

**PRO-ENERGY**  
**“Promoting Energy Efficiency in Public Buildings  
of the Balkan-Mediterranean Territory”**

**WP3:** Joint Regional Analysis, Strategy and Framework”

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## 1. Region of Epirus and Regional Unit of Thesprotia: General Information

### 1.1 Information About Region

Epirus is one of the thirteen administrative regions of Greece. The region is a traditional geographic and modern administrative region in northwestern Greece. To the south it borders the region of West Greece, to the west the Ionian Islands, to the east the regions of Western Macedonia and Thessaly and to the north, Albania.

Figure 1: Region of Epirus



The Region covers a total area of 9,203.22 km<sup>2</sup> and it is divided into four regional units, namely those of Thesprotia, Ioannina, Arta and Preveza. Its capital and largest city is Ioannina, where nearly one third of the population lives. Additional main urban centers include the cities of Arta, Preveza and Igoumenitsa.

According to the census conducted in 2011 by the Hellenic Statistic Authority, the total population amounts to approx. 336,856 people.

The Region's Gross domestic product (GDP) was 4.1 billion € in 2018, accounting for 2.2% of the Greek economic output. GDP per capita adjusted for purchasing power was 14,700 € or 49% of the EU27 average in the same year. The GDP per employee was 63% of the EU average. Epirus is the region in Greece with the third lowest GDP per capita and one of the poorest regions in the EU.

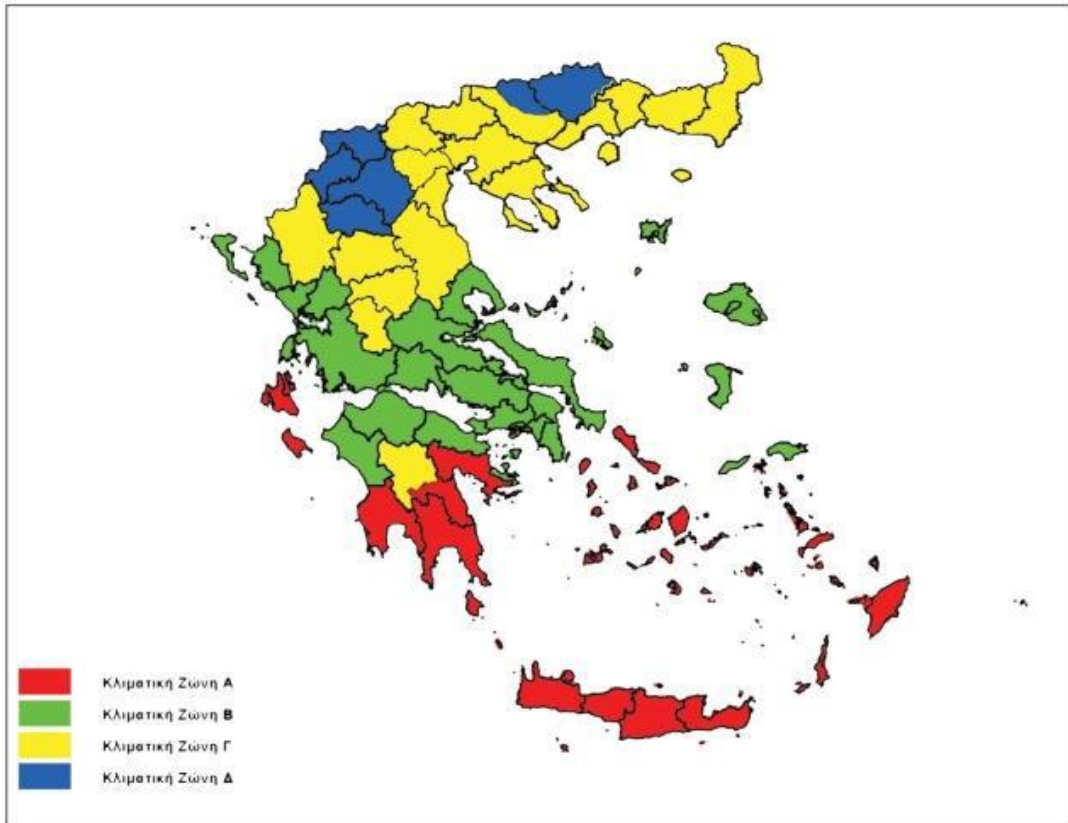
The Regional Unit of Thesprotia covers a total area of 1,515 km<sup>2</sup> and its total population equals to 43,587 citizens, according to the census conducted in 2011 by the Hellenic Statistic Authority. It includes three (3) municipalities, namely Igoumenitsa, Filiates and Souli.

## 1.2 Climate and Temperature Area

According to the Energy Efficiency Regulation of Buildings - KENAK, the Greek territory is divided into four climatic zones, based on the degree of heating days, with zone A being the warmest and D the coldest.

As shown in the next picture, the Region of Epirus belongs to climatic zones B and C. The Regional Units of Thesprotia, Arta and Preveza belong to climatic zone B while the Regional Unit of Ioannina belongs to C.

**Figure 2: Climate Zones in Greece**



Source: KENAK

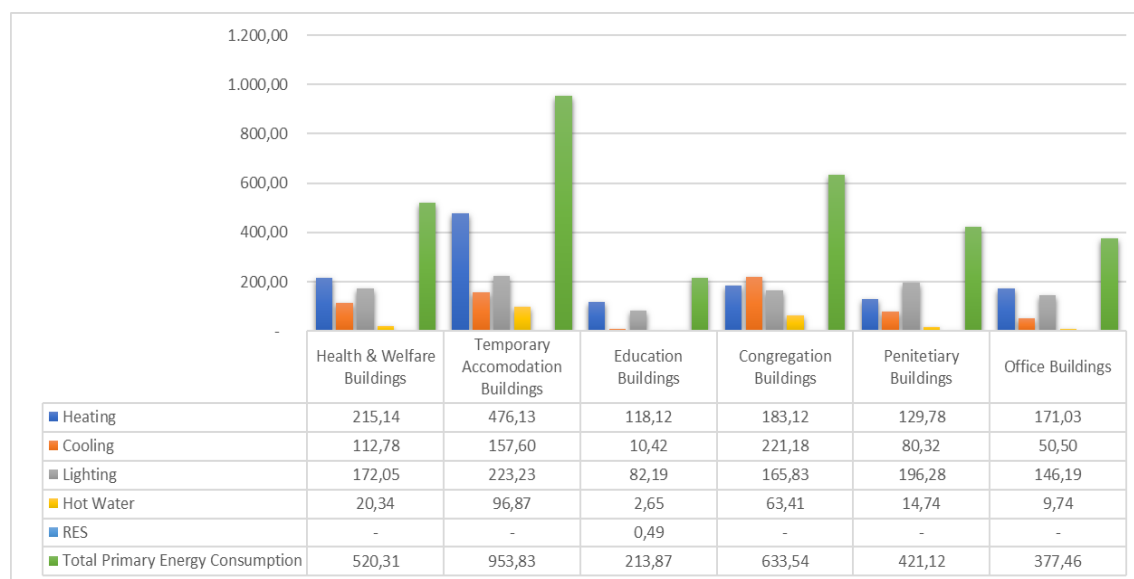
The climate of Epirus Region is mainly alpine. The Region as a whole is rugged and mountainous. However, there is a differentiation of climate conditions among regional units. Cold winters of a semi-alpine climate dominate the eastern part and higher elevations, while the Region's capital city (Ioannina) suffers from heavy rainfall during the whole year. On the other hand, the coastal areas have a mild Mediterranean climate and milder winters and temperatures that rarely drop below zero, while in the summer they reach quite high temperatures with rare rainfall.

As long as the Regional Unit of Thesprotia is concerned, on the coast and in the lowland zone the climate is Mediterranean, with mild winters and warm summers, while in the semi-mountainous and mountainous hinterland the climate renders to continental.

### 1.3 Statistical Data about Energy Efficiency in Public Buildings

The following figure presents the average primary energy consumption (kWh/m<sup>2</sup>) in public buildings in the Region of Epirus for the period 2011-2019.

