
7. Handling and treatment of waste	Reduce the amount of produced waste and the reduce the amount to be treated – primary goal Landfill processes used – collection of the gases	Waste Act (OG 178/04, 60/08, 87/09,111/09) Ordinance on the Methods and Conditions for the Landfill of Waste, Categories and Operational Requirements for Waste Landfills (OG 117/07)

8. Agriculture	Composting of waste Controlled disposal of staw	Act on Agriculture (OG 149/09); Act on Agricultural Soil (152/08); Code of Good agricultural practice; Programme for emission reduction

1/ For the definition of major source category see article 1, paragraph 10.

14. **Question 10[8]: With reference to article 2, paragraph 3 (b)(ii), please indicate the techniques applied in your country to reduce VOCs emissions from petrol distribution and motor vehicle refuelling operations and to reduce the volatility of petrol, taking into consideration annex II (IV.B, paras. 39–44) and annex III (IV, paras. 27–34) to the Protocol.**

The techniques applied in Croatia to reduce VOCs emission from petrol distribution and motor vehicle refuelling operation and to reduce volatility of petrol is describe in the Regulation on technical environmental standards for volatile organic compound (VOC) emissions resulting from the storage and distribution of petrol (OG 135/06).

The petrol storage and distribution sector in Croatia uses Stage I control.

MEASURES FOR THE REDUCTION OF TOTAL TRAFFIC-RELATED EMISSIONS

In the total emission of Croatia, the road transport is the major contributor to emissions of lead, NOx, CO and particulate matter. It should be noted that road transport accounts for about 20 per cent of NMVOC emissions, suggesting that problems of ozone precursors lie for the most part in other emission sources. Emissions of CO and NMVOCs show a decreasing trend, while emissions of other pollutants remained at approximately the same level. The NMVOC emissions are decreasing due to the falling share of petrol in the consumption and less fugitive emissions from new cars. In 2005 the number of cars equipped with catalytic converters was 552,000 and is rising by 10 per cent annually (vehicles inspected at stations for technical inspection of vehicles).

15. **Question 11: With reference to article 2, paragraph 3 (a)(ii), please provide details of the national or international measures applied to products containing solvents, taking into consideration annex II.V to the Protocol. Please indicate whether there is labelling of products specifying their VOCs content.**

Directive 2004/42/EC on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products is to be transposed into Croatian legislation through adoption of the Regulation on limitation of emissions of volatile organic compounds in certain paints and varnishes and vehicle refinishing products from September 2007 (OG 96/07).

The Regulation stipulates the use of paints and varnishes and/or vehicle refinishing products with lower content of volatile organic compounds in order to prevent and reduce air pollution resulting from the emissions of such compounds into the air.

The products which are placed on the market must contain a label in the Croatian language. The label shall contain:

– the prescribed VOC content limit values in g/l for product subcategory referred to in Article 7 of this Regulation and for product subcategory referred to in Article 8 of this Regulation, as well as a subcategory code and,

– the maximum VOC content in g/l of ready to use product.

For dry cleaning - closed-system cleaning apparatus (until now around 80% of dry cleaning have closed-system). Until now just rough estimations was known about measure for reduction of emission in the sector for using the solvents.

[8] The question refers only to Parties in those areas in which national or international tropospheric ozone standards are exceeded or where transboundary fluxes originate or are expected to originate.

16. **Question 12: With reference to article 2, paragraph 3 (a)(iii), please specify the national or international emission standards applied in your country to newly registered mobile sources, taking into consideration annex III to the Protocol. Please complete the table below. If your country is a Party to the Gothenburg Protocol, you may cross-refer to questions 51–56.**

Table 6: Question 12

Mobile source	Emission standards for VOCs (g/km) or (g/kWh)		National legislation (start of implementation)
	Petrol	Diesel	
1. Passenger cars and light commercial vehicles	2 g/test		
2. Trucks and buses			
3. Motorcycles and mopeds			
4. Off-road vehicles, machines and locomotives			
5. Other sources, e.g. ships (pleasure craft)			

IV. THE 1994 SULPHUR PROTOCOL

17. **The questions in this section are based on the reporting obligation of Parties in accordance with article 5, paragraph 1 (a) and (c), and enable Parties to provide information on the implementation of the obligations under articles 2.5 and 4.1 of the Protocol. By virtue of article 2, paragraph 5, questions 15 and 16 do not apply to Parties subject to the United States/Canada Air Quality Agreement of 1998.**

18. **They refer to the following Parties to the Protocol: Austria, Belgium, Bulgaria, Canada, Croatia, Cyprus, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Liechtenstein, Luxembourg, Monaco, the Netherlands, Norway, Slovakia, Slovenia, Spain, Sweden, Switzerland, the United Kingdom and the European Community.**

19. **Question 13: With reference to article 4, paragraph 1(a), please provide details of the national strategies, policies and programmes your country has adopted to implement obligations under article 2 of the Protocol. If your country is a Party to the Gothenburg Protocol, you may cross-refer to question 39.**

Croatian Parliament ratified the Protocol to the 1979 Conventionon Long-Range Transboundary Air Pollution on further reduction of sulphur emissions in December 1998, published in Official Gazette – International Treaties (OG-IT 17/98, 3/99), and it come into force with respect to the Republic of Croatia on 27 April 1999.
Croatian Parliament also ratified Protocol to the 1979 Convention on Long-range Transboundary Air Pollution Abate Acidification, Eutrophication and Ground-level Ozone in May 2008, published in Official Gazette – International Treaties (OG-IT 04/08), and it come into force with respect to the Republic of Croatia on 05 January 2009, and the effective date was published in OG-IT 07/08.

According to obligation from the Gothenburg Protocol emission ceiling for SO_2 is 70 kt in 2010.

In accordance with the calculated results, the level of SO_2 emission in 2007 reached 65.1 kt. The trend shows that emissions of SO_2 have increased by 2,9% compared to the emission in 2006 and decreased by 61.7 % since 1990. It could be concluded that SO_2 emission in 2007 was lower than the target set under the Gothenburg Protocol (70 kt). Since 1990, SO_2 emission has the overall decreasing trend due to

consumption of fossil fuel with lower sulphur content. Croatia's obligation is accordance with the NOx Protocol to remain on the same level as it was in 1990. This obligation has already been fulfilled in advance.

The outstanding high level of SO_2 emission in 1990 is a result of fossil fuel consumption with high sulphur content in sector "non-industrial combustion plants" and sector "combustion in manufacturing industry". In years ahead, emissions from these two sectors were reduced by 50%.

In 2007, the emission of SO_2 was generally assigned to sector "combustion in energy transformation industry" due to the combustion in energy transformation industry (60.6% of total SO_2 emissions). The sector "combustion in manufacturing industry" and sector "production processes" equally accounted with respectively 11.6% and 10% in total emission of SO_2, the road transport accounted with 7.4% and non-industrial combustion plants and off-road vehicles equally with respectively 5.3 and 5.1%.

During the period from 1990 to 2007, the decrease of SO_2 emissions was achieved in almost all sectors and the greatest decrease of SO_2 emission was in sector 03 - industrial combustion plants (-85.4%).

SO_2 emission increased only in sector "road transport (+9.2%), although the sulphur content in fuel was lowered. This was due to increase of number of vehicle on the road.

Policies and measures

- **National Environmental Strategy with National Environmental Action Plan (OG 46/2002)**

Framework objective for SO_2 is reduction of the total emission to the level prescribed by international treaties; by the year 2010 the emission to be reduced by 61% in relation to 1990 and by 22 per cent in relation to 1998. The total emission from existing stationary sources

- **Air Quality Protection and Improvement Plan in the Republic of Croatia for 2008 – 2011 (OG 61/08)**
- **Plan on reduction of emissions of sulphur dioxide, nitrogen oxides and particulate matter from major combustion plants and gas turbines in the territory of the Republic of Croatia (OG 151/08)**
- **Strategy for energy development in the Republic of Croatia (OG 130/09)**

Use of low sulphur fuel and decrease of use of liquid fuel in electrical energy production. Big energetic system will use installations of DeSOx with high level of segregation. Energy will contribute to overall level of SO_2 and NOx emission bellow ceilings prescribed by the Gothenburg protocol.

- **Programme for gradual emission reduction of certain pollutants in the Republic of Croatia for the period until the end of 2010, with emission projections for the period 2010-2020 (OG 152/08)**

Based on the new Environmental Protection Act (OG 110/07) prior to starting construction and operation, as well as prior to a significant change in operation or reconstruction of the installation intended for performing an activity, which may cause emissions which pollute the soil, air, water and sea, the company shall **obtain integrated environmental protection requirements**. Integrated environmental protection requirements shall be determined with the aim of integrated environmental protection through prevention, reduction and removal to the greatest possible extent of pollution, primarily at the source, and through ensuring prudent management of natural assets by supervising pollution and establishing a sustainable balance between human activity and social and economic development on the one hand and natural assets and nature's regenerative capacity on the other

Regulatory measures

The Air Protection Act (OG 176/2004 60/08) gives legal framework for transposition of numbers of sectoral EC directives into the Croatian legislation.

Based on the Act and the new Act on Environmental Protection (OG 110/07) the following Ordinances/Regulations that have impact on the reduction of SO_2 emissions were adopted:

- Regulation on emission limit values of pollutants into the air from stationary sources (OG 21/07, 151/08)

- Ordinance on emission pollutants monitoring from stationary sources into the air (OG 1/06),

- Regulation on unit charges, corrective coefficients and detailed criteria and benchmarks for determination of the charge for emission into the environment of SO_2 and NOx (OG 71/04),

- Ordinance on the method and terms for calculation and payment of charges for emission into the environment of sulphur oxides, in the form of sulphur dioxide, and nitric oxides, in the form of nitric dioxide (OG 95/04),

- Regulation on environmental impact assessment (OG 64/08, 67/09),

- Ordinance on the environmental pollution register (OG 35/08),

- Regulation on the quality of petroleum-derived liquid fuels (OG 53/06, 154/08),

- Regulation on limit values of pollutants in ambient air (OG 133/05),

- Regulation on alert thresholds of pollutants in ambient air (OG 133/05),

- Regulation on ozone in ambient air (OG 133/05),

- Regulation on determining locations of stations in the national network for continuous air quality monitoring (OG 4/02),

- Regulation on the procedure for establishing integrated environmental requirements (OG 114/08),

- Regulation on emission quotas for certain pollutants in the Republic of Croatia (OG 141/08)

20. **Question 14: With reference to <u>article 2, paragraph 4,</u> please provide details of how your country is making use of the most effective measures, appropriate to your country's particular circumstances, for reducing sulphur emissions for new and existing sources. This could include measures to:**

(a) Increase energy efficiency;

(b) Increase the use of renewable energy;

(c) Reduce the sulphur content of particular fuels and to encourage the use of fuel with low sulphur content, including the combined use of high-sulphur with low-sulphur or sulphur-free fuel;

(d) Apply BAT not entailing excessive costs, using the guidance in <u>annex IV</u>.

<u>Measures for Application of Economic Instruments under the Polluter Pays Principle</u>

Economic instruments applied include charges on sulphur dioxide and nitrogen oxide emissions introduced in 2004 and charges on carbon dioxide missions introduced in 2007. Entities liable to pay charges on SO_2 and NOx emissions are all sources of these emissions obliged to submit data to the Pollutant Emission Register. The unit charge on the emission of 1 tonne of SO_2 and NOx amounts to 310 kunas. Since the limit costs of emission reduction measures exceed the unit charges by an order of magnitude only, plant operators are not stimulated to invest in them.

MEASURES TO REACH LIMIT VALUES, IF EXCEEDED

SO_2 emissions in Rijeka and Sisak arise from the operation of refineries and partly thermal power plants. This should be solved by implementation of the ELV regulation, which implies the use of low-sulphur fuel oil after 2010. The City of Zagreb has banned the use of coal in boiler-houses. The existing coal-fired boiler-houses in the city are to be replaced and it is necessary to continue introducing the gas grid and extending the long distance heating system. District heating plants should be constructed as cogeneration plants and actively involved in the promotion of energy efficiency measures and the use of renewable energy sources. New constructions and refurbishing of public institutions should meet the highest energy conservation standards.

