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SEPlaM-CC

SEPlaM-CC – Raising capacity of cross-border public institutions in sustainable energy planning and management and climate change mitigation

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Analysis of gathered strategic and planning documents regarding energy and climate with energy and climate planning and management modes in Croatia

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1. Summary

The basis for establishment of a quality process of energy and climate planning and management is the analysis of existing regulations and other relevant strategic and planning documents which are crucial in regulating energy and climate issues. Accordingly, the purpose of this document is to present and analyze the legislative framework of regulating energy and climate with energy and climate planning and management modes in Croatia. Analysis of the existing regulations, strategic and planning documents was conducted using publicly available sources as well as access to relevant scientific papers.

In the last few years, Croatia has noticed the importance of energy and climate planning in order to achieve energy neutrality and reduce greenhouse gas emissions, so the relevant Croatian government bodies adapted the national legislation accordingly. Croatia also recognized that due to many internal and external political, economic, technical and technological influences it is very important to take them into account in energy and climate planning and energy and climate policies development. Since the main objective of SEPlaM-CC (Raising capacity of cross-border public institutions in sustainable energy planning and management and climate change mitigation) project is to raise capacity of cross-border public institutions in sustainable energy planning and management and climate change mitigation this document will also be used as educational material by local and regional government units during the development of strategic and planning documents, i.e., in development of sustainable energy and climate action plans and other relevant strategies and implementation programmes.

This document consists of seven chapters. In the first chapter of this document the significance of energy planning and management and climate change mitigation and importance of their legislative regulation in Croatia will be elaborated.

In the second chapter the European and Croatian regulations in the field of energy and climate will be compared. It will also be elaborated how the European regulations have been translated into Croatian regulations and other relevant strategic and planning documents.

In the fourth chapter the Croatian general regulations, strategic and planning documents and other relevant regulations regarding energy with energy planning and management modes will be presented and analyzed.

Since the energy sector is a key contributor to climate change, accounting for more than two-thirds of global greenhouse gas emissions, in the fifth chapter the Croatian regulations, strategic and planning documents regarding climate with climate planning and management modes will be presented and analyzed.

In the sixth chapter based on conducted analysis some general conclusions will be presented. Also, since this document is the basis for development of methodology on strategic planning, in sixth chapter certain recommendations for development of methodology on strategic planning will be given.

The final, seventh chapter includes list of references, i.e., list of documents which were used for development of this document.

2. Introduction

Energy is one of the most important drivers of the economy and determines the intensity of socio-economic development of each country. It is linked to almost all economic sectors such as agriculture, industry, commerce, trade, transport, etc. which require the increasement of capacities of related institutions and cooperation between various agencies and organizations. When we talk about energy, it is important to include the issues related to energy security, fossil fuel consumption, socio-economic impacts and environmental pressures. These are all motivating factors that have brought energy policy, energy planning and energy management onto the public agenda over the last decades.

The energy sector can be affected by changing climate conditions through many ways, either for the better or for the worse. Although impacts on energy supply and demand are the most immediate, climate change can also affect various other aspects of the energy sector, such as energy transportation and infrastructure, or have indirect effects through other economic sectors. Due to all mentioned above, it is very important to integrate energy and climate management and planning policies with economic planning policies. Planners who work in local and regional government units have an important role to play in helping communities meet energy needs, reduce greenhouse gas emissions, and adapt to a changing climate. While most planners recognize the significance of these issues, they are still working on translating these imperatives into on-the-ground plans, actions, and regulations.

Before going into the depths of the problem of energy and climate planning and management it is important to define the terms energy planning and climate change planning. Energy planning is the process of envisioning a desired future state of sustainable energy supply and consumption based on existing concerns and realities, and designing the appropriate measures to implement that energy future and it offers a number of opportunities and tools for countries to deal with energy issues related to development[1]. Energy planning isn't a one-time exercise, but a continuous, iterative process in which the results are continuously reviewed and new information leads to new analyses. It is relevant for developing countries since it can be used to overcome the limitations that inhibit sustainable energy strategies and has to be designed and used in order to meet social goals such as improving the quality of life, environmental goal such as climate protection and sustainability goals. Energy planning helps in cleaning up the environment through preservation of green spaces. It reduces climate change due to greenhouse gas emissions by reducing exclusive dependence on fossil fuel consumption. Climate change planning refer to planning activities that seek to mitigate or adapt to climate change. These activities are not simply the work of a specialized few, but encompass all aspects of planning, including energy planning, land-use planning, and community planning in addition to the development of specific climate change adaptation or mitigation plans[2].

Energy and climate planning can be carried out at the national as well as at the regional and local levels. National planning covers longer time spans and considers

[1] [1]
[2] [2]

more sectors and processes but cannot pay attention to the variations in socio-economic and ecological factors of a region which influence the success of any intervention.

The following activities may be identified as a part of the energy and climate planning process[3]: database development and management, supply and demand management, assessment of economic, social and environmental impacts, creation of research and development facilities, creation of institutional mechanisms for the participation of all stakeholders in the planning and implementation process, schemes for implementation including awareness raising, capacity building and educational programmes, setting up monitoring, follow up and evaluation mechanisms.

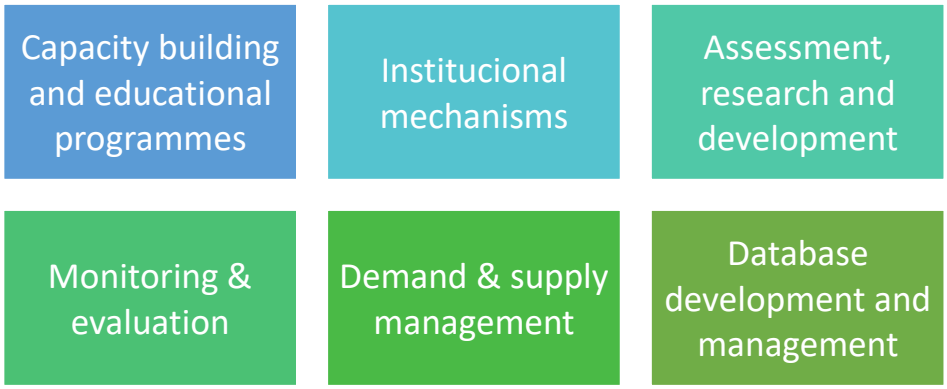

Figure 1 – Aspects of energy and climate planning

Energy and climate planning and management are the most challenging tasks with whom local, regional and national governments are facing. Croatia considers energy, climate and climate change to be critical factors in development so it is very important to set rules in order to regulate this fields. Croatia also recognized the need to develop a national energy and climate policies (including strategies, programs and plans) and bring them to the regional and local level, where concrete measures will need to be implemented. It is important to know that the overall energy and climate policies need to adapt to dynamic changes in the energy sector and should include new entities and their needs. Decentralization of energy generation, transmission and distribution, on one hand, and the opportunities for improvement of the efficiency of energy consumption, on the other hand, has nowadays changed radically the attitude towards energy and climate change. For this reason, an increasing number of people and institutions in Croatia are paying special attention to energy and climate planning as a significant element of their energy policy, but also of the policy regarding climate change. Agreement between top-down planning and bottom-up planning is presently one of the most important tasks, whose implementation will ensure realism and efficiency of the efforts of national, regional and local authorities.

Due to all mentioned above, energy and climate policies in Croatia are important basis for development and implementation of measures in order to achieve energy savings, reducing greenhouse gas emissions and dealing with the increasingly frequent consequences of climate change.

[3] [1]

At the regional and local level, it is necessary to involve the energy agencies and other relevant institutions in monitoring and revising the energy and action plans and other relevant documents, especially in cases where local authorities do not have the skills and resources, or where there is a lack of technical capacity to implement and adapt to new needs.

3. Comparison of European and Croatian regulations in the field of energy and climate

By joining the European Union (EU) in 2013, Croatia has made certain commitments in the field of energy planning and management and climate change mitigation and adaptation. Energy and climate change are two areas in which EU and Member States (MS) share competence which means that the EU and MS can develop and adopt legally binding regulations. Accordingly, in order to understand Croatian legislation in the field of energy and climate, it is necessary to look at and understand European regulations regarding energy and climate.

Energy and climate change are closely linked because energy production, mainly through the transformation and combustion of fossil fuels, and energy use, for example in industry, households and transport, account for 79%[4] of EU greenhouse gas (GHG) emissions. Consequently, reshaping energy production and its use are crucial to finding solutions to climate change. Meeting energy needs while reducing GHG emissions is a key challenge for the EU and its MS. The key priority for EU is to create a "resilient energy union with an advanced climate policy". In order to create such energy union, the European Commission (EC) has proposed several important legislative acts and non-legislative initiatives in the field of energy and climate change, including the Clean Energy for All Europeans package in 2016 which will be elaborated below in this document.

The field of energy and climate at the EU level is regulated through appropriate treaties, regulations, directives, decisions, recommendations and opinions. The Treaty is a binding agreement between EU's MS. It sets out the EU's objectives, the rules for the EU institutions, the decision-making process and the relations between the EU and its MS. The objectives set out in the EU treaties are achieved through various legal acts, i.e., regulatory instruments. Some are binding and some are not. Some apply to all EU members, while some apply to only a few. In the Figure 2 we can see the main EU regulatory instruments.

Regulations	Directives	Decisions	Recommendations	Opinions
• binding legislative act which must be applied entirety all across the EU	• legislative act that sets out a goal that all EU countries must achieve • is up to the individual countries to devise their own laws on how to reach these goals	• binding on those to whom it is addressed (e.g. an EU country or an individual company) and is directly applicable	• is not binding so it allows the institutions to make their views known and to suggest a line of action without imposing any legal obligation on those to whom it is addressed	• is an instrument that allows the institutions to make a statement in a non-binding fashion, in other words without imposing any legal obligation on those to whom it is addressed

Figure 2 – EU regulatory instruments

[4] [3]

In the legal framework of EU, regulations and directives are two main types of acts which harmonize the legal framework of MS. These two acts differ significantly in the degree to which they harmonize the internal rights of the MS: while regulations completely unify the law, i.e., they replace the existing internal norms with one, completely identical European norm, the directives leave room for different solutions in different MS. EU directive outlines certain rules which must be met, but each MS decides how to ensure compliance through national laws. Directives specify an exact date by which they must be implemented (or transposed) into national law. This is normally two years after their publication in the Official Journal, but can be longer for some other instruments. Regulations are binding legislative acts that have direct implications for all MS. They are applied in their entirety across the EU, meaning that they are directly applicable in every MS and can be immediately enforced through law like any piece of local legislation. Regulations are equally pertinent to every MS of the EU.

Increasing evidence of climate change and increasing energy dependence underscore the EU's efforts to become a low-energy economy and to ensure that the energy consumed is safe, secure, competitive, locally produced and sustainable. In addition, European energy policy aims to:

- ensure the efficient operation of the energy market;
- ensure the security of supply of energy in the EU;
- promote energy efficiency and energy savings, as well as the development of new and renewable energy sources;
- promote the interconnection of energy networks to ensure solidarity between MS.

These aims, i.e., EU’s policies on climate and energy are based on Articles 191 – 194 of the Treaty on the Functioning of the European Union. Under Article 191, combating climate change is one of the objectives of the EU’s environment policy, while under Article 194 the EU promotes energy efficiency and energy saving and the development of new and renewable forms of energy.

The starting point for the development of legislative framework for energy and climate planning and management in Croatia are aligned obligations with the European acquis in the process of accession to the EU, fulfilment of obligations within Energy Community Treaty and real needs of regulating relations in the energy sector which are in accordance with the requirements of energy policies at the European and national level. By adopting new energy acts and regulations necessary for their implementation, Croatian energy legislative framework is continuously harmonized with the requirements of European acquis. In Croatia, the field of energy and climate is regulated through laws, bylaws and other strategic and planning documents. It is important to point out that all regulatory instruments in Croatia are harmonized with the relevant legislative instruments of the EU. The main EU directives related to energy and climate implemented in Croatian legislative are:

1. Directive (EU) 2019/692 of the European Parliament and of the Council of 17 April 2019 amending Directive 2009/73/EC concerning common rules for the internal market in natural gas;
2. Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in electricity and repealing Directive 2003/54/EC;
3. Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency;
4. Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable energy sources;
5. Directive (EU) 2018/2002 of the European Parliament and of the Council of 11 December 2018 amending Directive 2012/27/EU on energy efficiency.

The main EU regulation which sets out the necessary legislative foundation for reliable, inclusive, cost-efficient, transparent and predictable governance of the Energy Union and Climate Action is Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action. The Regulation 2018/1999 ensures the achievement of the 2030 and long-term objectives and targets of the EU in line with the 2015 Paris Agreement on climate change following the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (the 'Paris Agreement'), through complementary, coherent and ambitious efforts by the Union and its MS, while limiting administrative complexity.