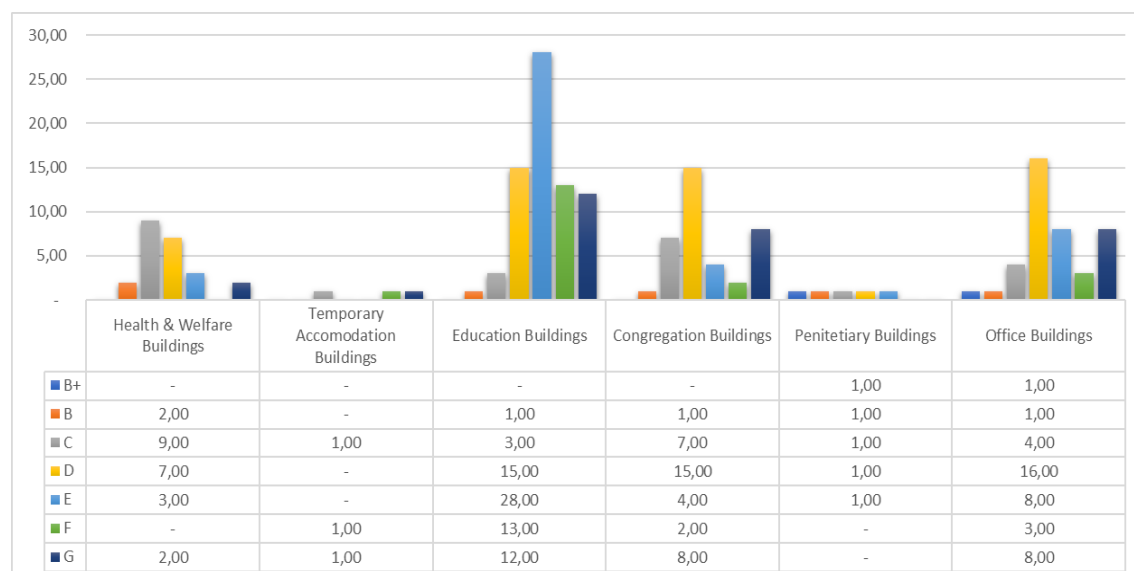
**Figure 3: Average Primary Energy Consumption per purpose - Public Buildings/Region of Epirus (kWh/m<sup>2</sup>)**



Source: Ministry of Environment & Energy

When it comes to public buildings' classification according to their energy efficiency score (as per the energy performance certificate's scale) the current state of play regarding the Region of Epirus is presented to Figure 4.

**Figure 4: Energy Performance Certificates per Use and Class - Public Buildings/Region of Epirus (kWh/m<sup>2</sup>)**



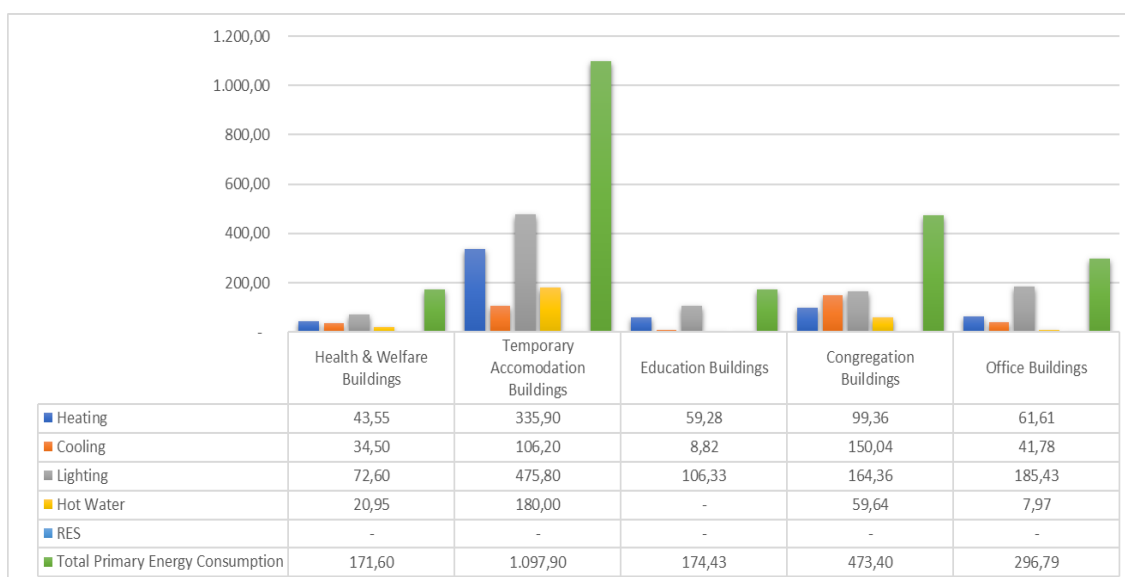
Source: Ministry of Environment & Energy

The data are referring to the Energy Performance Certificates that have been issued for Public Sector Buildings.

It is more than obvious that the Region's performance concerning public buildings' energy efficiency is rather poor, as more than half of them belongs to Categories D and E, while none has achieved an A/A+ Grade.

As long as the Regional Unit of Thesprotia is concerned, primary energy consumption (kWh/m<sup>2</sup>) in public buildings is presented to Figure 5.

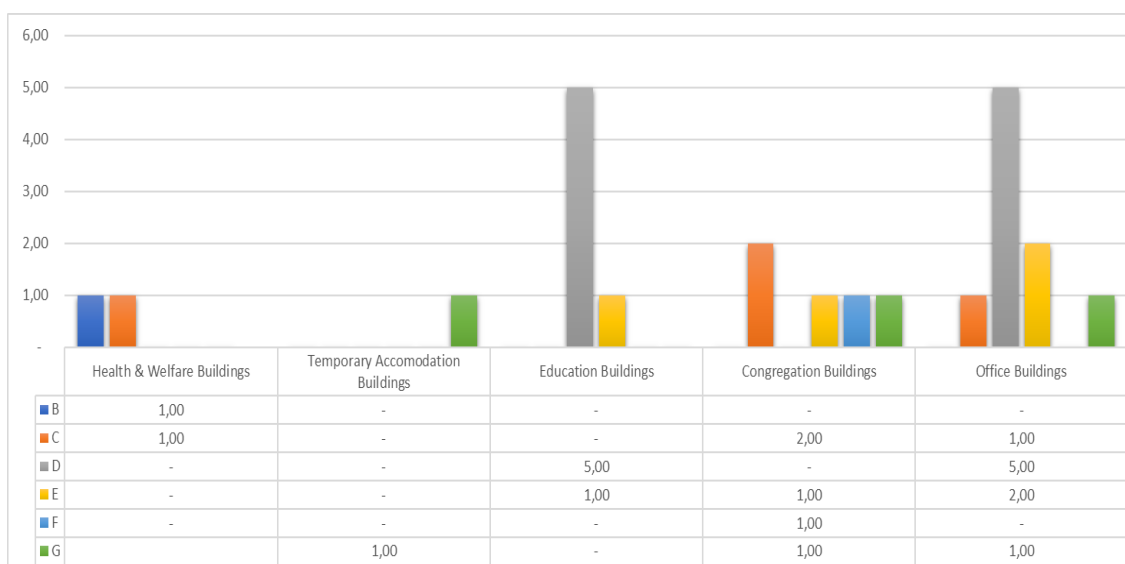
**Figure 5: Average Primary Energy Consumption per purpose - Public Buildings/Regional Unit of Thesprotia (kWh/m<sup>2</sup>)**



Source: Ministry of Environment & Energy

When it comes to public buildings classification according to their energy efficiency score (as per the energy performance certificate scale) the current state of play regarding the Regional Unit of Thesprotia is presented to Figure 6.

**Figure 6: Energy Performance Certificates per Use and Class - Public Buildings/Regional Unit of Thesprotia (kWh/m<sup>2</sup>)**



Source: Ministry of Environment & Energy

The data are referring to the Energy Performance Certificates that have been issued for Public Sector Buildings.

The Regional Unit's performance concerning buildings' energy efficiency is poor, as the majority (14 buildings) belongs to Class D and E, while no public buildings have achieved an A/A+ Grade.

## 1.4 Renewable Energy Sources

According to National Energy and Climate Plan (NECP), published in December 2019, Greece has set a core objective for achieving a RES share of at least 35% in in gross final energy consumption by 2030.

Moreover, there are additional targets for the RES share in gross final electricity consumption to reach at least 60%, the RES share in covering heating and cooling needs to exceed 40% and the RES share in the transport sector to exceed 14% in line with the relevant EU calculation methodology.

