



REPUBLIC OF CROATIA
MINISTRY OF ENVIRONMENT AND ENERGY



Report on implementation of policies
and measures that reduce greenhouse
gas emissions by sources or enhance
removals by sinks

Republic of Croatia

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

REPUBLIC OF CROATIA

Project coordinator

Tatjana Obučina, Ministry of Environment and Energy

List of authors

Project Coordinator: Valentina Delija-Ružić, Ekonerg Ltd.

Authors: Valentina Delija-Ružić, Ekonerg Ltd.
Andrea Hublin, Ph. D., Ekonerg Ltd.
Berislav Marković, Ekonerg Ltd.
Igor Stankić, Ph. D., Ekonerg Ltd.
Vladimir Jelavić, Ph. D., Ekonerg Ltd.
Mladen Antolić, Ekonerg Ltd.
Renata Kos, Ekonerg Ltd.
Delfa Radoš, Ekonerg Ltd.
Kruna Marković, Ekonerg Ltd.
Dora Stanec, Ekonerg Ltd.
Iva Švedek, Ekonerg Ltd.

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Andrea Hublin, Ph. D.
Berislav Marković
Igor Stankić, Ph. D.
Vladimir Jelavić, Ph. D.
Mladen Antolić
Renata Kos
Delfa Radoš
Kruna Marković
Dora Stanec
Iva Švedek

Atmospheric Protection and
Climate Change Department:

General Manager:

Vladimir Jelavić, Ph.D.

Zdravko Mužek, M.Sc.

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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, 118/18).

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 2019 therefore has:

- Description of national system for monitoring the implementation of policies and measures and for the development of the projections of GHG emissions,
- Objective of the policy and measures,
- Type of policy instruments,
- Status of implementation of the policy or measure,
- Indicators for the projections with aim to assessment of policies and measures implementation,
- Quantitative estimates of the effect of policies and measures on emissions and removals of greenhouse gases for 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.

2. National system for monitoring the implementation of policies and measures and for the development of the projections of GHG emissions

The Ministry of Environment and Energy 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 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 organised in two-year cycles, according to Regulation (EU) No 525/2013.

Ekoneg - 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 2021, when it will be published a new tender.

In accordance with the Air Protection Act (OG 130/11, 47/14, 61/17, 118/18), 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.

According to the Amendments to Environmental Protection Act (OG 118/18), the Croatian Agency for the Environment and Nature is from the 1st of January 2019 organisationally merged with the Ministry of Environment and Energy, and therefore all tasks, legal rights and obligations of the Croatian Agency for the Environment and Nature are taken over by the Ministry of Environment and Energy.

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 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 and product use
- waste
- agriculture
- land use, land use change and forestry (LULUCF)
- other (cross-cutting) policies and measures.

3.2. Energy

The overview of the strategic 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 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 until 2020, 4th National Energy Efficiency Action Plan for the Period until 2019, Program for the Energy Efficiency in Heating and Cooling, Plan for the use of Funds from the Sale of Emission Allowances in the Republic of Croatia for the Period until 2020 (OG 19/18), 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.

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 Energy Strategy, Integrated National Energy and Climate Plan of the Republic of Croatia for the period from 2021 to 2030, Low-Carbon Development Strategy until 2030 with a view to 2050.

The measures described below are taken from the listed documents and legislative framework, but mostly from the Integrated National Energy and Climate Plan of the Republic of Croatia for the period from 2021 to 2030.

