REPORT ON IMPLEMENTATION OF POLICIES AND MEASURES THAT REDUCE GREENHOUSE GAS EMISSIONS BY SOURCES OR ENHANCE REMOVALS BY SINKS

REPUBLIC OF CROATIA

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CROATIAN AGENCY FOR THE ENVIRONMENT AND NATURE

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REPUBLIC OF CROATIA

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CONTENT

LIST OF TABLES

CHAPTER 1: INTRODUCTION

'Report on implementation of policies and measures that reduce greenhouse gas emissions by sources and enhance removals by sinks' (hereinafter: the Report) is an integral part of the national system for monitoring the implementation of policies and measures for greenhouse gas emissions reduction and projections of greenhouse gas emissions related to the fulfilment of commitments under the United Nations Framework Convention on Climate Change (hereinafter: the Convention) and the Kyoto Protocol. The Republic of Croatia is required to report to the European Commission on monitoring the implementation of these policies and measures and emission projections, based on the EU legislation.

The legal basis for preparation of the Report in the national legislation is primarily in Article 75 Paragraph 3 of the Air Protection Act (OG 130/11, 47/14, 61/17).

Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision 280/2004/EC (hereinafter: Regulation (EU) No 525/2013) and Commission Implementing Regulation (EU) No 749/2014 of 30 June 2014 on structure, format, submission processes and review of information reported by Member States pursuant to Regulation (EU) No 525/2013 of the European Parliament and of the Council (hereinafter: Implementing Regulation) are applicable regulations of the European Union which prescribe obligations and way of reporting for Member States.

Article 13 of the aforementioned Regulation prescribes the content of the report. Report on the implementation of policies and measures to reduce emissions and increase removals of greenhouse gases for 2017 therefore has:

- Description of national system for reporting on policy and measures,
- Objective of the policy and measures,
- Type of policy instruments,
- Status of implementation of the policy or measure,
- Indicators for tracking of the effects of policy and measures,
- Quantitative estimates of the effect of policies and measures on emissions and removals of greenhouse gases for 2015, 2020, 2025, 2030 and 2035 (ex -ante analysis),

- Amount of annual national emission allocation,
- Anticipated progress in meeting the emission limits to the amount of annual national quota,
- Information on planned additional measures to achieve greater emission limits of the amount of annual national quota,
- Assessment of the effect of the Clean Development Mechanism, Joint Implementation and Emissions Trading as a supplementary measure to reduce greenhouse gas emissions,
- Indicators for the projections for 2012, 2020, 2025, 2030 and 2035 in accordance with Annex III of the Regulation.

CHAPTER 2: NATIONAL SYSTEM FOR THE DEVELOPMENT OF THE PROJECTIONS OF GHG EMISSIONS

The Ministry of Environment and Energy (MEE) is responsible for the overall national policy of environmental protection, including climate change and reporting on the implementation of policies and measures and on emission projections. The Croatian Agency for the Environment and Nature (CAEN) is responsible for organizing the preparation of the Inventory of greenhouse gas emissions, data collection, preparation of quality assurance and quality control plan and selection of an authorized institution for a three-year period. Update of the Report on the implementation of policies and measures to reduce emissions and enhance sinks of greenhouse gases and Report on projections of greenhouse gas emissions is organized in two-year cycles, according to Regulation (EU) No 525/2013.

Ekonerg - Energy Research and Environmental Protection Institute is an institution that was awarded in a public tender for a three-year period to prepare reports on the inventory of greenhouse gas emissions, greenhouse gas emission projections and policies and measures to reduce emissions and enhance sinks of greenhouse gases. The current contract expires in 2018, when it will be published a new tender.

In accordance with the Air Protection Act (OG 130/11, 47/14, 61/17), for monitoring and evaluation of the implementation and planning of policies and measures for mitigation and adaptation to climate change in the Republic of Croatia, the Commission for inter-sectoral coordination of policies and measures for mitigation and adaptation to climate change (OG 114/14) was established. The Committee members include representatives of relevant government bodies and other relevant organizations, agencies and non-governmental organizations. The composition of the Commission, tasks and functioning of the Commission is determined by the Croatian Government on the proposal of the ministry responsible for environmental protection. The Committee oversees the process of drafting the Report on projections of greenhouse gas emissions and Report on the implementation of policies and measures to reduce emissions and enhance sinks of greenhouse gases.

CHAPTER 3: DESCRIPTION OF POLICIES AND MEASURES

3.1. GENERAL INFORMATION

Policies and measures that are subject of this report are included in the 'with existing measures' and 'with additional measures' scenarios along with 'without measures' scenario in the "Report on projections of greenhouse gas emissions." The above report has been prepared as a separate document.

Policies and measures to reduce emissions from sources and increase sinks of greenhouse gases are shown separately for the following sectors:

- energy
- transport
- industrial processes
- waste management
- agriculture
- land use, land use change and forestry (LULUCF)
- other (cross-cutting) policies and measures.

EU ETS, as a common EU, supranational, cross-cutting measure is listed with the other (cross-cutting) policies and measures.

3.2. ENERGY

The overview of the strategical and planning framework for reduction of emissions in the energy sector is shown in the Figure 3-1.

The important currently actual strategies and plans include Energy Strategy (OG 130/09), Long-Term Strategy for Mobilising Investment in the Renovation of the National Building Stock (OG 74/14), Plan for protection of air, ozone layer and climate change mitigation in the Republic of Croatia for the period from 2013 to 2017 (OG 139/13), National Renewable Energy Action Plan (ME, 2013), Program for the Energy Efficiency in Heating and Cooling (ME, 2016), set of national programs and plans for the renovation of existing buildings and increase of nearly-zero energy buildings (described later) and national Operational programs for the use of EU Funds[1].

Planning periods of some of the existing plans have expired, but very important policy documents are either available in draft versions or in the process of development. Among them are Low-Carbon Development strategy until 2030 with a view to 2050, Revision of the Energy Strategy, 4th National Energy Efficiency Action Plan for the Period 2017-2019, Action Plan for the Implementation of the Low-Carbon Development Strategy for the First 5-year Period, Program for the Energy Efficiency in Public Lighting until 2025, Integrated Energy-Climate Plan for the Period 2021-2030 as well as new Plan for the use of Funds from the Sale of Emission Allowances in the EU ETS for the Period 2017-2020.

The measures described below are taken from the listed documents, but also from the other national or EU legislation if applicable for the reduction of GHG emissions.

[1] http://www.strukturnifondovi.hr/

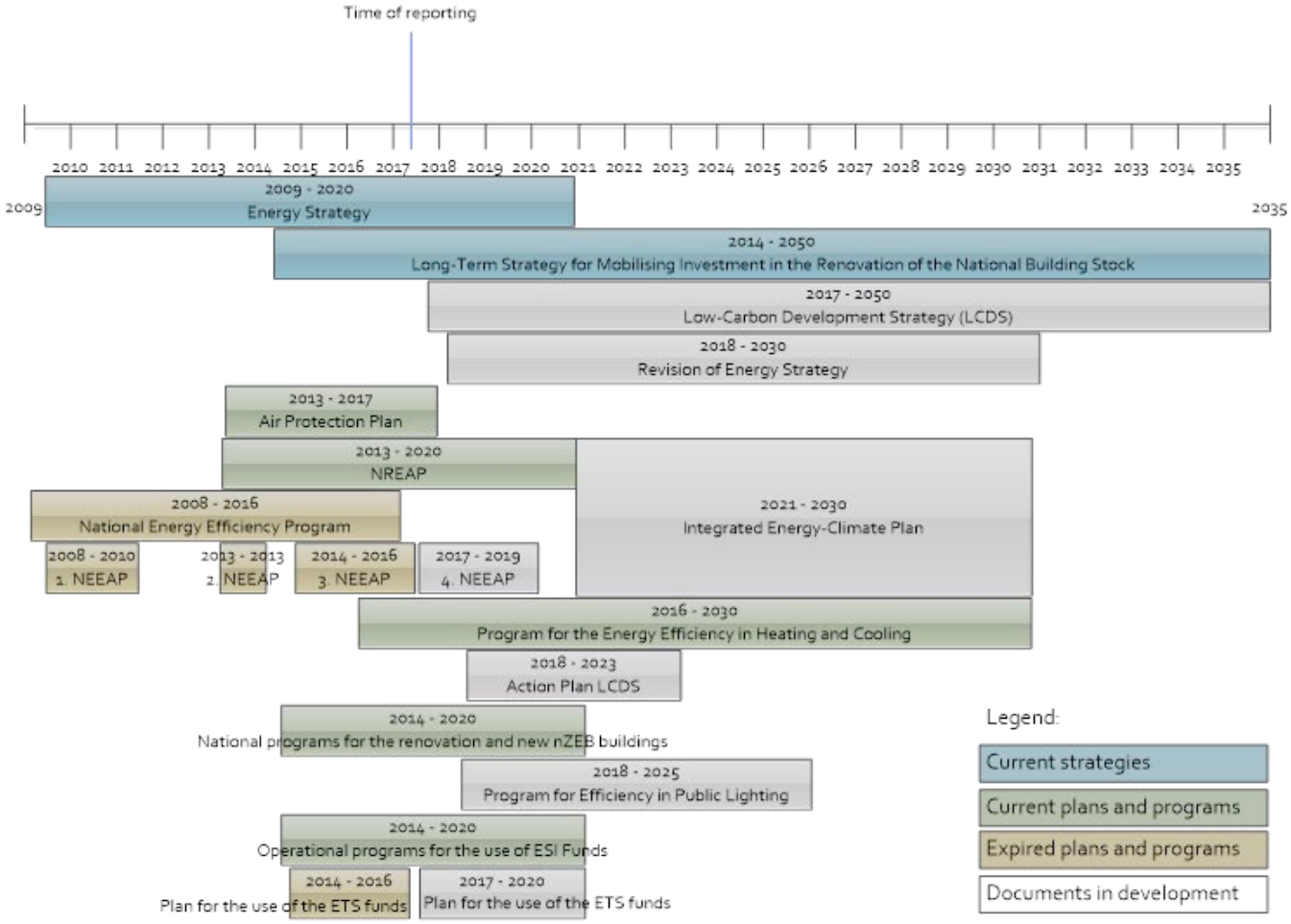

Figure 3-1: Overview of the strategical and planning framework for reduction of GHG emissions in the energy sector

MEN-1: National Plan for the Increase of the Number of Nearly-Zero Energy Buildings

According to the Directive 2010/31/EU on Energy Performance of Buildings (EPBD), MS have to ensure that after 31st December 2020 all new buildings are build according to nearly zero energy (nZEB) standard for buildings, and all new buildings in which stay or are owned by the public bodies should be built according to the nZEB standard after 31st December 2018.