In the addition to before mentioned directives, in the international context, important documents and agreements regarding energy and climate developed in the past 20 years are also the **Energy Charter Treaty** and **Energy Community Treaty**, United Nations Framework Convention on Climate Change (UNFCCC), Kyoto Protocol and the Paris Agreement. **The United Nations Framework Convention on Climate Change** (UNFCCC) is an international environmental treaty addressing climate change, negotiated and signed by 154 states at the United Nations Conference on Environment and Development (UNCED), informally known as the Earth Summit, held in Rio de Janeiro from 3 to 14 June 1992. As of 2020, the UNFCCC has 197 signatory parties. **The Kyoto Protocol** is an international treaty which extends the 1992 United Nations Framework Convention on Climate Change (UNFCCC) that commits state parties to reduce GHG emissions, based on the scientific consensus that (part one) global warming is occurring and (part two) it is extremely likely that human-made GHG emissions have predominantly caused it. The Kyoto Protocol was adopted in Kyoto on 11 December 1997 and entered into force on 16 February 2005. The Protocol's first commitment period started in 2008 and ended in 2012. A second commitment period was agreed in 2012, known as the Doha Amendment to the Kyoto Protocol. As of October 2020, 147 states have accepted the Doha Amendment. It entered into the force on 31 December 2020, following its acceptances by 144 states. Negotiations were held in the framework of the yearly UNFCCC Climate Change Conferences on

measures to be taken after the second commitment period ends in 2020. This resulted in adoption of the Paris Agreement in 2015, which is a separate instrument under the UNFCCC rather than an amendment of the Kyoto Protocol. **The Paris Agreement** sets out a global framework to avoid dangerous climate change by limiting global warming to well below 2°C and pursuing efforts to limit it to 1.5°C. It also aims to strengthen countries' ability to deal with the impacts of climate change and support them in their efforts. This is the first-ever universal, legally binding global climate change agreement, adopted at the Paris climate conference (COP21) in December 2015. It entered into force on 4th of November 2016. Implementation of the Paris Agreement is essential for the achievement of the **UN Sustainable Development Goals**, and provides a roadmap for climate actions that will reduce GHG emissions and build climate resilience. UN Sustainable Development goals include the following 17 Goals: No Poverty, Zero Hunger, Good Health and Well-being, Quality Education, Gender Equality, Clean Water and Sanitation, **Affordable and Clean Energy**, Decent Work and Economic Growth, Industry, Innovation and Infrastructure, Reduced Inequalities, **Sustainable Cities and Communities**, Responsible Consumption and Production, **Climate Action**, Life Below Water, Life on Land, Peace, Justice and Strong Institutions and Partnership. In order to provide policymakers with regular scientific assessments on climate change, its implications and potential future risks, as well as to put forward adaptation and mitigation options **the Intergovernmental Panel on Climate Change** was established. The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body for assessing the science related to climate change.

It can be said that the Paris Agreement on Climate Change, the United Nations' Sustainable Development Goals and the Special Report of the Intergovernmental Panel on Climate Change (October 2018) all call for accelerated and decisive action to reduce GHG emissions and to create a low-carbon and climate-resilient economy. The EU has agreed ambitious targets for 2030 regarding GHG emission reductions, renewable energy and energy efficiency, and has approved rules on GHG emissions from land use as well as emissions targets for cars and vans. In 2018 EC published its strategic long-term vision for a prosperous, modern, competitive and climate-neutral economy by 2050. In September, the EC tabled the **2030 Climate Target Plan** which seeks to raise the EU's 2030 GHG emissions reduction target from 40% to at least 55%. This proposal sets Europe on a responsible path to becoming climate neutral by 2050. This plan was accompanied by a comprehensive impact assessment which indicates that renewables and energy efficiency will be crucial for achieving this increased ambition. The assessment estimates that the share of energy from renewable sources for 2030 should reach 38% to 40%; and that the energy efficiency gains needed are 36% - 39% for final energy consumption and 39 - 41% for primary energy consumption[5]. Also, in order to follow up the new needs in GHG emissions, in November 2020, EC has launched two public consultations on the revision of the Renewable Energy Directive and the Energy Efficiency Directive so by June 2021 they will be review and if necessary, revised.

[5] [4]

4. Croatian regulations, strategic and planning documents regarding energy with energy planning and management modes

Basic support for the construction and organization of the energy sector in Croatia consists of legal acts and other appropriate regulations. They determine the principles of energy policy, prescribe the conditions for performing energy activities and adopt rules relating to the operation and regulation of the energy sector, energy planning, construction, operation, maintenance and supervision of energy facilities, taking into account energy efficiency, use of renewable energy sources and environmental protection. Overall energy policy framework in Croatia is determined by the signed international agreements and political determination to join the EU on 1 July 2013.

Following the EU regulations on energy and climate, the Croatian government published multiple regulations on overall energy and climate planning. These regulations are crucial for a long-term change and improvement of energy sector, the economy and the overall ecology of the country.

When we talk about Croatian regulations regarding energy, we can divide them in three groups: general regulations, strategic and planning documents and other specific regulations. Each group of regulations are presented and analyzed in the following chapters.

4.1. General regulations

General regulations regarding energy are divided into acts, regulations, ordinances, decisions and rules as set forth below.

Legal framework for energy sector in Croatia is defined through the package of energy acts. The main act which regulates energy issues, i.e., energy sector in Croatia is **Energy Act** (OG 120/12, 14/14, 102/15, 68/18). This Act, as a general act for the field of energy, regulates issues and relations that are of common interest for all energy activities or that are related to several forms of energy. The Energy Act regulates measures for secure and reliable energy supply and its efficient production and use, it determines energy policy and energy planning process, performance of energy activities on the market or as public services and basic issues of energy performance activities. Another important act is **Energy Activity Regulation Act** (OG 120/12, 68/18) which regulates the establishment and implementation of the system for the regulation of energy activities, the procedure for establishing the energy regulatory body – i.e., Croatian Energy Regulatory Agency (CERA) as an independent legal entity with public powers to regulate energy activities and its rights and obligations and other matters of importance for the regulation of energy activities.

Issues related to gas, electricity, oil and petroleum products, thermal energy, energy efficiency, renewable energy sources and high-effective cogeneration are regulated by special acts. In the following figure we can see all Acts defined in accordance with the Energy Act.

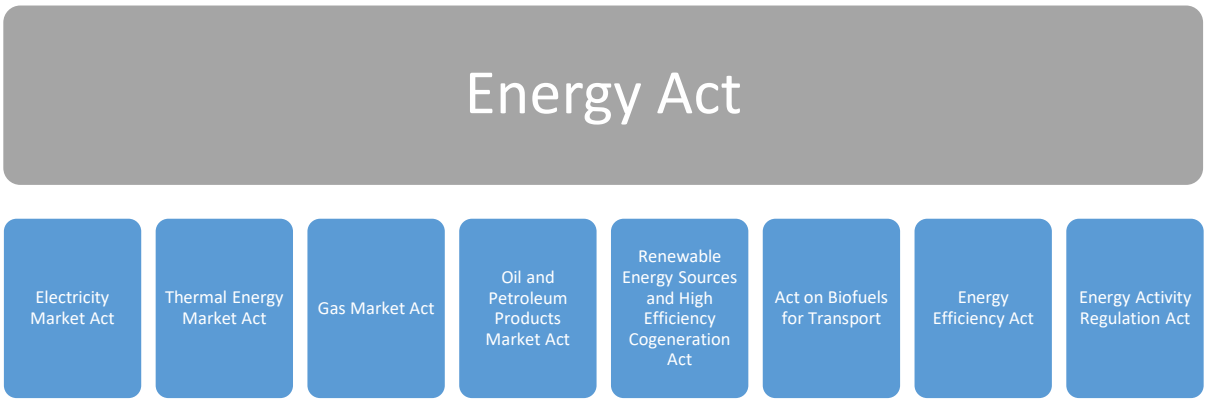

Figure 3 – Croatian Energy related Acts

Electricity Market Act (OG 22/13, 95/15, 102/15, 68/18, 52/19), **Thermal Energy Market Act** (OG 80/13, 14/14, 102/14, 95/15, 76/18, 86/19), **Natural Gas Market Act** (OG 18/18, 23/20) and **Oil and Petroleum Products Market Act** (OG 19/14, 73/17, 96/19) prescribe rules and measures for safe and reliable production, transmission, distribution, storage and supply of electricity, natural gas, thermal energy and oil and petroleum products, as well as organization of the electricity, natural gas, thermal energy and oil and petroleum market. **Act on Biofuels for Transport** (OG 65/09, 145/10, 26/11, 144/12, 14/14, 94/18) regulates the production, trade and storage of biofuels and other renewable fuels and the use of biofuels in transport. It prescribes the adoption of programs and plans to encourage the production and use of biofuels in transport, powers and responsibilities to establish and implement policies to encourage production and use of biofuels in transport. **Renewable Energy Sources and High Efficiency Cogeneration Act** (OG 100/15, 123/16, 131/17, 111/18) regulates the planning and encouragement of production and consumption of electricity produced in production facilities that use renewable energy sources (RES) and high-efficiency cogeneration (HEC), determines incentive measures for electricity production using RES and HEC and regulates the implementation of incentives for electricity production from RES and HEC. Furthermore, it regulates issues of construction of facilities for production of electricity from RES and HEC on state land, regulates keeping the register of RES and HEC, project holders and privileged producers of electricity from RES and HEC, regulates the issue of international cooperation in the field of RES and regulates other issues of importance for the use of RES and HEC. **Energy Efficiency Act** (OG 127/14, 116/18, 25/20) regulates the area of energy efficiency (EE), adoption of plans for EE improvement at the local, regional and national level and their implementation, EE measures, EE obligations, obligations of the energy regulator, transmission system operator, distribution system operator and energy market operators in connection with the transport and distribution of energy. It also defines obligations of energy distributors and energy water suppliers in providing energy services and obligations regarding determination of energy savings and consumer rights in the application of EE measures. The main purpose of this act is to achieve the goals of sustainable energy development, to reduce the negative environmental impacts from the energy sector, improve energy security, meet the needs of energy consumers and meet the international obligations of Croatia in the field of reducing GHG emissions by stimulating EE measures in all areas of energy consumption.

One act which is also important for energy and climate legislation is **The Building Act** (OG 153/13, 20/17, 39/19, 125/19) which was enacted by Croatian Government in 2013 and regulates the designing, construction, use and maintenance of construction works and the enforcement of administrative and any other procedures relating thereto for the purpose of ensuring protection and planning of space in accordance with the regulations governing physical planning and providing the essential requirements for construction works and other requirements prescribed for construction works under this Act and regulations adopted on the basis thereof as well as under special regulations. In order for Croatia to adopt to EU legal framework it was necessary to enact **Act on Ratification of the Energy Community Treaty** (OG 6/06) and **Act on Ratification of the Energy Charter Agreement** (OG 15/97). These acts are important in defining the cooperation between national government authorities with the regulatory and other authorities in EU.

With the aim of implementing special act provisions, certain bylaws are enacted. These bylaws, i.e., secondary legislations include regulations, ordinances, decisions and rules. Regulations are general normative documents with force immediately below the acts and are passed by the national executive body. For the field of RES and HEC the following regulations are important: **Regulation on encouraging the production of electricity from renewable energy sources and high-efficiency cogeneration** (OG 116/18, 60/20), **Regulation on the criteria for the payment of the reduced fee for renewable energy sources and high-efficiency cogeneration** (OG 57/20) and **Regulation on quotas for stimulating the production of electricity from renewable energy sources and high-efficiency cogeneration** (OG 57/20). The main goal of these regulations is to encourage and promote the use of RES and HEC in order to increase national energy efficiency targets.

In order to confirm the Protocol to the Energy Charter on Energy Efficiency and Related Environmental Problems in 1998 the **Regulation on the ratification of the Protocol to the Energy Charter on Energy Efficiency and Related Environmental Problems** (OG 7/98) was enacted. The Regulation defines policy principles for the promotion of EE as a considerable source of energy and for consequently reducing adverse environmental impacts for energy systems. It provides guidance on the development of energy efficiency programmes, indicates areas of cooperation and provides a framework for the development of cooperative and coordinated action. **Regulation on contracting and implementation of energy services in the public sector** (OG 11/15) prescribes the manner of contracting energy services for the public sector, the obligations of providers and clients of energy services, the content of energy performance contracts and energy services budget monitoring for clients of energy services from the public sector. **Regulation on the issuance of energy approvals and determination of conditions** (OG 7/18) prescribes the procedures for issuing energy permits which determine individual conditions, individual connections, when connected to the electricity network and contractual relations between network users and the competent energy entity regarding the conditions and deadlines for connection to the electricity network. **Regulation on the criteria for acquiring the status of endangered customers of energy from networked systems** (OG 95/15) defines the criteria for acquiring the status of vulnerable energy consumer from networked systems and the method of raising funds in order to reduce energy poverty of vulnerable

customers through social support. Two regulations relevant for electricity sector are **Regulation on the establishment of a system of guarantee of origin of electricity** (OG 84/13, 20/14, 108/15, 55/19) and **Regulation on the share in the net electricity supplied to eligible producers which electricity suppliers are obliged to take over from the electricity market operator** (OG 116/18, 119/19).