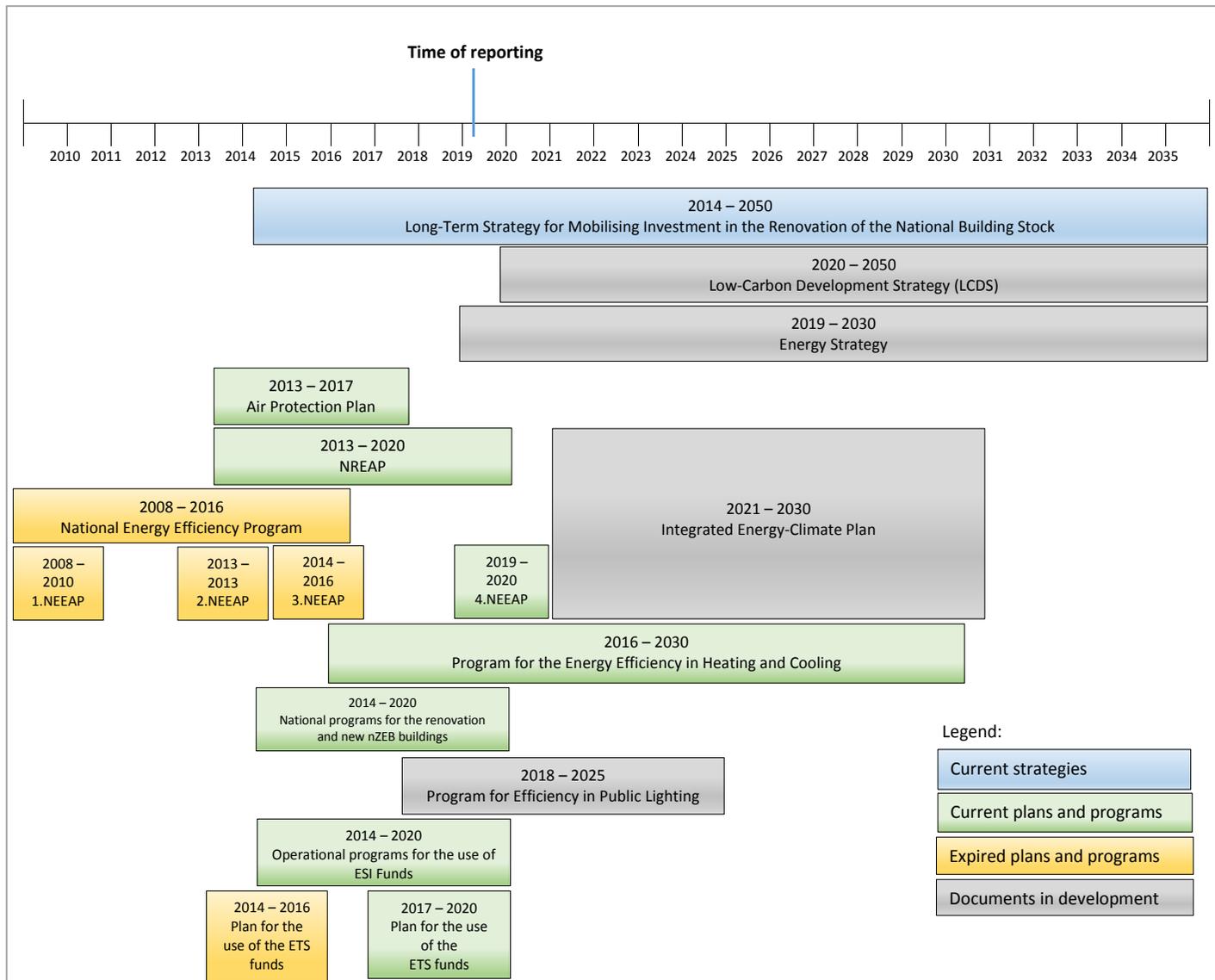


Figure 3-1: Overview of the strategical and planning framework for reduction of GHG emissions in the energy sector

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, 70/18, 73/18, 86/18) 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 and revised in 2017.

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.

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.

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 2000 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.

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

The measure is based on the Programme for the Energy Renovation of Public Buildings for the Period from 2014 to 2015 (OG 48/17, 116/18), the Programme for the Energy Renovation of Public Buildings for the Period from 2016 to 2020, (OG 22/17).

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.

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 . 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, 116/18), Directive 2012/27/EU on Energy Efficiency and Ordinance on Energy Management (OG 18/15, 6/16).

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

The Energy Efficiency Act (OG 127/14, 116/18) 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. The frequency of application of this statutory provision should be reduced to a monthly level, and it is necessary to ensure that the energy regulatory authority (HERA) carries out control over these obligations of the energy supplier.

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, 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 and water savings in the households which meet energy poverty criteria.

Within the Programme for the reduction of energy poverty, capacity building will be continued through local info centers. Indicators necessary to monitor the energy poverty will be identified and a monitoring system will be established through the already existing system for collecting data on household consumption and habits. Implementation of energy efficiency measures in energy poor households will be co-financed.

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.

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 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.

The 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 130000000, annual income of at least HRK 260000000, an average of at least 250 employees during the financial year). The obligation is regulated by the Energy Efficiency Act (OG 127/14, 116/18),
- 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 of 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, 123/16, 131/17, 111/18) was adopted and modified the existing system from the feed-in tariffs to premium.

It is expected that the premium system will be established and operational by 2020. In line with the goals for using renewable energy sources and the planned increase in installed power in all technologies, the Ministry of the Environment and Energy will each year prepare a three-year plan for the increase in RES power by type and technology, with detailed elaboration for the next year, by 30th September of the

year preceding the plan. The Ministry shall at least once a year issue a tender for the construction of facilities using RES.