The calculations of the cost-optimal levels of minimum criteria for the energy performances of all types of buildings were done in 2013 and 2014. In Technical Regulation OG 128/15 the definitions of nZEB buildings were adopted to ensure to fulfilment of the requirements of the EPBD.

National Plan for the Increase of nZEB buildings was adopted in December 2014. The Program for the stimulation of the building new buildings and renovation of existing buildings according to the nZEB standard is in the development.

Also, The Long-term Strategy to Stimulate Investment in the Renovation of the National Building Stock in Croatia (OG 74/14) was adopted in 2014.

MEN-2: Program for energy renovation of the apartment buildings

This measure foresees the continuation for the implementation of The Program of Energy Renovation of Apartment Buildings for the Period from 2014 to 2020 (OG 78/14), with the focus on the buildings built before the 1987 and with the goal for their renovation to the B, A or A+ energy class.

The main source of the funding is based on the EU structural and investment funds (EU SIF), precisely from the European Fund for the Regional Development. The goal is to increase the yearly renovation share from 1% to 2% of the surface of the apartment buildings. The plan is to reallocate the funds available from the ESIF to enable the renovation to happen in the planned scope.

Important source of funding of the renovations of apartment buildings in the Republic of Croatia were the revenues from the sales of the greenhouse gas emission allowances by the auctions [21].

MEN-3: Program for the increase of energy efficiency and use of renewable energy sources in commercial non-residential buildings

The measure builds up on The Program of Energy Renovation of Commercial Non-residential Buildings for the Period from 2014 to 2020 (OG 98/14) with the plan allocate the funds available from the EU SIF for the implementation of the measures, with the focus to tourism and trade sectors.

The funds will be allocated in grants and through the advanced financial instruments and in accordance with the EU regulations 651/2014 and 1407/2013 on state aid in EU.

Important source of funding of the use of renewable energy sources in commercial non-residential buildings in the Republic of Croatia were the revenues from the sales of the greenhouse gas emission allowances by the auctions [21].

MEN-4: Program for the Energy Renovation of the Family Dwellings

The measure is based on The Program of Energy Renovation of Family Houses for the Period from 2014 to 2020 (OG 43/14), but with the plan to allocate also the funds from the EU SIF and to advance the financial models to activate the private capital.

The goal is to support the renovation of 4000 houses in Croatia annually.

Important source of funding of the renovations of family dwellings in the Republic of Croatia were the revenues from the sales of the greenhouse gas emission allowances by the auctions [21].

MEN-5: Program for the energy renovation of public buildings

The measure is based on the Programme for the Energy Renovation of Public Buildings 2014 - 2015 (Ministry of Construction and Physical Planning, 2014) and the Programme for the Energy Renovation of Public Buildings 2016 - 2020 (Ministry of Construction and Physical Planning, 2017).

The main source of finances in period 2016-2020 will be on the EU SIF, Operational Programme Competitiveness and cohesion for the period from 2014 to 2020, under Priority Axis 4 - Promotion of energy efficiency and renewable energy sources. The funds will be allocated with the goal to activate the private capital and ESCO market.

The plan is to renovate the 9.46% of the total surface of the public buildings until 2020.

Important source of funding of the renovations of public buildings in the Republic of Croatia were the revenues from the sales of the greenhouse gas emission allowances by the auctions [21].

MEN-6: Energy management in the public sector

Energy management in the public sector include implementation of continuous and systematic measurement, planning and improvements of the energy use in public sector. It includes the use of national information system on energy management ISGE[2]. Energy Management Information System (ISGE), which was supported and established by the UNDP, GEF, the Fund and the Croatian Government, is used as a national tool for systematic energy and water management in public buildings. ISGE is under the competence of the Ministry of Construction and Physical Planning and Agency for Transactions and Mediation in Immovable Properties (APN).

The measure is regulated by the Energy Efficiency Act (OG 127/14), Directive 2012/27/EU on Energy Efficiency, Ordinance on Energy Management (OG 18/15) and Methodology on Energy Management (OG 18/15).

In the period 2017-2019 the focus will be on the automation of the data collection of the consumption of energy and water, reporting and verification of energy savings and education of associates.

MEN-7: Measurement and informative calculation of energy consumption

Law on Energy Efficiency (OG 127/14) stipulates that energy distributors ensure that, to the extent that is technically possible, financially reasonable and proportionate in view of the potential energy savings, final customers of energy and hot water in homes acquire individual meters at competitive prices that accurately reflect the actual energy consumption of end customers. Energy supplier shall free of charge on request of the end customer at least once a year provide information on the calculation of electricity, heat or gas and previous consumption of the end customer.

Legible and understandable energy bills (electricity, heat and natural gas) and individual consumption metering are obligation of distribution system operators and suppliers. This will increase consumer awareness of the way in which they consume the energy. The bills should include comparisons of consumption for the current year and for the corresponding period of the previous year, as well as information on available energy efficiency measures.

[2] https://www.isge.hr/

MEN-8: Labelling the energy efficiency of household appliances

Scheme of labelling the energy efficiency of household appliances is legally prescribed in the Regulations on Energy Labelling of Household Appliances (OG 130/2007, 101/2011, 48/13, 127/14). It is prescribed that energy efficiency label have to be marked on all household appliances that use electricity and are placed on the Croatian market, whether they are manufactured in the Republic of Croatia or imported.

By energy labelling, customers are informed about the energy consumption of devices and selection is directed towards more efficient appliances. For the implementation of these measures, a lot has been done to raise public awareness and educate in order to increase the market share of household appliances with A, A+, A++ energy efficiency class and reduce the market share of household appliances under class C.

MEN-9: Eco-design of energy-using products

Ordinance on establishing Eco-design requirements for energy related products (OG 80/2013, 127/14, 50/15), transposed the 2009/125/EZ Directive of the European Parliament and of the Council of 21 the October 2009 about establishing a framework for determining the Eco-design requirements for energy related products to the Croatian legislation.

This Ordinance established a framework for the setting of EU Eco-design of energy-related products with the aim of ensuring the free movement of these products on the internal market. The Ordinance provides for the determination of requirements to be met by energy-related products covered by implementing measures, to be placed on the market and / or in use. It contributes to sustainable development by increasing the energy efficiency and level of environmental protection, while at the same time increasing the security of energy supply.

This Ordinance also allows the implementation of provisions related to the Directive 2009/125/EZ (air conditioners and fans, fan motor-driven, self-circulation pumps without seals, household washing machines, electric motors, non-directional household lamps, lamps directed to the corresponding equipment LED - lamps, fluorescent lamps, external power supplies, cooling devices, simple control boxes, electric and electronic equipment in homes and offices - mode, hold and mute, televisions, household dryers, washing household dishes and pumps water). The Ordinance came into force on the date of the Republic of Croatia accession to EU.

MEN-10: Promotion of energy efficiency and implementation of measures through energy services model

The goal of the promotion of energy efficiency is to raise the awareness of the persons and companies on possibilities and benefits of improving the energy efficiency.

The leading body is the National Energy Efficiency Authority (NKT), which moderates and promotes the national web portal for energy efficiency www.enu.hr.

Energy efficiency projects with implementation through energy services include modernization, reconstruction and renovation of existing plants and facilities with the aim of rational use of energy in a way to achieve the return on investment through savings in energy costs and maintenance. These projects include the development, implementation and financing to improve energy efficiency and reduce operation and maintenance. Areas of business are public and private sectors, i.e. buildings (schools and kindergartens, offices, hotels, universities, hospitals), public lighting, industry and power supply systems (cogeneration, district heating).

MEN-11: Program for the reduction of energy poverty

The reduction of the energy poverty in Croatia will be accomplished through three activities: development of the Program for the Reduction of the Energy Poverty; capacity building of the institutions for the reduction of the energy poverty; and implementation of measures for the energy sand water savings in the households which meet energy poverty criteria.

The financing of the measures will be based on the revenues from the auctions of the emission allowances from the EU ETS, and the goal is to implement the measures in around 330 households annually.

MEN-12: Education in the area of energy efficiency

The goal of this measure is to set the education and certification system for the workers in the area of energy efficiency.

The Ordinance on education and certification system will be developed and education of coaches and program for the education done in accordance with the CROSKILLS project[3].

[3] www.croskills.hr

The important source of the funding will be through the EU SIF, Operational Program Efficient Human Resources.

MEN-13: National Program for the Energy Efficiency in Public Lighting

Public lighting consumes around 3% of final electricity consumption in Croatia. By this measure, National Program for the Energy Efficiency in Public Lighting will be developed.

The focus of the program will be on establishing the advanced implementation models to together with the efficient allocation of the funds available from the EU SIF based on the Operational Program Competitiveness and Cohesion 2014-2020.

The goal is to provide savings of at least 30 GWh annually.

MEN-14: Green public procurement

The goal of this measure is to incorporate the criteria of environmental protection in public procurement. Based on the National Action Plan for Green Public Procurement for the Period 2015-2017 with a view to 2020 (Ministry for environmental protection and Energy, 2015), the parties obligated for the public procurement should include environmental protection criteria.

The goal is that by 2020 at least 50% of public procurement has incorporated the criteria of environmental protection.

New Public Procurement Act (OG 120/16) prescribed the obligation for the economic evaluation of the offers, including evaluation of social and environmental criteria, which will be the strong stimulus for the green public procurement.

MEN-15: Energy audits in industry

With this measure, support to assess the potential energy savings in industrial plants through co-financing the implementation of energy audits should be provided. Scheme for Energy audits in industry includes:

- mandatory energy audits for large companies (companies that meet at least two of the following criteria: total assets of at least HRK 130,000,000.00, annual income of at least HRK 260,000,000.00, an average of at least 250 employees during the financial year). The obligation is regulated by the Law on Energy Efficiency (OG 127/14),

- voluntary scheme of energy audits for small and medium companies. Energy audits on a voluntary basis are supported by the financial assistance provided by the Environmental Protection and Energy Efficiency Fund.

MEN-16: Industrial Energy Efficiency Network (MIEE)

This is the voluntary cooperation instrument with the goal to promote the energy efficiency in industry sector, support the synergies of the processes where possible and facilitate the access to funds available through various options.

MEN-17: Increase of the use of renewable energy sources and energy efficiency in industry sector

The plan of this measure is to reallocate the funds available from the EU SIF, based on the Operational Program Competitiveness and Cohesion as well as funds available from the auctions of the emission allowances in EU ETS and direct them for the use of renewable energy sources and energy efficiency in industry sector.

The allocation of the funds has to be in line with the Regulations of the EU 651/2014 and 1407/2013 on the state aid.