Apparently, the key pillar for attaining the core objective is the RES share in electricity consumption, and therefore this sub-sector is the main policy priority, thus posing the highest demand for the timely and efficient implementation of the measures planned. Attaining this objective requires a sharp increase in RES installed capacity for power generation (approx. 7,000 MW in September 2020), which is expected to more than double for most of the relevant technologies.

Furthermore, a specific objective has been set for promoting RES systems in buildings and dispersed generation systems, through auto production and net metering schemes. More specifically, a forecast has been made for having such RES power generation systems in operation with an installed capacity of 1 GW, capable of covering the average electricity consumption of at least 330,000 Greek households, by 2030. NECP acknowledges as a challenge the gradual expansion of net-metering schemes in Greece and the attainment of higher-than-today growth rates.

Regarding the penetration and the share of RES to meet thermal needs in final consumption, it is expected that there will be a significant increase in the role of heat pumps, especially in the tertiary sector, an increased share of thermal solar systems and geothermal energy, as well as a steady contribution of biomass (NCEP sets a target for approx. 2.5 GW of installed capacity for all the three aforementioned types' contribution to meet thermal needs in final consumption by 2030).

As long as the Region of Epirus is concerned, the total installed RES capacity, as per September 2020, is presented to the following table.

**Table 1: RES Installed Capacity – Region of Epirus**

RES Type	Installed Capacity (MW)
Wind Farms	619
Small Hydro Power Plants	47
Biomass/Biogas	4
PVs	180
<b>Total</b>	<b>849</b>

Source: DAPEEP/RES info note Sep-20



## 1.5 Energy Performance Certificate

According to the Buildings' Energy Efficiency Regulation (KENAK – Government Gazette B'/2367/12.07.2017) and Law 4122/2013 (as in place), Energy Performance Certificate includes:

- Energy efficiency data for the building or the building unit, as well as a series of benchmarks concerning minimum energy efficiency requirements, in order to allow the owners or the tenants of the building to compare and evaluate its energy efficiency score. The energy efficiency categories' breakdown is A +, A, B +, B, C, D, E, F and G.
- Additional information, such as general building details, estimated annual total primary energy consumption of the very building vs a benchmark building of reference, the actual annual energy consumption of the building or building unit, the percentage of participation of RES produced in the total energy consumption, estimated and actual annual carbon dioxide emissions (kg/m<sup>2</sup>) and the results of the assessment conducted by the energy inspector regarding the quality of the building's internal environment.
- Financially affordable recommendations for improving the energy efficiency of the building or the building unit, unless there is not a reasonable possibility of upgrading its characteristics compared to the applicable requirements for energy efficiency.

When it comes to public sector, energy performance certificate is mandatory for all public sector buildings of more than 250 m<sup>2</sup> total floor surface, in which regular interaction with the general public takes place. It is mandatory for the Energy Performance Certificates of public buildings to be posted in public view.

For the year 2019, 780 energy performance certificates were issued for public sector buildings in Greece (0.25% of the total amount of certificates issued), that cover a total surface of 665,988 m<sup>2</sup>. Most of them (47.82%) are classified in energy category C-D, 43.21% in energy category E-G and only a 8.97% in A-B.

It has been recorded that for the year 2019, indoor swimming pools (average annual primary energy consumption of 3,598 kWh/m<sup>2</sup>), indoor gyms (1,107 kWh/m<sup>2</sup>) and institutions (1,002 kWh/m<sup>2</sup>) constitute the most energy consuming public sector buildings. In public sector buildings, the largest amount of energy consumed refers to covering need related to heating purposes (average annual consumption of primary energy in heating equal to 159 kWh/m<sup>2</sup>) and to lighting (118 kWh/m<sup>2</sup>).

According to the sum of energy performance certificates that have been issued between the years 2011-2019, almost half of the public sector buildings (49.51%) are classified in energy categories C-D, while the largest part of total annual energy consumption is related to heating (131 kWh/m<sup>2</sup>) and lighting (113 kWh/m<sup>2</sup>) purposes. In addition, the most energy-intensive public service buildings are the penitentiaries (average annual primary energy consumption equal to 652 kWh/m<sup>2</sup>) and the buildings used for temporary accommodation purposes 781 kWh/m<sup>2</sup>).

## 2. Stakeholders in the Region of Epirus and in the Regional Unit of Thesprotia Relevant to Energy Efficiency of Public Buildings

Identification and participation of stakeholders is of vital importance for the successful implementation of a long-term strategy for the energy renovation of buildings. The following figure shows the key factors involved in the decision-making process for the renovation of a building.

Figure 7: Key factors involved in the decision-making process for the renovation of buildings



According to the “National Report on long-term strategy for mobilizing investment in the renovation of the national stock of residential and commercial buildings, both public and private”, there is a number of ministries, public bodies and institutions which are directly or indirectly associated with the energy upgrade of buildings in Greece (in terms of policy measures, financial tools, technical assistance, market monitoring etc.).

By applying the LFA’s (Logical Framework Approach) methodological tool of stakeholders’ matrix, the stakeholders relevant to energy efficiency of public buildings in the Region of Epirus and the Regional Unit of Thesprotia are presented to the following table.

Table 2: Stakeholders’ Matrix

Stakeholder Category & Key Features	Interests and how they are affected by the project	Opportunities & Incentives for Change	Possible Actions
<b>Central Government Bodies</b> <ul style="list-style-type: none"> <li>Ministry of Environment and Energy</li> <li>Ministry of Transport and Infrastructures</li> <li>Ministry of Finance</li> <li>Ministry of the Interior</li> </ul>	<ul style="list-style-type: none"> <li>Develop energy policies and interventions</li> <li>Manage / implement / coordinate Sectoral and Regional Operational Programs of the NSRF that include</li> </ul>	<ul style="list-style-type: none"> <li>Political influence</li> <li>Decision-making power</li> <li>Financial resources</li> </ul>	<ul style="list-style-type: none"> <li>Increasing their information through conferences, public consultations, bilateral meetings, etc.</li> <li>Mobilizing representatives/ associations of citizens and</li> </ul>

<ul style="list-style-type: none"> <li>• Ministry of Development and Investments</li> <li>• Ministry of Education and Religious Affairs</li> <li>• Ministry of Health</li> </ul>	<p><b>actions related to energy</b></p>		<p><b>corporations to influence them</b></p>
<p><b>Regional and Municipal Authorities</b></p> <ul style="list-style-type: none"> <li>• Region of Epirus</li> <li>• Decentralized Administration of Epirus and Western Macedonia</li> <li>• Regional Unit of Thesprotia</li> <li>• Municipalities of Thesprotia Regional Unit</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Develop energy policies and interventions</b></li> <li>• <b>Own and manage public sector buildings</b></li> <li>• <b>Manage / implement / coordinate Regional Operational Programs of the NSRF that include actions related to energy</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Political influence</b></li> <li>• <b>Decision-making power</b></li> <li>• <b>Financial resources</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Increasing their information through conferences, public consultations, bilateral meetings, etc.</b></li> <li>• <b>Mobilizing representatives/ associations of citizens and corporations to influence them</b></li> </ul>
<p><b>Public Companies</b></p> <ul style="list-style-type: none"> <li>• Hellenic Public Properties Company (HPPC) S.A.</li> <li>• Building Infrastructures (KTYP) S.A.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Own and manage public sector buildings</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Decision-making power</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Increasing their information through conferences, public consultations, bilateral meetings, etc.</b></li> <li>• <b>Mobilizing representatives/ associations of citizens and corporations to influence them</b></li> </ul>
<p><b>Institutions</b></p> <ul style="list-style-type: none"> <li>• Technical Chamber of Greece</li> <li>• Centre for Renewable Energy Sources</li> <li>• Research Institutions (e.g. National Observatory of Athens)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Develop energy policies and interventions</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Technical Guidance/assistance</b></li> <li>• <b>Decision-making power</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Increasing their information through conferences, public consultations, bilateral meetings, etc.</b></li> <li>• <b>Mobilizing representatives/ associations of</b></li> </ul>