ENERGY EFFICIENCY AND RENEWABLE ENERGIES

Energy Law (OG 68/01, 177/04, 76/07, 152/08) regulates measures to ensure a secure and reliable energy supply, efficient power generation and its use; enforcement of acts that will stipulate and on the basis of which the energy policy and energy strategy will be designed; it also regulates carrying out of energy activities based on market principles or pursuant to public service obligation, and other key issues relevant for the energy sector.

Law on electricity market (OG 177/04, 76/07, 152/08) regulates the following activities of the energy sector: power generation, transmission, distribution, retail supply, operation and control of the electricity system and organization of the electricity market.

The regulation on the minimum share of electricity produced from renewable energy sources and cogeneration whose production is incentivized (OG 33/07) defines the target national policy

In the field of renewable sources and cogeneration and prescribes the minimum share of renewable energy sources and cogeneration which energy supply undertakings are obliged to supply in the structure of energy offered to end buyers.

Tariff system for the production of electricity from renewable energy sources and cogeneration (OG 33/07) estimates the definition of incentive prices for the electricity produced from renewable energy sources and cogeneration. This tariff system contains guaranteed incentive prices for the production of electricity from all plants using renewable energy sources or cogeneration and that have the right to an incentive.

Regulation on the fee for stimulating electricity production from renewable energy sources and cogeneration (OG 33/07) determines charge rate for the stimulation of renewable energy sources that every energy supply subject (both tariff and privileged buyers) will have to include in the price of energy, with the aim of collecting funds for the payment of incremental expenses deriving from the promotion of renewable energy sources and cogeneration.

Regulation on minimal share of electricity produced from renewable energy sources and cogeneration whose production is incentivized (OG 33/07) determines that in 2010 the minimum share of renewable energy sources in customer supply will amount to 1139 GWh/year of electricity without electricity from large hydropower plants (capacity of 10 MW or more). Production of 1139 GWH in 2010 will represent about 5.8% in the structure of total electricity consumption in relation to share of 0.8% in Croatia in 2004.

Ordinance on the use of renewable energy sources and cogeneration (OG 62/07) specifying renewable energy sources used for energy production, conditions and feasibility of their use, including planning, administrative procedure, register of renewable energy and cogeneration projects and other issues of significance for using the renewable energy sources and cogeneration.

Ordinance on acquiring the status of an privileged electricity producer (62/07) laying down the types of plants with regard to application of specific technology using renewable energy sources for producing the electricity and criteria for high-efficiency cogeneration pursuant to Directive 2004/8/EZ, and which may be granted the status of privileged producer.

In the energy and transport sector in Croatia, significant results in reducing all pollutant emissions into the air, including reduction in sulphur emission, have been achieved through implementation of all available measures and methods. The following methods and procedure are applied:

- the Regulation on thermal energy savings and thermal protection in buildings (OG 79/05, 155/05, 74/06) – implementation of which better energy efficiency of buildings and a reduction in energy needs is achieved

- limitation where set on the import of new (EURO IV) and used (EURO III) vehicles of the most represented M1 category, whereby better energy efficiency and reduction in the pollution generated from transport is achieved

- the use of better-quality low sulphur fuels is introduced into energy and transport sector, while modernisation of refineries is also being carried out in order to meet demand for this types of fuels

- in the ELV Regulation quantity of sulphur oxides in flue gasses of large combustion plants in line with European regulation is prescribed, and for the existing energy facilities adaptation deadlines have been set

- the use of gas fuels in the energy and transport sector has been significantly increased, showing a further growth trend

- increasingly better results are achieved through the growing use of renewable energy sources, the use of wind power through the construction of wind power plants, the construction of energy facilities using various types of agricultural waste and biogas from landfills, as well as through the use of solar energy, especially in tourist facilities for hot sanitary water and heating.

21. **Question 15: With reference to article 2, paragraph 5 (a), and annex V, please provide details of the emission limit values applied in your country to all major stationary combustion sources, the construction or substantial modification of which was authorized after 31 December 1995. If your country is a Party to the Gothenburg Protocol, you may cross-refer to questions 40 and 41. Please complete the table below.**

Table 7: Question 15

Major stationary combustion source	**Oxygen (O_2) % in flue gas**	**Emission limit value (mg SO_2/Nm^3)**	**Desulphurization rate indigenous fuels (%)**	**National legislation**	**Comments**
1.Solid fuels				ELV regulation	
(a) 50-100 MW_{th}	6%	850	>50 - 300 MW_{th}- 92% (ELV 300 mg/m^3)		
(b) 100-500 MW_{th} 1/	6%	>100 MW_{th} – 200 mg/Nm^3	> 300 MW_{th} - 95% (ELV 400 mg/Nm^3)		
(c) >500 MW_{th}					
2. Liquid fuels				ELV regulation	
(a) 50-300 MW_{th}	3%	850			
(b) 300-500 MW_{th}	3%	400-200 (linear decrease)			
(c) >500 MW_{th}	3%				
3. Gaseous fuels			n.a.	ELV regulation	
(a) Gaseous fuels in general	3%	35			
(b) Liquified gas	3%	5			
(c) Low calorific gases from gasification of refinery residues, coke oven gas, blast furnace gas	3%	800			

1/ If you apply, as an alternative, a desulphurisation rate, the category should be split up into 100–167 and 167–500 MW_{th}.

22. **Question 16: With reference to article 2, paragraph 5 (b), and annex V, please provide details of the emission limit values applied in your country to major stationary combustion sources, the construction of which was authorized on or before 31 December 1995. If other emission limitations or other appropriate provisions are applied, please describe these, taking due account of the conditions for such alternatives as specified in article 2, paragraph 5 (b). If your country is a Party to the Gothenburg Protocol, you may cross-refer to question 41. Please complete the table below.**

Table 8: Question 16

Major stationary combustion source relevant age of plant	**Oxygen (O_2) in flue gas (%)**	**Emission limit values (mg SO_2 /Nm^3)**	**Desulphuri-zation rate indigenous fuels (%)**	**Alternative emission limitations (where appropriate)**	**National legislation**	**Comments**
1. **Solid fuels**					ELV regulation	
(a) 50-100 MW_{th}	6%	2000	60			
(b) 100-500 MW_{th}	6%	2000 – 400 (linear decrease)	75 (>100-300) 90 (>300)			
(c) >500 MW_{th}	6%	400	94			
2. **Liquid fuels**					ELV regulation	
(a) 50-300 MW_{th}	3%	1700				
(b) 300-500 MW_{th}	3%	1700 – 400 (linear decrease)				
(c) >500 MW_{th}	3%	400				
3. **Gaseous fuels**			n.a.		ELV regulation	
(a) Gaseous fuels in general	3%	35				
(b) Liquified gas	3%	5				
(c) Low calorific gases from gasification of refinery residues, coke oven gas, blast furnace gas	3%	400				

23. **Question 17: With reference to article 2, paragraph 5 (c), and annex V, please provide details of the national standards for the sulphur content of gas oil applied in your country. Please complete the table below.**

Table 9: Question 17

Type	**Sulphur content (% or ppm)**	**National legislation**
1. Diesel for on-road vehicles	50 mg/kg 10 mg/kg	From 1 June 2006 From 1 January 2010
2. Other types (e.g. diesel for off-road vehicles gas oil for inland navigation, heating, etc.)		

-off road vehicles	Gas oil 0,2% m/m 0,1 % m/m	From 1 June 2006 From 1 January 2010
-inland navigation	Gas oil 0,2% m/m 0,1 % m/m	From 1 June 2006 From 1 January 2010
-for heating	Gas oil 0,2% m/m 0,1 % m/m Heavy oil 1,0/ m/m	From 1 June 2006 From 1 January 2010 From 1 January 2010

V. PROTOCOL ON PERSISTENT ORGANIC POLLUTANTS

24. **The questions in this section are based on the reporting obligation of Parties in accordance with article 9, paragraphs 1 (a) and 2, and enable Parties to provide information on the implementation of the obligations under articles 3.1 (a), 3.1 b)(i), 3.1 b)(iii), 3.1 (c), 3.3, 3.5(b)(i), 3.5(b)(ii), 3.5 (b)(v), 3.8 and 7.1 of the 1998 Protocol on Persistent Organic Pollutants (POPs). Questions 28 and 29 are not yet mandatory. They are designed to enable Parties to provide information on progress made towards the implementation of articles 3.5 (b)(iii) and 3.5 (b)(iv) concerning obligations that will become effective in 2011.**

25. **They refer to the following Parties to the Protocol: Austria, Belgium, Bulgaria, Canada, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Iceland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, the Netherlands, Norway, Republic of Moldova, Romania, Slovakia, Slovenia, Sweden, Switzerland, the United Kingdom and the European Community.**

Croatian Parliament ratified Protocol to the 1979 Convention on long-range transboundary air pollution on persistent organic pollutants in April 2007, published in Official Gazette – International Treaties (OG-IT 05/07), and it come into force with respect to the Republic of Croatia on 5 December 2007, and the effective date was published in OG-IT 09/07.

Croatian Parliament also ratified Stockholm convention on persistent organic pollutants in November 2006, published in Official Gazette – International Treaties (OG-IT 11/06), and it come into force with respect to the republic of Croatia on 20 April 2007, and the effective date was published in OG-IT 02/07.

In 1996, the Republic of Croatia has started to calculate estimate the POPs emissions in accordance with EMEP/CORINAIR methodology, officially adopted by the Executive Body of the LARTAP Convention.

Annual emissions are provided for three groups of POPs: pesticides, polycyclic aromatic hydrocarbons and Dioxins/furans.

The pesticide emissions originate from the agricultural use of pesticides. Other emission sources (e.g. the manufacturing of pesticides or emission of imported products) are considered to be negligible compared to emissions caused by the agricultural use of pesticides.

Polycyclic aromatic hydrocarbon (PAH) emission

There are more than 100 of different polycyclic aromatic hydrocarbons, and annual emission report is provided for four of them as follows: benzo(a)pyren, benzo(b)fluorantene, benzo(k)fluorantene, indeno(1,2,3-cd)pyren. The 4 PAHs are those defined by the Aarhus protocol. The major source of PAHs emissions is fossil fuel combustion in residential sector, coke production and primary aluminium production with Söderberg's anodes. It should be mentioned that in 1991 the primary aluminium production in Šibenik was stopped and in 1994, the coke production in Bakar.

A total PAHs emission equals 7.4 t in 2007 and that is 14.7% lower in comparison to emissions in 2007. The emission trend of PAHs was descending during the period between 1990 and 2007 (-47.8%). The

structure of sectors didn't change in that period, and the major source of PAHs emissions is sector "non-industrial combustion plants" (97.2% of total national emissions).

Dioxin and furans emission (DIOX)

The major source of dioxins and furans emissions in Croatia is fuel wood combustion in the residential sector. Other processes that contribute to this emission are steel production in electric arc furnace, energy conversion, waste incineration and cremation.

In 2007, dioxins and furans emissions were 78.9 g I-TEQ . The emissions are 14.8 % lower than in 2006 and 50.6% lower than1990.

The major source is sector "non-industrial combustion plants" which accounted with 92.5% of total national emissions in 2007 (- 50.3% decrease since 1990).

The production process contribution to DIOX emissions in period from 1990 (11,98 g I-TEQ) to 2007 (5.34 g I-TEQ) decreased for about 55.4 % due to the production decrease in iron and steel industry. All other sectors contribute to total national emissions with about 0.7%.

26. **Question 18: With reference to article 7, paragraph 1, please provide details of the national strategies, policies and programmes your country has developed to discharge its obligations under the Protocol.**

National Implementation Plan (NIP)

The Republic of Croatia transmitt NIP to the Secretariat of the Stockholm Convention in March 2009.

The basic goal of the NIP as well as the Stockholm Convention is to protect human health and the environment from POPs.

The priority goals of NIP implementation are:

- Elimination of all potential PCBs sources;

- Systematic control of the levels of POPs compounds in all environmental elements;

- Restriction and control of PCDD/PCDF, PCBs and HCB emissions from unintentional sources;

- Unintentional releases of PCDD/Fs, PCBs and HCB are controlled and continuously reduced;

- Application of technological solutions (BAT/BEP) that facilitate emissions reduction or abatement of POPs compounds from unintentional sources;

- Informed public about influence of POPs compounds on human health through their intake and about the measures to avoid exposure.