MEN-18: Feed-in tariffs and premium system for the support of the use of renewable energy sources in electricity generation and for the efficient cogeneration

The main mechanism creditable for the past development of renewable energy sources are incentive prices (feed-in tariffs). The tariffs depend on the type of source, power plant size and amount of generated electricity.

In addition to the system of incentives for electricity, generation from cogeneration plants provides adoption of appropriate regulations to promote the heat generation from cogeneration (defining the status of eligible heat producer).

In the National Action Plan for Renewable Energy Sources (Ministry of Economy, 2013), the Republic of Croatia determined the objectives and policy for increasing the share of RES in final energy consumption by 2020 to 20%, 35% in electricity generation, 10% in transport and 20% in heating and cooling.

Act on Renewable Energy Sources and Efficient Cogeneration (OG 100/15) was adopted in 2015 and modified the existing system from the feed-in tariffs to premium. The bylaws still have to be adopted and no tender has been done in line with the new model.

MEN-19: Program for the Energy Efficiency in Heating and Cooling

The Program (Ministry of Economy, 2014) analysed the potential for the development of the district heating systems, mapped the energy consumption and production of heat, explored the potential for additional highly efficient cogeneration and evaluated the possible support mechanisms for the efficient cogeneration.

The Program set out the guidelines for development of the heating and cooling sector and primary energy savings.

MEN-20: Promotion of the use of renewable energy sources and energy efficiency by HBOR-a (Croatian Bank for Reconstruction and Development)

For the purpose of financing the environmental protection projects, HBOR extends loans through the Loan programme for the Preparation of Renewable Energy Resources and Loan Programme for the Financing of Projects of Environmental protection, Energy Efficiency and Renewable Energy Sources.

The goal of the loan program of environmental projects, energy efficiency and renewable energy sources is the realization of investment projects focused on environmental protection, improving energy efficiency and promoting renewable energy. Loans are intended for investment in land, buildings, equipment and devices. Final user may be local and territorial (regional) governments, utility companies, companies, dealers and other legal entities.

MEN-21: Promotion of the use of renewable energy sources and energy efficiency by FZOEU (The Environmental Protection and Energy Efficiency Fund) resources

The Environmental Protection and Energy Efficiency Fund provides funding for the preparation, implementation and development of programs and projects in the field of environmental protection, energy efficiency and use of renewable energy sources and climate change mitigation.

Funds for financing are provided from the revenues raised by environmental polluters, which includes fees for nitrogen oxides, sulphur dioxide and carbon dioxide emissions, fees for burdening the environment with waste, environmental user fees and special fees for the environment for motor vehicles.

Resources of the Environmental Protection and Energy Efficiency Fund are allocated to projects, which improve energy efficiency, including cogeneration, district heating systems, energy audits and demonstration activities, public lighting projects, fuel replacement and waste heat use and projects in the field of building construction and sustainable construction.

Renewable energy projects for which the Environmental Protection and Energy Efficiency Fund grants resources include solar energy, wind energy, biomass, energy from small hydro and geothermal energy.

The Environmental Protection and Energy Efficiency Fund provides grants to local and regional governments, companies, craftsmen, non-profit organizations and individuals, through loans, interest rate subsidies, financial aids and donations.

For some tenders of the Fund, operators in the EU ETS are eligible, thus this measure has effects in the EU ETS and non-EU ETS sector.

MEN-22: CO_2 emission tax for the non-ETS stationary sources

The Regulation on Unit Charges, Corrective Coefficients and Detailed Criteria and Benchmarks for Determination of the Charge for Emissions into Environment of Carbon Dioxide (OG 73/07, 48/09) stipulates the obligation to pay charges on CO_2 emission for all stationary sources emitting more than 30 tonnes of CO_2 per year. Fee payers who invest in energy efficiency, renewable energy and other measures to reduce emissions of CO_2 and other greenhouse gas emissions are charged by lower fee.

The Environmental Protection and Energy Efficiency Fund is authorized for accounting and collecting charges. The Law on Amendments to the Law on Environmental Protection and Energy Efficiency Fund (OG 142/12) stipulates that from 1 January 2013, legal or natural persons who own or use a single source of CO_2 emissions, for which permits for greenhouse gas emissions have been obtained, do not have to pay fee. This means that from 2013 onwards measures apply only to sources that are not covered by the ETS.

The amount of compensation paid by the operators of installations excluded from the EU ETS in accordance with the Article 27 of Directive 2003/87/EC on establishing a scheme for greenhouse emission allowance trading within the Community is defined by the Decision on the amount of the unit charge on greenhouse gas emissions for operators of installations excluded from emissions trading system. The unit fee for 2013 was HRK 32.78 for emitting one tonne of CO_2 in 2013 (OG 105/14), HRK 45.40 in 2014 (OG 96/15), HRK 58.29 in 2015 and HRK 39.53 in 2016. The price for a present year is determined based on the average EUA price in the EU ETS in the previous year.

MEN-23: Revitalization and energy efficiency in existing thermal and hydro power plants

The activities of this measure are related to the Croatian utility company HEP. As listed in the 4th National Energy Efficiency Action Plan, in the coming years the plans for revitalization and implementation of energy efficiency measures in existing thermal and hydro power plants include: reconstruction of water management system, new steam boiler, optimization and automation of hydro stations, revitalization of hydro power plants, reduction of own use of heat, new measurement systems etc.

MEN-24: Reconstruction and renovation of the heating and steam network

Due to the ageing and damages of the heating and steam network, high losses of energy are occurring. The expected investments in the coming period will be provided from the utility companies and from the use of EU SIF, under the Operational Programme Competitiveness and Cohesion for the period 2014-2020.

MEN-25: Operation of power system and development of the transmission and distribution network

Croatian Transmission System Operator (HOPS) is responsible for the reduction of losses in transmission network, development of the transmission network and management of the power system. As listed in the 4th National Energy Efficiency Action Plan, HOPS will focus on optimization of network topology and reduction of losses and development of the network capacity.

HEP-Distribution System Operator (HEP-ODS) is responsible for the reduction of losses in distribution network and implementation of smart meters for the final consumers in Croatia.

The funds for the pilot project for the introduction of "smart grids" are available under the Operational Programme Competitiveness and Cohesion for the period 2014-2020.

3.3. TRANSPORT

MTR-1: Providing information to consumers on fuel economy and CO_2 emission of new passenger cars

Pursuant to the Ordinance on Availability of Information on Fuel Economy and CO_2 Emissions from Passenger Cars (OG 7/15) each supplier of new passenger cars intended for sale shall provide consumers with information on the fuel consumption rate and specific CO_2 emission of passenger cars. The Ministry of Interior which is responsible for the road traffic safety, on the basis of the Ordinance once a year, not later than 31 March of the current year, makes a Guidelines on cost-effectiveness of fuel consumption and CO_2 emission from new passenger cars available for purchase on the market in the Republic of Croatia. The Guidelines contains required information for each model of new passenger cars available in the domestic market.

MTR-2: Training for drivers of road vehicles for eco-driving

The pilot projects were conducted and systematic training for drivers of road vehicles for eco-driving is implemented. This saves energy and increases the level of awareness of all citizens and drivers in the Republic of Croatia on advantages of this modern, intelligent and environmentally friendly driving style. Special elements are dedicated to education on eco driving for drivers of passenger cars, buses and trucks.

MTR-3: Obligation for the use of biofuels in transport

The basic regulation that regulates and promotes the usage of biofuel is Law on Biofuels for Transport (OG 65/09, 145/10, 26/11, 144/12, 14/14).

Based on this law, in 2010, the National Action Plan that promotes the production and use of biofuels in transport for the period 2011 - 2020 was prepared. The Plan establishes a policy to promote increased production and use of biofuels in transport in Croatia. The Plan contains a review and assessment of the situation on the fuel market for transport and air protection, comparative analysis, long-term goals, including the target-market of biofuels and measures to promote increased production and use of biofuels in transport. Measures prescribed by action plan included measures that promote the production of raw materials for the production of biofuels, measures that promote

the production of biofuels with reference to the fee for promotion of production, measures that promote consumption of biofuels with reference to liquid petroleum distributors to place the biofuels on market, administrative measures and research and development activities. The National Action Plan for Renewable Energy Sources (Ministry of Economy, 2013) determined the goals and policies related to increasing the share of RES in final energy consumption by 2020 and in particular the estimated contribution of energy of biofuels in transport.

In 2014 the national system was modified to support only the use of biofuels in transport, not the production. Croatia has to modified the system again in 2017 to include the provisions of Directive 2015/1513 (ILUC Directive) for the biofuels in transport.

MTR-4: Special fee for environment on the motor vehicles

The current system of paying a special fee for the environment in motor vehicles is regulated by Law on Fund for Environmental Protection and Energy Efficiency (OG 107/03, 144/12), Regulation on unit charges, corrective coefficients and detailed criteria and standards to determine the special environmental fee for motor vehicles (OG 114/14, 147/14). Special fee is charged taking into consideration the type of engine and fuel, engine operating volume, type of vehicle, CO_2 emissions and vehicle's age.

MTR-5: Special tax on motor vehicles

This tax is prescribed by the Law on Special Tax on Motor Vehicles (OG 15/13, 108/13, 115/16). The tax is related to the vehicles intended for use on the roads in Croatia in the moment of their first registration in Croatia.

The tax depends on the price of the vehicles, fuel type and CO_2 emissions. The hybrid and electric vehicles are not subject to this tax.

MTR-6: Financial incentives for the purchase of plug-in hybrid and electric vehicles

Electric and hybrid vehicles are due to the cost of technological development currently still more expensive than conventional vehicles using internal combustion engines. Electric vehicles are significantly more efficient than conventional from the standpoint of primary energy consumption

and are almost neutral from the standpoint of carbon dioxide emissions provided that are powered by electricity generated by using renewable sources.

In order to increase the share of electric and hybrid vehicles, subsidies for the purchase of electric and hybrid vehicles through a grant have been introduced. These payments are made from the income of the Environmental Protection and Energy Efficiency Fund achieved, inter alia, by collecting special environmental charge for motor vehicles. The Third National Action Plan for Energy Efficiency for the Period from 2014 to 2016 (Ministry of Economy, 2014) prescribed goals and a plan to support purchases of electric and hybrid vehicles.

MTR-7: Development of infrastructure for alternative fuels

Based on the Directive 2014/94/EU on the deployment of alternative fuels infrastructure, Croatia has adopted The National Policy Framework on Development of the Infrastructure and Market for Alternative Fuels in Transport (OG 34/17) and the Act on Development of the Infrastructure for Alternative Fuels (OG 120/16) with the goal to promote and ensure development of the infrastructure.

The measure includes development of the infrastructure for the use of liquefied natural gas (LNG) in maritime transport.