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

The Program for the Energy Efficiency in Heating and Cooling 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: CO₂ 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, 2/18) stipulates the obligation to pay charges on CO₂ emission for all stationary sources emitting more than 450 tonnes of CO₂ per year. The obligated parties who invest in energy efficiency, renewable energy and other measures to reduce emissions of CO₂ and other greenhouse gas emissions are charged by lower fee.

The Environmental Protection and Energy Efficiency Fund is authorised for accounting and collecting charges. The Act on Environmental Protection and Energy Efficiency Fund (OG 107/03, 144/12) stipulates that from 1 January 2013, legal or natural persons who own or use a single source of CO₂ 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 CO₂ 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. In smaller systems with their own boiler room, it is necessary to allow for the reconstruction of boiler rooms, in particular by replacing them with high-efficiency cogeneration systems or systems using heat pumps. 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. The use of ESI funds in the next programming period from 2021 to 2027 must be programmed for the implementation of this measure.

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. The ten-year development plan for electricity transmission network defines the need for reinforcements/revitalizations of the transmission network.

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.

HEP-ODS will continue to conduct activities to reduce technical and non-technical losses in the distribution network, which includes optimizing the network operating condition, reconstructing parts of the network with a small cross-section of conductors and long sections, switching parts of the 10 kV network to a 20 kV voltage level, replacement of old transformers with large losses, installing energy transformers with reduced losses and reducing own consumption; further installation and introduction of as many advanced meters into the remote monitoring and readout system as possible, further comprehensive implementation of the connection and measuring points control (KPiMM), with the emphasis on detecting unauthorized electricity consumption and continued reconstruction of existing connections and measuring points, which are located in the customers' premises.

In order to enable further development of energy markets and the active role of customers of energy in energy markets, the introduction of advanced consumption meters is ongoing. 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. Based on the experience gained from the implementation of a pilot project for the deployment of smart grids in pilot areas using ESI funds, it is necessary to programme the continuation of the use of ESI funds in the next programming period from 2021 to 2027 for the further development of smart grids.

The ten-year development plan for gas transmission system defines projects for improvement of the gas transmission system.

MEN-26: Energy management system in the business (service & production) sector

Although large companies are obliged to regularly carry out energy audits, this obligation does not ensure continuous consideration of energy consumption in the company, nor does it include small and medium-sized enterprises. In order to encourage companies to introduce certified energy management systems (ISO 50001), by 2020 a comprehensive analysis will be performed regarding the possibilities of using the tax system (including taxes and parafiscal charges) to stimulate companies to introduce such a system and thus ensure continuous consideration of energy consumption. These tax incentives should be introduced from 2021.

MEN-27: Informational and educational measures

Dissemination of information to the public and target groups will be conducted through the organization of targeted informational campaigns related to investments in systems using renewable energy sources, especially in systems for own needs. The measure will be implemented in order to build the capacity of consumers who produce energy for their own needs and energy communities.

MEN-28: Spatial planning prerequisites for use of renewable energy sources

According to the Strategy and Action Plan for Biological and Landscape Diversity (OG 143/08), the preparation and implementation of the Landscape Plan of the Republic of Croatia is planned through cooperation of relevant sectors (spatial planning, nature protection, environmental protection, cultural heritage protection, transport, agriculture, forestry, water management, mining, energy sector, education and science, etc.) in order to identify the condition of landscape features, take inventory and categorise. Based on the prepared spatial inventory, the Ministry of the Environment and Energy shall, if

needed, in cooperation with the Ministry of Construction and Physical Planning prepare the spatial planning documentation for identified locations.

MEN-29: Development of the regulatory framework for the electricity market and active participation of customers on the electricity market

Development of the regulatory framework for aggregators, energy communities (participation in local energy production, distribution, storage and supply, and provision of energy services and aggregation services) and energy production for own needs, in accordance with the provisions of the Electricity Directive and the Regulation on the Internal Electricity Market).

It is necessary to ensure the implementation of an appropriate balancing mechanism that involves all the entities responsible for imbalances and to ensure an appropriate remuneration or pricing mechanism for these services. It is necessary to ensure an adequate secondary and tertiary P/f reserve for balancing, including the intraday market and the organization of balancing energy market.

The analysis of the potential to provide ancillary services and flexibility services by consumption response of network users will be conducted. The method of providing services from final customers will be defined and the regulatory framework will be appropriately modified, primarily through the introduction of an aggregator as a market participant.

MEN-30: Promoting the use of renewable energy sources at the point of consumption

Subsidizing investment in renewable energy sources technologies for customers with own production.