In order to determine the amount of the fees for the concession for the distribution of natural gas and thermal energy and the concession for the construction of energy facilities for the distribution of gas and thermal energy the following regulations are enacted: **Regulation on the amount and manner of payment of the fee for the concession for the distribution of thermal energy and the concession for the construction of energy facilities for the distribution of thermal energy** (OG 1/14) and **Regulation on the amount and manner of payment of the fee for the gas distribution concession and the concession for the construction of the distribution system** (OG 31/14). In order to define the criteria for acquiring the status of a protected customer in conditions of crisis in gas supply a special regulation was enacted in 2015. **Regulation on the special environmental fee for not placing biofuels on the market** (OG 125/10,116/18) defines the amount of the special environmental fee for not placing biofuels on the market and for not reducing GHG emissions.

Ordinances are also general regulations and they are legal documents which are enacted based on relevant acts. **Ordinance on the energy balance** (OG 33/03) was enacted based on Energy Act in 2003 and prescribes the content and manner of submission of data that national authorities, local and regional government units and relevant energy entities are obliged to submit to the ministry responsible for energy in order to determine the proposed energy balances (includes analysis of the primary energy usage, energy transformations, transformed energy usage, import and export of primary and transformed energy and the use of certain forms of energy for the supply of direct energy customers). Since Croatia encourages the usage of RES and HEC, it is important to mention two ordinances regulating these two aspects: **Ordinance on the use of renewable energy sources and cogeneration** (OG 88/12) and **Ordinance on the Register of Renewable Energy Sources and Cogeneration and Eligible Producers** (OG 87/19). Croatia is obligated to manage the Register of Renewable Energy Sources and Cogeneration and Eligible Producers, a unique database on RES and HEC projects, HEC facilities and eligible producers in the Republic of Croatia. The content of this Register is defined in Ordinance on the Register of Renewable Energy Sources and Cogeneration and Eligible Producers. Ordinance on the use of RES and cogeneration identifies facilities using RES and HEC for energy production, prescribes conditions and possibilities for the use of RES and HEC facilities, and regulates other issues of importance for the use of RES and HEC. **Ordinance on data that energy entities are obliged to submit to the Ministry** (OG 132/14, 16/15, 127/19) determines the content, manner and deadlines for submission and publication of data that energy entities engaged in the production, transport, wholesale, retail and storage of oil and petroleum products and energy entities that import or import petroleum products for their own needs are obliged to submit to the Ministry for the needs of energy planning and reporting. **Ordinance on the calculation of average daily net imports, average daily consumption and quantities of stocks**

of oil and petroleum products (OG 43/16, 116/19) prescribes the methods and procedures for calculating the average net import, average daily consumption, the amount of stocks stored and the content, form and maintenance of registers and statistical summaries of mandatory stocks of oil and petroleum products, as well as deadlines and methods of submitting data to the EC. The main ordinances prescribing and defining the nature and all relevant issues related to petroleum and mining projects, the construction characteristics of petroleum and mining facilities and plants and professional qualifications for performing certain tasks in petroleum mining are: **Ordinance on petroleum and mining projects and the procedure for checking petroleum and mining projects** (OG 95/18), **Ordinance on the construction of petroleum and mining facilities and plants** (OG 95/18) and **Ordinance on professional qualifications for performing certain tasks in petroleum mining** (OG 95/18). **Ordinance on the determination of average energy values of fuels** (OG 36/11) prescribe average energy values of fuels for transport purposes. **Ordinance on measures to encourage the use of biofuels in transport** (OG 42/10,119/18) prescribes measures to encourage the use of biofuels in transport and the manner of their implementation. **Ordinance on the manner and conditions of application of sustainability requirements in the production and use of biofuels** (OG 83/13,118/18) prescribes manner, conditions and deadline for application of sustainability requirements in the production and use of biofuels. Furthermore, it defines the methodology for calculating the reduction of GHG emissions in relation to emissions from the use of diesel fuel and petrol, the sustainability criteria for biofuels, verification or procedure of checking compliance and determining compliance with sustainability criteria in the production and use of biofuels. It prescribes the obligation to prove sustainability criteria on the basis of mass balances and their verification and methodology for calculating avoided GHG emissions for the use of biofuels in transport.

In accordance to Energy Efficiency Act two very important ordinances were enacted: **Ordinance on the system for monitoring, measuring and verifying energy savings** (OG 71/15, 33/20) and **Ordinance on systematic energy management in the public sector** (OG 18/15, 06/16). The Ordinance on the system for monitoring, measuring and verifying energy savings prescribes the methodology for monitoring and calculating energy consumption indicators at national and sectoral level and calculating new energy savings which are the result of the implementation of measures to improve energy production and the application of energy services.

The main purposes of Ordinance on the system for monitoring, measuring and verifying energy savings are:

- establishment of a national system for monitoring and evaluating the success of the EE policy implementation,
- achieving the goals set in the Energy Development Strategy of the Republic of Croatia and the National Energy Efficiency Action Plan;
- definition of methods for calculating new energy savings;
- definition of the procedure for verifying new energy savings, as well as the methodology for drafting the National Energy Efficiency Action Plans and Annual Energy Efficiency Plans.

Special focus in energy sector is given to the planning and monitoring of energy consumption, i.e., systematic energy management which imposes an obligation on the public sector to manage energy and water consumption in an energy efficient manner. For this purpose, **Ordinance on systematic energy management in the public sector was enacted.** This ordinance prescribes the obligation to manage energy and water consumption, consumption analysis, the method of reporting on energy and water consumption and the methodology of systematic energy management in the public sector. The main purposes of systematic energy management are:

- determine the energy and water consumption;
- determine the place, manner and amount of consumption in buildings or parts of public sector buildings and public lighting;
- reduce energy and water consumption and financial expenditure on energy and water;
- final reduce the harmful impact on the environment through the application of EE measures.

The tool used for the needs of systematic energy management is called **the National Information System for Energy Management** which public sector should use. Also, the public sector is obliged to periodically, and at least once a year, analyze the consumption of energy and water in buildings and public lighting.

Energy certification is one of the measures which play a key role in energy planning in building sector, so it was crucial to develop some legal documents which will regulate the process of energy certification. Energy certification is a set of actions and procedures carried out for the purpose of issuing an energy certificate and includes energy audit of the building, necessary calculations for reference climate data to express specific annual thermal energy required for heating and cooling, specific annual primary energy, specific annual CO_2 emissions, determination of the energy class of the building and preparation of the energy certificate. The main ordinances in regulating the process of energy certification are **Ordinance on energy audit of buildings and energy certification** (OG 88/17, 90/20), **Ordinance on persons authorized for energy certification, energy audit of a building and regular inspection of heating and cooling or air conditioning systems in a building** (OG 73/15, 133/15, 60/20) and **Ordinance on the control of the energy certificate of a building and the report on the regular inspection of the heating and cooling or air conditioning system in the building** (OG 73/15, 54/20).

Decisions are, as ordinances, legal documents which are enacted according to national acts and they are regulating special aspects of energy sector. Some decisions prescribe the amounts of tariff items for supply, distribution, transmission, transport, storage, reception and dispatch of different energy sources. Accordingly, the following decisions were enacted: **Decision on the amount of tariff items for guaranteed electricity supply** (OG 25/19, 68/20, 98/20), **Decision on the amount of tariff items for the transmission of electricity** (OG 112/18), **Decision on the amount of tariff items for guaranteed distribution of electricity** (OG 112/18), **Decision on the amount of tariff items for gas transport** (OG 111/18, 124/19, 144/20, 147/20),

Decision on the amount of tariff items for gas distribution (OG 127/17), **Decision on the amount of tariff items for gas storage** (OG 122/16) and **Decision on indicative amounts of tariff items for the reception and dispatch of liquefied natural gas** (OG 56/18, 144/20). Some decisions were enacted in order to prescribe the amount of fees for participation in the system of guarantee of origin of electricity – **Decision on the amount of fees for participation in the system of guarantee of origin of electricity** (OG 34/15), for the use of space used by production facilities for the production of electricity – **Decision on the amount of the fee for the use of space used by production plants for the production of electricity** (OG 84/13, 101/13, 72/15), for connection to the electricity network and gas distribution or transmission system – **Decision on the amount of the fee for connection to the electricity network and for increasing the connected capacity** (OG 52/06) and **Decision on the fee for connection to the gas distribution or transmission system and for increasing the connection capacity for the regulatory period 2017 – 2021** (OG 122/16), for RES and HEC – **Decision on compensation for renewable energy sources and high-efficiency cogeneration** (OG 87/17) and for performing energy regulation activities – **Decision on the amount of fees for performing energy regulation activities** (OG 155/08, 50/09, 103/09, 21/12). In order to organize the electricity and gas market **Decision on the fee for organizing the electricity market** (OG 94/07, 38/12) and **Decision on the fee for organizing the gas market** (OG 23/16) were enacted.

After the promulgation of the Act on the Ratification of the Umbrella Agreement on the Institutional Framework for the Establishment of International Oil and Gas Transport Systems and Ratification of Amendments to the Trade Provisions of the Energy Charter Agreement Act were made in 2000 and in 2003 the corresponding decisions were enacted. In order to appoint a body in charge of coordinating the licensing procedures for projects of common interest, **Decision on the designation of the body responsible for coordinating the licensing procedure for projects of common interest in the energy sector** (OG 137/14) was enacted.

The final documents within general regulations are the rules. The rules, as decisions regulate special aspects of energy sector. The most important rules are as follows: **Rules for organizing the electricity market** (OG 107/19, 36/20), **Rules on changing electricity suppliers** (OG 56/15, 33/17), **Rules on the use of the register of guarantees of origin of electricity** (HROTE 12.07.2019.), **Rules of procedure in case of exceeding the power of a privileged electricity producer** (HERA 2/17), **Rules on balancing the power system** (HOPS, 5/16, 3/17, 11/19), **Rules on connection to the transmission network** (HOPS, 4/18), **Rules on connection to the distribution network** (HEP-ODS 4/18), **Rules on the use of cross-border transmission capacities** (HOPS 10/16), **Network rules of the distribution system** (OG 74/18, 52/20), **Network rules of the transmission system** (OG 67/17), **Grid rules for the distribution of thermal energy** (OG 35/14), **Grid rules of the gas distribution system** (OG 50/18), **Rules on the organization of the gas market** (HROTE 50/18), **Network rules of the transport system** (PLINACRO 50/18, 31/19, 89/19, 36/20), **Rules for the use of the gas storage system** (OG 50/18, 31/19, 89/19, 36/20) and **Rules for the use of liquefied natural gas terminals** (OG 60/18, 39/20).

When we talk about general regulations it can be concluded that Croatian government authorities developed a numerus legal documents in order to regulate energy sector. By enacting these documents, legal entities tend to ensure the objectivity, transparency and impartiality in the performing of energy activities, help with the execution of the principle of regulated access to network/system, fix methodologies for setting the tariff items of tariff systems, establish efficient energy market and market competition and protect the energy customers and energy undertakings.

Based on all mentioned above, it can be said that Croatia has a very well-developed system for regulating energy sector and energy activities with following objectives: increased energy efficiency, security of energy supply, diversification of energy and sources, utilization of renewable energy sources, realistic and market-related energy prices and development of energy market and entrepreneurship and environmental protection.

4.2. Strategic and planning documents

In accordance with the provisions defined in acts and other bylaws, each country is obliged to adopt appropriate planning and strategic documents in order to define their key development potentials, basic principles and criteria for determining goals and priorities in considering long-term transformation towards sustainable development. Unlike general regulations, which are more focused on the harmonization with European directives into national legislation, strategies and plans are implementing documents that define the methods of energy planning and management with defined deadlines and holders of individual activities for longer time periods.