The measures will be financed based on various models: from utility companies, by the funds available from the auctions of allowances in EU ETS, from the EU SIF, based on the Operational Programme Competitiveness and cohesion for the period from 2014 to 2020, under Priority Axis 7 – Connectivity, with the coordination with the local governance etc.

MTR-8: Promotion of integrated and intelligent transport systems and alternatives fuels in urban areas

Traffic and need for mobility is one of the biggest pressures on the environment in urban areas. Increase in the number of passenger cars, the way they are used, intensity of traffic and unstructured expansion of urban areas largely reversed technological progress in relation to the energy efficiency of vehicles and emission intensity, including noise.

This measure include promotion of optimization of transport of goods, integrated transport of citizens, intelligent transport management, promotion of car-sharing schemes, promotion of public

bicycles and measures to support the development of infrastructure for alternative fuels in urban areas.

With this measure, a gradual development of sustainable transport systems in urban areas of Croatia is provided where Plans for sustainable transport development should be drawn up as basic documents. These plans would include the analysis of the current situation, defining the vision and objectives, impact analysis and the adoption of measures for all types of transportation, distribution of responsibilities, method of implementation and monitoring mechanism. These plans would be brought on the level of major cities, they should be prepared in accordance with the European Commission guidelines and funded through EU programs and funds.

In addition, incentives are expected and under the Operational Programme Competitiveness and cohesion for the period from 2014 to 2020 where under Priority Axis 7 - Connectivity and mobility, the development of public transport system with low levels of CO_2 is planned.

MTR-9: Monitoring, reporting and verification of greenhouse gas emissions in the lifetime of liquid fuels

In accordance with the Air Protection Act (OG 130/11, 47/14, 61/17), supplier that places the fuel on domestic market shall monitor greenhouse gas emissions per energy unit in the life of the fuel. Suppliers have to draw up a report that has to be verified and submitted to the Croatian Agency for the Environment and Nature.

Pursuant to the Act, the Croatian Government's Regulation on the quality of liquid petroleum fuels and the method of monitoring and reporting and methodology of calculation of greenhouse gas emissions in the lifetime of delivered fuels and energy (OG 57/17) lays down the limit values of components and/or quality characteristics of liquid petroleum fuels, method of determining and monitoring the quality of liquid petroleum fuels, conditions for the operation of sampling laboratories and laboratory analysis of the quality of liquid petroleum fuels, the way of demonstrating conformity of the product, the name and marking of the product, way and deadlines for the submission of reports on the quality of liquid petroleum fuels and emissions reports of greenhouse gases in the lifetime of fuels and energy to the Croatian Agency for Environment and Nature, method of monitoring and reporting, methodology for calculation of greenhouse gas emissions in lifetime of fuels and energy, methodology for determining the level of greenhouse gas emissions in lifetime of

fuels per energy unit for the base 2010, methodology for calculating the contribution of electric road vehicles to reducing greenhouse gas emissions, the format of the report and the length of the storage and the manner of transmission of data to the competent bodies European Union.

3.4. INDUSTRIAL PROCESSES

The Industrial Strategy of the Republic of Croatia 2014 – 2020 defines objectives of industrial development and key indicators of the Croatian industry in the period 2014 – 2020. According to the "realistic scenario", by the year 2020 achieving the level of physical volume of industrial production on the level of 2008 is expected, when it reached the highest level of economic activity in Croatia.

Measures belonging to the ETS sector are included in the section Other (cross-cutting) policies and measures under the measure *MCC-4 Emission Trading System* (the measures are below):

- reduction of clinker factor in cement production – increase in share of mineral additives in the cement up to 35%, depending on the composition of raw materials, availability of suitable additives on the market and market demands for certain types of cement (clinker content in cement is defined by standard HRN EN 197-1);
- increase of recycled glass in the glass production - returning container glass that lost applied value into the production process (depends on the efficiency of waste glass collection system in the Republic of Croatia and the possibility of import of waste glass);.
- reduction of N_2O emission in nitric acid production (catalytic decomposition) – N_2O emission reduction up to 88% can be achieved by installing the catalyst; measure is cost-effective because of relatively low marginal costs and high N_2O emission reduction potential.

In addition to production of cement, nitric acid and ammonia, the key source in the sector Industrial processes and product use is production of petrochemical and carbon black, non-energy products from fuels and solvent use and consumption of hydrofluorocarbons in refrigerating and air-conditioning equipment. Therefore the following measures are considered:

MIP-1: Reducing emissions of volatile organic compounds in solvent use sector

Regulation on limit values for contents of volatile organic compounds in certain paints and varnishes used in construction and vehicles finishing products (OG 69/13) prescribes limit values for contents of these volatile organic compounds which may be placed on the market. Development and implementation of solvent management plan reduces emissions of volatile organic compounds and thereby carbon dioxide emissions.

Regulation on substances that deplete the ozone layer and fluorinated greenhouse gases (OG 90/14) prescribes the following measures:

MIP-2: Handling of substances that deplete the ozone layer and fluorinated greenhouse gases

Releasing controlled substances and fluorinated greenhouse gases into air while performing activities of collecting, leakage testing, maintenance or servicing of appliances and equipment is forbidden.

MIP-3 Technical and organizational measures for collection, reuse, recovery and destruction of controlled substances and fluorinated greenhouse gases

This set of measures defines how the used controlled substances and fluorinated greenhouse gases contained in products and equipment must be collected, reused, recovered or destroyed.

MIP-4: Capacity building and strengthening the knowledge of authorized repairers

Education of authorized repairers (servicers) on collection and handling of controlled substances and fluorinated greenhouse gases during equipment servicing.

MIP-5: Leakage detection of controlled substances and fluorinated greenhouse gases

Technical measures to prevent or eliminate leakage of controlled substances and fluorinated greenhouse gases in the atmosphere.

MIP-6: A fee to cover the costs of collection, reuse, recovery and destruction of controlled substances and fluorinated greenhouse gases

An entrepreneur, who imports/introduces controlled substances and/or fluorinated greenhouse gases for placing on the Croatian market or for their own needs, is required to pay a fee in the Environmental Protection and Energy Efficiency Fund. The fee is three HRK per kilogram imported/entered unused controlled substances and/or fluorinated greenhouse gases.

3.5. WASTE MANAGEMENT

For the purpose of effective implementation of the measures included in the waste management sector, along with the already adopted sectoral legislation that is harmonized with EU legislation, it is necessary to adopt a more significant number of by-lows. It will primarily impact on the projections after 2020 to measures MWM-1, MWM-2 and MWM-3, described below.

MWM-1: Preventing the generation and reducing the amount of municipal waste

It is the first in the order of priority in the municipal waste management, pursuant to the Sustainable Waste Management Act (OG 94/13). This measure is achieved by cleaner production, education, economic instruments and enforcement of regulations, and by investing in modern technologies. According to the Act, quantitative targets and deadlines for reducing the total amount of waste disposed to non-compliant landfills are defined. By the end of 2017, the maximum waste disposed to non-compliant landfills amounts 800,000 tons. Disposal of waste to non-compliant landfills in Croatia is prohibited after 31 December 2017.

MWM-2: Increasing the amount of separately collected and recycled municipal waste

Beside the Sustainable Waste Management Act, the Waste Management Plan of the Republic of Croatia for the period 2017 – 2022 (OG 3/17) also defines the quantitative targets and deadlines for increasing the amount of separately collected and recycled waste. By 2020, it is necessary to secure the preparation for reuse and recycling of the following waste materials: paper, metal, plastic and glass from households and possibly from other sources if these waste streams are similar to the waste from households, with the minimum share of 50% by waste weight.

MWM-3: Methane flaring

The Ordinance on the Methods and Conditions for the Landfill of Waste, Categories and Operational Requirements for Landfills (OG 114/15) and Ordinance on the Waste Management (OG 23/14, 51/14, 121/15, 132/15) regulate technical requirements for landfill operation, which reduces possible adverse effects of landfills on the environment. On landfills where landfill gas occurs it is necessary to secure a gas collection system, and that gas must be treated and used. If collected landfill

gases cannot be used for energy production, they should be burned in the area of the landfill and the emission of methane into the atmosphere should be prevented.

MWM-4: Reducing the amount of disposed biodegradable municipal waste

The aim of this measure is to reduce the amount of biodegradable fraction of waste disposed at landfills, thus reducing methane emissions resulting from anaerobic decomposition of waste.

Pursuant to the Sustainable Waste Management Act, quantitative targets related to the reduction of biodegradable municipal waste disposed to landfills are established. By the end of 2020, the share of biodegradable municipal waste disposed of in landfills must be reduced to 35% weight of biodegradable municipal waste produced in 1997.

MWM-5: Use of biogas for electricity and heat generation

The measure is associated with measure MEN-18: Feed-in tariffs and premium system for the support of the use of renewable energy sources in electricity generation and for the efficient cogeneration in the Energy sector. The main mechanism for encouraging the application of biogas for electricity generation and the construction of biogas cogeneration plants are incentive prices (feed-in tariffs) that depend on the type of source, power plant size and amount of generated electricity. Looking at the waste management sector, the potential reduction in greenhouse gas emissions of these measures is the potential to reduce methane emissions (resulting from the anaerobic decomposition of the biodegradable fraction of waste), which is used for electricity and heat generation.

In Croatia, so far, 28 biogas plants (total installed power of 33.435 MW) and two power plants on landfill gas and gas from wastewater treatment plants (total installed power of 5.500 MW) are connected to the power grid, within the system of eligible power producers. Additionally, 23 biogas plants (total installed power of 23.084 MW) have signed power purchase agreements with the Croatian Energy Market Operator, but plants have not yet been put into operation (http://www.hrote.hr/contracting, at 15/05/2017).

3.6. AGRICULTURE

The positive impact of the implementation of measures on overall greenhouse gas emissions in the agriculture sector is reflected in the direct reduction of methane and nitrogen compounds emissions. Measures included in the formation of scenarios of gradual transition of agriculture in relation to the referent scenario:

MAG-1: Change in diet of cattle and pigs and animal feed quality

Specific sub-measures within this group of measures which relate to the further improvement of cattle keeping, animal waste management systems, level of production as well as their diet (digestibility): the change of ratios of certain types of forage in the diet and the use of fat supplements as an energy source for animals and improving the quality of voluminous forage and improving grazing systems. These measures refer to the potential reduction of methane (CH_4) and nitrogen compounds emissions from enteric fermentation and animal waste management.

MAG-2: Anaerobic decomposition of manure and biogas production

With the introduction of biogas plants emission reductions is achieved through elimination of methane emissions due to the disposal of used litter and receiving electricity from renewable sources. The measure is linked to the measures in Renewable sources in the production of electricity and heat and Construction of cogeneration plants from the Energy sector. Anaerobic breakdown help biogas plants to reduce the source of easily degradable carbon in the manure that is applied to agricultural land, but it also potentially reduces the process of nitrification and N_2O emissions.