Government of the Republic of Croatia gave the mandate for NIP implementation to Ministry of Environmental Protection, Physical Planning and Construction. Due to the multidisciplinary nature of the problem, the authority for surveillance of NIP implementation should comprise representatives of other state bodies responsible for surveillance of the use of POPs compounds (Ministry of Agriculture, Fishery and Rural Development, Ministry of Regional Development, Forestry and Water Management; Ministry of Health and Social Welfare; Ministry of Economy, Labour and Entrepreneurship…).

27. **Question 19: With reference to article 3, paragraph 1 (a), please provide details of the measures taken by your country to eliminate the production and use of substances listed in annex I to the Protocol. Please complete the table below.**

Table 10: Question 19

Substance	Elimination of	Measures taken (e.g. national legislation)
Aldrin	Production - banned	Act on Plant Protecting Agents OG 70/05
	Use - banned	Act on Plant Protecting Agents OG 70/05
Chlordane	Production - banned	Act on Plant Protecting Agents OG 70/05

	Use - banned	Act on Plant Protecting Agents OG 70/05
Chlordecone	Production - banned	Act on Plant Protecting Agents OG 70/05
	Use - banned	Act on Plant Protecting Agents OG 70/05
DDT[9]	Production - banned	Act on Plant Protecting Agents OG 70/05
	Use - banned	Act on Plant Protecting Agents OG 70/05
Dieldrin	Production - banned	Act on Plant Protecting Agents OG 70/05
	Use - banned	Act on Plant Protecting Agents OG 70/05
Endrin	Production - banned	Act on Plant Protecting Agents OG 70/05
	Use - banned	Act on Plant Protecting Agents OG 70/05
Heptachlor	Production - banned	Act on Plant Protecting Agents OG 70/05
	Use - banned	Act on Plant Protecting Agents OG 70/05
Hexabromobiphenyl	Production - banned	Act on Plant Protecting Agents OG 70/05
	Use - banned	Act on Plant Protecting Agents OG 70/05
Hexachlorobenzene	Production - banned	Act on Plant Protecting Agents OG 70/05
	Use - banned	Act on Plant Protecting Agents OG 70/05
Mirex	Production - banned	Act on Plant Protecting Agents OG 70/05
	Use - banned	Act on Plant Protecting Agents OG 70/05
PCBs[10]	Production - banned	List of Hazardous Chemicals Whose Market is Prohibited or Limited OG 17/06
	Use - banned	List of Hazardous Chemicals Whose Market is Prohibited or Limited OG 17/06
Toxaphene	Production - banned	Act on Plant Protecting Agents OG 70/05
	Use - banned	Act on Plant Protecting Agents OG 70/05

28. **Question 20: With reference to article 3, paragraph 1 (b) (i), please provide details of the measures your country has taken to ensure that the destruction or disposal of substances listed in annex I is undertaken in an environmentally sound manner, taking into account relevant international regimes, in particular the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (Basel Convention).**

POPs pesticides are not produced in Croatia, nor are active substances for production of finished formulations of POPs pesticides. Nowadays in Croatia there are numerous preparations registered, that have completely replaced the toxicologically unfavourable pesticides, including POPs. Future production of POPs pesticides is neither planned nor possible as their manufacture has been prohibited. Until the ban of POPs pesticides, the quantities used were those indicated in the respective licences. Their elimination has not caused big problems because of the substitutes which were less toxic, less hazardous and ecologically acceptable.

POPs pesticides that contain active substance prohibited by the Convention are not used in the forestry. The practice of using plant protection agents containing POPs a component is prevented since those agents are not produced or in use in Republic of Croatia.

The only substance in Croatia that is subject of the destruction or disposal of PCBs contained in existing equipments. PCBs have never been produced in Croatia although the equipment (transformers and capacitors) containing PCBs had been manufactured. The new Law on Chemicals (OG 150/08 and 53/08) and List of Hazardous Chemicals with Prohibited or Limited Circulation (OG 17/06) prescribes that it is prohibited to circulate and use PCBs except in the cases of maintenance of existing installations until their end of use.

[9] Dichlorodiphenyltrichloroethane.
[10] Polychlorinated biphenyls.

In September 2008 the Ordinance on Polychlorinated Biphenyls and Polychlorinated Terphenyls Management was adopted (OG 105/08). The Ordinance envisaged that holders shall undertake all required measures in order to ensure recycling and/or disposal and decontamination of PCBs and equipment containing PCB by 31 December 2010 at the latest. In addition circulation of PCBs and PCB containing equipment is also prohibited after 31 December 2010. The same Ordinance prescribes the obligation for all PCB equipment holders to submit the list of PCB equipment of volume larger than 5 dm^3 of volume to the Ministry of Environmental protection, Physical Planning and construction and to the Croatian Environmental Agency in order to form the PCB inventory. This obligation was fulfilled in March 2009 and the PCB inventory was made in May 2009.

Where incineration is used for recycling or disposal, a special regulation which prescribes thermal waste treatment shall apply. Other methods of recycling and/or disposing of PCBs, used PCBs and/or equipment containing PCBs may be accepted provided they achieve equivalent environmental safety standards in comparison with incineration and if they fulfil the technical requirements referred to as best available techniques.

As the Republic of Croatia does not have capacities for recycling or disposal of waste containing PCBs such waste is exported to the countries of the European Union following the Basel Convention procedure. Furthermore, exporters of hazardous waste are obliged to submit reports on exported quantities of waste to the Ministry once a year.

29. **Question 21: With reference to article 3, paragraph 1 (b) (iii), please provide details of the measures taken to ensure that the transboundary movement of substances listed in annex I is conducted in an environmentally sound manner, taking into consideration applicable international regimes, in particular the Basel Convention.**

According to the Waste Act (OG No. 178/04, 111/06, 60/08, 87/09) the import of of hazardous waste is prohibited, except in the case of recovery when the recovery of the material gets a new product or raw material which ceases to be waste.

The Republic of Croatia ratified the Basel Convention on the Control of Transboundary Movements of Hazardous Waste and their Disposal (OG-IT 3/94) in 1994. By this Convention "waste materials and objects containing or contaminated with polychlorinated biphenyls (PCB) i.e. polychlorinated terphenyls (PCT) i.e. polybrominated biphenyls (PBB)" (label Y10) are classified as waste requiring control i.e. as hazardous waste (Annex I). In compliance with the Basel Convention, hazardous waste can be exported to the countries having no ban on the import of hazardous waste and at written approval of the competent institution of the importing country. Also, transboundary movement of hazardous waste and of other types of waste must be reduced to the least possible extent, in compliance with environmentally harmless and efficient waste disposal practices, and in the manner that prevents harmful impact of such movements to human health and environment.

Transportation of PCBs and of the equipment containing PCB must comply with the provisions of the Act on Transportation of Hazardous Substances (OG 79/07). This Act is based on the European Agreement concerning the International Transport of Goods by Roads (ADR). According to ADR PCBs are classified as dangerous substances that during transportation pose danger to the participants in traffic, to people and environment (Class 9). PCBs level of hazard is 2b (substances that in case of fire may generate dioxins) and of the equipment with PCBs is 3. The vehicles carrying PCBs and waste contaminated with PCBs must be technically in order, equipped and labelled in compliance with the set standards. PCBs must always be transported under necessary safety measures, as a rule at daytime, and the consignment has to be packed in the manner satisfying the conditions for safe carriage.

30. **Question 22: With reference to article 3, paragraph 1 (c), please provide details of the measures taken to restrict the substances listed in annex II to the uses described in that annex. Please complete the table below.**

Table 11: Question 22

Substance	Measures taken (e.g. national legislation)

DDT	There is no production, import, export and use of POPs pesticides, which is in line with the current legislation, in Croatia. Use and production is banned in 1972. Action Plan for Production, Import and Export, Use, Stockpiles and Waste of DDT is not a priority of Croatia because no production and import, and the usage are banned since 1972. The use of DDT for the purpose of disease vector control has never been present, as there was no malaria on the territory of Croatia in last 50 years, and the application and use of dicofol are prohibited; ACT ON PLANT PROTECTING AGENTS OG 70/05
HCH[11] (mixed isomers)	Hexachlorocyclohexan (HCH) is banned since 1972; ACT ON PLANT PROTECTING AGENTS OG 70/05
Lindane (HCH gamma isomer)	Lindan was used recently. The last pesticide prohibited, categorised as persistent organic pollutant but not listed in the Stockholm Convention, was lindane. It was prohibited in 2001, the same year as in the European Union; ACT ON PLANT PROTECTING AGENTS OG 70/05
PCBs	PCBs have never been produced in Croatia although the equipment (transformers and capacitors) containing PCBs was manufactured. For this purpose the liquid PCBs were imported. In September 2008 the Ordinance on Polychlorinated Biphenyls and Polychlorinated Terphenyls Management was adopted (OG 105/08). The Ordinance envisaged that holders shall undertake all required measures in order to ensure recycling and/or disposal and decontamination of PCBs and equipment containing PCB by 31 December 2010 at the latest.In addition circulation of PCBs and PCB using equipment is also prohibited after 31 December 2010; LIST OF HAZARDOUS CHEMICALS WHOSE MARKET IS PROHIBITED OR LIMITED OG 17/06

31. **Question 23: Has your country granted any exemptions in accordance with article 4, paragraph 2 of the Protocol?**

Yes ☐ No **x**

If yes, please provide details of the exemption and indicate when your country provided the secretariat with the information required under article 4, paragraph 3.

32. **Question 24: Did your country apply any of the exemptions allowed for in annex I, other than those identified in annex II?**

Yes ☐ No **x**

If yes, please provide details.

33. **Question 25: With reference to article 3, paragraph 3, please provide details of the measures taken in your country to ensure that wastes and articles still in use containing the substances listed in annexes I, II, or III, upon becoming wastes, are destroyed or disposed of in an environmentally sound manner.**

The Waste Act (OG 178/04, 111/06, 60/08, 87/09) prescribes waste in the Republic of Croatia has to be recovered and/or disposed in environmentally sound manner. As the Republic of Croatia does not have capacities for recycling or disposal of waste containing PCBs such waste is exported to the countries of the European Union following the Basel Convention procedure.

34. **Question 26: With reference to article 3, paragraph 5 (b)(i), and annex V, please explain how you ensure the application of BAT, to each new stationary source (construction commenced after**

[11] Hexachlorocyclohexane.

23 October 2005) within a major stationary source category for which that annex identifies BAT, for example through national legislation, permitting procedures, guidance, etc.

Limit values of pollutant emission from stationary sources into the air are regulated by the Regulation on limit values of pollutants emission from stationary sources into air (OG 21/07, 150/08).

ELV for dioxins and furans in the waste incinerator gasses and waste gasses occurring in the technological processes obtaining cement using waste as fuel is 0,1 ng/m^3. Limit value is determined in accordance to EU Directive (2000/76/EC) relating to all types of waste incinerators including co-incineration of waste.

Anticipated activities for reduction/removal of by-products released into the environment should be in accordance to goals defined for POPs compounds in the National Strategy for Environmental Protection (OG 46/02) and National Plan for Environmental Protection (OG 46/02). In these two strategic documents framework aims regarding POP compounds were given.

In accordance to the Air Quality Protection and Improvement Plan in the Republic of Croatia for the Period of 2008 – 2011 (OG 61/08) a list of measures aiming at POPs reduction were given:

• Introduce a programme for IPPC Directive implementation and application of best available techniques, for reduction of POPs

In the Republic of Croatia it is necessary to systematically introduce IPPC Directive which presents the most important instrument for dioxins and furans emissions reduction instrument. The objective of IPPC Directive – directive on integrated pollution prevention and control, is to reduce environmental impact of the biggest industrial installations through reduction of air-pollution, water and soil pollution, waste minimisation and rational use of natural resources and energy.

In relation to POPs emissions reduction, the UNEP document best available techniques (BAT) and best environmental practices (BEP) for reducing and/or eliminating emission of POPs by products is available.

According to the NIP the priority goals of NIP implementation are:

- Elimination of all potential PCBs sources;

- Systematic control of the levels of POPs compounds in all environmental elements;

- Restriction and control of PCDD/PCDF, PCBs and HCB emissions from unintentional sources;

- Unintentional releases of PCDD/Fs, PCBs and HCB are controlled and continuously reduced;

- Application of technological solutions (BAT/BEP) that facilitate emissions reduction or abatement of POPs compounds from unintentional sources;

- Informed public about influence of POPs compounds on human health through their intake and about the measures to avoid exposure.