First fundamental strategic document is the **Sustainable Development Strategy of the Republic of Croatia** (OG 30/09) which was adopted by the Croatian Parliament in February 2009 for the period until 2019. This document serves as a key strategic document from which it will be possible to identify the key development potentials of Croatia, the choice of direction and path towards the realization of a long-term development vision. The Sustainable Development Strategy makes reference to several key areas important for this document:

- environment and natural resources;
- promoting sustainable production and consumption;
- ensuring energy independence and increasing energy efficiency.

In order to adopt the existing challenges in sustainable development, use all potentials and coordinate the efforts of all public policies, Croatia needs to have a clear vision of its future development and define the goals it wants to achieve by 2030. In addition, as a member of EU it has generous European funds at its disposal which will be an important leverage in achieving these goals. However, this requires a clear framework and quality multi-annual planning, so that the benefits of EU membership can be better exploited. Accordingly, in 2018, the Croatian Government began drafting **the National Development Strategy until 2030** as an umbrella document and a

comprehensive strategic planning document which directs the long-term development of society and the economy in all important issues for Croatia. The document is based on Croatia's competitive economic potential and on identified development challenges at the regional, national, European and global levels. The National Development Strategy defines the vision of the future development of Croatia, taking into account the expected global trends. The main goal is to accelerate the economic recovery in order to raise living standards and create conditions for better living conditions for all Croatian citizens.

The **Strategy of regional development of Republic of Croatia for period until 2020** (Regional development strategy) is main planning document of regional development policy, prepared at central level and adopted by Croatian Parliament in July 2017. Regional development strategy sets objectives and priorities of regional development and methods of their achievement, areas with specific development issues and relations of stakeholders involved in implementation of the Strategy. The main objective of the Regional development strategy, which was built on the principle of partnership, is a more balanced development of the country and reduction of socio-economic disparities. One of the strategic objectives for all Croatian regions is sustainable management of cultural property and natural resources in order to enhance the competitiveness of the region and sustainable management of environment and energy. In the following figure, we can see the main strategic goals of Croatian development policy.

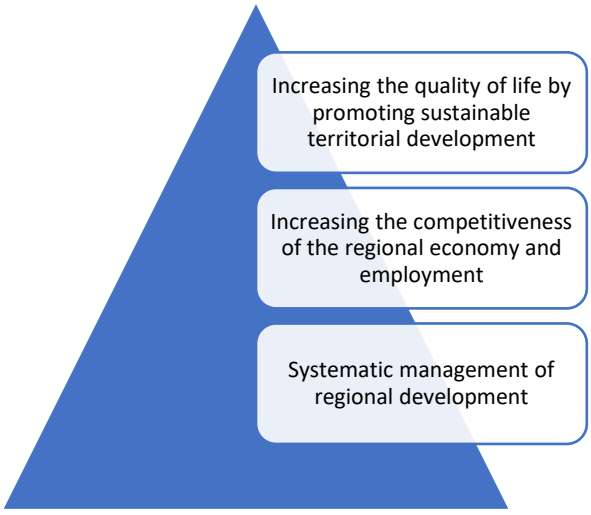

Figure 4 – Strategic goals of Croatian regional development policy

In order to identify the impact of this Strategy it was necessary to develop **Strategic study on the environmental impact of the Strategy of regional development of Republic of Croatia for period until 2020.**

Due to the constant development of the energy sector, the Republic of Croatia had to develop and adopt a **Strategy for the energy development of the Republic of Croatia** (OG 130/09). The first Strategy for the energy development of the Republic of Croatia was developed in 2009 for the period until 2020. The second **Strategy for the energy development of the Republic of Croatia until 2030 with an outlook to 2050** (OG 25/20) (Energy development strategy) was enacted in March 2020. The key objectives of the Energy development strategy are:

- ensuring sustainable energy production in Croatia over the next 10 years, with projections until 2050;
- reducing import dependence,
- and strengthening the security of energy supply through the development of strategic infrastructure.

The main purpose of Energy development strategy is to ensure energy independence, a safe and sustainable supply, as well as the development and competitiveness of the energy system, in the context of accomplishing the vision of a common energy-climate policy in Croatia and at the EU level. The implementation of Energy development strategy will enable a transition to low-carbon energy through two types of activity – increasing EE and utilizing RES as much as possible.

Speaking about increasing EE in the context of lowering overall energy consumption in the next 10 years, as well as in the period until 2050, CO_2 emissions are expected to be reduced by about 36%. These objectives will require significant investment in renewable energy production as well as in the EE of buildings. Energy development strategy is based on growing, flexible and sustainable energy production, development of new infrastructure and alternative energy supply routes, and greater EE, the purpose being the accomplishment of the EU's climate neutrality by 2050. In the following figure we can see the main goals of energy development in Croatia which are also stated in Energy development strategy.

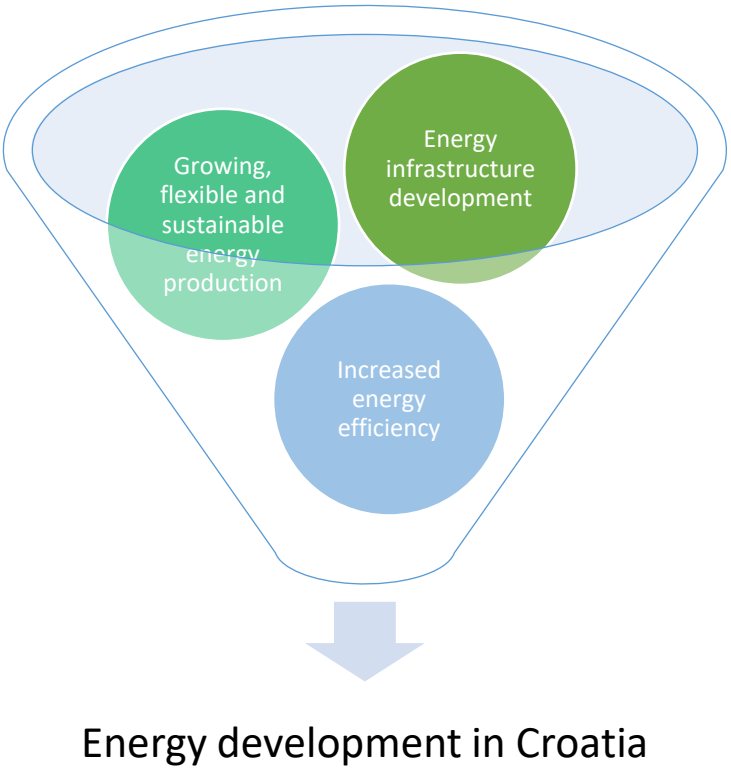

Figure 5 – The main goals of energy development in Croatia

Based on the Energy development strategy, the Government of the Republic of Croatia adopts the **Energy Development Strategy Implementation Program**, which determines measures, activities and dynamics of energy policy implementation, the

manner of cooperation with local and regional government units in energy sector development planning and cooperation with energy institutions, and with other international organizations.

In order to develop and implement the Energy development strategy, it was necessary to develop **the Strategic study of the impact of the Energy development strategy on the environment** and **Analysis and Foundations for the Preparation of the Energy Development Strategy of the Republic of Croatia – Green Book**. The Green Book includes the analytical foundations for the preparation of the strategy and was developed in 2019 by Energy Institute Hrvoje Požar. In line with the final version of the Green Book, the **Draft Climate Change Adaptation Strategy in the Republic of Croatia for the period to 2040 with a view to 2070 - White Book** was also prepared. The White Book represents an executive summary of the current state and analytical outcomes for selected development scenarios in line with the results of the Green Book.

According to Energy Efficiency Act Republic of Croatia has to develop National Energy Efficiency Action Plan (NEEAP). NEEAP is a planning document adopted for a three-year period and determines the implementation of the national policy for improving EE. So far Croatia developed four NEEAPs, where the Fourth NEEAP is currently in force. **The Fourth National Energy Efficiency Action Plan for the period until the end of 2019** was adopted at the 140th session of the Government of the Republic of Croatia on 30 January 2019 and it will be in force until end of 2020. As a comprehensive implementing document, the Fourth NEEAP defines the energy efficiency policy for the relevant three-year period and features an evaluation of the achieved energy savings compared to the objectives set in the 3rd NEEAP of the Republic of Croatia until the end of 2015.

Since energy planning and management must be carried out at all levels in Croatia (including regional and local level) local and regional government units are required to adopt certain strategic and planning documents related to energy management, energy efficiency and encouraging the use of renewable energy sources in order to achieve the national energy goals. In accordance with the Energy Efficiency Act, regional government units adopt three-year action and annual energy efficiency plans in their administrative area. Energy efficiency annual and three-year plans are more systematic presentation of EE measures prepared in accordance with the Energy development strategy of the Republic of Croatia, the fourth NEEAP, the Energy Efficiency Act and other relevant regulations.

The main purpose of development the three-year **Energy Efficiency Action Plan** is to determine guidelines for the implementation of energy efficiency improvement policy through the realization of energy savings and respecting the energy needs of the region and the principles of sustainability and environmental protection. Energy Efficiency Action Plan contains an overview and assessment of the situation and needs in energy consumption, long-term goals including the indicative energy saving target of the county, EE measures and sources of funding for their implementation, calculation of planned energy savings, monitoring and implementation of the plan and the method of financing the plan.

The Annual Energy Efficiency Plan contains a detailed overview of EE measures that planning institutions plan to implement during the next budget year. It consists of two main parts: analysis of implemented measures for the previous reporting year and calculation of achieved savings and calculation and proposal of activities for the current year in order to achieve planned energy savings and implementation of planned activities in accordance with current strategic guidelines and documents of local and regional governments. By development of these documents at regional level, the necessary energy and financial savings will be achieved, which will ultimately reduce the negative impact on the environment from the energy sector, improve security of energy supply and meet the needs of all energy consumers through the use of renewable energy sources and the implementation of planned EE measures.

Local and regional government units as key drivers of sustainable development at the local and regional level are also, according to Energy Act obligated in their development documents to plan the needs and manner of energy supply and harmonize such documents with the Energy Development Strategy and Action Plan for the Implementation of the Energy Development Strategy. These development documents referred to **development strategies of regional government units** and **implementation programs of local and regional government units** and other relevant planning documents.

Implementation programs of local and regional government units are a short-term strategic planning documents related to the multi-annual budget adopted by the mayor, chief or prefect which describe priority measures and activities for implementing goals from related, hierarchically higher strategic planning documents of national importance and of importance for local and regional government units. Development strategy of regional government unit is a basic strategic planning document in which development goals and priorities for the county are determined in order to strengthen its development potentials, with special emphasis on the role of large cities and cities of county headquarters in encouraging development and the development of less developed areas. Among other defined priorities within those documents, environmental and nature protection, energy management, the use of renewable energy sources and the promotion of energy efficiency stands out. Achievement of these priorities will contribute to the main goals of the new **EU strategy for growth and development Europe 2020**. One of the basic priorities defined in the Europe 2020 strategy relates to sustainable development through resource efficiency and a "greener" and more competitive economy. The Europe 2020 strategy encourages the building of competitive society based on a low-carbon economy, environmental protection, prevention of biodiversity loss and the introduction of efficient "smart" electricity grids.

Local government units according to Energy Efficiency Act can develop Energy Efficiency Action Plans but by now only small number of local government units in Croatia developed Energy Efficiency Action Plan. By developing this document, local government units define their curs of action in order to increase energy efficiency in their administrative area.

Due to the need for significant investments in RES and HEC, it is important to mention the following two documents: **National Action Plan for Renewable Energy Sources until 2020** and **National potential for cogeneration in Croatia**.

By joining the EU on 1 July 2013, the Republic of Croatia, together with other MS, and pursuant to Directive 2009/28/EC on the promotion of the use of energy from renewable sources, made a commitment to increase the use of energy from renewable energy sources. The share of energy from renewable sources in gross direct consumption should be at least 20 percent by end of 2020, i.e., at least 32% by end of 2030 observed at the EU level. In order to achieve this basic goal, each MS is obliged to adopt a National Action Plan for Renewable Energy Sources, which sets the overall national target for RES according to the prescribed methodology and sectoral goals and trajectories in electricity generation, heating and cooling and energy in transport from RES. Also, the National Action Plan needs to determine the existing and planned policy for RES as instruments, measures and mechanisms with which the goals would be achieved by 2020 and 2030.