MAG-3: Improving cattle facilities and systems of animal waste management

Covering manure storage places - creating a natural layer (cortex) with a natural (straw) or artificial material (porous). This measure reduces direct methane and ammonia emissions, although to a lesser degree they enhance the process of nitrification (porous material) and emissions of nitrous oxide.

MAG-4: Improvement of mineral fertilizer application methods

Application of new slow-release fertilizers suitable for growing corn and wheat (fertilizers coated with polymers especially). Research suggests the possibility of reduced need of fertilizer application per hectare with unchanged or increased revenues, including reduced emissions of nitrogen due to soil losses.

MAG-5: Hydromeliorative interventions and systems of protection against natural disasters

The reduction of nutrients leaching from arable horizon can be affected with the construction of drainage and irrigation systems; consequently, there is less need for nitrogen application.

MAG-6: Introduction of new cultivars, varieties and cultures

Encouraging development, education and implementation of technologies at a national and regional level, encouraging the transition and adaptation of the entire production chain to produce new crops or enabling and encouraging the implementation of cultivars and varieties that are more resistant to drought and disease and have a lower overall carbon footprint. This, among other benefits, is aimed at reducing the need for the introduction of nitrogen into the soil through fertilizers.

MAG-7: Rural Development Programme of the Republic of Croatia for the Period 2014-2020

One of the principal areas of institutional work of the European Union is the Common Agricultural Policy (CAP). Rural development, as the second CAP tier, is financed through the Agricultural Fund for Rural Development (EAFRD). Development of the Rural Development Programme of the Republic of Croatia is a prerequisite for the EAFRD eligibility in the next period. Goals set by the Europe 2020 Strategy are also evident within three CAP goals: agriculture competitiveness, sustainable resource management and balanced development of rural areas. The Rural Development Programme should achieve the goals set by CAP through measures given in six priorities:

- Promotion of knowledge and innovation transfers in agriculture, forestry and rural areas
- Improvements in sustainability and competitiveness in agriculture, forestry and rural areas
- Promotion of food provision chain, including processing and market placement of agricultural products, animal welfare and risk management

- Revitalization, protection and improvement of agriculture and forestry related ecosystems
- Promotion of resource efficiency and encouraging the shift to low-carbon farming, resilient to climate changes in the agriculture, food and forestry sectors
- Promotion of social involvement, combating poverty through economic development of rural areas.

3.7. LULUCF

MLF-1: Improving the reporting in LULUCF sector

The Annex I countries of the United Nations Framework Convention on Climate Change, including Croatia as well, are obligated in accordance with Annex I to Decision 15/CP.17 continuously review the quality of the relevant technical elements of GHG inventory. Because of this commitment and the stipulation of Decision 529/2013/EU which obliges countries to prepare also reports on emissions/removals from the activities Grassland management and Cropland management and submits their final annual estimates for accounting no later than 15 March 2022, the implementation of this measures is still considered relevant.

For the implementation of this measure, the Ministry of Environment and Energy published the list of projects recognized as needed in LULUCF sector securing the financial resources for the corresponding public procurement in 2017.

MLF-2: Preparation of cost-benefit analysis of afforestation on new areas and natural regeneration of forests as a measure of increasing the sinks in LULUCF sector

Changes in the sinks of greenhouse gases as a result of direct land use change caused by human activity and forestry activities are allowed to be calculated in the national balance of emissions and sinks of greenhouse gases and used to fulfil obligations under the Kyoto Protocol. The aforementioned is stipulated by Article 3 paragraph 3 of Kyoto Protocol for parties included by Annex I to the Kyoto Protocol.

By analysing the costs and benefits of afforestation on the new areas, possibility of increasing greenhouse gas sinks using reforestation activities on the barren productive forest floor will be investigated. Thus would justify introduction of possible incentive measures, such as the afforestation of fast-growing species and natural regeneration of forests, equivalent to measures for greenhouse gas emissions reduction. The implementation of this activity was determined in the Plan for Air Protection, Ozone Layer Protection and Climate Change Mitigation for the period 2013-2017 (OG 139/13), and its implementation originally planned for 2015 has been postponed and has been envisaged for 2017.

MLF-3: Implementation of Action plan for LULUCF sector

According to the Decision 529/2013/EU4, as a member of the European Union, Croatia was obliged to prepare and submit information from the forestry sector to the Commission in accordance with Article 10 of Decision 529/2013/EU. The plan was drafted and submitted to the EC on 9 January 2015, and will form an integral part of the national strategy for low carbon development.

When developing this plan, the measures in the LULUCF sector of the Republic of Croatia were recognized and taken from appropriate strategies, programmes and legal acts such as: Plan for the air protection, protection the ozone layer and climate change mitigation in the Republic of Croatia for the period 2013-2017 (OG 139/13), Rural Development Programme of the Republic of Croatia for the Period 2014-2020, the Ordinance on multiple compliance (OG 32/15) and the Forest Management basis for areas of the Republic of Croatia for the period 2006-2015. The first report on the implementation of measures was sent to the Commission in line with the Article 10, paragraph 4.

[4] Decision No 529/2013/EU of the European Parliament and of the Council of 21 May 2013 on accounting rules on greenhouse gas emissions and removals resulting from activities relating to land use, land-use change and forestry and on information concerning actions relating to those activities

3.8. OTHER (CROSS-CUTTING) POLICIES AND MEASURES

MCC-1: Committee for cross-sectoral coordination of policies and measures for mitigation and adaptation to climate change

In accordance with the Air Protection Act (OG 130/11, 47/14, 61/17), for monitoring and evaluation of the implementation and planning of policies and measures for mitigation and adaptation to climate change in the Republic of Croatia, the Commission for inter-sectoral coordination of policies and measures for mitigation and adaptation to climate change (OG 114/14) was established. The Committee members include representatives of relevant government bodies and other relevant organizations, agencies and non-governmental organizations. The Committee members, activities and functioning of the Commission are determined by the Croatian Government on the proposal of the ministry responsible for environmental protection.

MCC-2: System for the Measurement and Verification of Energy Savings

System for the Measurement and Verification of Energy Savings (SMIV) was established by the Ordinance on the System for the Measurement and Verification of Energy Savings (OG 71/15). It will monitor the energy savings and resultant reduction of greenhouse gas emissions.

SMIV is moderated by the National Energy Efficiency Authority (NKT).

It is the important component of the future energy efficiency obligation schemes in Croatia.

MCC-3: Promotion of the use of innovative information and communication technologies (ICT) to reduce greenhouse gas emissions

Innovative information and communication technologies have an increasingly important role in reducing greenhouse gas emissions and increasing energy efficiency. Intensifying their use in public administration, services and manufacturing processes, will boost productivity and work efficiency and at the same time will reduce energy consumption and consequent greenhouse gas emissions. The measure is expected to intensify the use of innovative ICT and monitoring of actual energy savings and reductions of greenhouse gas emissions.

MCC-4: Emissions Trading System

ETS (Emissions Trading System) sector includes all activities listed in Annex I of the Regulation on trading with greenhouse gas emission allowances (OG 69/12, 154/14) and for the reduction of greenhouse gas emissions from these activities alone are responsible plant operators involved in the trading system. Reduction commitments through emission allowances allocated evenly have been distributed to all Member States with the goal to contribute to the reduction of the emissions by 21% until 2020 compared with the 2005 level. Thus it can be concluded that reduction of emissions of certain activities of the ETS is in fact regulated at EU level.

From 1 January 2013, the Republic of Croatia is fully integrated in the EU Emission Trading System (EU ETS). Operators in Croatia - the pursuant in the EU ETS have obtained Permits for greenhouse gas emissions and have established a regime for emissions monitoring and reporting to the competent authority.

Greenhouse gases covered by EU ETS are: carbon dioxide (CO_2) for all activities and additionally for certain activities, nitrous oxide (N_2O) and perfluorocarbon (PFC). Additional activity included in EU ETS is aviation. Aircraft operators in Croatia are included in the EU ETS from 2012 for flights to EU and from 2014 for flights within Croatia, and Croatia undertook to administer aviation operators included in the EU ETS from 2014.

All operators, except electricity producers for the third parties sales, have submitted their applications for issuance of free allowances. Free allowances can be distribute free of charge for the installations that are exposed to the risk of carbon leakage to third countries, on the bases of benchmark established in accordance with values of 10% of the most efficient installations in the same sector. Operators, which will not have a sufficient number of allowances to cover their greenhouse gases emissions, have the option to purchase emission units through auctions.

MCC-5: Use of funds obtained from the sales of EU ETS emission allowances through auctions for the GHG emission reduction measures

Of the total number of allowances designated for the allocation to operators and aircraft operators, in each year of the trading period, a part is distributed free of charge according to the above prescribed method. The remaining part is distributed to the Member States of the European Union and is subject to public auctions. Revenues from the sales of emission allowances through

auctions belong to the member states and must be earmarked for activities that are directly associated with the reduction of greenhouse gas emissions.

The Air Protection Act (OG 130/11, 47/14, 61/17) stipulates that Republic of Croatia for climate related purposes use all funds received decreased by 5%, which will be paid to the state budget of the Republic of Croatia to cover the costs of administering the emissions trading system, for administrative affairs, functioning of the Union Registry, auctioneers, National System for monitoring greenhouse gas emissions and other matters related to climate change. Plan for the use of funds obtained from the sales of emission allowances through auctions in the Republic of Croatia for the period from 2014 to 2016 was adopted by the Croatian Government (OG 140/14), while the funds are paid to a special account of the Environmental Protection and Energy Efficiency Fund. The new plan is under preparation and will cover the period 2017-2020.

MCC-6: Preparation of National Feasibility Study with the action plan for the preparatory activities for CCS projects in Croatia

Technology for carbon capture and storage for large emission sources is not yet commercially available. The possibility of commercial application is expected in the period after 2020.

According to Directive 2009/31/EC on the geological storage of carbon dioxide, respectively Article 36 of Directive on industrial emissions 2010/75/EU, for power plants with capacity exceeding 300 MW which have obtained the construction permit after the entry into force of the Directive 2009/31/EK, it is necessary to assess whether the following requirements are satisfied:

- suitable storage locations are available,
- transport facilities are technically and economically feasible and
- upgrade of the plant for CO_2 capture is technically and economically feasible.

If these conditions are satisfied, the competent authority should provide adequate reserve area on the plant's location for equipment for capturing and compressing extracted CO_2.

Due to described commitments for new thermal power plants, with this measure the preparation of National Feasibility Study with the action plan of the preparatory activities for CCS projects is planned. This Study will include stages of capturing on the sources of emissions, transport, injection and storage.