Based on the Environmental Protection Act (OG 110/07) Ordinance on the register of use permits establishing integrated environmental requirements and of decision on integrated environmental requirements for existing installations (OG 113/08) and Regulation on the procedure for establishing environmental requirements (OG 114/08) were adopted and came into force in April 2009. It made a basis for pollution control.

Integrated environmental protection requirements for the installations will be issued for existing installations, new installations and for significant changes in operation or reconstruction of existing installations.

Integrated environmental protection requirements

For new installations

1. local permit is mandatory part of the local permit and are conditions from Decision on integrated environmental protection requirements

2. a part of the request for a building permit is also written report of an authorised auditor confirming that the technical solution of the installation proves that the integrated environmental protection requirements are fulfilled
3. use permi

For existing installations

1. 3 years after the Environmental protection Act is in force analysis of the status related to the installations and a study on the manner of harmonization with the provisions of the Environmental protection Act
2. evaluation of the analysis of the status related to the installation and a study on the manner on harmonization with the provision
3. opinion of the MEPPC
4. positive opinion for a further procedure and requirements
5. 6 months deadline – request for determine integrated environmental protection requirements
6. decision on integrated environmental protection requirements

35. **Question 27: With reference to article 3, paragraph 5 (b)(ii), and annex IV, please provide details of the limit values applied to each new stationary source (construction commenced after 23 October 2005) within a category referred to in that annex. Please complete the table below.**

Table 12: Question 27

Major new stationary sources	**Limit values for PCDD/F (in ng TE/m^3, based on 11% oxygen in flue gas)**	**Other emission reduction strategies (if applicable)**
A. Municipal solid waste (>3 tons/hour)	0,1	

B. Medical solid waste (>1 ton/hour)	0,1	<u>The Ordinance on Medical Waste Manangement (OG 72/07)</u> Infectious medical waste shall be collected separately at the point of generation into air-tight and leak-proof containers resistant to breakage and leakage, and transported to a temporary warehouse, without sorting or transfer to other containers.The storage of infectious waste at the point of generation shall not exceed fifteen days if the temperature is up to +8°C, or eight days at the temperature from +8°C to +15°C. Infectious waste shall not be stored at temperatures exceeding + 15 °C. Medical waste shall be locked at the point of generation and kept in a fenced and separate temporary warehouse until treatment, recovery and/or disposal or its delivery to the authorized person. Hazardous medical waste shall be packed into appropriate packaging material, labelled in accordance with regulations on transport of hazardous substances and valid international agreements, if exported for treatment. Recovery and/or disposal of medical waste by incineration or co-incineration shall be carried out exclusively in the authorized plant with continuous monitoring of hazardous gas emissions pursuant to a special regulation, whereby dioxin and furan emissions shall not exceed the limit value stipulated by a special regulation.

C. Hazardous waste (>1 ton/hour)	0,1	<u>The Ordinance on Waste Management (OG 23/07, 111/07)</u> Technical-technological requirements for hazardous waste storage are following: – as a rule, it must be closed and covered. – it must be built from firm material, enclosed and secured against inflow of precipitation waters. – storage within an economic activity must be physically separated from the principal activity, – waste must be stored separately according to its property, type and state of matter, – the floor surface of a storage must be impermeable and resistant to the effects of stored waste, – it must be equipped in such a way as to prevent dispersion or spillage of waste, spreading of dust, noise, odours and other emissions, – it must be equipped with devices, equipment and instruments for notifying, extinguishing and preventing the spreading of fire, as well as with other safety equipment pursuant to special regulations, – stationary containers, tanks and other packaging in a storage shall be manufactured in a way that enables safe filling, emptying, venting, sampling and impermeable closing and sealing, and uncovered tanks must have a double lining or must be attested for the storage of substances which are a component part of waste – the sign “action plan in case of emergency” shall be posted in a visible location of a storage and it shall contain the following information on: types of waste which are being stored; possible emergencies; name, surname and phone numbers of responsible persons and their competences; phone number of the police; phone number of the fire department and phone number of the ambulance, – a waste storage shall be marked with the sign “waste storage” containing information on types of waste which are being stored, key number from the Waste Catalogue pursuant to a special regulation, legal or natural person’s name and working hours. – the setup of lighting with artificial light sources for the safe handling of hazardous waste, – the compliance with special regulations for devices and other safety equipment for the storage and handling of dangerous substances contained in hazardous waste, – the construction of energy, gas, water, ventilation and other installations under special regulations which lay down the storage and handling of dangerous substances contained in hazardous waste.

36. **Question 28[12]: With reference to article 3, paragraph 5 (b)(iii), and annex V, please provide information on progress made towards applying BAT to each existing stationary source (construction commenced on or before 23 October 2005) within a major stationary source category for which that annex identifies BATs, in so far as this is technically and economically feasible. If your country intends to apply, as an alternative, different strategies that will achieve equivalent emission reductions, please describe these.**

37. **Question 29[12]: With reference to article 3, paragraph 5 (b)(iv), and annex IV, please provide information on progress made towards applying limit values to each existing stationary source (construction commenced on or before 23 October 2005) within a category mentioned in that annex, in so far as this is technically and economically feasible. If your country intends to apply, as an alternative, different strategies that will achieve equivalent emission reduction, please describe these.**

Table 13: Question 29

Major existing stationary sources	**Limit values for PCDD/F (in ng TE/m^3, based on 11% oxygen in flue gas)**	**Other emission reduction strategies (if applicable)**
A. Municipal solid waste (>3 tons/hour)	0,1	
B. Medical solid waste (>1 ton/hour)	0,1	
C. Hazardous waste (>1 ton/hour)	0,1	

38. **Question 30: With reference to article 3, paragraph 5 (b) (v), and taking into consideration annex VII, please provide details of the measures taken to control emissions from mobile sources. Please complete the table below.**

Table 14: Question 30

Mobile source categories for POPs	**Measures (e.g. limit values[1/], national legislation, guidance)**
A. Diesel-fuelled passenger cars	NA
B. Heavy duty vehicles	NA
C. Off-road engines	NA

1/ When limit values are given, please provide those for category A in g/km and those for categories B and C in g/kWh.

39. **Question 31: With reference to article 3, paragraph 8, please provide the available (historical) information you have collected relating to the production and sales of the substances listed in annexes I and II to the Protocol. Please complete the table below.**

Table 15: Question 31

[12] Not mandatory. The obligation will become effective after 23 October 2011.

Substance	Production (quantity per year)	Sales (quantity per year)
Aldrin	No data	No data
Chlordane	No data	No data
Chlordecone	No data	No data
DDT	No data	No data
Dieldrin	No data	No data
Endrin	No data	No data
Heptachlor	No data	No data
Hexabromobiphenyl	No data	No data
Hexachlorobenzene	No data	No data
Mirex	No data	No data
PCBs	No data	No data
Toxaphene	No data	No data
HCH (lindane)	Elapsed 161 l Gamacida T-50- (that use lindane) in 2004.	1,7 l Gamacida T-50 (that use lindane) sold in 2004.

Active substances listed in the Table 15. are prohibited in the Republic of Croatia, so thare are no data about production or sales, except HCH (lindane) in 2004.

VI. THE 1998 PROTOCOL ON HEAVY METALS

40. **The questions in this section are based on the reporting obligation of Parties in accordance with article 7, paragraphs 1 (a) and 2 and enable Parties to provide information on the implementation of the obligations under articles 3.1, 3.2 (a), 3.2 (b), 3.3 and 5.1 of the Protocol. Questions 35 and 36 are not yet mandatory. They are designed to enable Parties to provide information on progress made towards implementation of articles 3.2 (c) and 3.2 (d) concerning obligations that will be in force in 2011. Question 38 concerns an obligation that will enter into force in 2008.**

41. **They refer to the following Parties to the Protocol: Austria, Belgium, Bulgaria, Canada, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, the Netherlands, Norway, Republic of Moldova, Romania, Slovakia, Slovenia, Sweden, Switzerland, the United Kingdom, the United States and the European Community.**

42. **Question 32: With reference to article 5, paragraph 1, please provide details of the national strategies, policies and programmes your country has developed to discharge its obligations under the Protocol.**

Croatian Parliament ratified the Protocol to the 1979 Conventionon Long-Range Transboundary Air Pollution on heavy metals in April 2007, published in Official Gazette – International Treaties (OG-IT 05/07), and it come into force with respect to the Republic of Croatia on 05 December 2007, and the effective date was published in OG-IT 09/07.

LEAD EMISSION (Pb)

In 2007, lead emission was estimated to 9.2 t, which is 1.5% lower than in 2006 and almost 46.9 times lower than in 1990. In 1990, sector “Road transport” was the biggest contributor to lead emission (98.2 %), while in 2007 its contribution was 38.6%. Therefore, since 1990 lead emission from this sector was decreased by 120 times. This large decrease is due to an introduction of unleaded gasoline in road vehicles. If sectoral emissions data are compared, the largest emission increase since 1990 comes from sector “Other mobile sources and machinery” by 3.7 times due to an increase in gasoline consumption in industry by 36.5 times. Since 1990, Pb emission has also increased in sector “Combustion in energy transformation

industry" by 47.9 %. Since 1990, in sectors "Non-industrial combustion plants", "Combustion in manufacturing industry" and "Production processes emission of lead" has decreased by respectively -68.2%, -74% and 28.8%.

MERCURY EMISSION (Hg)

In 2007, emission of mercury was 624.4 kg, which was 6.2% lower then in 2005 and 54.1% lower than in 1990, the year with maximum emission level of 1361.2 kg. High levels of emission in the period from 1990 to 1992 are due to the emissions from the natural gas extraction in INA-Naftaplin, GTP Molve III plant. In 1993 the process units for removal of mercury from natural gas were put into operation. With this measure for mercury emission reduction, the inlet average mercury concentration of 516 $\mu g/m^3$ decreases at the outlet to 0.12 $\mu g/m^3$ of average mercury concentration. In the period from 1993 to 2007 emission of mercury occurred mainly due to fossil fuel combustion in stationary energy sectors. In 2007, the dominant source of mercury emission was sector "combustion in industry" (45.5 % of national total). Other sectors that participated in mercury emission were: sector "combustion in energy transformation industry" (29.6 %), sector "non-industrial combustion plants" (21%), sector "production processes (cement production, steel production in electric arc furnace, metal and glass production)" with 3.8 % in mercury emission on the territory of Croatia in 2007.

CADMIUM EMISSION (Cd)

Cadmium emission was 789.9 kg in 2007, which is 5.5% lower compared to 2006 and 37.5% lower than in 1990.

A great proportion of cadmium emission occurs during combustion of solid mineral fuels and heavy fuel oil. Therefore, cadmium emission mainly comes from the stationary energy sectors (76.3% of total emissions in 2007), road transport with the contribution of 15.2% in 2007 and production processes with the contribution of 7.9% in 2007 (-30.4% reduction compared to 1990).

The highest reduction of cadmium emission by 4 times was achieved in sector "combustion in manufacturing industry", and the greatest increase in sectors "Road transport" during the 1990-2007 period (for about 2 times), and "combustion in energy transformation industry" (2.6 times).

Policies and measures

- **National Environmental Strategy with National Environmental Action Plan (OG 46/2002)**

Framework objective by pollutants are:

- heavy metals: for reduction of total emission of lead, cadmium and mercury, including other heavy metals, by the year 2010 in relation to 1990 emissions and in accordance with obligations arising from international treaties. Phasing out leaded petrol by 2005. Reduction of total emissions from existing stationary sources to the level of prescribed limit values. Formulating the management plan for products containing heavy metals

- particulate matter: the total emission of particulate matter from stationary sources to be reduced to the level of prescribed limit values.

- **Air Quality Protection and Improvement Plan in the Republic of Croatia for 2008 – 2011 (OG 61/08)**

- **Programme for gradual emission reduction of certain pollutants in the Republic of Croatia for the period until the end of 2010, with emission projections for the period 2010-2020 (OG 152/08) (Program for emission reduction)**

Also covers pollutants: SO_2, NO_2, VOC, NH_3, PM and heavy metals: cadmium (Cd), lead (Pb) i mercury (Hg).

The aim of the Programme for pollutants PM and heavy metals (HM) is to draw up the emission projection for period from 2010 to 2020 with proposal of ceilings and provide measures over critical sectors.