Table 1 – A comparison of key energy goals for 2020 and 2030

	Reduction of greenhouse gas emissions	Renewable energy sources	Energy efficiency	Interconnection
2020	20%	20%	20%	10%
2030	≥ 40%	≥ 32%	≥ 32,5%	14%

Energy security and climate change prevention largely depend on considerable improvements in building energy efficiency. The key strategic document for the energy efficiency dimension in building sector is the **Long-term Strategy for Mobilising Investment in the Renovation of the National Building Stock of the Republic of Croatia by 2050** (Long-term renovation strategy), which promotes the need to invest in the building stock and based on established economically-energy-optimal model of building renovation, identifies effective measures for long-term mobilisation of cost-effective integrated renovation of the national building stock by 2050 on grounds of the established economical and energy-optimal building renovation model. The Long-term renovation strategy was enacted in 2014 and revised in 2017 and 2020. The Long-term renovation strategy aligns the renovation objectives and activities in the construction sector, with trends of accelerated abandonment of the existing building stock of poorer properties and gradual growth in new construction. The current energy renovation rate of 0.7% per year will gradually rise to 3% over the 2021 – 2030 period, with a 10-year average rate of 1.6%[6]. An important element of the Long-term renovation strategy is the introduction of additional measurable indicators of energy renovation of buildings, which will strengthen the process of conversion of the stock into nearly zero-energy buildings, i.e., climate neutral. To achieve the goals set by the Long-term renovation strategy, the existing measures primarily include the

[6] [5]

implementation of national energy renovation programs for different types of buildings. Energy renovation programs for buildings will be adopted in accordance with the Building Act by 30 June 2021, and they will precisely determine the necessary financial resources for co-financing. More information on the renovation programs will be given in the next subchapter.

Due to the need to increase the number of nearly zero-energy buildings in Croatia (obligation to Directive 2010/31/EU on the energy performance of buildings/Directive (EU) 2018/844 on the energy performance of buildings), Ministry of Construction and Physical Planning (later Ministry of Physical Planning, Construction and State Assets) defined the **Plan for increasing the number of nearly zero-energy buildings (nZEB) up to year 2020**. This plan contains review of existing targets for increasing EE in buildings, review of available funding models, policies and measures to promote nZEB buildings.

One another relevant planning document refers to **Social Action Plan on understanding the social aspects of the Energy Community (Social Action Plan)**. The Social Action Plans were intended to serve as a roadmap to develop and implement necessary measures to deal with social consequences in a socially responsible manner. The whole idea of developing this document came from the Treaty on Establishing the Energy Community which defines social stability alongside economic development as one of the primary interests for MS for which the access to stable and continuous energy supply is essential. Chapter IV of the Treaty on Establishing the Energy Community (Articles 31 – 33) further promotes the social aspects of the energy acquis in the context of provision of energy to citizens and its affordability. During the implementation of the Treaty on Establishing the Energy Community, i.e., the social consequences of its implementation, a **Memorandum of Understanding on Social Issues of the energy community** was adopted. He became the starting point for development of Social Action Plan on understanding the social aspects of the Energy Community. Croatia developed this document in 2013. which main goals are[7]:

- improving the living and working conditions of workers in the energy sector, anticipating and resolving the negative impacts that the restructuring of the sector will have on them: protection of workers' rights, improvement of working conditions and protection at work, equal opportunities for men and women, education, rewarding improvements in energy efficiency at work and similar activities;
- encouraging social dialogue that will ensure the development of the energy sector in line with social needs, both on the production side (domestic producers, supply routes, renewable energy sources) and on the consumption side (EE, fiscal and tax policy), consumer information and education play a key role. The energy sector must provide a reliable, high-quality, available and affordable service. Special attention must be paid to the design of measures to protect the most economically vulnerable social categories.

[7] [6]

As it was said, the energy planning should be implemented on all country levels including local level. One very important initiative which deals with energy planning in EU on local level is initiative called Covenant of Mayors. The Covenant of Mayors was launched in 2008 in Europe with the ambition to gather local governments voluntarily committed to achieving and exceeding the EU climate and energy targets. When officially joining the Covenant of Mayors, signatories commit to developing a **Sustainable Energy Action Plans** (SEAP) within two years. Many Croatian local governments joint the initiative and developed SEAP. SEAP is a key document that shows how the Covenant signatory will reach its commitment by 2020. It uses the results of the Baseline Emission Inventory to identify the best fields of action and opportunities for reaching the local authority's CO_2 reduction target. It defines concrete reduction measures, together with time frames and assigned responsibilities, which translate the long-term strategy into action. In 2014, the EC launched the Mayors Adapt initiative. Based on the same principles as the Covenant of Mayors, this sister initiative was focusing on adaptation to climate change. Mayors Adapt invited local governments to demonstrate leadership in adaptation, and was supporting them in the development and implementation of local adaptation strategies. In 2015 these two initiatives officially merged into new initiative The Covenant of Mayors for Climate & Energy. The signatories of the new initiative commit to developing a **Sustainable Energy and Climate Action Plans** (SECAP). Since this document include the climate and climate change aspects, it will be further elaborated in the fifth chapter.

4.3. Other specific regulations

Other specific regulations include methodologies, programmes, technical regulations and ministry notes.

Energy security and the prevention of climate changes largely depend on considerable improvement of the EE of buildings sector. The key regulation for building sector with the Building Act is **Technical regulation on rational use of energy and thermal protection in buildings** (OG 128/15, 70/18, 73/18, 86/18, 102/20). This regulation prescribes technical requirements regarding the rational use of energy and thermal protection of the construction part of the building, technical heating systems, ventilation, cooling, air conditioning, hot water preparation and lighting that need to be fulfilled during the design and construction of new buildings and during reconstruction, design and major reconstruction of existing buildings. It sets requirements on the consumption of thermal energy for heating in residential and non-residential buildings, requirements related to airtightness of buildings, the maximum allowed transmission heat loss coefficient of building elements, etc. In order to clarify the provisions of the Technical regulation regarding nZEB standard, Ministry of Physical Planning, Construction and State Assets made a **Note on the application of the provisions for the design of near-zero energy buildings**.

In order to increase EE in the building sector several renovation programmes were developed. The objectives of this programmes are to determine and analyze energy consumption and EE in the existing Croatian residential and non-residential building fund, to identify the potential and the possibility of reducing energy consumption in

existing buildings, to develop measures to promote energy efficiency improvements in existing buildings and to evaluate their performance. Building retrofit (renovation) programmes were adopted for different types of buildings and they are implemented accordingly: **energy renovation program of family houses for the period 2014 – 2020 with a detailed plan for the period from 2014 to 2016**; **energy renovation program of multi-residential buildings for the period 2014 - 2020 with a detailed plan for the period from 2014 to 2016**; **energy renovation program of non-residential commercial buildings for the period 2016 – 2020**; and **energy renovation program of public buildings for the period 2016 – 2020**.

In addition to these programs, the **Program to encourage the construction of new and renovation of existing buildings to almost zero energy standards** was also developed. This program was developed in 2018 with the aim of encouraging the renovation and construction of nZEB buildings. Ministry of Construction and Physical Planning (later Ministry of Physical Planning, Construction and State Assets) based on **Ordinance on energy audits and energy certification of buildings** (OG 88/17, 90/20) enacted the **Methodology of performance of energy audits of buildings** on 4 September 2017 which was applied from 30 September 2017. This methodology defines the concept and implementation steps of the energy audit, the way of collecting the necessary input data, the way of conducting the analysis and the budget. It also prescribes the layout and contents of the final report on the energy inspection of the building.

In addition to the Methodology of performance of energy audits of buildings, several other relevant methodologies were enacted. Some methodologies determine the amount of tariff items for supply, distribution, transmission, production, transport, storage, reception and dispatch of various energy sources (electricity, natural gas, thermal energy, etc.), prices and connection fees for different energy sources. When we talk about tariff items, prices and connection fees for different energy sources it is necessary to mention the most important institution in charge of regulating energy activities in Croatia – **Croatian Energy Regulatory Agency** (CERA). CERA is an autonomous, independent and non-profit public institution which regulates energy activities in the Republic of Croatia. CERA's obligations, authorities and responsibilities are based on the Act on the Regulation of Energy Activities, the Energy Act and other acts regulating specific energy activities. For the purposes of arranging the internal organization and representation, work and operations, supervisory bodies, establishment and scope of work of advisory and professional bodies, powers and methods of decision-making, general acts, confidentiality of data, publicity of work and other issues of importance for the CERA the **Statute of Croatian Energy Regulatory Agency** was passed.

In order to determine the amount of tariff items for guaranteed supply, distribution, transfer of electricity the following methodologies were developed: **Methodology for determining the amount of tariff items for guaranteed electricity supply** (OG 20/19), **Methodology for determining the amount of tariff items for electricity distribution** (OG 104/15) and **Methodology for determining the amount of tariff items for electricity transmission** (OG 104/15, 84/16). In addition to determination of the amounts of tariff items for electricity, the following methodologies were also

developed: **Methodology for determining the origin of electricity** (OG 133/14, 127/19), **Methodology for setting prices for the provision of ancillary services** (HOPS 7/16), **Methodology for determining prices for the calculation of balancing electricity** (OG 71/16, 112/16), **Methodology for determining prices for the provision of balancing services** (OG 85/15) and **Methodology for determining the fee for connection to the electricity network of new network users and for increasing the connection capacity of existing network users** (OG 51/17, 31/18). Methodology for determining the origin of electricity defines the principles and basic elements of determining the origin of electricity, determinates the structure of electricity produced in the incentive system, the structure of the total remaining electricity, the structure of electricity that suppliers sell to end customers, obligations of the supplier towards end customers, etc.

In order to determine the amount of tariff items for production and distribution of thermal energy, the following methodologies were developed: **Methodology for determining the amount of tariff items for heat production** (OG 56/14) and **Methodology for determining the amount of tariff items for the distribution of thermal energy** (OG 56/14). In addition, the following methodologies for determining the amount of tariff items for guaranteed supply, distribution, transport, storage of natural gas and reception and shipment of liquefied natural gas: **Methodology for determining the amount of tariff items for the public gas supply service and guaranteed supply** (OG 34/18); **Methodology for determining the amount of tariff items for gas distribution** (OG 48/18); **Methodology for determining the amount of tariff items for gas transport** (OG 48/18, 58/18, 79/20); **Methodology for determining the amount of tariff items for gas storage** (OG 48/18) and **Methodology for determining the amount of tariff items for the reception and shipment of liquefied natural gas** (OG 48/18, 79/20). Additional methodologies were developed in order to determine the fees for connection to the heating distribution network and for increasing the connection power (**Methodology for determining the fee for connection to the heating distribution network and for increasing the connection capacity** (OG 42/16)), for connection to the gas distribution or transmission system and to increase the connection capacity (**Methodology for determining the fee for connection to the gas distribution or transmission system and for increasing the connection capacity** (OG 48/18)). In order to determine the price of non-standard services for gas transport, gas distribution, gas storage and public gas supply service the **Methodology for determining the price of non-standard services for gas transport, gas distribution, gas storage and public gas supply service** (OG 48/18, 25/19) was enacted.

Conditions of quality of electricity supply (OG 37/17, 47/17, 31/18) and **General conditions of network use and electricity supply** (OG 85/15) are two basic bylaws regulating the electricity sector in the Republic of Croatia – primarily elaborating relations between electricity network users and network service providers (distribution and transmission) or electricity suppliers and quality of electricity supply. **General conditions for thermal energy supply** (OG 35/14), **General conditions for the supply of thermal energy** (OG 35/14, 129/15) and **General conditions for gas supply** (OG 50/18) are basic bylaws regulating the natural gas and thermal energy sector in the Republic of Croatia primarily elaborating relations between natural gas

and thermal energy network users and network service providers (distribution and transmission) or natural gas and thermal energy suppliers.

4.4. Conclusions

As we can see within this chapter, the Croatian energy policy is based on the EU legislative framework and it can be said that we have a very well-developed system of energy planning and management. The European, as well as Croatian energy policy developed in the last few year is based on the package **The Clean Energy Package for all Europeans** which was proposed by European Commission in November 2016, whereas the EU completed a comprehensive update of its energy policy framework in 2019 to facilitate the transition away from fossil fuels towards cleaner energy and to deliver on the EU's Paris Agreement commitments for reducing GHG emissions. In the following figure we can see five elements of the package Clean Energy for all Europeans.