MCC-7: Energy efficiency obligation scheme

Based on the provisions of the Directive 2012/27/EU, Act on Energy Efficiency (OG 127/14), 3rd and 4th National Energy Efficiency Action Plan, Croatia plan to establish the energy efficiency obligation scheme for the fuel suppliers.

The obligated parties will have contribute to the energy savings in final energy consumption.

CHAPTER 4: OVERVIEW OF POLICIES AND MEASURES BY SECTORS

Overview tables of policies and measures in each sector contain the code and title of the policy or measure, objective of implementation, identification of greenhouse gas affected by the policy or measure, type of policy instrument, status of implementation and implementing body.

The type of instrument was determined according to recommendations laid down in the Guidelines for the preparation of National Communications by parties included in Annex I to the Convention. The guidelines make a distinction between economic, fiscal, agreement, regulatory, information, research and other instruments.

The status of implementation that can be assigned to a policy or measure is: implemented, adopted or planned. Status "implemented" is assigned if national legislation is in force, voluntary agreements have been established, financial resources have been allocated or human resources have been mobilized. Status "adopted" is assigned to policies and measures for which an official government decision has been made and there is a clear commitment to proceed with implementation. For those policies and measures that are still under discussion and have a realistic chance of being adopted and implemented, status "planned" is chosen.

ENERGY

Table 4-1: Overview of policies and measures in Energy

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MEN-1: National Plan for the Increase of the Number of Nearly-Zero Energy Buildings	Increase the number of nearly-zero energy buildings	CO_2	regulatory, economic, planning	implemented	Ministry of Construction and Physical Planning
MEN-2: Program for energy renovation of the apartment buildings	Support the renovation of 2% of multi-family dwellings annually	CO_2	economic	implemented	Ministry of Construction and Physical Planning, Environmental Protection and Energy Efficiency Fund
MEN-3: Program for the increase of energy efficiency and use of renewable energy sources in commercial non-residential buildings	Support the energy renovation and use of RES in commercial and services sector	CO_2	economic	adopted	Ministry of Environment and Energy, Ministry of Construction and Physical Planning, Environmental Protection and Energy Efficiency Fund
MEN-4: Program for the Energy Renovation of the Family Dwellings	Energy renovation of 2.000 houses annually	CO_2	economic	implemented	Ministry of Construction and Physical Planning, Ministry for Regional Development, Environmental Protection and Energy Efficiency Fund
MEN-5: Program for the energy renovation of public buildings	Renovate 9,46% of the surface of all the public sector buildings	CO_2	economic	implemented	Ministry of Construction and Physical Planning, Environmental Protection and Energy Efficiency Fund, Agency for Legal Affairs and Real Estate

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MEN-6: Energy management in the public sector	Improve the energy performance of public sector	CO_2	regulatory	implemented	Agency for Legal Affairs and Real Estate, National Energy Efficiency Authority
MEN-7: Measurement and informative calculation of energy consumption	informing consumers on energy consumption and production	CO_2	regulatory, information	implemented	Ministry of Environment and Energy, energy distributors
MEN-8: Labelling the energy efficiency of household appliances	informing consumers on the energy efficiency of household appliances	CO_2	regulatory, information	implemented	Ministry of Environment and Energy
MEN-9: Eco-design of energy-using products	improve the energy efficiency of energy-using products	CO_2	regulatory, information	implemented	Ministry of Environment and Energy
MEN-10: Promotion of energy efficiency and implementation of measures through energy services model	promote the of energy efficiency and ESCO model projects	CO_2	information	implemented	National Energy Efficiency Authority, ESCO companies
MEN-11: Program for the reduction of energy poverty	Reduce the energy poverty	CO_2	economic, regulatory	planned	Ministry of Environment and Energy, Ministry for Demography, Family, Youth and Social Policy, Environmental Protection and Energy Efficiency Fund

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MEN-12: Education in the area of energy efficiency	Educate the workers for energy efficiency	CO_2	education	implemented	Croatian Employment Service, Agency for Vocational Education and Adult Education
MEN-13: National Program for the Energy Efficiency in Public Lighting	New energy savings of 30 GWh in electricity annually	CO_2	economic	implemented	Ministry of Environment and Energy National Energy Efficiency Authority, Environmental Protection and Energy Efficiency Fund and EU Funds
MEN-14: Green public procurement	Include the environmental criteria in public procurement	CO_2, CH_4, N_2O	regulatory	implemented	Ministry of Environment and Energy, Ministry of the Economy, Entrepreneurship and Crafts, Public office for public procurement, National Energy Efficiency Authority
MEN-15: Energy audits in industry	Assessment of potential for energy savings	CO_2, CH_4, N_2O	regulatory, informative	implemented	Ministry of Environment and Energy, Ministry of the Economy, Entrepreneurship and Crafts, Environmental Protection and Energy Efficiency Fund
MEN-16: Industrial Energy Efficiency Network (MIEE)	Assessment of potential for energy savings, synergies and sources for funding	CO_2, CH_4, N_2O	voluntary	implemented	Croatian Chamber of Commerce, National Energy Efficiency Authority, Environmental Protection and Energy Efficiency Fund

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MEN-17: Increase of the use of renewable energy sources and energy efficiency in industry sector	Increase of the use of renewable energy sources and energy efficiency in industry sector	CO_2, CH_4, N_2O	economic	implemented	Ministry of Environment and Energy, National Energy Efficiency Authority, Environmental Protection and Energy Efficiency Fund
MEN-18: Feed-in tariffs and premium system for the support of the the use of renewable energy sources in electricity generation and for the efficient cogeneration	increasing the share of renewable energy in electricity and heating; primary energy savings	CO_2	economic, regulatory	implemented	Ministry of Environment and Energy, Croatian Energy Operator (HROTE)
MEN-19: Program for the Energy Efficiency in Heating and Cooling	increasing the share of renewable energy in gross final energy consumption	CO_2	regulatory, economic, information	adopted	Ministry of Environment and Energy, Ministry of Construction and Physical Planning
MEN-20: Promotion of the use of renewable energy sources and energy efficiency by HBOR-a (Croatian Bank for Reconstruction and Development)	increasing the share of renewable energy in gross final energy consumption, primary energy savings	CO_2, CH_4, N_2O	economic	implemented	Croatian Bank for Reconstruction and Development (HBOR)

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MEN-21: Promotion of the use of renewable energy sources and energy efficiency by FZOEU (Environmental Protection and Energy Efficiency Fund) resources	increasing the share of renewable energy in gross final energy consumption, primary energy savings	CO_2, CH_4, N_2O	economic, regulatory	implemented	Ministry of Environment and Energy, Environmental Protection and Energy Efficiency Fund
MEN-22: CO2 emission tax on the non-ETS stationary sources	reduce CO2 emissions from stationary sources with annual emissions greater than 30 tons of CO2, excluding EU ETS operators	CO_2	fiscal	implemented	Ministry of Environment and Energy, Ministry of Finances, Environmental Protection and Energy Efficiency Fund
MEN-23: Revitalization and energy efficiency in existing thermal and hydro power plants	primary energy savings	CO_2	voluntary, regulatory	implemented	HEP-Proizvodnja d.o.o.
MEN-24: Reconstruction and renovation of the heating and steam network	primary energy savings	CO_2	regulatory, economic	implemented	HEP-Toplinarstvo d.o.o.
MEN-25: Operation of power system and development of the transmission and distribution network	primary energy savings	CO_2	economic, regulatory	implemented	Croatian Transmission System Operator, HEP-Distribution System Operator

TRANSPORT

Table 4-2: Overview of policies and measures in Transport

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MTR-1: Providing information to consumers on fuel economy and CO2 emission of new passenger cars	consumer information on fuel economy and CO2 emissions of new passenger cars	CO_2	information	implemented	Ministry of Environment and Energy
MTR-2: Training for drivers of road vehicles for eco-driving	reducing CO2 emissions from road vehicles	CO_2	educational	implemented	Ministry of Interior Affairs, Ministry of Environment and Energy, Environmental Protection and Energy Efficiency Fund, National Energy Efficiency Authority
MTR-3: Obligation for the use of biofuels in transport	increasing the share of biofuels in transport	CO_2	regulatory, economic, fiscal	adopted, partially implemented	Ministry of Environment and Energy
MTR-4: Special fee for environment on the motor vehicles	reducing CO2 emissions from road vehicles	CO_2	fiscal, economic	implemented	Ministry of Environment and Energy, Ministry of Finances, Environmental Protection and Energy Efficiency Fund
MTR-5: Special tax on motor vehicles	reducing CO2 emissions from road vehicles	CO_2	fiscal, economic	implemented	Ministry of Environment and Energy, Ministry of Finances
MTR-6: Financial incentives for the purchase of plug-in hybrid and electric vehicles	reducing CO2 emissions from road vehicles	CO_2	economic	implemented	Ministry of Environment and Energy, Environmental Protection and Energy Efficiency Fund

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MTR-7: Development of infrastructure for alternative fuels	Legislative framework and reducing CO2 emissions from road vehicles	CO_2	regulatory, economic	implemented	Ministry of the Sea, Transport and Infrastructure, Ministry of Environment and Energy, Ministry of Construction and Physical Planning, Ministry of Finances, Ministry of Interior, Units of regional and local self-government, Environmental Protection and Energy Efficiency Fund
MTR-8: Promotion of integrated and intelligent transport systems and alternatives fuels in urban areas	reducing CO2 emissions from road vehicles	CO_2	research	partly adopted, partly implemented	Ministry of Environment and Energy, Units of regional and local self-government, Environmental Protection and Energy Efficiency Fund
MTR-9: Monitoring, reporting and verification of greenhouse gas emissions in the lifetime of liquid fuels	Greenhouse Gas Emissions Monitoring of liquid petroleum fuels	CO_2	regulatory	adopted	Ministry of Environment and Energy, Croatian Agency for the Environment and Nature

INDUSTRIAL PROCESSES

Table 4-3: Overview of policies and measures in Industrial processes

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MIP-1: Reducing emissions of volatile organic compounds in solvent use sector	reducing emissions of volatile organic compounds and thereby CO_2 emissions	CO_2	economic, regulatory	implemented	Ministry of Environment and Energy
MIP-2: Handling of substances that deplete the ozone layer and fluorinated greenhouse gases	ban of the release of controlled substances and fluorinated greenhouse gases into the atmosphere	SF_6, HFC, PFC	regulatory	implemented	Ministry of Environment and Energy
MIP-3: Technical and organizational measures for collection, reuse, recovery and destruction of controlled substances and fluorinated greenhouse gases	collection, reuse, recovery and destruction of controlled substances and fluorinated greenhouse gases	SF_6, HFC, PFC	regulatory	implemented	Centers for collection and recovery of controlled substances and fluorinated greenhouse gases
MIP-4: Capacity building and strengthening knowledge of authorized repairers	education of authorized repairers (servicers) on collection and handling of controlled substances and fluorinated greenhouse gases	SF_6, HFC, PFC	regulatory, educational	implemented	Ministry of Environment and Energy