43. **Question 33: With reference to article 3, paragraph 2 (a), and annex III, please explain how you ensure the application of BAT to each new stationary source within a major source category (construction or substantial modification commenced after 29 December 2005) for which that annex identifies BAT, for example through national legislation, permitting procedures, guidance, etc.**

In the ELV Regulation ELV for particulate matters and heavy metals in gas are prescribed, and each new stationary source has to be in line with these values.

For any new stationary sources listed in the Annex to the Regulation on environmental impact assessment (EIA) (OG 64/08, 67/09), procedure of EIA project is the assessment of possible significant impacts set out under the Act and the ELV regulation.

44. **Question 34: With reference to article 3, paragraph 2 (b), annex II and annex V, please provide details of the limit values applied to each new stationary source within a major stationary source category. If different emission reduction strategies that achieve equivalent overall emission reductions are applied, please describe these. Please complete the table below.**

Table 16: Question 34

Category annex II	**New stationary sources**	**Pollutant**	**ELV[4/] (in mg/ m^3**	**% O_2 in flue gas**	**National legislation**	**Alternative strategies[3/]**
1	Combustion of solid and liquid fuels	Particulate matter (PM)	>50-100 MW_{th} – 50 > 100 MW_{th} - 30	6% for solid fuel 3% for liquid fuel	ELV Regulation	
2	Sinter plants	PM	50	n.a	ELV Regulation	
	Pellet plants: (a) grinding, drying (b) pelletizing or: (c) total plant emissions [1/]	 PM PM PM	 25 25 40 g/t produced pellets	n.a.	ELV Regulation	
3	Blast furnaces	PM	50	n.a	ELV Regulation	
	Electric arc furnaces	PM	20	n.a		
5 and 6	Production of copper and zinc (incl. Imperial Smelting furnaces)	PM	20	n.a	ELV Regulation	
	Production of lead	PM	10	n.a	ELV Regulation	
7	Cement industry	PM	20	n.a	ELV Regulation	

Category annex II	New stationary sources	Pollutant	ELV[4/] (in mg/ m^3	% O_2 in flue gas	National legislation	Alternative strategies[3/]
8	Glass industry	Pb	the sum of mass concentitation of Cd, As, Co, Ni, Se, Sb, Pb, Cr, Cu and Mn, at the mass flow of 25 g/h or more - 5	8-10%	ELV Regulation	
9	Chlor-alkali plants (mercury cell process) [2/]	Mercury (Hg)	0,01 Hg/t produced Cl_2 (annual average value)	n.a	ELV Regulation	
10 and 11	Hazardous waste incineration	PM Hg	10 0,05 (daily average value)	11%	ELV Regulation	
	Medical waste incineration	PM	10	11%	ELV Regulation	
	Municipal waste incineration	PM Hg	25 0,05	11%	ELV Regulation	

1/ Specify limit value in g/Mg pellets produced.
2/ Specify limit value in g Hg/Mg Cl_2 production capacity.
3/ If applicable describe how the equivalent overall emission reductions are achieved.
4/ Emisión limit value (ELV).

45. **Question 35[13]: With reference to <u>article 3, paragraph 2 (c),</u> and <u>annex III</u>, please provide information on progress made towards applying BAT to each existing stationary source (construction commenced on or before 29 December 2005) within a major stationary source category for which annex III identifies BAT. If your country intends, as an alternative, to apply different strategies that will achieve equivalent emission reductions, please describe these.**

Most applied BAT for dust reduction used in existing installations in Croatia is fabric filters.

Question 36[13]: With reference to <u>article 3, paragraph 2 (d),</u> and <u>annex V</u>, please provide information on progress made towards applying limit values to each existing stationary source (construction commenced on or before 29 December 2005) within a major stationary source category, in so far as this is technically and economically feasible. If your country intends, as an alternative, to apply different strategies that will achieve equivalent emission reductions, please describe these. Please complete the table below.

[13] Not mandatory. The obligation will become effective after 29 December 2011.

Table 17: Question 36

Category annex II	**Existing stationary sources**	**Pollutant**	**ELV (in mg/ m^3)**	**% O_2 in flue gas**	**National legislation**	**Alternative strategies[3/]**
1	Combustion of solid and liquid fuels	PM for solid fuel PM for liquid fuel	< 500 MWth - 100 ≥ 500 MWth – 50 50	6% 3%	ELV Regulation	
2	Sinter plants	PM	same as in the Table 16	n.a	ELV Regulation	
	Pellet plants: (a) grinding, drying (b) pelletizing or: (c) total plant emissions [1/]	 PM PM PM	same as in the Table 16	n.a.		
3	Blast furnaces	PM	same as in the Table 16	n.a	ELV Regulation	
	Electric arc furnaces	PM		n.a		
5 and 6	6. Production of copper and zinc (incl. Imperial Smelting furnaces)	PM	same as in the Table 16	n.a	ELV Regulation	
	Production of lead	PM		n.a		
7	Cement industry	PM	same as in the Table 16	n.a	ELV Regulation	
8	Glass industry	Pb	same as in the Table 16		ELV Regulation	
9	Chlor-alkali plants (mercury cell process) [2/]	Hg	same as in the Table 16	n.a	ELV Regulation	
10 and 11	Hazardous waste incineration	PM Hg	same as in the Table 16		ELV Regulation	
	Medical waste incineration	PM	same as in the Table 16			
	Municipal waste incineration	PM Hg	same as in the Table 16			

1/ Specify limit value in g/Mg pellets produced

2/ Specify limit value in g Hg/Mg Cl_2 (chlorine gas) production capacity

3/ If applicable describe how the equivalent overall emission reductions are achieved.

46. **Question 37: With reference to <u>article 3, paragraph 3</u> and <u>annex VI, paras. 1 to 4</u>, please describe the product control measures being applied to marketed petrol in accordance with the conditions and timescales specified in <u>annex VI</u>. If leaded petrol with a lead content above 0.013 g/l is marketed for use by old on-road vehicles, indicate what percentage of total petrol sales it represents.**

Lead petrol is prohibited to be placed on the market since 1 January 2006. Eurosuper petrol (EURO IV) and Eurosuper diesel (EURO IV) are usually placed on the market in Croatia and since 2008 certain amount of EURO V fuel is available across the State.

47. **Question 38: With reference to article 3, paragraph 3, and annex VI, paragraph 5, please describe the measures applied to limit the mercury content in batteries, in accordance with the conditions and timescales specified in annex VI. Please complete the table below.**

Table 18: Question 38

Product	**Hg content applied (% per weight)**	**Measures (e.g. national legislation, guidance, etc.)**
1. Alkaline manganese batteries prolonged use (except button cells)		
2. Other alkaline manganese batteries (except button cells)		

VII. GOTHENBURG PROTOCOL

48. **The questions in this section are based on the reporting obligation of Parties in accordance with article 7, paragraph 1 (a), and enable Parties to provide information on the implementation of the obligations under articles 3.2, 3.3, 3.5, 3.8 and 6.1 (a) of the Protocol. Any Party that applies different emission reduction strategies that achieve equivalent overall emission levels for all source categories together, in accordance with article 3.2 and 3.3 and article 7 (a)(i), may go directly to question 49. By virtue of article 3.10 (b), questions 59–66 do not apply to the United States.**

49. **They refer to the following Parties to the Protocol: Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Finland, France, Germany, Hungary, Latvia, Lithuania, Luxembourg, the Netherlands, Norway, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, the United Kingdom, the United States and the European Community.**

50. **Question 39: With reference to article 6, paragraph 1(a), please provide details of the supporting strategies, policies and programmes your country has adopted to facilitate the implementation of its obligations under article 3 of the Protocol. Where pollutant specific policies, strategies or programmes are used, please make a clear distinction between (a) sulphur; (b) NO_x; (c) VOCs; and (d) ammonia.**

a) sulphur

- **National Environmental Strategy with National Environmental Action Plan**
- **Air Quality Protection and Improvement Plan in the Republic of Croatia for 2008 – 2011 (OG 61/08)**
- **Plan on reduction of emissions of sulphur dioxide, nitrogen oxides and particulate matter from major combustion plants and gas turbines in the territory of the Republic of Croatia (OG 151/08)**
- **Strategy for energy development in the Republic of Croatia (OG 130/09)**
- **Programme for gradual emission reduction of certain pollutants in the Republic of Croatia for the period until the end of 2010, with emission projections for the period 2010-2020 (OG 152/08)**

b) NO_x

- **National Environmental Strategy with National Environmental Action Plan**

- **Air Quality Protection and Improvement Plan in the Republic of Croatia for 2008 – 2011 (OG 61/08)**
- **Plan on reduction of emissions of sulphur dioxide, nitrogen oxides and particulate matter from major combustion plants and gas turbines in the territory of the Republic of Croatia (OG 151/08)**
- **Strategy for energy development in the Republic of Croatia (OG 130/09)**
- **Programme for gradual emission reduction of certain pollutants in the Republic of Croatia for the period until the end of 2010, with emission projections for the period 2010-2020 (OG 152/08)**

c) <u>VOCs</u>

- **National Environmental Strategy with National Environmental Action Plan**
- **Air Quality Protection and Improvement Plan in the Republic of Croatia for 2008 – 2011 (OG 61/08)**
- **Programme for gradual emission reduction of certain pollutants in the Republic of Croatia for the period until the end of 2010, with emission projections for the period 2010-2020 (OG 152/08)**
- **Code of Good agricultural practice**

d) <u>ammonia</u>

- **National Environmental Strategy with National Environmental Action Plan**
- **Air Quality Protection and Improvement Plan in the Republic of Croatia for 2008 – 2011 (OG 61/08)**
- **Programme for gradual emission reduction of certain pollutants in the Republic of Croatia for the period until the end of 2010, with emission projections for the period 2010-2020 (OG 152/08)**
- **Code of Good agricultural practice**

51. **Question 40: With reference to <u>article 3, paragraph 2,</u> and <u>annex IV, paragraph 9</u>, specify the limit values for sulphur emissions applied to each new stationary source (construction or substantial modification commenced after 17 May 2006) in your country within stationary source categories identified in that annex. If you have applied alternative emission reduction strategies, please go to question 49. Please complete the table below.**

Table 19: Question 40

Stationary source category[1/]	**O_2 in flue gas (%)**	**Limit value**[2/]	**Alternative: Desulphurization rate for domestic solid fuel**	**National legislation**
1. Solid and liquid fuels 50-100 MW_{th}	6 and 3%	850	92	ELV Regulation
2. Solid and liquid fuels 100-300 MW_{th}	6 and 3%	400-200		
3. Solid and liquid fuels >300 MW_{th}	6 and 3%	200	95	
4. Gaseous fuels	3%	35	n.a.	
5. Liquified gas	3%	5	n.a.	
6. Low-calorific-value gases (e.g. gasification of refinery residues or combustion of coke oven gas)	3%	200		
7. Blast furnace gas	3%	200	n.a.	
8. Combustion plant in refineries >50 MW_{th} total refinery capacity (average of all new installations)		600	n.a.	

1/ For new stationary source, see article 1 (Definitions); for further information on stationary source categories see annex IV (paras. 9–12).

2/ Different limit values for different types of fuels may be provided, e.g. biomass, peat, etc.

52. **Question 41: With reference to article 3, paragraph 3 and annex IV, paragraph 9, please provide details of the limit values for sulphur emissions applied in your country to each existing stationary source (construction commenced on or before 17 May 2006) within a stationary source category identified in that annex, in so far as it is technically and economically feasible and taking into consideration the costs and advantages. If you have applied alternative emission reduction strategies, please go to question 49. Please complete the table below.**

Table 20: Question 41

Stationary source category[1/]	**O_2 in flue gas (%)**	**Limit value**[2/]	**Alternative: Desulphurization rate for domestic solid fuel (%)**	**National legislation**
1. Solid fuels 50-100 MW_{th} [1/]	6%	2000	60	ELV Regulation
2. Solid fuels 100-500 MW_{th} [2/]	6%	2000-400	100-300 MWth = 75 300-500 MWth = 90	
3. Solid fuels >500 MW_{th}	6%	400		
4. Liquid fuels 50-300 MW_{th}	3%	1700	n.a.	
5. Liquid fuels 300-500 MW_{th}	3%	1700-400	n.a.	
6. Liquid fuels >500 MW_{th}	3%	400	n.a.	
7. Gaseous fuels	3%	35	n.a.	
8. Liquified gas	3%	5	n.a.	
9. Low-calorific-value gases (e.g. gasification of refinery residues or combustion of coke oven gas)	3%	800	n.a.	
10. Blast furnace gas	3%	50	n.a.	