<ul style="list-style-type: none"> <li>• Academic Institutions (e.g. University of Ioannina, Technological Educational Institute of Epirus)</li> </ul>			<p><b>citizens to influence them</b></p>
<p><b>Associations</b></p> <ul style="list-style-type: none"> <li>• Associations of real estate owners (e.g. Hellenic Property Federation)</li> <li>• Associations of property developers (e.g. Federation of Property Developers and Construction Companies)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Building owners</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Decision-making power</b></li> <li>• <b>Technical Guidance/assistance</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Increasing their information through conferences, public consultations, bilateral meetings, etc.</b></li> <li>• <b>Mobilizing representatives/ associations of citizens and corporations to influence them</b></li> </ul>
<p><b>Environmental NGOs</b></p> <ul style="list-style-type: none"> <li>• Greenpeace</li> <li>• WWF</li> <li>• INZEB</li> <li>• Hellenic Passive House Institute</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Develop energy policies and interventions</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Technical Guidance/assistance</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Increasing their information through conferences, public consultations, bilateral meetings, etc.</b></li> <li>• <b>Mobilizing representatives/ associations of citizens to influence them</b></li> </ul>
<p><b>Private Entities</b></p> <ul style="list-style-type: none"> <li>• Energy Service Companies (ESCOs)</li> <li>• Banks and Financial Institutions</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Implement energy efficiency interventions</b></li> <li>• <b>Funding resources</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Financial Resources</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Increasing their information through conferences, public consultations, bilateral meetings, etc.</b></li> </ul>

### 3. Analysis of Energy Efficiency Investments in the area, mapping of policies, interventions and initiatives

#### 3.1 Investments of Energy Efficiency

The National Strategic Reference Framework 2014-2020 (NSRF) constitutes the main strategic plan for growth in Greece, involving the contribution of significant resources originating from the European Structural and Investment Funds (ESIF) of the European Union. The NSRF 2014-2020, through its implementation, seeks to tackle a series of structural weaknesses in Greece as well as other economic and social problems caused by the long year financial crisis. Moreover, it is called upon to help attain the national targets under the prism of the Europe 2020 Strategy.

Within this framework, the Region of Epirus has conducted its Operational Program for the period 2014-2020, with a total budget of approx. € 337.1 mn. The latter foresees both as a Strategic Target and as a Priority Axis (PA 2) the “Environmental Protection and Sustainable Development” and as a Thematic Objective (TO 4) “To support the shift towards a low carbon economy in all sectors”. The total budget of PA2 amounts to € 132.2 mn. Moreover, the Program sets as an Investment Priority (IP 4c) the “Support for energy efficiency, smart energy management and the use of renewable energy sources in public infrastructure, including public buildings, and in the housing sector”.

According to the latest available data, occurring from the ANAPTYXI.gov.gr, which is the official website of the Ministry of Economy and Investments that provides detailed information on the progress of the implementation of the NSRF 2014-2020, a total budget of approx. € 166 mn. (occurring from the sum of NSRF operational -regional and sectoral - programs) refers to projects in the Region of Epirus under the thematic target of “Supporting the shift towards a low carbon economy in all sectors”, out of which approx. € 2.9 mn. refer to enhancing energy infrastructure in the Regional Unit of Thesprotia. The state of play of the currently approved/contracted projects and grants for the Region of Epirus is presented to the following table.

**Table 3: NSRF Projects/Grants (Thematic Objective “Eco-economy”) - Region of Epirus**

	Title	Beneficiary	Budget
5049255	Upgrading Buildings and Improving Energy Efficiency in the Home Building Industry - Second Cycle	HELLENIC DEVELOPMENT BANK S. A.	25,000,000 €
5027228	Upgrading buildings and improving energy efficiency in the residential building sector	HELLENIC DEVELOPMENT BANK S. A.	4,500,000 €
5032929	Actions for upgrading the energy efficiency of the University Hospital of Ioannina	UNIVERSITY HOSPITAL OF IOANNINA	4,436,904 €
5045467	Energy performance improvement of building complex of 1st Secondary - 1st High School of Igoumenitsa	MUNICIPALITY OF IGouMENITSA	1,753,157 €
5029524	Energy Upgrading of the Sports Hall in the 1st Lyceum of the Municipality of Preveza	MUNICIPALITY OF PREVEZA	1,658,693 €
5052248	LED LIGHT INSTALLATION IN THE CITY OF ARTA	MUNICIPALITY OF ARTEON	1,523,000 €
5029516	Energy upgrading interventions at the PEAKI indoor swimming center of Ioannina	GENERAL SECRETARIAT OF SPORTS	1,460,395 €
5050490	New energy efficient vehicles in the municipality of Preveza	MUNICIPALITY OF PREVEZA	1,000,680 €
5052624	New energy efficient vehicles in municipality of Igoumenitsa	MUNICIPALITY OF IGouMENITSA	999,998 €
5050123	Vehicles replacement with new energy efficient and low-emission ones in the municipality of Ioannina	MUNICIPALITY OF IOANNINA	999,892 €
5029554	Energy Upgrade of the Municipal Swimming Center of Arta	MUNICIPALITY OF ARTEON	998,820 €
5052654	SUPPLY OF MUNICIPAL ENERGY EFFICIENT VEHICLES	MUNICIPALITY OF ARTEON	985,800 €
5047142	Building upgrade and energy efficiency improvement of public buildings in the municipality of Arta - PHASE A'	MUNICIPALITY OF ARTEON	960,000 €
5047063	ENERGY UPGRADE OF THE SCHOOL BUILDINGS IN THE MUNICIPALITY OF ZITSA	MUNICIPALITY OF ZITSA	950,000 €
5050501	INTEGRATED INTERVENTION ON THE INFRASTRUCTURE OF TRAFFIC LIGHTS IN THE MUNICIPALITY OF IOANNINA	MUNICIPALITY OF IOANNINA	830,000 €
5047109	ENERGY UPGRADE AND CONSTRUCTION WORKS OF THE BUILDING OF THE CENTER OF MENTAL HEALTH FOR CHILDREN AND TEENAGERS	UNIVERSITY HOSPITAL OF IOANNINA	660,310 €
5052664	SUPPLY OF ENERGY EFFICIENT VEHICLE FOR THE NEEDS OF ARTA'S MUNICIPAL ENTERPRISE FOR WATER SUPPLY AND SEWERAGE	MUNICIPAL WATER SUPPLY AND SEWERAGE COMPANY OF ARTA	570,400 €
5005002	Development of an air pollution measuring system	REGION OF EPIRUS	165,223 €
5000627	action plan for sustainable energy ( sdve ) municipality of Ioannina	MUNICIPALITY OF IOANNINA	156,860 €
5000641	Study for an action plan for sustainable energy in the municipality of arta	MUNICIPALITY OF ARTEON	127,374 €
5000552	Development of the sustainable energy action plan of the municipality of preveza	MUNICIPALITY OF PREVEZA	115,791 €

Source: Ministry of Economy & Investments – Anaptyxi.gov

## 3.2 Mapping of policies

### 3.2.1 Relevant EU Directives

The European Union is committed to developing a sustainable, competitive, secure, and decarbonized energy system by 2050. To meet that goal, Member States and investors need measures that aim to reach the long-term greenhouse gas emission goal and to decarbonize the building stock, which is responsible for approximately 36 % of all CO<sub>2</sub> emissions in the Union, by 2050. Member States should seek a cost-efficient equilibrium between decarbonizing energy supplies and reducing final energy consumption. To that end, the Member States and investors need a clear vision to guide their policies and investment decisions, which includes indicative national milestones and actions for energy efficiency to achieve the short-term (2030), mid-term (2040) and long-term (2050) objectives in conjunction with the 2020 objectives (2018/844/EU) (European Union, 2018).

With those objectives in mind and considering the Union’s overall energy efficiency ambitions to boost the energy performance of buildings, the EU has established a legislative framework that includes the Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency. Both Directives were amended, as part of the Clean Energy for all European package, in 2018 and 2019, respectively. In particular, the Directive amending the Energy Performance of Buildings Directive (2018/844/EU) introduces new elements and sends a strong political signal on the EU’s commitment to modernize the buildings sector in light of technological improvements and increase building renovations (European Commission, 2020). The Directive amending the energy efficiency (2018/2002/EU) establishes the EU energy efficiency target for 2030 of at least 32.5% (compared to projections), with a clause for a possible upwards revision by 2023. Over the years, the European Commission has published guidance notes to help EU countries to transpose fully the different elements these Directives into national law.

The articles of the aforementioned Directives that directly affect the public sector are described in the following table.