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MIP-5: Leakage detection of controlled substances and fluorinated greenhouse gases	prevention or elimination leakage of controlled substances and fluorinated greenhouse gases in the atmosphere	SF_6, HFC, PFC	regulatory	implemented	Ministry of Environment and Energy, operators
MIP-6: A fee to cover the costs of collection, reuse, recovery and destruction of controlled substances and fluorinated greenhouse gases	payment a fee in the Environmental Protection and Energy Efficiency Fund	SF_6, HFC, PFC	regulatory, economic	implemented	Ministry of Environment and Energy, Environmental Protection and Energy Efficiency Fund

WASTE MANAGEMENT

Table 4-4: Overview of policies and measures in Waste management

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MWM-1: Preventing the generation and reducing the amount of municipal waste	reduce the amount of waste for disposal	CH_4	regulatory, economic, educational	implemented	Ministry of Environment and Energy Regional and local self-government units
MWM-2: Increasing the amount of separately collected and recycled municipal waste	reuse and recycling of waste, reduce the amount of waste for disposal	CH_4	regulatory, economic	implemented	Ministry of Environment and Energy Regional and local self-government units
MWM-3: Methane flaring	reduce methane emissions in the atmosphere	CH_4	regulatory, economic	implemented	Ministry of Environment and Energy Regional and local self-government units
MWM-4: Reducing the amount of disposed biodegradable municipal waste	reduce methane emissions in the atmosphere	CH_4	regulatory	implemented	Ministry of Environment and Energy Regional and local self-government units
MWM-5: Use of biogas for electricity and heat generation	reduce methane emissions in the atmosphere, primary energy savings in energy generation	CO_2, CH_4	regulatory, economic	implemented	Ministry of Environment and Energy Regional and local self-government units

AGRICULTURE

Table 4-5: Overview of policies and measures in Agriculture

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MAG-1: Change in the diet of cattle and pigs and animal feed quality	reduction of methane and nitrogen compounds emissions from enteric fermentation and animal waste management	CH_4, N_2O	economic	planned	Ministry of Agriculture
MAG-2: Anaerobic decomposition of manure and biogas production	reduction of easily degradable carbon in the manure that is applied to agricultural land, reducing the process of nitrification and N2O emissions	CH_4, N_2O	economic	planned	Ministry of Agriculture, Advisory services
MAG-3: Improving cattle facilities and system of animal waste management	reduction of direct methane and ammonia emissions, although to a lesser degree these enhance the process of nitrification (porous material) and emissions of nitrous oxide	CH_4	economic	planned	Ministry of Agriculture, Advisory services

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MAG-4: Improvement of mineral fertilizers application methods	application of new slow-release fertilizers with the possibility of reduction of fertilizer application (emissions of nitrogen) per hectare with unchanged or increased revenues	N_2O	economic, information, research	planned	Ministry of Agriculture, Advisory services
MAG-5: Hydromeliorative interventions and systems of protection against natural disasters	reduction of nutrients leaching from arable – reduction of nitrogen application.	N_2O	economic	planned	Ministry of Agriculture, Advisory services
MAG-6: Introduction of new cultivars, varieties and cultures	reducing the need for the introduction of nitrogen into the soil through fertilizers	N_2O	information, research	planned	Ministry of Agriculture
MAG-7: Rural Development Programme of the Republic of Croatia for the Period 2014-2020	Agriculture competitiveness, sustainable resource management and balanced development of rural areas: promotion of knowledge and innovation, improvements	CH_4, N_2O	regulatory, economic	adopted	Ministry of Agriculture, Agency for paying in Agriculture

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
	in sustainability and competitiveness, promotion of resource efficiency and encouraging of the shift to low-carbon farming, resilient to climate changes in the agriculture, food and forestry sectors				

LULUCF

Table 4-6: Overview of policies and measures in LULUCF sector

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MLF-1: Improving the reporting in LULUCF sector	improving the GHG estimation in LULUCF sector	CO_2	regulatory	Partially implemented Continuing until 2020	Ministry of Environment and Energy
MLF-2: Preparation of cost-benefit analysis of afforestation on new areas and natural regeneration of forests as a measure of increasing sinks in LULUCF sector	examining the justification of new measures to increase the outflow	CO_2	research	Planned	Ministry of Environment and Energy Ministry of Agriculture
MLF-3: Implementation of Action plan for LULUCF sector	fulfilment of the obligations of submitting data on LULUCF sector to the European Commission	CO_2	regulatory	Implementation in process until 2020	Ministry of Environment and Energy Ministry of Agriculture

CROSS-CUTTING POLICIES AND MEASURES

Table 4-7: Overview of cross-cutting policies and measures

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MCC-1: Committee for cross-sectoral coordination of policies and measures for mitigation and adaptation to climate change	monitoring the implementation of policies and measures for mitigation and adaptation to climate change	all GHG	regulatory	implemented	Ministry of Environment and Energy, competent ministries
MCC-2: System for the Measurement and Verification of Energy Savings	Monitoring and verification of energy savings	CO2	information, regulatory	implemented	National Energy Efficiency Authority
MCC-3: Promotion of the use of innovative information and communication technologies (ICT) to reduce greenhouse gas emissions	increasing productivity and work efficiency while reducing energy consumption and consequent greenhouse gas emissions. Improve monitoring of GHG emissions	CO2	information	implemented	Ministry of Environment and Energy, Ministry of Economy, Ministry of Construction and Physical Planning, Croatian Agency for the Environment and Nature
MCC-4: Emissions Trading System	reduction the GHG emissions in operators under EU ETS	CO2, N2O	economic	implemented	European Commission, Ministry of Environment and Energy, Croatian Agency for the Environment and Nature

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MCC-5: Use of funds obtained from the sales of EU ETS emission allowances through auctions for the GHG emission reduction measures	distribution of funds raised at the auction in projects to mitigate and adapt to climate change	all GHG	economic	implemented	Ministry of Environment and Energy, Government of the Republic of Croatia
MCC-6: Preparation of the National Feasibility Study with the action plan for the preparatory activities for CCS projects in Croatia	preparation of CCS projects in the Republic of Croatia	CO2	research	planned	Ministry of Environment and Energy
MCC-7: Energy efficiency obligation scheme	energy savings in final consumption	CO2	economic	planned	Ministry of Environment and Energy

CHAPTER 5: INDICATORS FOR THE PROJECTIONS IN YEARS 2014, 2020, 2025, 2030 AND 2035

Table 5-1: Indicators for the projections with aim to assessment of policies and measures implementation, 'with existing measures' scenario

NO.	SECTOR BY EUROSTAT	INDICATOR	2014	2020	2025	2030	2035
1	MACRO	GDP [bill. EUR] (EC14)	43.1	48.8	51.8	55.3	60.7
2	MACRO B0	CO2 intensity from energy consumption of GDP [t/mil. EUR]	352.7	314.8	293.6	277.3	243.3
		CO_2 emissions from energy consumption [kt CO2]	15,200	15,367	15,212	15,327	14,778
		GDP [bill. EUR] (EC14)	43.1	48.8	51.8	55.3	60.7
3	TRANSPORT C0	CO_2 intensity of passenger cars [kt CO_2/km]	169.2	150.7	140.1	129.9	119.5
		CO_2 emissions from passenger cars [kt]	3,580	3,554	3,621	3,674	4,626
		Number of kilometres from passenger cars [Mkm]	21,167	23,589	25,845	28,288	30,351
4	INDUSTRY A1	Energy related CO_2 intensity of industry [t/mil. EUR]	730,6	630.4	578.4	545.6	465.6
		CO_2 emissions from industry which use fossil fuels [kt]	7,094	7,137	6,893	6,936	6,419
		Gross value-added total industry [bill. EUR] (EC14)	9,7	11.3	11.9	12.7	13.8
5	HOUSEHOLDS A1	Specific CO_2 emissions of households [t/dwelling]	0.94	1.11	1.11	1.11	1.10
		CO_2 from households using fossil fuels [kt]	1,425	1,716	1,725	1,730	2,731
		Stock of permanently occupied dwellings [1,000]	1,520	1,542	1,553	1,561	1,567
6	SERVICES A0	CO_2 intensity of the commercial and institutional sector [t/mil. EUR]	18.7	19.1	18.0	16.9	15.4
		CO_2 emissions from fossil fuel consumption in commercial and institutional sector [kt]	471	558	570	581	589
		Gross value-added services [bill. EUR] (EC14)	25.3	29.2	31.7	34.3	38.3
7	TRANSFORMATION B0	Specific CO_2 emissions of public and autoproducer power plants [t/GJ]	NE	NE	NE	NE	NE
		CO_2 emissions from all fossil fuel combustion for gross electricity and heat production by public and autoproducer thermal power and combined heat and power plants. Without heat only plants. [kt]	NE	NE	NE	NE	NE
		All products — output by public and autoproducer thermal power stations [TJ]	NE	NE	NE	NE	NE

NO.	SECTOR BY EUROSTAT	INDICATOR	2014	2020	2025	2030	2035
8	AGRICULTURE	CH4 emissions from dairy cows [kt CH4/year]	19.52	14.01	14.56	14.93	15.18
		CH4 emissions from other cows (non-dairy mature and young) [kt CH4/year]	13.24	12.64	12.57	12.93	13.21
9	AGRICULTURE	Direct N2O emissions from soils due to synthetic fertilizer application [kt N2O-N/year]	1.27	1.55	1.54	1.54	1.53
		Direct N2O emissions from manure management [kt N2O-N/year]	0.46	0.35	0.35	0.36	0.37
		Dairy cattle population [1000 heads]	179	165	175	180	185
10	WASTE	Specific CH_4 emissions from landfills[kt/kt]	0.04	0.04	0.05	0.05	0.05
		CH_4 emissions from landfills [kt]	47.58	61.49	69.90	76.86	83.68
		Municipal solid waste going to landfills [kt]	1,349	1,463	1,533	1,612	1,743

*NE – not estimated

CHAPTER 6: QUANTITATIVE ESTIMATES OF THE EFFECTS OF POLICIES AND MEASURES ON EMISSIONS BY SOURCES AND REMOVALS BY SINKS OF GREENHOUSE GASES

6.1. QUANTITATIVE ESTIMATES OF THE EFFECTS OF POLICIES AND MEASURES ON EMISSIONS BY SOURCES AND REMOVALS BY SINKS OF GREENHOUSE GASES FOR 2015, 2020, 2025 AND 2030 (EX ANTE ASSESSMENT)

Quantitative estimates of the effects of policies and measures on emissions by sources and removals by sinks of greenhouse gases for years 2015, 2020, 2025, 2030 and 2035 (ex-ante assessment) for three scenarios are given in table 6-1 below.