11. Combustion plant in refineries (average of all existing installations)		1000	n.a.	

1/ If you apply, as an alternative, a desulphurization rate, the category should be 50–150 MW_{th}.
2/ If you apply, as an alternative, a desulphurization rate, the category should be 150–500 MW_{th}.

53. **Question 42: With reference to <u>article 3, paragraph 2,</u> and <u>annex IV, paragraphs 11 and 12</u>, please provide details of the limit values currently applied in your country for sulphur recovery for new and existing Claus plants and sulphur dioxide emissions from new and existing installations for titanium dioxide (TiO_2) production.**

1) The ELV related to the technological process of sulphur production (Claus installation) are:

	sulphur emission level
- up to and including 20 t sulphur per day	3%
- from 20 up to and including 50 t sulphur per day	2%
- from 50 t sulphur per day	0,5%
2. hydrogen sulphide	10 mg/m^3

2) The waste gas containing hydrogen sulphide shall be fed to the afterburning

3) The Claus installation shall not be continuously out of operation for more than 24 hours, or for 120 hours discontinuously in a calendar year

The ELV related to the technological process of production of titanium dioxide (TiO_2), for the discharge process due to digestion and calcinations in the TiO_2 production, for sulphur oxide expressed as SO_2 is 10 kg/t of the produced TiO_2.

54. **Question 43: With reference to <u>article 3, paragraph 2,</u> and <u>annex IV, paragraph 10</u>, please provide details of the limit value for sulphur content of gas oil that is currently applied in your country.**

Currently, limit value for sulphur content of gas oil is 0,2%, while 0,1% will be mandatory from 30 June 2011.

55. **Question 44: With reference to <u>article 3, paragraph 2</u> and <u>annex V</u>, please provide details of the limit values for NO_x emissions applied to each new stationary source (construction or substantial modification commenced after 17 May 2006) within stationary source categories identified in that annex. If you have applied alternative emission reduction strategies, please go to question 49. Please complete the table below.**

Table 21: Question 44

Stationary source category	**Limit value (mg/Nm^3)**	**National legislation**
A. Boilers		ELV Regulation
1. Solid fuels 50-100 MW_{th}	400	
2. Solid fuels 100-300 MW_{th}	300	
3. Solid fuels >300 MW_{th}	200	
4. Liquid fuels 50-100 MW_{th}	400	
5. Liquid fuels 100-300 MW_{th}	200	
6. Liquid fuels>300 MW_{th}	200	
7. Natural gas 50-300 MW_{th}	150	
8. Natural gas >300 MW_{th}	100	

9. Other gases	200	
B. Onshore combustion turbines >50 MW_{th}		
1. Natural gas	50	
2. Liquid fuels	120	
C. Cement production		
1. Dry kilns	500	
2. Other kilns		
D. Stationary engines		
1. Spark ignition engines, 4-stroke, >1 **MW_{th}**: Lean-burn engines	250	
2. All other spark-ignition engines	500	
3. Compression ignition (=Diesel) engines, >5 **MW_{th}**: natural gas (jet ignition engines)	500	
4. Compression ignition (=Diesel) engines, >5 **MW_{th}**: heavy fuel oil	600	
5. Compression ignition (=Diesel) engines, >5 **MW_{th}**: diesel oil or gas oil	500	
E. Sinter plants		
F. Nitric acid production, excl. acid concentration units	350	

56. **Question 45: With reference to <u>article 3, paragraph 3</u>, and <u>annex V</u>, please provide details of the limit values for NO_x emissions applied in your country to each existing stationary source (construction commenced on or before 17 May 2006) within a stationary source category identified in that annex, in so far as it is technically and economically feasible and taking into consideration the costs and advantages. If you have applied alternative emission reduction strategies, please go to question 49. Please complete the table below.**

Table 22: Question 45

Stationary source category	**Limit value (mg/Nm^3)**	**National legislation**
A. Boilers		ELV Regulation
1. Solid fuels 50-100 MWth	>50 to 500 MWth – 600 mg/m^3 >500 MWth – 500 mg/m^3	
2. Solid fuels 100-300 MWth		
3. Solid fuels >300 MWth		
4. Liquid fuels 50-100 MWth	>50 to 500 MWth – 450 mg/m^3 >500 MWth – 400 mg/m^3	
5. Liquid fuels 100-300 MWth		
6. Liquid fuels>300 MWth		
7. Natural gas 50-300 MWth	300	
8. Natural gas >300 MWth	200	
9. Other gases		
B. Onshore combustion turbines >50Mwth		
1. Natural gas	150	
2. Liquid fuels	150	

C. Cement production 1. Dry kilns 2. Other kilns	 800 1200	
D. Sinter plants		
E. Nitric acid production, excl. acid concentration units	450	

45 bis. [Comment from the secretariat: The Executive Body decided that the below question, which was formerly question 13 of part II of the questionnaire "General policy questions" (ECE/EB.AIR/2009/13) be better placed here, between questions 45 and 46].

Please describe how your country applies best available techniques (BAT) to mobile sources and to each new or existing stationary source with regard to the Gothenburg Protocol obligations and taking into account guidance documents I to V adopted by the Executive Body at its seventeenth session (decision 1999/1).

57. **Question 46: With reference to article 3, paragraphs 2 and 3, and annex VI, please provide details of the limit values for VOCs emissions applied in your country to new stationary sources (construction or substantial modification commenced after 17 May 2006) for the stationary source category defined in table I of that annex and to existing stationary sources (construction commenced on or before 17 May 2006), in so far as it is technically and economically feasible and taking into consideration the costs and advantages. If you have applied alternative emission reduction strategies, please go to question 49. Please complete the table below.**

Table 23: Question 46

Source category	Limit value (g VOCs/Nm^3)	National legislation
Storage and distribution of petrol, excluding loading of seagoing ships: Vapour recovery unit serving storage and distribution facilities at refinery tank farms or terminals with petrol throughput of 5000 m^3 annually	35	Regulation on technical standards of environmental protection form volatile organic compounds resulting from storage and distribution of petrol (OG 135/06)

58. **Question 47: With reference to article 3, paragraphs 2 and 3, and annex VI, please provide details of the limit values for VOCs emissions applied in your country to new stationary sources (construction or substantial modification commenced after 17 May 2006) for the stationary source categories defined in Tables II, V, VI,VIII, IX, X, XI, XII, XIV and XV of that annex and to existing stationary sources (construction commenced on or before 17 May 2006), in so far as it is technically and economically feasible and taking into consideration the costs and advantages. If you have applied alternative emission reduction strategies, please go to question 49.**

59. **Please complete the table below.**

Table 24: Question 47

Source category and solvent consumption (Mg/year)	**Limit value (mg C/Nm^3) and relevant conditions/ alternatives e.g. solvent reuse, process sub-part, % of solvent input**	**Limit value for fugitive emissions of non-methane VOCs (% of solvent input) and relevant conditions/ alternatives e.g. process sub-part, kg solvent per unit of product**	**National legislation**
1. Adhesive coating (annex VI, table II)			ELV Regulation
(a) Footwear manufacture >5 Mg/year [1/]	25 g solvent per pair		
(b) Other adhesive coating, excl. (a)			
(i) 5–15 Mg/year	50	25	
(ii) >15 Mg/year	50	20	
2. Coating processes in various industrial sectors (annex VI, table V)			
(a) Other coating, incl metal, plastics, textile, fabric, foil and paper (excl. web screen printing for textiles)			
(i) 5–15 Mg/year	100	25	
(ii) >15 Mg/year	50/75	20	
(b) Wood coating			
(i) 5–15 Mg/year	100	25	
(ii) >15 Mg/year	50/75	20	
3. Coil coating > 25 Mg/year (annex VI, table VI)			
(i) New installations	50	5	
(ii) Existing installations	50	10	
4. Manufacturing of coatings, varnishes, inks and adhesives (annex VI, table VIII)			
(a) 100-1,000 Mg/year	150	5	
(b) >1,000 Mg/year	150	3	
5. Printing processes (annex VI, table IX)			
(a) Heat set web offset			
(i) 15–25 Mg/year	100	30	
(ii) > 25 Mg/year	20	30	
(b) Publication rotogravure > 25 Mg/year			
(i) New installations	75	10	
(ii) Existing installations	75	15	
(c) Other rotogravure, flexography, rotary screen printing, lamination and varnishing units			
(i) 15–25 Mg/year	100	20	
(ii) >25 Mg/year			
(e) Rotary screen printing on textiles, paperboard > 30	100	20	

Source category and solvent consumption (Mg/year)	**Limit value (mg C/Nm^3) and relevant conditions/ alternatives e.g. solvent reuse, process sub-part, % of solvent input**	**Limit value for fugitive emissions of non-methane VOCs (% of solvent input) and relevant conditions/ alternatives e.g. process sub-part, kg solvent per unit of product**	**National legislation**
Mg/year			
6. Manufacturing of pharmaceutical products >50 Mg/year (annex VI, table X)			
(i) New installations	20	5	
(ii) Existing installations	20	15	
7. Conversion of natural or synthetic rubber > 15 Mg/year (annex VI, table XI)	20	25	
8. Surface cleaning (annex VI, table XII)			
(a) Using substances mentioned in para. 3 (w)			
1–5 Mg/year	20 mg compound/Nm^3	15	
>5 Mg/year	20 mg compound/Nm^3	10	
(b) Other surface cleaning			
2–10 Mg/year	75 mg compound/Nm^3	20	
>10 Mg/year	75 mg compound/Nm^3	15	
9. Vehicle refinishing >0.5 Mg/year (annex VI, table XIV)	50	25	
10. Impregnation of wooden surfaces >25 Mg/year (annex VI, table XV)	100	45	

1/ Specify limit value in g solvent per pair

60. **Question 48: With reference to <u>article 3, paragraphs 2 and 3</u>, and <u>annex VI</u>, please provide details of the limit values for VOCs emissions applied in your country to new stationary sources (construction or substantial modification commenced after 17 May 2006) for the stationary source categories defined in tables III, IV, VII and XIII of that annex and to existing stationary sources (construction commenced on or before 17 May 2006), in so far as it is technically and economically feasible and taking into consideration the costs and advantages. If you have applied alternative emission reduction strategies, please go to question 49. Please complete the table below.**

Table 25: Question 48

Capacity, technique, further specification and solvent consumption	**Limit value for total emissions of non-methane VOCs (NMVOCs) (specify unit)**	**National legislation**
1. Wood and plastic lamination >5 Mg/year (annex VI, table III)	30 g NMVOC/m^2	ELV Regulation

Capacity, technique, further specification and solvent consumption	**Limit value for total emissions of non-methane VOCs (NMVOCs) (specify unit)**	**National legislation**
2. Coating processes in the car industry (annex VI, table IV) (a) Car coating (M1, M2) > 15 Mg/year of solvent consumption (i) >5,000 coated items a year - New installations	45 g NMVOC/m^2 or 1,3 kg/item and 33 g NMVOC/m^2	
- Existing installations	60 g NMVOC/m^2 or 1,9 kg/item and 41 g NMVOC/m^2	
(ii) ≤5,000 coated monocoques or >3,500 coated chassis a year	90 g NMVOC/m^2 or 1,9 kg/item and 41 g NMVOC/m^2	
(b) Coating of new truck cabins (N1, N2, N3) >15 Mg/year of solvent consumption (i) ≤5,000 coated items a year -New installations - Existing installations	65 g NMVOC/m^2 85 g NMVOC/m^2	
(ii) >5,000 coated items a year		
- New installations - Existing installations	55 g NMVOC/m^2 75 g NMVOC/m^2	
(c) Coating of new trucks and vans (without cabin) (N1, N2,N3) >15 Mg/year of solvent consumption (i) ≤2,500 coated items a year - New installations	90 g NMVOC/m^2	
- Existing installations	120 g NMVOC/m^2	
(ii) >2,500 coated items a year - New installations - Existing installations	70 g NMVOC/m^2 90 g NMVOC/m^2	
(d) Coating of new buses (M3) >15 Mg/year of solvent consumption (i) ≤2,000 coated items a year - New installations - Existing installations (ii) >2,000 coated items a year	210 g NMVOC/m^2 290 g NMVOC/m^2	
- New installations - Existing installations	150 g NMVOC/m^2 225 g NMVOC/m^2	
3. Dry cleaning (annex VI, table VII)	0	
4. Extraction of vegetable and animal fat and refining of vegetable oil >10 Mg of solvent consumption a year (annex VI, table XIII) (a) Animal fat	1,5	

Capacity, technique, further specification and solvent consumption	Limit value for total emissions of non-methane VOCs (NMVOCs) (specify unit)	National legislation
(b) Castor	3,0	
(c) Rape seed	1,0	
(d) Sunflower seed	1,0	
(e) Soya beans (normal crush)	0,8	
(f) Soya beans (white flakes)	1,2	
(g) Other seeds and vegetable material	3,0	
(h) All fractionation processes, excl. degumming	1,5	
(i) Degumming	4,0	

61. **Question 49: With reference to article 7, paragraph 1(a)(i), please specify whether your country, instead of applying the measures referred to in articles 3.2 and 3.3, has applied any alternative emission reduction strategies to achieve overall emission levels for all source categories together, equivalent to those resulting from the measures. Please provide details of any such strategies and the way in which overall emission levels are achieved.**

In the ELV Regulation we prescribe obligations for installations that exceeded prescribed ELV to prepare Emission Reduction Program. Until the end of January 2010 around 1200 installations are registered to perform some of activities where solvent is used, with information about activity, solvent used, capacity and measurements obligation, as well as annual emission report based on the measurements/calculations. In transitional period until 31/12/2015 installations could exceeded ELV 1,5 time. In the Reduction Program those installations that exceeded ELV and are not in a position to comply have to report about measures to be taken to fulfil the requirements in the prescribed time frame. Until now around 60 installations received Programs. Some of them are already complied.