**Table 4: EU Directives’ articles that affect the public sector**

Directive	Article	Description
<b>Energy Efficiency Directive (2012/27/EU)</b>	Article 5 - Exemplary role of public bodies’ buildings	3% of the total floor area of heated and/or cooled buildings owned and occupied by its central government is renovated each year
	Article 6 - Purchasing by public bodies	Central governments purchase only products, services and buildings with high energy-efficiency performance
	Article 7 - Energy efficiency obligation schemes	Each Member State shall set up an energy efficiency obligation scheme and ensure to achieve a cumulative end-use energy savings target. To attain the

		cumulative target, measures in the public sector could be included.
	Article 18 - Energy services	The Member States shall support the public sector in taking up energy service offers, in particular for building refurbishment
<b>Energy Performance of Buildings Directive (2010/31/EU)</b>	Article 9 - Nearly zero-energy buildings	The Member States shall ensure that after 31 December 2018, new buildings occupied and owned by public authorities are nearly zero-energy buildings.
	Article 12 - Issue of energy performance certificates	An EPC is issued for buildings where a total useful floor area over 500 m <sup>2</sup> is occupied by a public authority and frequently visited by the public. On 9 July 2015, this threshold of 500 m <sup>2</sup> shall be lowered to 250 m <sup>2</sup>
	Article 13 - Display of energy performance certificates	Public authorities that frequently visited by the public, must ensure that the EPC is displayed in a prominent place clearly visible to the public.

Source: CEA

### 3.2.2 National Implementation of EU Directives and other relevant National Regulation

The EU Directive 2010/31/EU has been initially implemented in Greek Legislation through the Law 4122/2013, which has been partially revised through the Law 4685/2020.

The provisions of Law 4122/2013 include, among others:

- The conduction of a Long-term Strategy for Energy Refurbishment of all public and private buildings.
- The framework for setting out the energy efficiency minimum requirements through KENAK.
- The mandate, starting from 01.01.2019, for all the new public sector buildings to be near zero energy consumption.
- The issuance of Energy Performance Certificates for all public sector buildings of more than 250 m<sup>2</sup> total floor surface, in which regular interaction with the general public takes place.
- The mandate for the Energy Performance Certificates of public buildings to be posted in public view.
- The initiation of measures, funding programs and other means to improve the energy efficiency of new and existing buildings. Incentives shall take into account the cost-effectiveness of energy efficiency investments for society as a whole.

Furthermore, the Directive 2012/27 has been initially implemented in Greek Legislation through the Law 4342/2015, which has been partially revised through the Law 4713/2020.

According to the provisions of Law 4342/2015:

- An indicative National Target of Energy Efficiency has been set (Article 4 of the Law in accordance with Article 3 of the Directive)
- It renders mandatory for the State to proceed with the energy refurbishment of the 3% of public sector buildings in terms of covered surface (Article 7 of the Law in accordance with Article 5 of the Directive)
- Yearly targets of energy efficiency (ktoe) have been set for the period 2015-2020 (Article 9 of the Law in accordance with Article 7 of the Directive)
- The framework for the conduction of energy audits was legislated (Article 10 of the Law in accordance with Article 8 of the Directive)
- A framework is set up for safeguarding the accuracy and validity of metering and billing information to the final consumer of electricity, gas and heating / district heating (Articles 11 & 12 of the Law in accordance with Articles 9-11 of the Directive)
- A series of measures regarding the enhancement of general public concerning the benefits of energy efficiency actions for households have been enacted (Articles 13 & 18 of the Law in accordance with Articles 12 & 17 of the Directive)
- A certification framework was set for energy auditors and for public sector buildings' energy managers (Article 17 of the Law in accordance with Article 16 of the Directive)
- A national record for energy service companies (ESCOs) was created (Article 19 of the Law in accordance with Article 18 of the Directive)
- A horizontal support measures scheme has been legislated (Article 20 of the Law in accordance with Articles 19-20 of the Directive)

### 3.3 Interventions and Initiatives

As described in the latest annual progress report of the National Action Plan for Energy Efficiency, a series of interventions and initiatives have taken place at national level in order to enhance Energy Efficiency during the period 2014-2016.

**Table 5: Energy Efficiency (ktoe) from interventions applied during 2014-2016**

Policy Measure / Initiative	Number of Interventions	2014	2015	2016
“Exoikonomo” Program for Residence Buildings	26,164 buildings	21.98	8.17	1.55
“Exoikonomo” Program for Municipalities	59 Municipalities	-	-	2.25
“Exoikonomo II” Program for Municipalities	14 Municipalities	-	0.05	0.17



Replacing of old light and heavy trucks of public and private sector	10,952 vehicles	4.17	5.12	3.14
Replacing of old transport vehicles of private sector	165,778 vehicles	28.27	29.86	17.13
“ΕΠΠΕΡΑΑ” Actions	-	0.24	1.24	11.66
Athens Metro Expansion	-	29.30	-	-
Offsetting fines for arbitrary buildings	522 buildings	0.00	0.13	0.50
Energy Managers	204 buildings	-	-	1.19
Energy Performance Certificates	5,724 Energy Performance Certificates	2.09	3.51	2.26

Source: National Action Plan for Energy Efficiency

Furthermore, additional actions have been put in place for the years 2017-2020 as presented to the following table.

**Table 6: Energy Efficiency (ktoe) from interventions decided to apply during 2017-2020**

Policy Measure / Initiative	2017	2018	2019	2020
“Exoikonomo” Program for Residence Buildings	7.19	-	-	-
Residence Buildings’ Energy Refurbishment Actions	-	25.04	18.78	18.78
Public Buildings’ Energy Refurbishment Actions	-	7.14	7.14	7.14
Energy Efficiency Demonstration Projects	-	3.01	3.01	3.01
Application of energy management system (based on ISO 50001) on public sector	-	1.19	1.19	-
Commercial Buildings’ Energy Refurbishment Actions through EPC schemes	-	-	0.85	0.85
Development of intelligent systems for energy management	1.39	-	6.30	6.30
“ΕΠΠΕΡΑΑ” Actions	6.31	-	-	-

Energy Managers and Action Plans for public sector's buildings	8.39	76.13	84.53	-
Energy Performance Certificates	2.62	2.62	2.62	2.62
Street lighting Networks Upgrade	-	10.00	-	-
Pumping Stations Upgrade	-	-	4.00	2.00
Enforcement Regimes	25.00	44.33	33.50	33.00

Source: National Action Plan for Energy Efficiency

Moreover, an ambitious strategy has been adopted by the Greek Authorities for the renovation of the sum of building stock in Greece, so that an energy renovation of 600,000 buildings (12% -15% of the total building stock) at a nZEB level to be accomplished by 2030.

To promote the renovation of the residential buildings stock, the program "Saving at Home II" is implemented, aiming at promoting interventions to improve energy efficiency in the shell and in the technical systems (heating - cooling - hot water) mainly in residential buildings of low energy rating.

In addition, a series of policy measures have been put in place in order to implement an ambitious plan for both the renovation and the enhancement of the energy efficiency of the stock of public buildings, as well as the full renovation of those buildings that have completed their life cycle.

To that end, the creation of a National Record of all public sector buildings is currently underway.

Furthermore, in order to improve the energy efficiency of public buildings and in the context of the exemplary role of the public sector, it is sought to carry out an annual energy refurbishment of the 3% out of the surface of the central government buildings. This very objective shall be accomplished through the "revised program ELECTRA".

The latter refers to the financing of the investments needed to boost energy efficiency in general government buildings through a blending finance scheme that includes public resources, private funds' participation and the involvement of Energy Service Companies (ESCOs), through Energy Performance Contracts.

The key aim of the program is to create attractive and sustainable energy upgrade investments for the buildings used by public bodies (general government bodies), by effectively leveraging funds from both the private and public sector. The adjustment of the regulatory framework shall facilitate the mobilisation of private funds in a sector with considerable potential, which will contribute significantly towards attaining the ambitious objectives of the national plan for the energy upgrading of buildings.

More specifically, the ELEKTRA program shall strengthen the energy upgrading of public buildings by financing part of the required investments through investment loans, which will be repaid by the programme. It shall also provide for the participation of energy service companies, whereas payments to them, in the context of energy performance contracts, are guaranteed through securities.

Furthermore, at a Regional level, a major intervention consists of the EIB funded Project "Efficient Eco-Friendly Transportation, Public Lighting and Buildings in the Region of Epirus, Greece". The latter is implemented through the ELENA Mechanism of European Investment Bank and aims at

improving the energy efficiency of public buildings and public lighting systems located in the Region of Epirus and deploy sustainable transport. The programme has a substantial scale for the Region as well as a high level of ambition in terms of energy efficiency performance objectives set.