Table 6-1: Quantitative estimates of policies and measures for 2015, 2020, 2025, 2030 and 2035 (kt)

'Without measures' scenario	**2015**	**2020**	**2025**	**2030**	**2035**
Energy	11,496	11,975	13,098	14,395	15,215
Transport	5,703	6,050	6,373	6,692	6,973
Industrial process	2,781	3,157	3,287	3,457	3,626
Waste management	1,612	1,931	2,205	2,450	2,708
Agriculture	2,414	2,523	2,591	2,713	2,820
TOTAL	**24,006**	**25,636**	**27,553**	**29,707**	**31,341**

'With existing measures' scenario	**2015**	**2020**	**2025**	**2030**	**2035**
Energy	11,433	11,169	10,944	10,967	10,434
Transport	5,603	5,422	5,514	5,595	5,561
Industrial process	2,781	3,009	3,060	3,147	3,229
Waste management	1,599	1,854	2,072	2,256	2,444
Agriculture	2,414	2,523	2,591	2,713	2,820
TOTAL	**23,830**	**23,977**	**24,182**	**24,677**	**24,488**

'With additional measures' scenario	**2015**	**2020**	**2025**	**2030**	**2035**
Energy	11,412	10,847	9,741	8,840	7,677
Transport	5,599	5,421	5,128	4,827	4,286
Industrial process	2,781	2,447	2,484	2,547	2,586
Waste management	1,597	1,449	1,185	974	845
Agriculture	2,387	2,266	2,318	2,395	2,459
TOTAL	**23,777**	**22,430**	**20,855**	**19,583**	**17,854**

CHAPTER 7: ANNUAL NATIONAL EMISSION ALLOCATIONS

7.1. AMOUNT OF ANNUAL EMISSION ALLOCATION

Outside the EU ETS, aims to reduce or increase the permitted emissions are determined on the basis of GDP per capita in the framework of the Decision on joint efforts of the division. For the Republic of Croatia is allowed to increase greenhouse gas emissions outside the EU ETS by 11% by 2020 compared to 2005. The Commission Decision 2013/162/EC of 26 March 2013 determined the allocation expressed in absolute terms for Croatia from 2013 to 2020. The Commission Decision 2013/634/EC of 31 October 2013 adjusted the allocation due to an increase in the scope of the EU ETS, which has decreased the allocation for emissions outside the EU ETS. In both documents, allocation is expressed using the value of global warming potential (GWP) of the second and fourth report of the Intergovernmental Panel on Climate Change (IPCC).

Table 7-1 shows the limitation of greenhouse gas emissions outside the EU ETS (national annual allocation) in the period 2013-2020 using GWP values from the second and fourth assessment report of the IPCC.

Table 7-1: Annual emission allocations for the Republic of Croatia for the period 2013-2020 [t CO2eq]

	2013	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
GWP from second report	18,990,152	19,185,523	19,380,894	19,576,265	19,771,635	19,967,007	20,162,378	20,357,748
GWP from fourth report	19,613,805	19,805,256	19,996,708	20,188,161	20,379,612	20,571,063	20,762,515	20,953,966

7.2. PROJECTED PROGRESS IN MEETING THE EMISSION LIMITATIONS TO THE AMOUNT OF ANNUAL NATIONAL ALLOCATION

Table 7-2: Projected development in relation to the national annual allocation in period 2013 – 2020 [kt CO2eq]

	2013	2014	2015	2016	2017	2018	2019	2020
Quota	19.614	19.805	19.997	20.188	20.380	20.571	20.763	20.954
Difference								
'Without measures' scenario	4.509	5.174	4.795	4.799	4.802	4.805	4.809	4.812
'With measures' scenario	4.509	5.174	4.931	5.090	5.249	5.408	5.567	5.726
'With additional measures' scenario	4.509	5.174	4.964	5.304	5.644	5.984	6.324	6.664

Table 7-2 shows the estimates of the amount of greenhouse gases in period 2013-2020 and differences realized in relation to the national annual allocation. Differences were calculated by subtracting the amount of the annual national and estimated annual emissions of non-ETS sectors.

It is evident that the expected projections are below the annual national allocation laid down for all three scenarios.

7.3. INFORMATION ON PLANNED ADDITIONAL MEASURES FOR ACHIEVING LARGER EMISSION LIMITATIONS THAN THE AMOUNT OF NATIONAL ANNUAL ALLOCATION

The Plan for Air and Ozone Layer Protection, and Climate Change Mitigation in the Republic of Croatia for the period 2013 - 2017 as one of the goals defines "further reduction and limitation of greenhouse gas emissions in accordance with the decisions and strategic documents of EU's path towards a low carbon economy and in accordance with the development of green economy in the Republic of Croatia". This goal is in addition to the single goal of "reducing and limiting emissions of greenhouse gases and substances that deplete the ozone layer in the period 2013 - 2017 in accordance with obligations assumed from the Croatian international treaties, in particular the Kyoto Protocol and its amendments and the acquis communautaire". A set of measures arising from the general and specific objectives in the area of climate change mitigation includes further reduction. There were not specifically defined measures that would pertain solely to further limit emissions. It is expected that the envisaged measures to achieve emission constraints result in a higher limit and will ultimately achieve the limitation of the amount of annual national allocation until 2020.

CHAPTER 8: ASSESSMENT OF IMPACT OF APPLICATION of CLEAN DEVELOPMENT MECHANISM, JOINT IMPLEMENTATION AND EMISSIONS TRADING AS COMPLEMENTARY MEASURES TO REDUCE GHG EMISSIONS

The current impact of application of the Kyoto Protocol is still inestimable since in Croatia this mechanism has not yet been used. Domestic measures were the only measures applied to reduce emissions and increase sinks of greenhouse gases. The Regulation on Implementation of the Flexible Mechanisms (OG 142/08) from 2008 remains in force, which is the standard way of flexible mechanisms. From 2013, the system of emissions trading (EU ETS) the plants in Croatia were included, which means that the application of the emissions trading mechanism at the level of industrial plants has started. Croatia made no plans for the implementation of project mechanisms, i.e. for investment in clean development mechanism and joint implementation by which Croatia would acquire units of CERs and ERUs.

Since 2013, the system of emissions trading (EU ETS) includes the plants in Croatia as well, which means that there is application of emission trading mechanism at the level of industrial plants.

In Croatia, implementation of the auction is regulated by the Air Protection Act (OG 130/11, 47/14, 61/17), Decision on the Auctioneer for conducting the auction of allowances and the choice of auction system (OG 84/14) and the Regulation on auction of greenhouse gas emission (OG 19/13) .

In accordance with Article 100 of the Air Protection Act, the funds obtained from the sale of emission allowances through the auctions shall be paid to a special account of the Environmental Protection and Energy Efficiency Fund. The aforementioned law also prescribes the activities financed from the sale of emission allowances through auctions, thus the Plan on using financial funds obtained from the sale of emission allowances through the auctions in the Republic of Croatia for the period from 2014 to 2016 (OG 140/14, 12/17) was adopted for that purpose and Plan for period from 2017 to 2020 is under preparation.

Sales of emission allowances at auction, which are relevant to participants in the ETS from Croatia, began in early 2015.

Of the total realized revenues from the sale of emission allowances by auction in 2015, 58.4% was spent. From this amount, spent:

- for environmental programs and projects 6%
- for energy efficiency programs and projects 94%.

REFERENCES

1. Guidelines for the preparation of national reports for Parties included in Annex I to the Convention (FCCC/CP/1999/7, Part II)
2. Guidelines for the preparation of information under Article 7 of the Kyoto Protocol (FCCC/KP/CMP/2005/8, Annex 2)
3. Air Protection Act (OG 130/11, 47/14)
4. Regulation (EU) No 525/2013 of the European Parliament and of the Council of 21 May 2013 on a mechanism for monitoring and reporting greenhouse gas emissions and for reporting other information at national and Union level relevant to climate change and repealing Decision No 280/2004/EC
5. Commission Implementing Regulation (EU) No 749/2014 of 30 June 2014 on structure, format, submission processes and review of information reported by Member States pursuant to Regulation (EU) No 525/2013 of the European Parliament and of the Council
6. Air and Ozone Layer Protection Plan and Climate Change Mitigation in the Republic of Croatia for the period 2013-2017 (OG 139/13)
7. Sixth Croatian National Communication to the United Nations Framework Convention on Climate Change (UNFCCC), Ministry of Environmental Protection, Physical Planning and Construction, 2014.
8. The Framework for the Development of Low-carbon Development Strategy of Croatian Ministry of Environmental Protection and Nature, 2013.
9. The National Action Plan for Renewable Energy Sources, Ministry of Economy, 2013.
10. The Third National Action Plan for Energy Efficiency Croatia for the period 2014-2016, Ministry of Economy, 2014.
11. The Long-term Strategy to Stimulate Investment in the Renovation of the National Building Stock in Croatia (OG 74/14)
12. The Program of Energy Renovation of Apartment Buildings for the Period from 2014 to 2020 with a Detailed Plan for the Period from 2014 to 2016 (OG 78/14)
13. The Program of Energy Renovation of Family Houses for the Period from 2014 to 2020 with a Detailed Plan for the Period from 2014 to 2016 (OG 43/14)

14. The Program of Energy Renovation of Commercial Non-residential Buildings for the Period from 2014 to 2020 with a Detailed Plan of Energy renovation of Commercial Non-residential Buildings for the Period from 2014 to 2016 (OG 98/14)
15. The Programme for the Energy Renovation of Public Buildings, Ministry of Construction and Physical Planning, 2013.
16. Regulation on substances that deplete the ozone layer and fluorinated greenhouse gases (OG 90/14)
17. Waste Management Strategy of the Republic of Croatian (OG 130/05)
18. Waste Management Plan of the Republic of Croatia for the period 2017 – 2022 (OG 3/17)
19. Sustainable Waste Management Act (OG 94/13)
20. Decision No 529/2013 / EC of the European Parliament and of the Council of 21 May 2013 on accounting rules on greenhouse gas emissions and removals resulting from activities relating to land use, land-use change and forestry and on information concerning actions relating to those activities, the European Parliament and European Council, 2013.
21. Report on the Use of the Revenues from the Sales of the Greenhouse Gas Emission Allowances by the Auctions in the Republic of Croatia in 2015, Ministry of Environment and Energy, 2017