MEN-31: Encouraging farmers and land owners to grow biomass for energy needs

Favouring lease of unused agricultural land and degraded agricultural land owned by the state /local self-government units for the dedicated production of biomass resulting in carbon sequestration, for advanced biofuels (biorefineries), while complying with sustainability requirements. For the purpose of absorption of atmospheric carbon, and according to the development needs of the food sector and bioeconomy (biorefineries and anaerobic digestion), to create models for agricultural land owners aimed at motivating them to put this land into operation, either through lease or other means of compensation for carbon sequestration and biomass production.

MEN-32: Promotion of biorefineries

For the purposes of decarbonization and development of the food sector and bioeconomy, to promote the development of biorefineries which will, in addition to advanced biofuels, also produce biopolymers and biochemicals necessary to reduce the carbon footprint of food and pharmaceutical products (bioplastic packaging, dietary supplements and pharmaceuticals).

MEN-33: Capacity building for bioeconomy

To encourage inclusion in bioeconomy and increase the competitiveness of the biomass-based industry, it is proposed to create several highly reproducible business models for different biomass sources, types and pathways, which will encourage the use of innovative business chains valuing by-products and biowaste created during the production process.

MEN-34: Pumped-storage hydroelectric power plant construction

The construction of an additional 150 MW pumped-storage hydroelectric power plant before 2030 is foreseen, primarily due to regulatory requirements in the system.

MEN-35: Fostering research and development of clean energy technologies and low-carbon technologies

Research and development in the area of low carbon and clean energy technologies will be fostered.

3.3. Transport

MTR-1: Providing information to consumers on fuel economy and CO₂ emission of new passenger cars

Pursuant to the Ordinance on Availability of Information on Fuel Economy and CO₂ 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 CO₂ 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 CO₂ 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 the Biofuels for Transport Act (OG 65/09, 145/10, 26/11, 144/12, 14/14, 94/18).

Based on this act, 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 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 modified the system again in 2018 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 Act on the Environmental Protection and Energy Efficiency Fund (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, CO₂ emissions and vehicle's age.

MTR-5: Special tax on motor vehicles

This tax is prescribed by the Act on Special Tax on Motor Vehicles (OG 15/13, 108/13, 115/16, 127/17). 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 CO₂ 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 4th National Action Plan for Energy Efficiency for the Period until 2019 (Ministry of Environment and Energy, 2019) 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 CO₂ 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, 118/18), 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 Ministry of Environment and Energy.

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 Ministry of Environment and Energy, 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.

MTR-10: Promotion of intermodal transport

The measure is regulated by the Act on Combined Transport of Goods (OG 120/16) and the Ordinance on Incentives in Combined Transport of Goods (OG 5/18), which stipulates incentives for combined transport of goods by rail, inland waters or sea, and incentives for combined transport of goods on road sections.

MTR-11: Promotion of clean and energy efficient vehicles in road transport

The measure is regulated by the Act on Combined Transport of Goods (OG 120/16) and the Ordinance on Incentives in Combined Transport of Goods (OG 5/18), which stipulates incentives for combined transport of goods by rail, inland waters or sea, and incentives for combined transport of goods on road sections.

3.4. Industrial processes and product use

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 N₂O emission in nitric acid production (catalytic decomposition) – N₂O emission reduction up to 88% can be achieved by installing the catalyst; measure is cost-effective because of relatively low marginal costs and high N₂O emission reduction potential. Abatement technology was already installed at the end of 2012 and during 2013 at one plant for the production of nitric acid in Croatia.

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

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

For the purpose of effective implementation of the measures included in the Waste sector, along with the already adopted sectoral legislation that is harmonized with EU legislation, it is necessary to adopt a more significant number of measures. It will primarily impact on the projections after 2020 to measures described below:

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

It is the first in the order of priority in the waste management, pursuant to the Sustainable Waste Management Act (OG 94/13, 73/17, 14/19). The projections include municipal solid waste, industrial waste and sludge from wastewater treatment plants.

This measure is achieved by cleaner production, education, economic instruments and enforcement of regulations in waste management, 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. Disposal of waste to non-compliant landfills in Croatia is prohibited after 31 December 2017.

According to Directive (EU) 2018/850 of the European Parliament and of the Council of 30 May 2018 amending Directive 1999/31/EC on the landfill of waste, Member States should take the necessary measures to ensure that by 2035 the amount of municipal waste landfilled is reduced to 10% or less of the total amount of municipal waste generated (by weight). Croatia was given the possibility of a delay of five years to meet the target because it is among the Member States that are in 2013 landfilled more than 60% of its municipal waste. The five-year delay is included in the projections. In this case, Croatia

must take the necessary measures by 2035 to reduce the amount of municipal waste landfilled to 25% or less of the total amount of municipal waste generated (by weight).