It is the first project of that kind in Greece, while the ELENA assistance contributes substantially to the implementation of the investment program by bringing in missing resources and expertise.

The very investment program consists of four (4) pillars, namely:

- Design and implementation of a sustainable lake transportation system in the city of Ioannina
- Design and construction of a new rural regional road lighting network, including smart grid technology, for the entire Region of Epirus
- Design and deployment of a new LED lighting technology including dedicated control systems in the Municipalities of Arta, Preveza and Igoumenítsa
- Design and implementation of Renewable Energy Systems and Energy Efficiency Retrofits in Public Buildings in the Region of Epirus

All investment schemes shall be realized through either PPP or EPC initiatives, aiming at mobilizing a total amount of investments of approx. € 63 mn. The project's expected results include:

- Energy Efficiency - annual energy saved 13.6 GWh<sub>el</sub> and 7.1 GWh<sub>th</sub>
- Renewable Energy - annual total energy generation 1.2 GWh
- CO<sub>2</sub> emissions reductions – annual total reductions of CO<sub>2</sub> emissions 25,400 t CO<sub>2</sub> eq.

Furthermore, when it comes to the Regional Unit of Thesprotia, Igoumenitsa consists the only Municipality that has successfully developed a Sustainable Energy and Climate Action Plan (SECAP) within the framework of the Covenant of Mayors Initiative.

Within its SECAP framework, the Municipality of Igoumenitsa has already carried out final studies and subsequently energy saving interventions and inspections, in three public buildings (1st Nursery School of Igoumenitsa, Nursery School of Graikochori, Closed Gym of Igoumenitsa), by taking advantage of the within the framework of the “Exoikonomo” program.

Additionally, Igoumenitsa has already started to implement measures for improving its energy efficiency such as the installation of photovoltaics on the rooftop of a public school and upgrading the energy efficiency of two public school buildings and one public sports complex.

Moreover, the Municipality has carried out an extended improvement of the walking and cycling infrastructure in the city centre, while it is also aiming to the completion of the research for the city lighting, as part of European funding programs.

#### **4. Policy – makers and Public Authorities Planning, Promoting and Implementing Initiatives of Improving Energy Efficiency in the Region of Epirus and the Regional Unit of Thesprotia.**

The need to renovate the existing building stock is indisputable, as this will result in significant energy and cost savings, while – at the same time – shall improve the comfort, safety and health conditions of the buildings.

To that end, NECP establishes a central quantitative objective for the renovation and replacement of residential buildings with new nearly zero-energy buildings, which could in aggregate amount to 12-15% of all residential buildings by 2030. On a national level, the annual objective is to have an average of 60,000 buildings or building units upgraded in terms of energy and/or replaced with new more energy-efficient ones.

This particular target will contribute significantly to the major upgrading of the ageing building stock and will substantially boost the construction industry through high added value technologies, thus, essentially ensuring increased financial and operating benefits for households in Greece, also enabling them to cover their energy needs.

In essence, the national objective is to improve energy efficiency in final energy consumption by at least 38% in relation to the foreseen evolution of final energy consumption by 2030, as estimated in 2007 in the context of the EU energy policies, thus resulting in final energy consumption levels of not more than 16.5 Mtoe in 2030.

Within this framework, the network of Public Authorities which are in charge of planning, promoting and implementing initiatives that enhance energy efficiency, includes Central Government, meaning the Ministry of Environment and Energy as for the schedule of policy making, while the Regional Authorities and the local municipalities are involved in the implementation part.

As long as the Ministry of Environment and Energy is concerned, its central planning role is expressed – apart from the legislative activity - through the targets, the measures and the initiatives set by the National Energy and Climate Plan. According to the latter, the policy measures for energy efficiency improvement in the period 2021-2030 aim to cover twelve different policy priorities (PP3.1-PP3.12):

- PP3.1: Improvement in energy efficiency of public buildings and exemplary role of public sector - Improvement of urban public space microclimate
- PP3.2: Strategy for renovation of the building stock in the residential and tertiary sector
- PP3.3: Promoting energy efficiency contracts by energy service companies
- PP3.4: Promoting market mechanisms
- PP3.5: Promoting innovative financial instruments to ensure private capital leverage and financial sector involvement
- PP3.6: Improvement in energy efficiency and competitiveness of the industrial sector
- PP3.7: Framework for the replacement of polluting passenger vehicles and goods vehicles
- PP3.8: Developing infrastructure and plans for a shift in transport operations

- PP3.9: Energy efficiency improvement of electricity and gas infrastructures
- PP3.10: Promoting measures for modernising water supply / sewage and irrigation infrastructures
- PP3.11: Promoting efficient heating and cooling
- PP3.12: Training/informing professionals and consumers on energy-efficient equipment and rational use of energy

The NECP's full set of policy measures envisaged to improve energy efficiency is presented to the following table

**Table 7: NECP's summary of measures to improve energy efficiency**

<b>Name of policy measure</b>	<b>Correlation with policy priorities</b>	<b>Sector affected</b>	<b>Category of measure</b>
Promotion of energy performance contracts (EPCs) through targeted financing programmes.	PP3.1, PP3.3, PP3.5	Tertiary sector, public buildings	Economic measure
Financing programmes for the renovation of public buildings in the context of the new programming period.	PP3.1, PP3.5	Tertiary sector, public buildings	Economic measure
Financing of public building upgrades on the basis of the Action Plans for Sustainable Energy and the Action Plans for Energy Efficiency of Buildings under the responsibility of municipalities and regions.	PP3.1, PP3.5	Tertiary sector, public buildings	Economic measure
Improvement of regulatory framework and strengthening of the role of energy managers for public buildings.	PP3.1	Tertiary sector, public buildings	Regulatory measure
Promotion of energy management systems in public buildings.	PP3.1	Tertiary sector, public buildings	Regulatory, economic measure
Regulatory measures to promote near-zero energy buildings (nZEBs).	PP3.1, PP3.2	Tertiary sector, public buildings	Regulatory measure
Regulatory, tax and financial incentives to promote buildings exceeding minimum energy requirements (nZEBs).	PP3.1, PP3.2, PP3.5	Tertiary sector, public buildings	Regulatory, economic measure
Financing programmes for the renovation of residential buildings in the context of the new programming period.	PP3.2, PP3.5	Residential sector	Economic measure
Financing programmes for the renovation of tertiary sector buildings (other than public	PP3.2, PP3.5	Tertiary sector - Buildings other	Economic measure

buildings) in the context of the new programming period.		than public buildings	
Promotion of energy performance contracts (EPCs) in the private sector through targeted financing programmes.	PP3.2, PP3.3, PP3.5	Tertiary sector - Buildings other than public buildings	Economic measure
Use of tax and town planning incentives for implementing energy savings interventions in residential buildings and tertiary sector buildings (other than public buildings).	PP3.2	Residential sector Tertiary sector, Buildings other than public buildings	Regulatory, economic measure
Mandatory installation of solar thermal systems in new buildings and in buildings undergoing major renovation.	PP3.2, PP3.11	Residential sector Tertiary sector, Buildings other than public buildings	Regulatory measure
Strengthening of the role and improvement of the regulatory framework for energy efficiency obligation schemes.	PP3.4	All final consumption sectors	Regulatory measure
Implementation of tender procedures for achievement of energy savings.	PP3.4	All final consumption sectors	Economic measure
Design of framework for setting up innovative technology procurement groups.	PP3.4	All final consumption sectors	Regulatory measure
Promotion of energy audits in SMEs and in households.	PP3.12	Industrial, tertiary and residential sector	Economic measure
Financing programmes for the application of the recommendations of energy audits to obliged or non-obliged parties.	PP3.5, PP3.6	Industrial and tertiary sector	Economic measure
Promotion of energy management systems in SMEs.	PP3.2, PP3.6	Industrial and tertiary sector	Economic measure
Establishment of the National Energy Efficiency Fund.	PP3.5	All final consumption sectors	Regulatory, economic measure
Scheme for the certification of installers of building elements that affect the energy behaviour of buildings.	PP3.12	All final consumption sectors	Regulatory measure
Strengthening of the role of energy performance certificates by amending and upgrading them.	PP3.12	Tertiary and residential sector	Regulatory measure
Completion of a programme for the installation of individual smart meters.	PP3.9, PP3.12	Tertiary and residential sector	Technical measure