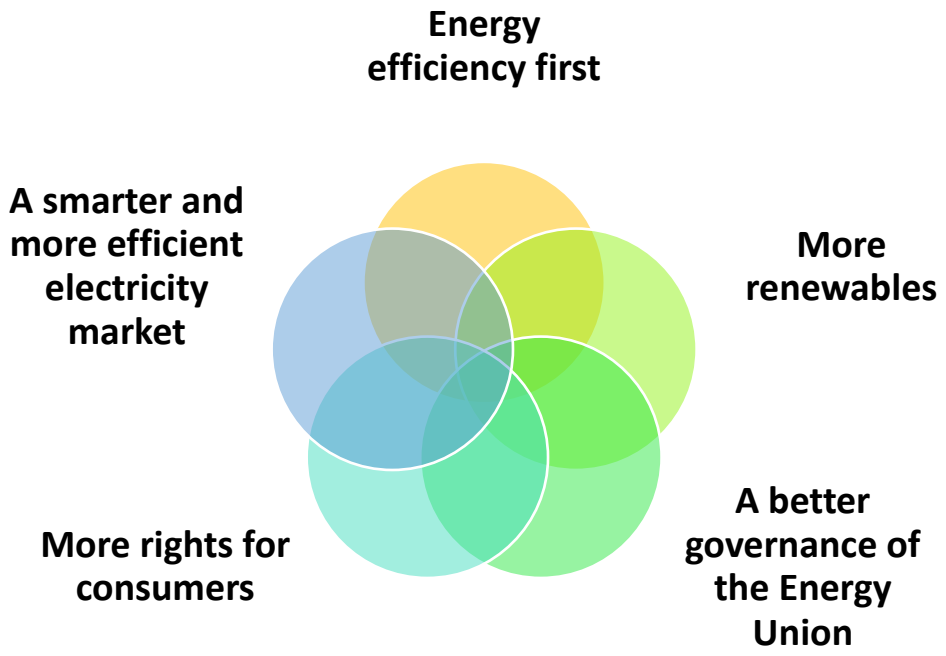

Figure 6 – Elements of Clean energy package for all Europeans

The Clean energy for all Europeans package sets the right balance between making decisions at EU, national and local level. MS will continue to choose their own energy mix, but must meet new commitments to improve EE and the take-up of renewables in that mix by 2030. This package includes four Directives and four Regulations: Energy Performance in Buildings Directive (EU) 2018/844; Renewable Energy Directive (EU) 2018/2001; Energy Efficiency Directive (EU) 2018/2002; Governance of the Energy Union Regulation (EU) 2018/1999; Electricity Regulation (EU) 2019/943; Electricity Directive (EU) 2019/944; Risk Preparedness Regulation (EU) 2019/941 and ACER Regulation (EU) 2019/942 which all MS have to harmonize within their legal framework. EC launched in November 2020 two additional public consultations in preparation for the ambitious 2030 GHG emission reduction target. The planned revision of the Renewable Energy Directive and the Energy Efficiency Directive in June 2021 will

ensure that EU renewable energy policies, energy sources and EE contribute to reducing GHG emissions by at least 55% by 2030 compared to 1990 levels. As all MS, Croatia will also have to adopt to these new goals.

As a final remark it could be said that Croatia is continuously working on the harmonization of its national legislative framework with the European legal framework through the adoption of new acts, but also through the amendment of existing acts and other regulations. While laws and bylaws are aimed at defining obligations, strategies and plans are more implementing documents that define concrete measures and steps to increase EE, encourage the use of RES and reduce GHG emissions that need to be achieved over a period of time. By developing the legal framework in regulating energy sector, Croatia promotes efficient and rational use of energy, entrepreneurship in the energy sector, investments in the energy sector and environmental protection.

5. Croatian regulations, strategic and planning documents regarding climate with climate planning and management modes

As it could be seen in the previous chapters, the EU has a significant influence on Croatia's energy planning and management policies which are mainly concentrated on energy security. However, due to rapid climate change, energy goals must now be achieved with minimum GHG emissions. Accordingly, Croatia adopted new regulations, strategies and other planning documents regarding climate with climate planning and management modes.

The main obligations for Croatia regarding climate came from international climate change policy which include Paris Agreement, UN Sustainable Development Goals and The Intergovernmental Panel on Climate Change. Croatia, as a signatory of Paris Agreement prepares and submits periodic reports on implementation of actions in mitigation and adaptation to climate change. The last **Seventh National Report of the Republic of Croatia under the United Nations Framework Convention on Climate Change** was submitted to the Secretariat of the Convention on 1 October 2018.

Until 2020 the Ministry of Environmental Protection and Energy was in charge of energy and climate issues, but after the reorganization of ministries in Croatia, these issues came under the authority of Ministry of Economy and Sustainable Development (MESD). MESD now acts also as energy and climate policy coordinator and works intensively to promote EE, RES usage and climate change adaptation policy in Croatia. MESD is the central government authority in charge of administrative and expert environmental protection activities relating to climate protection. It also carries the responsibility for the overall national policy of environmental protection, climate change, reporting on the implementation of policies, measures and GHG emission projections.

Croatian regulations regarding climate and climate change can be divided into three groups as it was the case with energy regulations: general regulations, strategic and planning documents and other specific regulations that are relevant for climate and climate change.

5.1. General regulations

The general regulations regulating climate issues include acts, regulations, ordinances and decisions. They are in the function of fulfilling the internationally undertaken commitments of the Republic of Croatia within the framework of the UNFCCC and the EU acquis, and are the starting point for the long-term development of the low-carbon emission economy.

The main Acts regulating climate issues in Croatia are: Air Protection Act (OG 130/11, 47/14, 61/17, 127/19), Climate Change and Protection of the Ozone Layer Act (OG 127/19), Environmental Protection Act (OG 80/13, 153/13, 78/15, 12/18, 118/18), Nature Protection Act (OG 80/13, 15/18, 14/19, 127/19), Act on Ratification of the

Kyoto Protocol to the United Nations Framework Convention on Climate Change (OG 05/07).

Air Protection Act (OG 130/11, 47/14, 61/17, 127/19) lays down the measures, the manner of organizing, implementing and supervising protection and improvement of air quality, as a part of the environment of common good, which has the special protection of the Republic of Croatia. **Climate Change and Protection of the Ozone Layer Act** (OG 127/19) prescribes the competence and responsibility for climate change mitigation, adaptation to climate change and protection of the ozone layer, documents on climate change and protection of the ozone layer, monitoring and reporting on GHG emissions. It also prescribes GHG emissions trading system, aviation, GHG emissions of non-trading sectors, ozone-depleting substances and fluorinated GHG, climate change mitigation financing, climate change adaptation and ozone layer protection, climate change and ozone protection information system and finally, administrative and inspection supervision. According to this act the basic documents on climate change and ozone protection are:

1. Low carbon development strategy of the Republic of Croatia;
2. Climate change adaptation strategy in the Republic of Croatia;
3. Action plan for the implementation of the Low Carbon Development Strategy of the Republic of Croatia;
4. Action plan for the implementation of the Climate Change Adaptation Strategy in the Republic of Croatia;
5. Integrated national energy and climate plan of the Republic of Croatia;
6. Climate change mitigation, climate change adaptation and ozone protection program.

Each of these documents will be elaborated in the subsection 2 of this chapter since they are strategic and planning documents which are defining the Croatian climate policy.

Environmental Protection Act (OG 80/13, 153/13, 78/15, 12/18, 118/18) and **Nature Protection Act** (OG 80/13, 15/18, 14/19, 127/19) are umbrella acts for environmental and natural protection. Environmental Protection Act determines principles of environmental protection and sustainable development, environmental protection from the effects of stress, environmental protection entities, the development of documents on sustainable development and environmental protection. It also prescribes environmental protection instruments, environmental monitoring and information system, the ensuring of access to environmental information, public participation in issues environment, ensuring the right of access to justice, liability for damages, financing and instruments of general environmental policy and finally administrative and inspection supervision. **Nature Protection Act** regulates the system of protection and complete preservation of nature and its parts and other related issues.

The Republic of Croatia signed the Kyoto Protocol on 11 March 1999 as the 78th signatory, but did not ratify it until 2007 due to negotiations on the base year. On 27 April 2007, the Croatian Parliament passed the **Act on Ratification of the Kyoto**

Protocol to the United Nations Framework Convention on Climate Change (OG – International Agreements, 5/07).

In addition to acts for regulating the area of climate several regulations are enacted. **Regulation on the quality of biofuels** (OG 141/05, 33/11) prescribes the limit values of biofuel quality characteristics that are placed on the domestic market, the method of determining the quality of biofuels and the method of proving compliance. **Regulation on the strategic assessment of the impact of environment strategy, plan and program** (OG 03/17) defines the requirements and criteria for the implementation of strategic assessment; frameworks for interventions in strategies, plans and programs that are subject to environmental impact assessment, method of individual tests, criteria for determining the likely significant impact of changes and/or amendments to strategies, plans or programs on the environment. It also prescribes the activities in implementation of evaluation procedure and strategic assessment procedure, mandatory content and manner of preparation of the strategic study and the related procedure, mandatory content of opinions and other acts in that procedure. It defines deadlines in which procedures have to be integrated into the strategy, plan or program; environmental protection conditions determined by the strategic assessment, the manner of monitoring the state of the environment regarding significant impacts of the strategy, plan and program during their implementation and the manner of verifying the implementation of environmental measures. **Regulation on unit charges, corrective coefficients and more detailed criteria and benchmarks for determining the charge on carbon dioxide emissions** (OG 73/07, 48/09, 02/18) prescribes the amount of the unit fee, corrective coefficients and more detailed criteria and benchmarks for determining the fee for carbon dioxide emissions. **Regulation on the implementation of flexible mechanisms of the Kyoto Protocol** (OG 142/08) was enacted according to Air Protection Act and prescribes the manner of implementation procedure for the application of flexible mechanisms of the Kyoto Protocol, the composition of the commission for the evaluation of project activities, i.e., programs, and the manner of reporting on their implementation. **Regulation on the method of trading in greenhouse gas emission allowances** (OG 69/12, 154/14) regulates the manner in GHG emission allowances trading, activities and GHG for which the obligation to obtain a permit for GHG emissions is established, aviation activities for which the obligation to monitor emissions is determined, the manner and criteria for excluding small installations subject to equivalent measures and installations ceased operations. It also prescribes the measures to achieve an equivalent contribution to emission reductions, the method (percentage) and scope of use of clean development mechanism units and joint project mechanism, obligations of plant operators and aircraft operators, method of monitoring and reporting of emissions. It defines the monitoring and verification criteria and data from emission reports, method of verification and quality assurance of data, method of disposing of emission units, method of disposing of the reserve of emission units, access to information, method of submitting data to the competent bodies of the EU and the method of public participation. Other regulations related to GHG emissions are **Regulation on the monitoring of greenhouse gas emissions, policies and measures for their reduction in the Republic of Croatia** (OG 87/12, 05/17) and **Regulation on the auctioning of greenhouse gas emission allowances** (OG 19/13). First Regulation

defines the list of GHG, method and methodology of monitoring GHG emissions, data on GHG emissions, deadlines for preparation and submission of reports to the Secretariat of UNFCCC and the European Commission, method of inventory (calculation) of GHG emissions, method of verifying reports, method and deadlines for their submission and the method of monitoring the fulfilment of the national annual quota. **Regulation on emission quotas for certain air pollutants in the Republic of Croatia** (OG 108/13, 19/17) prescribes certain pollutants in the air that cause adverse effects of acidification, eutrophication and photochemical pollution, their emission quota for a certain period in the Republic of Croatia and the method of preparing annual emission calculations. **Regulation on the quality of liquid petroleum fuels** (OG 113/13, 76/14, 56/15) prescribes the limit values of components and quality characteristics of liquid petroleum fuels, method of determining and monitoring the quality of liquid petroleum fuels, method of proving compliance, conditions for operation of laboratories for sampling and laboratory analysis of quality of liquid petroleum fuels, product labeling and method and deadlines for reporting on quality of liquid petroleum fuels. **Regulation on limit values for emissions of air pollutants from stationary sources** (OG 117/12, 90/14, 87/17) prescribes the limit values for emissions of air pollutants from stationary sources, monitoring and evaluation of emissions, entry of data on stationary sources using organic solvents or products containing volatile organic compounds in the REGVOC register (Register on installations using organic solvents or products containing volatile organic compounds) and method of reducing emissions of air pollutants. It also prescribes the manner and deadlines of submitting emission reports, method of informing the public, method of submitting data to the competent bodies of the EU and the level of permitted exceeding of the limit values for existing sources, for a certain period. **Regulation on substances that deplete the ozone layer and fluorinated greenhouse gases** (OG 90/14) prescribes the treatment of ozone-depleting substances and fluorinated GHG, treatment of devices and equipment containing or relying on these substances, treatment of these substances after cessation of use of devices and equipment containing them. It also prescribes the issues of checking the leakage of these substances, the amount of compensation to cover the costs of collection, recovery and destruction of these substances, the method of calculating the costs of collection, recovery and destruction of these substances, the method of marking devices and equipment containing or way of reporting on these substances. Two relevant regulations climate-related are **Regulation on Environmental Impact Assessment** (OG 61/14, 3/17) and **Regulation on air pollutant levels** (OG 117/12). Regulation on Environmental Impact Assessment determines the request and criteria for environmental impact assessment, the content of the study on environmental impact assessment, the method of participation of the authorized person, the manner of individual tests and criteria on the need to assess the impact of the project on the environment, the method of assessment. It prescribes a request for the issuance of an instruction on the content of the study on environmental impact assessment and the manner of issuing that instruction. Regulation on air pollutant levels prescribes limit and target values for individual air pollutants, long-term targets and target values for ground-level ozone in the air, and depending on the properties of the pollutant, upper and lower assessment thresholds. It also prescribes limits of tolerance, basic

components of the stated values, average exposure indicator, targeted reduction of exposure at the national level, concentration of exposure, critical levels, alert threshold, notification threshold and special human health protection measures taken at the time of their occurrence and deadlines for gradual reduction of tolerance limits and to achieve ground-level ozone targets.