MWM-2: Increasing the amount of separately collected and recycled solid 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.

According to Directive (EU) 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste, Member States should take the necessary measures to ensure that preparing for re-use and the recycling of municipal waste be increased to a minimum of 55% by weight till 2025, 60% by weight till 2030 and 65% by weight till 2035. Croatia was given the possibility of a delay of five years to meet the target because it is among the Member States that are in 2013 prepared for re-use and recycled less than 20% of its municipal waste. The five-year delay is included in the projections. In this case, Croatia must take the necessary measures to increase the preparing for re-use and the recycling of municipal waste to a minimum of 50% by weight till 2025, 55% by weight till 2030 and 60% by weight till 2035.

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, 103/18) and Ordinance on the Waste Management (OG 117/17) 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.

Implementation of binding targets for reduction of waste disposal and waste recycling, described within MWM-1 and MWM-2 measures, affects the amount of generated landfill gas, which is included in the projections.

MWM-4: Reducing the amount of disposed biodegradable 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 generated in 1997.

Implementation of binding targets for reduction of waste disposal and waste recycling, described within MWM-1 and MWM-2 measures, affects reducing the amount of disposed biodegradable waste, which is included in the projections.

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

The measure is associated with measures for promoting the use of renewable energy sources for electricity and heat generation and obligation to use renewable energy sources in transport. The potential for reducing CH₄ emission (produced by anaerobic decomposition of biodegradable fraction of waste) is included in the MWM-4 measure. The potential for reducing CO₂ emission, which can be achieved by applying this measure, is calculated in the Energy sector.

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 livestock diet of and 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 (CH₄) 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 N₂O 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: Usage of improved mineral fertilizers

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 indirectly 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.

MAG-8: Capacity building

To encourage projects that contribute to the decarbonisation of agriculture, a number of simple and easy-to-apply business models for various agricultural production (cattle breeding, multi-annual crops, farming, gardening, etc.) are proposed. Projects are of high replicability, which allow for added value in the agricultural economy emissions of greenhouse gases. Business models will make farmers easier to recognize business opportunities, making it easier to comply with default procedures and maximize the effect of decarbonisation. Business models will integrate measures for energy efficiency, the use of renewable energy sources and the creation of new biomass products for the needs of bio-economics.

MAG-9: Improvement of the regulatory framework for digestat

It is necessary to adapt the regulatory framework to improve management (covered digestate containers, digestion of digestate from bio-waste, etc.) and use of fertilizer digestates (taking into

account macro and micronutrient content), enabling de-carbonization of agriculture through greater use of organic fertilizers, soil substances and reduced agro input costs.

MAG -10: Establishment of biomass collection and logistics centers

In order to develop the biomass market band starting from the fact that Croatian small-scale farms are smallest in the EU, biomass-logistical centers will be established using existing infrastructure (utility companies, competence centers, business zones) to reduce the unit cost of production of biomass and capitalized the innovation capacity and the necessary equipment for innovative biomass products. Collection and logistics centers will play the role of link between biomass farmers, biomass processing into new products with higher benefit, new product development and with placing these new products on the market.

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/EU, 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.

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, 118/18), 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 (CO₂) for all activities and additionally for certain activities, nitrous oxide (N₂O) 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, 118/18) 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 until 2020 was adopted by the Croatian Government (OG 19/18), while the funds are paid to a special account of the Environmental Protection and Energy Efficiency Fund.

MCC-6: Implementation of an interdisciplinary research on the potential for carbon geological storage in the Republic of Croatia

The carbon capture and storage technology for large emission sources is not yet commercially available. It is necessary to evaluate the potential for carbon geological storage in the Republic of Croatia.

MCC-7: Energy efficiency obligation scheme

Based on the provisions of the Directive 2012/27/EU, Act on Energy Efficiency (OG 127/14, 116/18), 3rd and 4th National Energy Efficiency Action Plan, Croatia is established the energy efficiency obligation scheme for the energy suppliers.

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

MCC-8: Covenant of Mayors for Climate and Energy in the Republic of Croatia

The signatories of the Covenant support a joint vision for 2050: accelerating decarbonisation of their territories, strengthening capacity to adapt to the inevitable impact of climate change and allowing citizens to access safe, sustainable and affordable energy. The signatory cities are committed to action that will support the reduction in greenhouse gases by 40% by 2030 and the adoption of a common approach to mitigating and adapting to climate change. The Covenant encompasses 70 cities and municipalities, i.e. more than 2 million citizens of the Republic of Croatia.