62. **Question 50: With reference to article 7, paragraph 1(a)(ii), where your country, taking into consideration the costs and advantages, considers certain limit values, as specified in accordance with article 3.3, not to be technically and economically feasible for specific existing stationary sources, please provide a justification for this.**

Regulation on limit values for pollutant emissions from stationary sources into the air (OG No. 21/07, 150/08) prescribed limit values for pollutant emissions from stationary sources into the air and the allowed exceedance of emission limit values during a certain period of time. In Anex VI of the Regulation ELV for installations where solvets are used and emisison of VOC occurs. According to the Regulation ELVs prescribed for existing stationary sources have to be fulfilled no letter then 31/12/2015. Those instalaltions need to submit to the Ministry Emission Reduction Plan with measures, time-frame and finantial plan how to comply. Estimated costs for adjustment of instalaltions to fulfill the requirements is around 518 million HRK (70 million EUR).

Transitional period for VOC emission and for harmonization of LCP are subject of Croatian negotiation with EU.

63. **Question 51: With reference to article 3, paragraph 5 and annex VIII, please provide details of the most recent limit values applied in your country to new passenger cars and light-duty vehicles. Please complete the table below.**

Table 26: Question 51[1/]

Category, class	Reference mass (RW)(kg)	National legislation and date of	Limit values

		application	Carbon monoxide (CO)		Hydro-carbon (HC)	NOx		$HC+NO_X$		Parti-culates
			L1(g/km)		L.2 (g/km)	L.3(g/km)		L2+L3(g/km)		L4 (g/km)
			Petrol	Diesel	Petrol	Petrol	Diesel	Petrol	Diesel	Diesel
M	All	Ordinance TPV 102 01.10.2008	1,0	0,50	0,1	0,08	0,25	-	0,30	0,25
N1 (I)	RW≤1305		1,0	0,50	0,1	0,08	0,25	-	0,30	0,25
N1 (II)	1305< RW≤1760		1,81	0.63	0,13	0,10	0,33	-	0,39	0,04
N1 (III)	1760<RW		2,27	0,74	0,16	0,11	0,39	-	0,46	0,06

1/ For further information, see annex VIII, table I.

64. **Question 52: With reference to article 3, paragraph 5 and annex VIII, please provide details of the most recent limit values applied in your country to new heavy-duty vehicles if the ESC/ELR test[1/] is used. Please complete the table below.**

Table 27: Question 52

National[1/] legislation and date of application	CO (g/kWh)	HC (g/kWh)	NOx (g/kWh)	Particulates (g/kWh)	Smoke (m^{-1})
Ordinance TPV 401 01.04.2008	1,5	0,46	3,5	0,02	0,5

1/ For further information, see annex VIII, table II.

65. **Question 53: With reference to article 3, paragraph 5, and annex VIII, please provide details of the most recent limit values applied in your country to new heavy-duty vehicles if the ETC test[1] is used. Please complete the table below.**

Table 28: Question 53

National[1/] legislation and date of application	CO (g/kWh)	Non-methane HC (g/kWh)	Methane (g/kWh)	NO_x (g/kWh)	Particulates (g/kWh)
Ordinance TPV 401 01.04.2008	4,0	0,55	1,1	3,5	0,03

1/ For further information, see annex VIII, Table III.

66. **Question 54: With reference to article 3, paragraph 5, and annex VIII, please provide details of the most recent limit values applied in your country to new diesel engines for non-road mobile machines (ISO 8178). Please complete the table below.**

Table 29: Question 54

Net power[1/] (p) (kW)	National legislation and date of application	CO (g/kWh)	HC (g/kWh)	NO_x (g/kWh)	PM (g/kWh)

130≤ P<560	Ordinance TPV 401 01.10.2009	5,0	1,3	9,2	0,54
75≤ P<130		5,0	1,3	9,2	0,70
37≤ P<75		6,5	1,3	9,2	0,85
18≤ P<37					

1/ For further information, see annex VIII, table V.

67. **Question 55: With reference to article 3, paragraph 5, and annex VIII, please provide details of the most recent limit values applied in your country to new motorcycles and three- and four-wheelers (> 50 cm^3; > 45 km/h). Please complete the table below.**

Table 30: Question 55

Engine type[1/]	**National legislation and date of application**	**CO (g/km)**	**HC (g/km)**	**NO_x (g/km)**
1. Two-stroke (a) Motorcycles (b) 3- and 4- wheelers	Ordinance TPV 212-5 01.04.2009	2,0 7,0[3] (2,0)[4]	0,8[1] (0,3)[2] 1,5[3] (1,0)[4]	0,15 0,4[3] (0,65)[4]
2. Four-stroke (a) Motorcycles (b) 3- and 4-wheelers		2,0 7,0[3] (2,0)[4]	0,8[1] (0,3)[2] 1,5[3] (1,0)[4]	0,15 0,4[3] (0,65)[4]

1/ For further information, see annex VIII, table VI.

Note: [1] < 150 ccm; [2] ≥ 150 ccm; [3] Otto; [4] Diesel

68. **Question 56: With reference to article 3, paragraph 5, and annex VIII, please provide details of the most recent limit values applied in your country to new mopeds (≤ 50 cm^3; ≤ 45 km/h) [1/]. Please complete the table below.**

Table 31: Question 56

National legislation and date of application	**CO (g/km)**	**HC+ NO_x (g/km)**
Ordinance TPV 212-5 01.04.2009	1,0	1,2

1/ For further information, see annex VIII, table VII.

69. **Question 57: With reference to article 3, paragraph 5, and annex VIII, tables VIII and X please provide details of the limit values applied in your country to petrol. Please complete the table below.**

Table 32: Question 57

Parameter[1/]	**Limits**		**National legislation and date of application***
	Minimum	**Maximum**	
1. Research octane number	95	-	

Parameter[1/]	Limits		National legislation and date of application*
	Minimum	Maximum	
2. Motor octane number	85		
3. Reid vapour pressure, summer period (in kPa)		60	
4. Distillation: (a) Evaporated at 100° C (in %v/v) (b) Evaporated at 150° C (in %v/v)	 46 75		
5. Hydrocarbon analysis:			
(a) Olefins (in %v/v)		18	
(b) Aromatics (c) Benzene		35 1	
6. Oxygen content (in %m/m)		2,7	
7. Oxygenates (in %v/v): (a) Methanol, stabilizing agents must be added (b) Ethanol, stabilizing agents may be necessary (c) Iso-propyl alcohol (d) Tert-butyl alcohol (e) Iso-butyl alcohol (f) Ethers containing 5 or more carbon atoms per molecule		 3 5 10 7 10 15	
8. Other oxygenates (in %v/v)		10	
9. Sulphur content (in mg/kg)		50	

1/ For further information, see annex VIII, tables VIII and X.

*Regulation on the quality of petroleum-derived liquid fuels (OG 53/06)

70. **Question 58: With reference to article 3, paragraph 5 and annex VIII, tables IX and XI, please provide details of the limit values applied in your country to diesel fuel. Please complete the table below.**

Table 33: Question 58

Parameter[1/]	Limits		National legislation and date of application*
	Minimum	Maximum	
1. Cetane number	51		
2. Density at 15° C (in kg/m$^{3)}$		845	
3. Distillation point: 95% (in °C)		360	
4. Polycyclic aromatic hydrocarbons (in % m/m)		11	
5. Sulphur content (in mg/kg)		50	

1/ For further information, see annex VIII, tables IX and XI.

*Regulation on the quality of petroleum-derived liquid fuels (OG 53/06)

71. **Question 59: With reference to article 3, paragraph 8 (a) and annex IX, paragraph 3, have you established, published and disseminated an advisory code on good agricultural practice to control ammonia emissions? If so, please provide details of its provisions, relevant to:**

Related to given question we would like to indicate that Ministry of Agriculture, Fisheries and Rural Development of the Republic of Croatia, in cooperation with Croatian Extension Institute has established, published and at this moment is disseminating brochure: Principles of Good Agricultural Practice to farmers (83500 addresses). The brochure is consisted of four thematic parts: soil protection, water

protection, air protection and animal protection. As part of Principles of good agricultural practice in air protection, methods for reduction of ammonia emission loses are listed in the brochure.

(a) Nitrogen management, taking account of the whole nitrogen cycle;

Limitations for the use and managing of fertilizers with nitrogen component (mineral and organic), apart from Protocol it's self, also derive from Council Directive 91/676/EEC, whose provisions are incorporated in our legislation through the Ordinance on good agricultural practice in the use of fertilizers (Official Gazette No. 56/08). The Ordinance prescribes the general principles of good agricultural practice in the use of fertilizers, the period within the year when the fertilizers application on agricultural soil is not allowed, the method of applying the fertilizers on the inclined terrain, well-watered soil, flooded, frozen or soil covered with snow, the conditions for the fertilizers application near water sources, the procedures regarding the application of mineral and organic fertilizers, the size and features of the manure containers. Listed provisions were used as guidelines during establishing of brochure Principles of Good Agricultural Practice, which explains cause – effect connection between fertilizers handling with regard to protection of water, soil and air.

(b) Livestock feeding strategies;

In brochure: Principles of Good Agricultural Practice, chapter III. Principles of Good Agricultural Practice in Air Protection, part 1.3: Reduction of air pollution caused by storage of manure and waste technological waters, it's stated as follows:

- Animals contaminated by barn manure have great impact on air pollution increase within the object.

- Watering of animals shall be arranged in order to avoid water spillage.

- By regular cleaning and littering of objects we keep animals clean and dry and reduce the emission of ammonia and unpleasant odors.

- During animal feeding, more proteins than prescribed standards shall not be added because the degradation of unused proteins in fertilizer develops unpleasant odors.

(c) Low-emission manure spreading techniques;

In brochure: Principles of Good Agricultural Practice, chapter III. Principles of Good Agricultural Practice in Air Protection, in part 1.1: Reduction of unpleasant odors in manure application and in part: 1.4. Ammonia emissions (guidelines are same as for part 1.1) it's stated as follows:

- Monitoring and time selection of favorable weather conditions for manure application in production areas, will reduce the level of unpleasant odors to the level acceptable to environment.

- The use of sprayers with smaller spraying angle and bigger drops is recommended.

- It is good to lay down slurry and liquid manure in strips on soil areas or even better by injectors in soil.

- Organic fertilizers applied on soil without vegetation cover shall be incorporated in soil as soon as it's possible by ploughing or cultivation.

- The selection of adequate equipment for efficient slurry application is in most cases the most important decision in manure's mixing planning as well as manure handling for reduction of air pollution

- Sprayers shall be adjusted to the surface on which they will be used on.

- Unpleasant odors are rapidly spreading if slurry and liquid manure are directed into fan sprayer under high pressure.

- Accelerated procedure of excluding and spraying of slurry and liquid manure without soil stamping, in the most favorable conditions may be performed by the system of vacuum pumps and mixers, and easily transportable aluminum pipes.