Development of the regulatory framework for demand response.	PP3.9, PP3.12	All final consumption sectors	Regulatory measure
Financing programmes for the energy upgrading of street lighting.	PP3.5	Tertiary sector	Economic measure
Financial and tax support for investment in energy savings technologies.	PP3.2, PP3.5, PP3.6	All final consumption sectors	Economic measure
Implementation of information actions on energy efficiency.	PP3.12	All final consumption sectors	Information and awareness-raising measure
Promotion of energy-efficient products through the implementation of energy labelling and of the eco-design Directive.	PP3.12	All final consumption sectors	Regulatory measure and information and awareness-raising measure
Promotion of green public procurement.	PP3.1, PP3.7	Public sector	Regulatory, economic measure
Financing programmes for promoting HECHP, district heating/cooling in the context of the new programming period.	PP3.5, PP3.11	All final consumption sectors	Economic measure
Expansion of natural gas distribution networks and deployment of autonomous compressed and liquefied natural gas networks	PP3.9	All final consumption sectors	Technical, economic measure
Promotion of innovative smart city models through the use of state-of-the-art technologies.	PP3.9	All final consumption sectors	Technical measure
Creation of database for energy characteristics of buildings and energy upgrading actions	PP3.12	All final consumption sectors	Information and awareness-raising measure
Financing programmes for improvement in the energy efficiency of industries and processors in the context of the new programming period, including the promotion of EPCs.	PP3.3, PP3.5, PP3.6	Industrial sector	Economic measure
Promotion of the relocation of industrial plants to industrial-business zones.	PP3.6	Industrial sector	Economic measure
Promotion of central heat generation and distribution systems at an industrial-business zone level	PP3.6	Industrial sector	Technical, economic measure
Compulsory quotas of vehicles with higher energy efficiency in the	PP3.1, PP3.7	Transport sector	Regulatory measure

fleets of public agencies or organisations.			
Promotion of use and improvement of energy efficiency of urban public transport systems.	PP3.8	Transport sector	Technical, economic measure
Implementation of infrastructure projects which are currently in progress in the (road and railway) transport sector.	PP3.8	Transport sector	Technical measure
Elaboration of sustainable urban mobility plans.	PP3.8	Transport sector	Regulatory measure
Elaboration of plans and implementation of infrastructures for a shift in commercial transport operations.	PP3.8	Transport sector	Regulatory measure
Use of tax incentives to promote alternative fuels in transport (biofuels, hybrid fuels, electric fuels, natural gas, LPG).	PP3.7, PP3.8	Transport sector	Economic measure
Completion of the institutional support framework for the deployment of infrastructures for promoting alternative fuels in transport (recharging stations for electric vehicles, natural gas, etc.)	PP3.7	Transport sector	Regulatory, technical measure
Implementation of a programme for the replacement of passenger vehicles and light goods vehicles with new high energy efficiency ones.	PP3.7	Transport sector	Economic measure
Regulatory measures for energy savings in the transport sector	PP3.12	Transport sector	Regulatory measure
Promotion of measures for improving energy efficiency in electricity infrastructures.	PP3.9	Electricity infrastructure	Regulatory, technical measure
Promotion of measures for improving energy efficiency in natural gas infrastructures.	PP3.9	Gas infrastructures	Regulatory, technical measure
Promotion of measures for modernising water supply / sewage and irrigation infrastructures, to save both water and energy.	PP3.10	Water infrastructures	Technical, economic measure

Source: NECP

When it comes to the Regional Level, the Region of Epirus has included as a Priority Axis in its Operational Program for the period 2014-2020 the “Environmental Protection and Sustainable Development” and has set a Thematic Objective “To support the shift towards a low carbon economy in all sectors”.

The strategy to support the transition to an economy of low CO<sub>2</sub> emissions includes:

- investments for the wider use of the energy efficiency contract in public buildings and the residential building sector



- energy efficiency of public buildings, including demonstration projects of buildings with zero emissions and a positive energy balance, as well as radical renovation of existing buildings beyond the optimal level costs
- improving the energy efficiency of transport, especially in urban areas through the promotion of clean technologies, the development of multimodal urban transport systems, etc.
- interventions to improve energy efficiency in urban centres.

The expected results of the strategy described above include improved energy efficiency and increased energy savings, as well as the reduction of annual CO2 Emissions.

In particular, a specific Investment Priority (4c) has been set for “Supporting energy efficiency, smart energy management and the use of renewable energy sources in public infrastructure, including public buildings, and in the housing sector”, as well as additional special targets (e.g. enhancing energy efficiency at the Region’s buildings stock) and indicative interventions for their implementation.

Upgrading buildings and improving energy efficiency in public buildings constitutes such an action, while, within this framework priority will be given to buildings with low energy efficiency, in which there is a large potential for energy savings (e.g. hospitals and school buildings), as well as to interventions that will ensure energy efficiency higher than the minimum requirements as defined by the current legislation. In order for the greatest possible leverage of financial resources for interventions in public buildings to be ensured, the possibilities of utilising the PPPs institution will be explored.

Moreover, the Operational Program incorporates a series of further measures such as:

- Actions to improve energy efficiency in urban centres, including interventions in the public lighting system of urban centres (e.g. replacement of conventional light bulbs with those of low consumption, adoption of automation for "smart" lighting management, use of photovoltaic collectors in street lighting, etc.) and integrated energy planning in energy-intensive urban functions.
- Improving energy efficiency and security of supply through the development of smart energy distribution, storage and transmission systems and through the integration of distributed energy from renewable sources. This priority aims to the reduction of energy production costs, to increased competition in the supply of electricity, a more efficient management of electrical charge and also contributes to the national target for reducing energy consumption in relation to Strategy Europe 2020.
- Investments to improve the energy efficiency of transport, especially in urban areas. The interventions that will be implemented concern the improvement of the energy efficiency of the medium and heavy vehicles fleet (public sector and the public transport sector) - with a proven significant burden on the urban environment, the expansion of the use of bicycles, and the promotion of sustainable urban mobility.

Within this framework, on September 2020, the Managing Authority of the Epirus Operational Program announced that seven Acts that support the energy efficiency in Epirus Region have been included in the invitation "Interventions that contribute to the energy efficiency of urban transport and centres". Actually, one of those refers to the Municipality of Igoumenitsa and it concerns the replacement of old vehicles with six new energy efficient, low pollution vehicles, with a budget of € 999,998.

In fact, when it comes to Municipal Authorities' level, the Municipality of Igoumenitsa is the only city out of the Regional Unit of Thesprotia that, not only participates in the Covenant of Mayors initiative, but also has proceeded with the accomplishment and submission of its Sustainable Energy and Climate Action plan.

Igoumenitsa's SECAP provides actions and measures to reduce the energy consumption in the following areas:

- Public sector (street lighting, public buildings, public vehicles etc.)
- Primary and Secondary sector
- Household and Tertiary sector
- Road Transport sector.

In the context of energy efficiency sector, the Municipality of Igoumenitsa intends to implement specific actions both in short/mid-term, as well as long term (by 2030), which are presented below:

- Energy Upgrade of Street Lighting
- Energy Upgrade of Public Buildings and Bioclimatic Interventions in the Environment Area of Selected Buildings and Squares
- Design and Installation of Photovoltaics (RES) in Public Buildings and Lands
- Installation of Energy Management Equipment for Public Buildings
- Training of employees for the Conclusion of Green Public Procurement/Contracts with Environmental and Energy Criteria
- Training of Drivers of the Municipality in ecological driving and more effective Management of the Public Vehicles Fleet
- Replacement of Public Vehicles
- Measures to Improve the Energy Efficiency of Pumping Stations
- Awareness Campaign for the Benefits of Zero, Low and Average Energy Saving in the Household and Tertiary Sector
- Campaign for Information and Promotion of National Household Sector Programs
- Information for the installation of RES Household and Tertiary Sector.