MCC-9: Improving sustainability of urban areas

The aim of this measure is to encourage cities and municipalities to build projects for revitalization and development of new urban environments on sustainability principles. The first step is the preparation of urban development plans, which will, based on the evaluation of sustainability indicators, define development projects to improve the defined indicators. For these projects, co-financing will be provided from ESI funds in the period 2021-2027 (2030). The measure is innovative and enables the development of urban environments that will contribute to decarbonisation and energy efficiency, but will also have numerous other social, economic and environmental benefits.

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 sector

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	implemented	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 2000 houses annually	CO ₂	economic	implemented	Ministry of Construction and Physical Planning, Ministry for Regional Development and EU Funds, 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
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

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
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, education	implemented	Ministry of Environment and Energy, Ministry for Demography, Family, Youth and Social Policy, Environmental Protection and Energy Efficiency Fund
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

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MEN-14: Green public procurement	Include the environmental criteria in public procurement	CO ₂ , CH ₄ , N ₂ O	regulatory	implemented	Ministry of Environment and Energy, Ministry of 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 ₂ O	regulatory, informative	implemented	Ministry of Environment and Energy, Ministry of 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 ₂ O	voluntary	implemented	Croatian Chamber of Commerce, National Energy Efficiency Authority, Environmental Protection and Energy Efficiency Fund
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 ₂ O	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 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	implemented	Ministry of Environment and Energy, Ministry of Construction and Physical Planning

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
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 ₂ O	economic	implemented	Croatian Bank for Reconstruction and Development (HBOR)
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 ₂ O	economic, regulatory	implemented	Ministry of Environment and Energy, Environmental Protection and Energy Efficiency Fund
MEN-22: CO ₂ emission tax on the non-ETS stationary sources	Reduce CO ₂ emissions from stationary sources with annual emissions greater than 30 tons of CO ₂ , 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 Ltd.
MEN-24: Reconstruction and renovation of the heating and steam network	Primary energy savings	CO ₂	regulatory, economic	implemented	Ministry of Environment and Energy, HEP-Toplinarstvo Ltd.
MEN-25: Operation of power system and development of the transmission and distribution network	Primary energy savings	CO ₂	regulatory, economic	implemented	Ministry of Environment and Energy, Croatian Transmission System Operator, HEP-Distribution System Operator

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MEN-26: Energy management system in the business (service & production) sector	Energy consumption reductions through fiscal incentives for standardised energy management systems	CO ₂	fiscal	planned	Ministry of Environment and Energy Ministry of Finance
MEN-27: Informational and educational measures	Primary energy savings, promote the use of renewable energy sources	CO ₂	information	implemented	Ministry of Environment and Energy
MEN-28: Spatial planning prerequisites for use of renewable energy sources	Promote the use of renewable energy sources	CO ₂	planning	planned	Ministry of Environment and Energy, Ministry of Construction and Physical Planning
MEN-29: Development of the regulatory framework for the energy market and active participation of consumers on the energy market	Primary energy savings, promote the use of renewable energy sources	CO ₂	regulatory	planned	Ministry of Environment and Energy, Croatian Energy Regulatory Agency
MEN-30: Promoting the use of RES at the point of consumption	Primary energy savings, promote the use of renewable energy sources	CO ₂	economic	planned	Ministry of Environment and Energy
MEN-31: Encouraging farmers and land owners to grow biomass for energy needs	Promote the use of renewable energy sources	CO ₂	economic, information, education	planned	Ministry of Environment and Energy , Ministry of Agriculture
MEN-32: Promotion of biorefineries	Promote the use of renewable energy sources	CO ₂	economic, information, education	planned	Ministry of Environment and Energy, Ministry of Agriculture
MEN-33: Capacity building for bioeconomy	Promote the use of renewable energy sources	CO ₂	education	planned	Ministry of Environment and Energy

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MEN-34: Pumped-storage hydroelectric power plant construction	Promote the use of renewable energy sources	CO ₂	economic	planned	Ministry of Environment and Energy
MEN-35: Fostering research and development of clean energy technologies and low-carbon technologies	Promote the use of renewable energy sources	CO ₂	research	planned	Ministry of Environment and Energy

TRANSPORT

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

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MTR-1: Providing information to consumers on fuel economy and CO ₂ emission of new passenger cars	Consumer information on fuel economy and CO ₂ 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 CO ₂ emissions from road vehicles	CO ₂	educational	implemented	Ministry of Interior, 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 CO ₂ 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 CO ₂ 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 CO ₂ 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 CO ₂ 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 CO ₂ emissions from road vehicles	CO ₂	economic, voluntary	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	implemented	Ministry of Environment and Energy
MTR-10: Promotion of intermodal transport	Reducing CO ₂ emissions from road vehicles	CO ₂	regulatory	implemented	Ministry of the Sea, Transport and Infrastructure
MTR-11: Promotion of clean and energy efficient vehicles in road transport	Reducing CO ₂ emissions from road vehicles	CO ₂	regulatory	implemented	Ministry of the Sea, Transport and Infrastructure