In addition to climate-related regulations, two very important ordinances were enacted: **Ordinance on the monitoring of greenhouse gas emissions in the Republic of Croatia** (OG 134/12) and **Ordinance on the method of free allocation of emission allowances to installations** (OG 43/12, 89/20). The monitoring and reporting of GHG emissions are the basis for the evaluation, planning and monitoring of climate policy. Ordinance on the monitoring of GHG in the Republic of Croatia regulates the manner and conditions of implementation of EU regulations governing the monitoring of GHG emissions, while Ordinance on the method of free allocation of emission allowances to installations regulates the manner of submitting, processing and verification of reports and data on activities for free allocation of emission allowances and the manner of fulfilling the tasks of competent authorities. It also regulates the manner of submitting requests for free allocation of allowances data for free allocation of emission allowances, the manner of fulfilling the tasks of the competent authorities, the manner of submitting, processing and verifying reports on annual emissions and reports on reference data related to free allocation of emission allowances.

Decisions in regulating climate issues in Croatia are enacted in order to adopt some plans and reports which are developed on national level and accept the establishment of committees. By enacting the **Decision on the establishment of the Committee for Intersectoral Coordination for the National Greenhouse Gas Emissions Monitoring System** (OG 06/14) in 2014, a body for National Greenhouse Gas Emissions Monitoring System intersectoral coordination was established. The Committee for Intersectoral Coordination was established for the purpose of monitoring the preparation of reports on GHG emissions, including removals by effluents, giving opinions on those reports and participating in the review of those reports. In 2018 **Decision on the establishment of a Committee for cross-sectoral coordination for policies and measures for climate change mitigation and adaptation** (OG 09/18) was enacted. To be effective, climate change mitigation and adaptation activities needs to be mainstreamed across multiple sectors so the greater policy coherence is essential. For this purpose, **Committee for cross-sectoral coordination for policies and measures for climate change mitigation and adaptation** was established. The Committee for cross-sectoral coordination was established in order to monitor and evaluate the implementation and planning of policies and measures for climate change mitigation and adaptation in the Republic of Croatia.

After Croatian Parliament adopted **Act on Ratification on the Stockholm Convention on Persistent Organic Pollutants** (OG – International Agreements, 11/06) Republic of Croatia developed two National Plans for the Implementation of the Stockholm Convention on Persistent Organic Pollutants, first in 2008 and second in 2016. In order to adopt the second National Plan for the Implementation of the

Stockholm Convention on Persistent Organic Pollutants, **Decision on the adoption of the National Plan for the Implementation of the Stockholm Convention on Persistent Organic Pollutants** (OG 62/16) was enacted. Two another decisions important for regulating air are **Decision on the adoption of the Plan for the reduction of emissions of sulfur dioxide, nitrogen oxides and particulate matter in large combustion plants and gas turbines in the territory of the Republic of Croatia** (OG 151/08) which was enacted in 2008 and **Decision on the adoption of the Plan for the Protection of Air, the Ozone Layer and Climate Change Mitigation in the Republic of Croatia for the period from 2013 to 2017** (OG 139/13) enacted in 2013.

After Croatia became a part of UNFCCC in 1996, she is obligated to prepare and submit a national report on climate change every four years. By now Croatia prepared and submitted seven National Reports of the Republic of Croatia under the United Nations Framework Convention on Climate Change. **The Decision on the acceptance of the Seventh National Report of the Republic of Croatia under the United Nations Framework Convention on Climate Change** was enacted in 2018. One another decision was enacted in order to adopt the Plan for the use of financial resources obtained from the sale of emission allowances through auctions in the Republic of Croatia until 2020. This decision was enacted in 2018 and amended in 2019.

As was the case with laws and bylaws regulating the field of energy, the laws and related by-laws in the field of climate are aimed at transposing the EU legal framework for regulating climate issues into the legislation of the Republic of Croatia. As youngest MS of the EU, Croatia demonstrated a strong commitment to integrating climate change in its legal and policy frameworks by adopting acts and regulations and implementing relevant strategies and planes developed based on acts.

5.2. Strategic and planning documents

It can be said that climate policies in the Republic of Croatia are most often linked to certain climate and energy planning segments, and there is a lack of cross-sectoral and integrative climate-energy development planning. Croatia has been a country with an active policy when it comes to international commitments. Preceding the Paris Agreement, the country fulfilled its obligations under the Kyoto Protocol. This consisted of lowering GHG emissions by 5% over the period 2008–2012 when compared with the 1990 benchmark[8].

Two main strategies for regulating climate are Low carbon development strategy of the Republic of Croatia by 2030 with a view to 2050 and Climate change adaptation strategy in the Republic of Croatia for the period to 2040 with a view to 2070. with five-years action plans for their implementation. The Republic of Croatia started to prepare **The Low-carbon Development Strategy of the Republic of Croatia by 2030 with a view to 2050** (Low-carbon development strategy) in 2012 by developing a Framework for a low-carbon strategy. The draft version of the new Low-carbon development

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strategy was proposed in June 2017. The Low-carbon development strategy isn't officially enacted and after its enactment it should be renewed every five years. The Low-carbon development strategy is a multi-sectorial development strategy and a base for defining the actions in emission reduction by sectors in line with European strategic guidelines and UNFCCC commitments. Low-carbon development strategy provides a transition towards a low-carbon and competitive economy whose growth is based on sustainable development. The general objectives of the Low-carbon development strategy are:

- achieve sustainable development based on knowledge and a competitive economy with low carbon and resource efficiency;
- increasing security of energy supply, sustainability of energy supply, increasing energy availability and reducing energy dependence;
- solidarity by fulfilling the obligations of the Republic of Croatia under international agreements, and within the policy of the EU as part of our historical responsibility and contribution to global goals;
- reduction of air pollution and health effects.

The strategy opens up opportunities to encourage: investment cycle, growth of industrial production, the development of new business, competitiveness of the economy and creating jobs with a sustainable perspective. The final adoption of the Draft of the Low-carbon development strategy has been postponed in order to align it with the Energy Development Strategy. In order to fulfill Low-carbon development strategy goals, Croatia proposed **Action plan for the implementation of the Low Carbon Development Strategy of the Republic of Croatia**. The plan includes 97 measures (intersectoral measures: energy sector, industry, agriculture, waste management, etc.) and after its enaction it will be in force for five years period (2021.-2025). The plan provides: detailed description of measures, holders of all activities, structure and sources of financing of the measures, expected results, frame for implementation and completion of a certain measures; institutional framework for the implementation of the Low-carbon strategy, indicators of the implementation of the Low-carbon Strategy and sources of funding for Low-carbon strategy measures.

In 2015, Croatia proposed a **Draft version of Climate Change Adaptation Strategy in the Republic of Croatia for the period to 2040 with a view to 2070** (Adaptation strategy). The drafting of the Adaptation strategy was preceded by the creation of the Green Book, based on technical documents related to:

- climate modelling that resulted in climate projections for the Republic of Croatia to 2040 and 2070;
- analysis of climate change impacts and vulnerability to projected climate change;
- defining the initial program of measures that will be applicable in the process of adaptation to climate change;
- analysis of cost effectiveness of the measures;
- an assessment of the need to strengthen capacity to adapt to climate change.

The purpose of the Green Book was to encourage debate on all the important issues for adapting to climate change and launching a debate at the national level. After consultation with key stakeholders, this document has been developed, in which the conclusions of public debates have been incorporated. The Adaptation strategy was adopted in April 2020 and it is a fundamental and crucial document which establishes a framework for implementing all climate change adaptation measures at the national level in Croatia. The Adaptation strategy aims at:

- reducing the vulnerability of social and natural systems to negative effects of climate change;
- gathering all relevant institutional, political, economic and social stakeholders in order to create strong support for joint actions when implementing adaptation measures;
- integrating the adaptation process into existing and new policies, programmes, plans and other strategic activities carried out at national, regional and local levels of governing;
- implementing and promoting scientific research in all vulnerable sectors in order to reduce the degree of uncertainty associated with the effects of climate change significantly;
- raising the level of awareness of the importance of climate change and the inevitability of the adaptation process in decision-makers, in the public and in the wider circle of citizens, who are also the main beneficiaries of the positive effects of the process of adaptation to climate change.

Along with the Adaptation strategy, a Draft version of the **Action plan of Climate Change Adaptation Strategy in the Republic of Croatia for the period to 2040 with a view to 2070** for the first five years of implementation (2019 – 2023) has been created. The Adaptation strategy provides vision and guidelines for the development of climate change adaptation, while action plan contains priority measures derived from Adaptation strategy.

In a communication from the European Commission on **A Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy** of 25th February 2015, it has been noted that integrated management is needed to ensure that all energy-related activities at the EU, regional, national and local level contribute to the objectives of the EU.

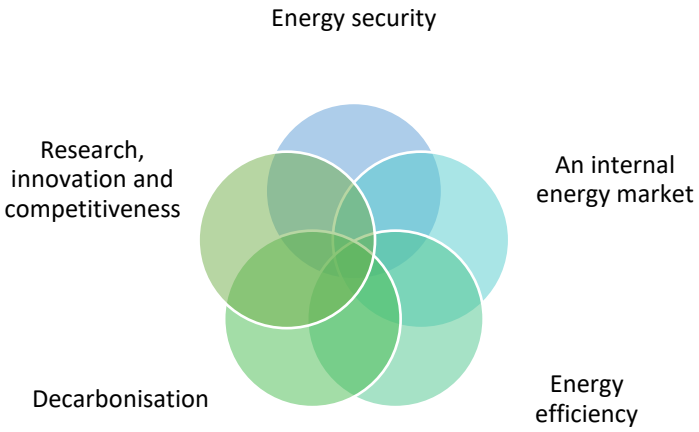

Figure 7 – Key dimensions of the Energy Union

In the addition to mentioned above, at the European Council on the Governance of the EU which was held on 26th November 2015 it was concluded that the energy and climate governance system should be based on the principles of integration of strategic planning and reporting on the implementation of climate and energy policy and on coordination between actors responsible for climate and energy policy, at EU, regional and national level. Accordingly, every MS has to developed integrated national energy and climate plan for a ten-year period. Croatia developed the first **Integrated National Energy and Climate Plan for the Republic of Croatia for the period 2021-2030 (Energy and climate plan)** in 2019. Energy and climate plan is based on existing national strategies and plans and provides an overview of the current energy system and the energy and climate policy. It also provides an overview of the national targets for each of the five key dimensions of the EU and the appropriate policies and measures to achieve those targets. In the Energy and climate plan, particular attention is paid to the targets to be achieved by 2030, which include the reduction in GHG emissions, energy from renewable sources, EE and electricity interconnection.

As it was already stated many times, the energy and climate planning process should be implemented also on local level since by engaging the local and regional level and taking stock of the situation, knowledge and expertise developed on the ground, is essential to ensure that MS reach their objectives. When we talk about local level climate planning it is important to mention **Sustainable Energy and Climate Action Plans** (SECAP) which plays a key role in adaptation to climate change at local level. SECAP is the key document that shows how signatories of Covenant of Mayors on Climate and Energy will reach its commitments by 2030 and defines concrete measures for both climate mitigation and adaptation, with timeframes and assigned responsibilities, translating the long-term strategy into action. A large number of Croatian local government units joined the initiative Covenant of Mayors for Climate and Energy and developed SECAPs for their administrative area. The development of SECAPs contributes to the energy transition which has long become a reality all over the world. The energy transition has become a global phenomenon affecting energy supply structures and the way citizens and companies can contribute to rapid decarbonization. The power sector is leading the way through the transition as solar

and wind power increasingly replace coal, natural gas, and nuclear energy as the world's main energy sources.

5.3. Other specific regulations

Other specific regulations regulating climate issues are programmes, guidelines and other relevant plans.