- Devices for surface manure distribution in strips by a set of distributors reduce unpleasant odors for 55 - 60 % in relation to standard fan sprayer.

- The best method is to enter manure shallowly (5 - 6 cm) into soil by injector.

- Open channels with injected slurry reduce unpleasant odors for 55 - 60 %. By deeper injecting by injectors the intensity of unpleasant odors is reduced for up to 85 % in relation to standard spraying

- Solid manure is spread out by specialized trailers. Width of spreading out depends on technical design of trailer

- By reduction of manure surface in contact with air is also reduced the loss of ammonia and consequently unpleasant odor

(d) Low-emission manure storage systems;

In brochure: Principles of Good Agricultural Practice, chapter III. Principles of Good Agricultural Practice in Air Protection, in part 1.1: Reduction of unpleasant odors in manure application and in part 1.2 and 1.3: Reduction of air pollution caused by storage of manure and waste technological waters, it's stated as follows:

- Solid manure, liquid manure and slurry are disposed depending on the animal keeping method. Manure may be stored inside or outside of objects that we build in order to reduce harmful gas (ammonia) emission and water pollution

- Tanks for slurry are made as lagoons or metal structures with plants for excluding and mixing of content. For that purpose impermeable and anti corrosive protected materials are used

-Slurry is stored in covered or open pits and reservoirs outside barns, and in pits under the slats (floor).

- Containers for slurry shall have pre pools for pumping.

- Tanks for storage of manure's liquid phase may be lagoons buried into soil or above ground structures.

- Covering of lagoons and above ground manure storages reduces ammonia emissions as well as unpleasant odors.

- The most adequate method is to store in lagoons built from reinforced concrete structure and above ground metal tanks equipped by protective cyclones, from where nitrogen loss is the lowest.

- Open pits and reservoirs are also good, but liquid manure surface shall be covered by natural or artificial material in order to reduce the ammonia emission.

- Deeper and narrower pits for liquid manure are better than more shallow and wider ones, as the open surface per volume unit of manure is smaller, and consequently the unpleasant odor emissions smaller.

- Depth of liquid manure storage is limited by underground water level and availability of pump capacities.

- The most frequent tanks capacities are 10 - 12 m, but there are also tanks of the 20 m diameter. Ratio may be limitless, taking account about the mutual synchrony between animal capacity and technical characteristics of facility, so that the pump and mixer system would ensure the consistency of storage content. Mixed quality of upper (liquid) and lower (solid) particles of content is critical in the whole suppurating system as it enables faster manure maturity, transport of tank content, complete emptying, simpler facility maintenance, tank disinfection and long range maintenance of water impermeability.

- Whenever it is possible, liquid manure storage shall be filled in and emptied from the bottom. In that way the surface becomes rigid, manure layer is not opened and the emission of ammonia and its unpleasant odor is reduced.

- Air pollution intensity may be reduced by the so – called biological treatment.

- Biological treatment implies entry of large air quantity (ozonization/aeration) in slurry and liquid manure in order to cause stronger development of aerobic microorganisms. Aerobic microorganisms rapidly degrade organic matter what is the main cause of unpleasant odor and harmful gases development. Turbulent process of organic matter degradation develops heat and inorganic matter. That biological process is called oxidation.

- There are three possible oxidation methods:

1. Aeration by surface mixers which throw off manure by propeller and mix it with the air.

2. Aeration by deep mixer immersed in manure to which air is led by pipes.

3. Processing of liquid manure by fan -mixers by oxidation, mutually connected, channels that enable continuous motion of liquid manure mass in objects for animals.

(e) Low-emission animal housing systems;

As part of techniques for ammonia emission reducing that are listed in Guidance document on control techniques for preventing and abating emissions of ammonia (UN Economic and Social Council, Economic Commission for Europe from 16 July 2007), in brochure Principles of Good Agricultural Practice, chapter III Principles of Good Agricultural Practice in Air Protection, it's stated as follows:

- Reduction of manure surface in contact with air is also reducing the loss of ammonia and consequently unpleasant odor.

- Solid manure, liquid manure and slurry are disposed depending on the animal keeping method. Manure may be stored inside or outside of objects that we build in order to reduce harmful gas (ammonia) emission and water pollution.

- Measures for reduction of air pollution are directed to procedures for proper storage, exclusion and application of manure.

- Liquid manure is stored in covered or open pits and reservoirs outside barns, and in pits under the slats (floor).

- Tanks for storage of manure's liquid phaze may be lagoons buried into soil or above ground structures.

- Covering of lagoons and above ground manure storages reduces ammonia emissions as well as unpleasant odors.

- Open pits and reservoirs are also good, but liquid manure surface must be covered by natural or artificial material in order to reduce the ammonia emission.

- Deeper and narrower pits for liquid manure are better than more shallow and wider ones, as the open surface per volume unit of manure is smaller, and consequently the unpleasant odor emissions smaller.

- It is useful to throw long straws in open pools in order to facilitate the formation of harder surface layer, preventing spreading of unpleasant odors in high extent.

- Whenever it is possible liquid manure storages shall be filled in and emptied from the bottom. In that way the surface becomes rigid, manure layer is not opened and the emission of ammonia and its unpleasant odor is reduced.

- Air pollution intensity may be reduced by the so – called biological treatment.

Biological treatment implies entry of large air quantity (ozonization/aeration) in liquid manure and slurry in order to cause stronger development of aerobic microorganisms. Aerobic microorganisms rapidly degrade organic matter what is the main cause of unpleasant odor and harmful gases development. Turbulent process of organic matter degradation develops heat and inorganic matter. That biological process is called oxidation.

- Manure may be also treated by separators. Separator separates manure's solid phase from manure's liquid phase through a sieve. Solid phase is composted and liquid is treated by ventilation.

(f) Possibilities for limiting ammonia emissions from the use of mineral fertilizers.

In above mentioned Ordinance on good agricultural practice in the use of fertilizers (Official Gazette No. 56/08) in article 7. item1. sub item 3.,it's stated:

(1) With the objective of reducing losses of nitrogen by drainage and vaporization (volatisation) the following is prohibited:

4. Fertilizing with mineral fertilizers with nitrate nitrogen on all agricultural surfaces from 1 November to 1 February, and the application of the solution of urea and ammonium nitrate (UAN) on the harvesting remains is exceptionally allowed.

72. **Question 60: With reference to article 3, paragraph 8 (a), and annex IX, paragraph 4, please provide details of the steps taken in your country to limit ammonia emissions from the use of solid fertilizers based on urea.**

In above mentioned Ordinance on good agricultural practice in the use of fertilizers (Official Gazette No. 56/08) in article 7. item1. sub item 3.,it's stated:

(1) With the objective of reducing losses of nitrogen by drainage and vaporization (volatisation) the following is prohibited:

4. Fertilizing with mineral fertilizers with nitrate nitrogen on all agricultural surfaces from 1 November to 1 February, and the application of the solution of urea and ammonium nitrate (UAN) on the harvesting remains is exceptionally allowed.

73. **Question 61: With reference to article 3, paragraph 8 (a), and annex IX, paragraph 5, please indicate whether the use of ammonium carbonate fertilizers is prohibited in your country and specify the relevant legislation.**

In above mentioned Ordinance on Good Agricultural Practice in the Use of Fertilizers (Official Gazette No. 56/08) in article 7. item1. sub item 3.,it's stated:

(1) With the objective of reducing losses of nitrogen by drainage and vaporization (volatisation) the following is prohibited:

4. Fertilizing with mineral fertilizers with nitrate nitrogen on all agricultural surfaces from 1 November to 1 February, and the application of the solution of urea and ammonium nitrate (UAN) on the harvesting remains is exceptionally allowed.

74. **Question 62: With reference to article 3, paragraph 8 (a), and annex IX, paragraph 6, please explain how your country ensures the use of the low-emission slurry application techniques listed in guidance document V (ECE/EB.AIR/WG.5/2007/13), taking into account local soil and geomorphological conditions, slurry type and farm structure.**

In brochure Principles of Good Agricultural Practice, chapter III Principles of good agricultural practice in air protection, it's stated as follows:

- Organic matter applied on soil without vegetation cover shall be entered in soil as soon as possible by plugging or cultivation.

- Devices for surface manure distribution in strips by a set of distributors, reduce unpleasant odors for 55 - 60 % in relation to standard fan sprayer.

- The best method is to enter manure shallowly (5 - 6 cm) into soil by injector.

- Into the soil through injector it's possible to inject 20 - 50 m3 of manure's liquid phase per hectare, depending on the injector speed.

- Open channels with injected slurry reduce unpleasant odors for 55 - 60 %. By deeper injecting by injectors the intensity of unpleasant odors is reduced for up to 85 % in relation to standard spraying.

- Solid manure is spread out by specialized trailers. Width of spreading out depends on technical design of trailer.

- By reduction of manure surface in contact with air is also reduced the loss of ammonia and consequently unpleasant odor.

- Dilution of liquid manure and slurry before spraying on land is a good method for unpleasant odor reduction.

- Ammonia emission will be lower if liquid manure and slurry are applied during still, cold and cloudy weather.

- Biological treatment implies entry of large air quantity (ozonization/aeration) in liquid manure and slurry in order to cause stronger development of aerobic microorganisms. Aerobic microorganisms rapidly degrade organic matter what is the main cause of unpleasant odor and harmful gases development. Turbulent process of organic matter degradation develops heat and inorganic matter. That biological process is called oxidation.

There are three possible oxidation methods:

1. Aeration by surface mixers which throw off manure by propeller and mix it with the air.

2. Aeration by deep mixer immersed in manure to which air is led by pipes.

3. Processing of liquid manure by fan -mixers by oxidation, mutually connected, channels that enable continuous motion of liquid manure mass in objects for animals

- Manure may be also treated by separators. Separator separates manure's solid phase from manure's liquid phase through a sieve Solid phase is composted and liquid is treated by ventilation.

75. **Question 63: With reference to article 3, paragraph 8 (a), and annex IX, paragraph 7, please provide details of the measures taken in your country to limit ammonia emissions from solid manure application, and in particular whether there is a requirement that solid manure applied to land to be ploughed is incorporated within at least 24 hours of spreading.**

In brochure Principles of Good Agricultural Practice, chapter III Principles of good agricultural practice in air protection, it's stated:

- Organic matter applied on soil without vegetation cover shall be entered in soil as soon as possible by ploughing or cultivation.

Also, in Ordinance on Good Agricultural Practice in the Use of Fertilizers (Official Gazette No. 56/08) in article 6, item 4., it'stated:

(4) With the objective of reducing losses of nitrogen during the manure application process, the following must be implemented:

- Fertilization with manure shall implemented in a way which prevents ammonia perspiration and while doing so, the phase of the vegetation, the time intervals, especially the air temperature and humidity and the sun should be taken into account,

- The manure must be entered into the soil as soon as possible on the surfaces which have not been inseminated,

- The manure must be equally spread onto the soil surface,

- The liquid manure must be stirred prior to the fertilization.

76. **Question 64: With reference to article 3, paragraph 8 (a), and annex IX, paragraph 8, please provide details on the use in your country of the low-emission storage systems for new slurry stores (construction commenced after 17 May 2006) on large pig and poultry farms (2,000 fattening pigs, or 750 sows or 40,000 poultry) or techniques that have been shown to reduce emissions by 40 per cent or more compared to the reference listed in guidance document V (ECE/EB.AIR/WG.5/2007/13).**

77. **Question 65: With reference to article 3, paragraph 8 (a) and annex IX, paragraph 9, please provide details of whether emission reductions of 40 per cent have been achieved in your country for existing slurry stores (construction commenced on or before 17 May 2006) on large pig and poultry farms (2,000 fattening pigs, or 750 sows or 40,000 poultry).**

78. **Question 66: With reference to article 3, paragraph 8 (a) and annex IX, paragraph 10, please provide details of the use in your country of housing systems for new animal housing on large pig**

and poultry farms which have been shown to reduce emissions by 20 per cent or more compared to the reference listed in guidance document V (ECE/EB.AIR/WG.5/2007/13).

VIII. FEEDBACK ON THE QUESTIONNAIRE

79. **Question 67: Have you encountered difficulties in answering this questionnaire, whether technical or interpretative? Please provide further details by completing the table below.**

Table 34: Question 67

Question No	Problem	Suggestion for improvement