INDUSTRIAL PROCESSES AND PRODUCT USE

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

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
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

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

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MWM-1: Preventing the generation and reducing the amount of solid 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 solid 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 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 biomethane production and electricity and heat generation	Reduce methane emissions in the atmosphere, use of renewable energy sources in transport, 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 sector

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MAG-1: Change in the diet of livestock and animal feed quality	Reduction of methane and nitrogen compounds emissions from enteric fermentation and animal waste management	CH ₄ , N ₂ O	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 N ₂ O emissions	CH ₄ , N ₂ O	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
MAG-4: Usage of improved mineral fertilizers	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 ₂ O	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 ₂ O	economic	planned	Ministry of Agriculture, Advisory services

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MAG-6: Introduction of new cultivars, varieties and cultures	Reducing the need for the introduction of nitrogen into the soil through fertilizers	N ₂ O	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 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	CH ₄ , N ₂ O	regulatory, economic	adopted	Ministry of Agriculture, Agency for paying in Agriculture
MAG-8: Capacity building	Encouraging projects that contribute to decarbonisation, integration of energy efficiency measures, use of renewable energy sources and creation of new biomass products	CH ₄ , N ₂ O	regulatory, economic	planned	Ministry of Agriculture
MAG-9: Improvement of the regulatory framework for digestat	Adjustment of the regulatory framework to improve management and use of digestate fertilizers, increase of organic matter in soil and reduction of costs	CH ₄ , N ₂ O	regulatory, economic	planned	Ministry of Agriculture

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MAG-10: Establishment of biomass collection and logistics centers	Establishment biomass collection and logistics centers to reduce the unit cost of production of biomass products	N ₂ O	regulatory, economic	planned	Ministry of Agriculture

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	Implemented	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	Implemented	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	CO ₂	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	CO ₂	information, voluntary	implemented	Ministry of Environment and Energy, Ministry of Economy, Entrepreneurship and Crafts, Ministry of Construction and Physical Planning
MCC-4: Emissions Trading System	Reduction the GHG emissions in operators under EU ETS	CO ₂ , N ₂ O	economic	implemented	European Commission, Ministry of Environment and Energy
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: Implementation of an interdisciplinary research on the potential for carbon geological storage in the Republic of Croatia	Research of potential for carbon geological storage	CO ₂	Research	planned	Ministry of Environment and Energy

Name of PAM	Objective	Greenhouse gas	Type of instrument	Status	Implementing body
MCC-7: Energy efficiency obligation scheme	Energy savings in final consumption	CO ₂	economic	planned	Ministry of Environment and Energy
MCC-8: Covenant of Mayors for Climate and Energy in the Republic of Croatia	Accelerating decarbonisation of cities and municipalities	CO ₂ , CH ₄ , N ₂ O	voluntary	implemented	Local government: cities and municipalities
MCC-9: Improving sustainability of urban areas	Accelerating decarbonisation of cities and municipalities	CO ₂ , CH ₄ , N ₂ O	research, voluntary	planned	Ministry of Construction and Physical Planning

5. Indicators for the projections in years 2015, 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	2015	2020	2025	2030	2035
1	MACRO	GDP [bill. EUR] (EC15)	44.6	51.9	58.0	64.2	70.4
2	MACRO B0	CO ₂ intensity from energy consumption of GDP [t/mil. EUR]	349.7	284.0	247.2	217.0	187.6
		CO ₂ emissions from energy consumption [kt CO ₂]	15597	14738	14336	13934	13210
		GDP [bill. EUR] (EC15)	44.6	51.9	58.0	64.2	70.4
3	TRANSPORT C0	CO ₂ intensity of passenger cars [g CO ₂ /km]	168.5	161.7	140.8	118.4	104.0
		CO ₂ emissions from passenger cars [kt]	3903	3941	3623	3301	3077
		Number of kilometres from passenger cars [Mkm]	23160	24376	25728	27871	29578
4	INDUSTRY A1	Energy related CO ₂ intensity of industry [t/mil. EUR]	396.9	339.4	303.1	270.5	237.4
		CO ₂ emissions from industry which use fossil fuels [kt]	2223	2274	2273	2272	2184
		Gross value-added total industry [bill. EUR] (EC15)	5.6	6.7	7.5	8.4	9.2
5	HOUSEHOLDS A1	Specific CO ₂ emissions of households [t/dwelling]	1.02	0.98	1.00	1.01	0.99
		CO ₂ from households using fossil fuels [kt]	1425	1716	1725	1730	2731
		Stock of permanently occupied dwellings [1,000]	1475	1472	1481	1520	1550
6	SERVICES A0	CO ₂ intensity of the commercial and institutional sector [t/mil. EUR]	22.2	20.8	19.5	18.3	16.4
		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)	26.3	30.6	34.6	38.5	42.5
7	TRANSFORMATION B0	Specific CO ₂ emissions of public and autoproducer power plants [t/GJ]	236.0	239.0	216.0	191.2	135.1