According to Air Protection Act (OG 130/11, 47/14, 61/17, 127/19) local government units have to develop a **Climate change mitigation and adaptation and ozone protection programs as a part of environmental protection program** in order to contribute to the process of climate planning. It includes the list of measures for air and ozone protection, climate change mitigation measures and climate change adaptation measures with certain priorities, deadlines and key stakeholders.

Since the climate change is connected with the GHG emissions it is important to mention the **Plan for the allocation of greenhouse gas emission allowances in the Republic of Croatia** (OG 76/09). This Plan includes the following:

- the total amount of emission allowances allocated to the state within a certain period,
- data on previous GHG emissions,
- list of activities emitting GHG emissions,
- annual emission quotas allocated to the installation,
- method of allocating GHG emission allowances to plant operators,
- estimation of future GHG emissions,
- determination of emission allowance reserves for new installations,
- manner of using the Kyoto Protocol mechanisms,
- deadline for allocation of emission allowances for installations.

Another planning document that defines targets, priorities and measures for the reduction of GHG emissions for each five-year period, and the manner, order, deadlines and obligations of the implementation of the measures is the **Plan for the protection of air ozone layer and mitigation of climate change in the Republic of Croatia for the planned period from 2018 to 2020**[9]. The measures provided in this Plan ensure the implementation of Croatian regulations as well as the European acquis that has been transposed into the legislation of the Republic of Croatia in the field of air, ozone layer and climate change mitigation.

One another relevant document is **Program for the gradual reduction of emissions for certain pollutants in the Republic of Croatia for the period until the end of 2010, with emission projections for the period from 2010 to 2020** (OG 152/09) which was developed in 2009. After Croatia entered in EU, she had to prepare a new **Program of gradual reduction of emissions for certain pollutants in the Republic of Croatia with emission projections until 2020, 2025 and 2030 with a view to 2050**. The main purpose of the program is to determinate appropriate

[9] [7]

objectives and measures by sectors of air impact (transport, industry, general consumption and related subsectors), priorities for implementation of measures, deadlines, actors responsible for implementation of measures, funds and use of funds for implementation of the program according to priority measures. The program sets out measures that should be applied over a four-year period to avoid, reduce and/or eliminate negative, most commonly anthropogenic, impacts on air quality, the ozone layer and climate change, and to mitigate the negative effects that climate change can cause.

Other regulations which should be mentioned are the guidelines. Guidelines aren't actually legal documents but they are usually developed in order to provide specific instructions. For climate field the most relevant guidelines are Guidelines for the inclusion of climate change and biodiversity in environmental impact assessments and Guidelines for project managers: How to increase the resilience of vulnerable investments to climate change.

The need for climate change action and biodiversity loss is recognized throughout Europe and around the world. In order to make progress in combating and adapting to climate change and to stop biodiversity loss and ecosystem degradation, it is necessary to fully integrate these issues into EU-wide plans, programs and projects. Accordingly, the main goal of **Guidelines for the inclusion of climate change and biodiversity in environmental impact assessments** is to help MS improve the way in which climate change and biodiversity are included in environmental impact assessments (EIAs) and carried out across the EU.

The main objective of the **Guidelines for project managers: How to increase the resilience of vulnerable investments to climate change** is to assist project managers and infrastructure development project developers in integrating existing climate variability and future climate change into their projects, infrastructure development and tangible assets. The purpose of the guidelines is to help project developers identify steps they can take to strengthen the resilience of investment projects to climate variability and climate change. The guidelines contain information on how to integrate climate change resilience issues into known project life cycle assessment methods used by project developers. These two guidelines are documents developed by European Commission who strongly recommends the application of these guidelines in projects and environment impact assessments developed in EU and beyond. The guidelines fall in the context of climate change policy development identified by the Commission with a view to integrating climate change resilience into a range of policy and instrumental areas for financing infrastructure development and tangible assets.

5.4. Conclusions

Climate change is a serious environmental, security and socio-political challenge. Its impact is already visible at national, regional and local level throughout Europe and beyond. Tackling this challenge requires urgent action, with the engagement of local governments and communities needed.

Before joining the EU, Croatia needed to adopt various legislative mechanisms and policy frameworks necessary to align the country goals with EU environmental standards and climate change. The country has therefore taken multiple steps at international, national and regional levels to change laws and acts, sign treaties and implement conventions that support the global fight against climate change. Accordingly, Croatia pledged to cut 80–95% of greenhouse gas emissions by 2050 compared with a 1990 baseline[10].

Being the youngest member state of the EU, Croatia demonstrated a strong commitment to integrating climate change in its legal and policy frameworks by adopting and implementing relevant acts, strategic and planning documents and other relevant regulations. However, more needs to be done for Croatia to become a more climate-resilient country and enhance its preparedness and capacity to respond to the impacts of climate change at local, regional and national level. The first step to accomplish this would be to adopt The Low-carbon Development Strategy of the Republic of Croatia by 2030 with a view to 2050.

Additionally, to address climate vulnerability effectively, Croatia must improve coordination among the different actors, beginning with stronger climate change discussion among its ministries. Climate change needs to extend beyond the framework of environmental legislation and become an active element in aiding understanding of the causal relationships within the Croatian socio-economic context.

Finally, it can be concluded that the most effective actions are those who combine holistic, integrated and long-term approach, addressing both climate change mitigation and adaptation, based on citizen, stakeholders and local governments involvement. The climate actions on local government level means addressing different sectors, from buildings to waste, but also involving the industry and business sectors. Local governments, together with other actors, play an essential role in this regard: creating a vision for the community, developing relevant strategies, implementing effective policies and rolling out actions. They lead citizens, act in an exemplary manner, and improve energy use in services.

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6. Overall conclusions and recommendations

After conducting this extensive analysis, it is possible to conclude that the Croatian legislative system in the field of energy and climate is mainly based on the European energy and climate policy. In the period from 2014 till 2018, the governments of Europe and representatives of the European Parliament adopted a comprehensive set of EU laws setting new, legally binding targets for climate and energy policy in Europe in a 2030 perspective which aim is to have a clean, affordable and reliable energy system in Europe. Accordingly, by 2030, the MS of the EU will:

- reduce their GHG emissions by 40% compared to 1990 levels;
- increase the EE of their economies by 32.5% compared to a 2007 baseline;
- increase the share of renewable energies in final energy consumption from roughly to 32% in 2030.

Furthermore, in 2018 the EC laid the analytical foundation for the development of an EU Long Term Strategy for climate and energy policy and a political vision for achieving a Net-zero economy by 2050. Simply put, these headline commitments for 2030, the expected goals for 2050 and the new legal framework mean that Europe is moving towards a clean energy transition based on an efficient use of energy and a progressive decarbonization of the energy supply. Accordingly, all MS of the EU have started to adapt their existing national regulations in order to be in line with the European energy and climate targets.

Since the energy sector is a key contributor to climate change it was necessary to integrate energy and climate policies in order to reduce the energy sector's contributions to GHG emissions and shore up its resilience to the impacts of climate change. In order to ensure this integration, European Parliament enacted **Regulation (EU) 2018/1999 on the Governance of the Energy Union and Climate Action**. This Regulation sets out the necessary legislative foundation for reliable, inclusive, cost-efficient, transparent and predictable governance of the EU and Climate Action (governance mechanism), which ensures the achievement of the 2030 and long-term objectives and targets of the EU in line with the 2015 Paris Agreement on climate change through complementary, coherent and ambitious efforts by the EU and its MS. The governance mechanism is based on integrated national energy and climate plans (NECPs) covering ten-year periods starting from 2021 to 2030, EU and national long-term strategies, as well as integrated reporting, monitoring and data publication. Croatia submitted their Integrated National Energy and Climate Plan for the period 2021 - 2030. The key objectives outlined in this plan are the reduction in GHG emissions for the Republic of Croatia for the year 2030, the share of RES in the gross final energy consumption and energy efficiency, expressed as consumption of primary energy and direct consumption of energy.

While analyzing the Croatian legal framework relating energy and climate it could be concluded that energy and climate policy of the Republic of Croatia is focused on EU goals in terms of reducing GHG emissions, increasing the share of RES, EE, security and quality of supply and developing the EU internal energy market, as well as available resources, energy infrastructure and competitiveness.

The main acts and strategies for regulating energy planning and climate change mitigation and adaptation activities in Croatia identified and analyzed within the document are: Energy Act, Energy Efficiency Act, Renewable Energy Sources and High Efficiency Cogeneration Act, Air Protection Act, Climate Change and Protection of the Ozone Layer Act, Energy Development Strategy of Republic of Croatia until 2030, Low-carbon Development Strategy of Republic of Croatia until 2030 and Adaptation to Climate Change Strategy of Republic of Croatia for the period until 2040. In order to regulate special provisions of the acts in the field of climate and energy, additional bylaws (regulations, ordinances, decisions, rules, etc.) and other strategic and planning documents were adopted. Unlike acts and bylaws, which are more focused on the harmonization with European directives and regulations in the field of climate and energy into Croatian national legislation, strategies and plans are implementing documents that define the methods of energy and climate planning and management with defined deadlines and holders of individual activities for longer time periods. They are crucial elements in defining the national development potentials, basic principles and criteria for determining goals and priorities in considering long-term transformation towards sustainable development. Since integration of energy and climate policy in Croatia is mainly focused in reducing GHG emissions in all sectors, it is important to ensure the transformation of the energy sector into the sector of low GHG emissions where all sectors of energy production and consumption will participate, as well as the systems that transmit and supply energy and fuels to customers. In their transformation, energy systems must continue to fulfill their basic purpose, which is the secure supply of energy to all customers, at affordable prices and with minimal impact on the environment.

The development of future Croatian energy and climate policy should be focused on achieving sustainable development based on knowledge and a competitive economy with low carbon and resource efficiency, increasing security of energy supply, sustainability of energy supply, increasing energy availability and reducing energy dependence. It should be focused in ensuring solidarity by fulfilling the obligations of the Republic of Croatia under international agreements, within the policy of the EU, as part of our historical responsibility and contribution to global goals and reduction of air pollution and health effects. As regards to energy and climate planning it is crucial to achieve it at all levels, from local, regional and national in order to achieve ambitious EU energy and climate targets. Energy and climate planning and management are the most challenging tasks with whom local and regional governments are facing nowadays. Although the national legal framework stipulates that local and regional government units adopt certain planning documents in which they define their energy and climate policy, it is important that they are aware of the importance of energy and climate planning in order to achieve national goals in terms of reducing GHG emissions. It is important not only to invest in the implementation of EE, RES and climate change mitigation measures defined in these documents, but also to get involved in additional initiatives such as the Covenant of Mayors for Climate and Energy to further contribute to the ambitious energy and climate goals and thus increase the quality of life and standard of the citizens in their administrative area.

In order to provide support to local government units in launching and implementing energy and climate related projects in their administrative area, national authorities

should make sure their cities and municipalities have the right human resources, legal competences, technical expertise and financial leverage to usher in new forms of governance models in the energy system. By setting a high level target for local energy ownership of renewable energy capacity, they will ensure that the corresponding framework is put in place. National Energy and Climate Plans in the future should provide the perfect opportunity to plan future energy scenarios with due consideration of all local movements, i.e., energy and climate related projects and in cooperation with them.

Also, national authorities should develop relevant professional handbooks and guidelines which local governments can use to develop robust climate and energy programs that incorporate complementary energy and climate strategies. For example, local governments can combine efforts to improve energy efficiency in local government operations with energy-efficient product procurement, combined heat and power, on-site renewable energy generation and green power procurement to help achieve additional economic, environmental, and social benefits. Local governments can also reduce their own transportation-related energy use and GHG emissions by implementing transportation control measures.

In order to develop a quality methodology on strategic planning in the field of energy and climate, it is important to have an insight in current legal framework in regulating energy and climate. Precisely this analysis, together with the analysis that will be conducted by the project partner from Hungary (analysis of strategic and planning documents regarding energy and climate with energy and climate planning and management modes in Hungary) will be used as basis for development of the joint methodology on strategic planning in the field of energy and climate. The joint methodology will have a cross-border character which means it will be applicable in the HU-HR cross-border area. The methodology on strategic planning in the field of energy and climate should include all the principles of quality strategic planning and it should enable the development of relevant strategic energy and climate plans in the given time framework and in accordance with EU and national energy and climate targets. It also should allow a high degree of participation and involvement of a wide range of relevant actors in the strategic process and provide a step-by-step process that local and regional government units may wish to use as a road map for discussion and decisions related to strategic energy and climate planning and project prioritization.

Due to the complexity of the process itself, climate and energy planning requires a strategic approach since it deals with public, non-profit and private sector and requires stakeholders buy-in to long-term vision, political commitment to mobilize authority and resources and identification of energy usage and future needs[11].

[11] [9]

7. References

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