In addition, one of the main priorities of the Municipality of Igoumenitsa is the implementation of energy saving interventions in public buildings. In particular, the interventions that are proposed as a top priority, concern twenty buildings of the Municipality of Igoumenitsa (15 school buildings and 5 administration buildings), which were proved as the most energy-intensive (increased energy consumption) or the most environmentally harmful (increased CO<sub>2</sub> emissions). The building interventions that have been examined are:

- Replacement of heating-cooling and AC systems and / or interventions in these installations
- Replacement of frames and glass of external frames
- Interventions in the thermal insulation of a building shell
- Replacement of luminaires
- Replacement of special lighting (floodlights) in case of sports facilities with modern technology luminaires
- Installation of solar systems Domestic Hot Water (DHW) for the generation of Hot Water in Public Buildings (Indoor Gyms, Nursery Schools)
- Installation of shades outside the building shell.

## 5. Analysis of the Regional and National Legal and Regulatory Framework in the Region of Epirus and the Regional Unit of Thesprotia and Relevant Policy- Making Trends.

### 5.1 Regulations at Regional and Local Level

In Greece, local authorities do not have a separate legislative framework but comply with central government's legislation. As a result, they are not able to issue separate laws or regulations regarding the energy efficiency of their buildings.

The very fundamentals of Energy Efficiency national regulatory framework consist of:

- Law 4122/2013 "Energy Efficiency in Buildings / Implementation of Directive 31/2010 and other provisions" (GG A' 42/19.02.2013)
- Law 4342/2015 "Pension arrangements, incorporation into Greek Law of Directive 2012/27 / EU of the European Parliament and of the Council of 25 October 2012 "On energy efficiency, amendment of Directives 2009/125 / EC and 2010/30 / EU and repeal of Directives 2004/8 / EC and 2006/32 / EC ", as amended by Council Directive 2013/12 / EU of 13 May 2013 adapting Directive 2012/27 / EU of the European Parliament and of the Council on energy efficiency , due to the accession of the Republic of Croatia and other provisions." (GG A' 143/9.11.2015), as it stands after the amendments occurred by Law 4713/2020 (GG A' 147/29.07.2020)
- Law 4685/2020 "Modernization of environmental legislation, incorporation into Greek legislation of Directives 2018/844 and 2019/692 of the European Parliament and of the Council and other provisions" (GG A' 92/07.05.2020).
- Joint Ministerial Decision (ΔΕΠΕΑ/οικ.1785810) "Approval of the Energy Efficiency Regulation of Buildings - KENAK" (GG B' 2367/12.07.2017)
- Ministerial Decision (ΔΕΠΕΑ/οικ. 182365) "Approval and implementation of the Technical Instructions of Technical Chamber of Greece for the Energy Efficiency of Buildings" (GG B' 4003/17.11.2017)
- Ministerial Circular for the implementation of Law 4122/2013 "Energy Efficiency in Buildings / Implementation of Directive 31/2010 and other provisions" (ΔΕΠΕΑ/111748/705/19.11.2020, ΑΔΑ ΨΛ424653Π8-P77)
- Ministerial Decision (ΥΠΕΝ/ΔΕΠΕΑ/85251/242) "Approval of a National Plan for increasing the number of n Zero Energy Buildings" (GG B' 5447/05.12.2018)
- Ministerial Decision ((Υ.Α. ΥΠΕΝ/ΔΕΠΕΑ/6949/72) "Determining how the value of the building or building unit is calculated to characterize a renovation as radical" (GG B' 408/14.02.2019)

The energy efficiency of buildings is calculated based on a methodology defined in the Energy Efficiency Regulation of Buildings (KENAK) which includes, besides the thermal insulation characteristics of the structural elements of the building's shell, a series of additional factors, such as HVAC installations, renewable energy sources, passive heating and cooling elements, shading, indoor air quality, adequate natural light and building design. The energy efficiency calculation methodology covers the annual energy efficiency of the building and has been prepared in accordance with the relevant European standards.

KENAK defines the minimum requirements for the energy efficiency of buildings and structural elements. These requirements have been set in order to achieve the optimal cost balance between the investments undertaken and the energy costs saved throughout the life cycle of the building.

## 5.2 Relevant Policy – Making Trends

There are two points worth mentioning concerning energy efficiency policy-making trends on a Regional and municipal level in Greece.

The first refers to the increased appetite of municipalities to participate to the covenant of Mayors initiative.

The Covenant of Mayors was launched in 2008, as an EU-initiative, with the ambition to gather local governments voluntarily committed to achieving and exceeding the EU climate and energy targets. Nowadays, the initiative gathers 9,000+ local and regional authorities across 57 countries drawing on the strengths of a worldwide multi-stakeholder movement and the technical and methodological support offered by dedicated offices.

The Covenant of Mayors for Climate and Energy is open to all local authorities democratically constituted with/by elected representatives, whatever their size and whatever the stage of implementation of their energy and climate policies. As local authorities play a leading role in climate change mitigation and adaptation, participation in the Covenant of Mayors for Climate & Energy supports them in this endeavour, by providing them the recognition, resources and networking opportunities.

Once joining as a signatory, a municipality is committed to develop a Sustainable Energy and Climate Action Plan within two years. Adopted by the local council, a signatory's action plan describes the steps towards its 2020 or 2030 targets. By end-2020, 142 Greek Municipalities that participate in the initiative have conducted and submitted their plans, thus creating the preconditions for taking their energy and climate commitments to the next level.

When it comes to the Region of Epirus, five (5) municipalities have joined the Covenant of Mayors Initiative, while three of them have already conducted a SECAP.

The second point refers to the recently legislated Energy Communities Framework.

The establishment and operation of the Energy Communities as introduced by Law 4513/2018 constitutes a new and integrated institutional intervention, supporting social economy in the energy sector.

Since then, several energy communities have been formed, thus having a significant number of energy projects under development in their portfolios. Due to abundant renewable energy sources from wind and sun, energy communities have the opportunity to transform the energy landscape in Greece.

The energy communities can strengthen the decentralized growth model, since incentives and benefits of clean energy production and management in local scale can be diffused across society to full extent. Locality is strengthened - yet synergies and partnerships with public and private energy stakeholders are promoted.

In addition, such kind of projects shall enact as successful technological examples of self-sufficient and energy autonomous schemes, mostly on a municipal level, while also contributing significantly to the economic and social progress of local communities.

## 6. Analysis of Relevant Strategies and their Objectives

The energy savings objective under Directive (EU) 2018/2002 on energy efficiency in the period 2021-2030 amounts to 7,299 ktoe of cumulative energy savings, taking into account the obligation to achieve energy savings annually equal to 0.8% of the average final energy consumption of the 2016-2018 period.

**Table 8: Setting the energy savings objective under Article 7 of Directive (EU) 2018/2002**

Year	Energy Savings on an annual basis (ktoe)										Cumulative Savings
2021	132,7										133
2022	132,7	132,7									265
2023	132,7	132,7	132,7								398
2024	132,7	132,7	132,7	132,7							531
2025	132,7	132,7	132,7	132,7	132,7						664
2026	132,7	132,7	132,7	132,7	132,7	132,7					796
2027	132,7	132,7	132,7	132,7	132,7	132,7	132,7				929
2028	132,7	132,7	132,7	132,7	132,7	132,7	132,7	132,7			1.062
2029	132,7	132,7	132,7	132,7	132,7	132,7	132,7	132,7	132,7		1.194
2030	132,7	132,7	132,7	132,7	132,7	132,7	132,7	132,7	132,7	132,7	1.327
<b>Total</b>											<b>7.299</b>

Source: NECP

This energy savings objective will be attained by combining energy efficiency obligation schemes with a mix of alternative policy measures.

More specifically, energy efficiency obligation schemes will account for 20% of the total cumulative objective for the period 2021-2030, whereas a total of additional nine alternative policy measures will be implemented to cover the remaining part of the objective, reflecting the key policy priorities and the most important energy efficiency improvement measures.

**Table 9: Mix of policy measures to attain the objective under Article 7 of Directive (EU) 2018/2002**

Policy measure	Total cumulative EU (Ktoe)
Energy upgrading of residential buildings	2.878
Energy upgrading of public buildings	208
Energy upgrading of tertiary sector buildings and industrial plants	427
Improvement in energy efficiency through energy service companies	196
Energy managers in public buildings	1.042
Energy upgrading of pumping equipment	315
Energy upgrading of street lighting	180
Development of transport infrastructures	264
Promotion of alternative fuels in road transport	329
Energy efficiency obligation schemes	1.460
<b>Total</b>	<b>7.299</b>

Source: NECP

## 7. References

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## **Annex**