No.	Sector by Eurostat	Indicator	2015	2020	2025	2030	2035
		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]	2984.4	2488.9	2139.0	1789.1	1584.3
		All products — output by public and autoproducer thermal power stations [TJ]	9345.2	5550.3	5343.5	5136.6	6321.1
8	AGRICULTURE	CH ₄ emissions from dairy cows [kt CH ₄ /year]	20.19	17.28	17.27	18.00	18.60
		CH ₄ emissions from other cows (non-dairy mature and young) [kt CH ₄ /year]	17.81	12.77	12.47	13.77	14.66
9	AGRICULTURE	Direct N ₂ O emissions from soils due to synthetic fertilizer application [kt N ₂ O-N/year]	1.16	1.56	1.56	1.56	1.56
		Direct N ₂ O emissions from manure management [kt N ₂ O-N/year]	0.54	0.51	0.52	0.55	0.57
		Dairy cattle population [1000 heads]	175	168	175	180	185
10	WASTE	Specific CH ₄ emissions from landfills [kt/kt]	0.04	0.04	0.04	0.04	0.04
		CH ₄ emissions from landfills [kt]	66.77	75.65	84.13	92.87	101.75
		Municipal solid waste going to landfills [kt]	1919	1824	1973	2155	2305

6. Quantitative estimates of the effects of policies and measures on emission 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 2020, 2025, 2030 and 2035 (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 two scenarios are given in table 6-1 below.

Table 6-1: Quantitative estimates of policies and measures for 2020, 2025, 2030 and 2035 [kt CO₂eq]

'With existing measures' scenario	2015	2020	2025	2030	2035
Energy	10776	9027	9012	8998	8574
Transport	5952	6278	5959	5641	5304
Industrial process	2832	2919	2998	3113	3189
Waste management	2231	2444	2658	2889	3117
Agriculture	2875	2692	2786	2907	3038
TOTAL	24667	23360	23415	23549	23223

'With additional measures' scenario	2015	2020	2025	2030	2035
Energy	10776	9027	8748	8469	7657
Transport	5952	6278	5917	5556	5138
Industrial process	2832	2489	2553	2649	2682
Waste management	2231	2276	1932	1602	1360
Agriculture	2875	2430	2486	2581	2662
TOTAL	24667	22500	21635	20858	19500

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 Commission Decision of 26 March 2013 on determining Member States' annual emission allocations for the period from 2013 to 2020 pursuant to Decision No 406/2009/EC of the European Parliament and of the Council (Effort sharing Decision, ESD). 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.

The Commission Decision (EU) 2017/1471 of 10 August 2017 amending Decision 2013/162/EU to revise Member States' annual emission allocations for the period from 2017 to 2020, adjusted the annual emission allocations due to the latest methodology updates for the calculation of National Inventory Reports.

Table 7-1 shows the limitation of greenhouse gas emissions under the ESD (national annual allocation) in the period 2013-2020 using GWP values from the fourth assessment report of the IPCC and latest amendments to the Decision.

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

	2013	2014	2015	2016	2017	2018	2019	2020
Annual emission allocation	19614	19805	19997	20188	18681	18893	19106	19318

7.2. Projected progress in meeting the emission limitations of 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	19614	19805	19997	20188	18681	18893	19106	19318
Difference								
'With measures' scenario	3406	4035	3748	3681	2543	2810	3079	3346
'With additional measures' scenario	3406	4035	3748	3681	2822	3230	3638	4046

* Historical data is until 2016 and projections are in the period 2017 - 2020

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 quota 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 two 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.

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, 118/18), 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 act 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 until 2020 (OG 19/18) was adopted for that purpose.

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

Of the total realised 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%.

Unrealised revenue from the sale of emission allowances in 2015 has been counted with revenue from sales of emission allowances realised in 2016.

Of that, total revenue from 99.99% was spent. From this amount, spent:

- for environmental programs and projects 0.7%
- for energy efficiency programs and projects 99.3%.

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