

# Extract



**ENERGY  
POLICY  
OF POLAND  
UNTIL 2040**

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## 1. INTRODUCTION

The European Union (EU) climate and energy policy, including its long-term vision of striving for EU climate neutrality by 2050 and regulatory mechanisms stimulating the achievement of effects in the coming decades, has a significant impact on shaping the national energy strategy. Achieving the EU's 2020 and 2030 climate and energy targets is key to a low-carbon energy transition. In line with the EU's ambition to decarbonize the European Union, in December 2020 the European Council approved a binding EU target to reduce net greenhouse gas emissions by 2030 by at least 55% compared to 1990 levels. Thus, the 40% reduction target was increased. The new EU ambition has been defined as a collective goal for the entire EU, i.e. implemented on the basis of contributions of Member States, taking into account national conditions, specific starting points, reduction potential, the principle of independence in shaping the national energy mix, the need to guarantee energy security; in the most cost-effective manner possible in order to maintain affordable energy prices for households and the competitiveness of the EU, as well as taking into account the principle of fairness and solidarity. Following the dynamically accelerating EU climate and energy trends will be a huge challenge for Poland.

The base point on the path of energy transition are the 2020 targets. In 2009, a regulatory package was adopted setting out three headline targets for counteracting climate change by 2020 (the so-called 3 x 20% package), with Member States participating in accordance with their capabilities. Poland is obliged to:

- increase energy efficiency by saving primary energy consumption by 13.6 Mtoe in 2010-2020 compared to the forecasts of demand for fuels and energy from 2007;
- increase the share of energy from renewable sources in gross final energy consumption to 15% by 2020;
- contribute to the EU-wide reduction of greenhouse gas emissions by 20% (compared to 1990) by 2020 (in terms of 2005 levels: -21% in the EU ETS sectors and -10% in non-ETS).

In 2014, the European Council maintained the direction of combating climate change and approved four targets for the 2030 perspective for the entire EU, which after the 2018 and 2020 revision have the following shape:

- reduction of greenhouse gas (GHG) emissions by at least 55% compared to 1990 emissions;
- at least 32% share of renewable energy sources in gross final energy consumption;
- increase in energy efficiency by 32.5%;
- completion of the EU internal energy market.

The above objectives are the EU's contribution to the implementation of climate agreements. Of key importance for current policies and activities is the so-called **the Paris Agreement** concluded in December 2015 at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21). It results in the need to stop the increase in the average global temperature below 2°C compared to the pre-industrial levels, and try to be that it was not more than 1.5°C. During the 24th conference (COP24) in December 2018, during the Polish Presidency, was signed the so-called Katowice climate package implementing the Paris Agreement. Particular attention has been subjected to that the transformation resulting from the Paris Agreement must be carried out in a fair and solidarity manner.

In 2019, the work on the Clean Energy for All Europeans regulatory package, which was ongoing at the EU forum, was completed. The package indicates how to operationalize the EU's 2030 climate and energy targets and is intended to contribute to the **implementation of the Energy Union** and the **construction of the EU's single energy market**. The Polish government took an active part in shaping the final wording of the provisions, as these regulations strongly affect the functioning and determination of the future of the energy market model in Poland.

In the future, it is assumed that the key EU regulations concerning the energy sector will be further revised, which will refer to the goals and tools of the European Union's energy and climate policy in a time horizon that goes beyond the 2030 framework. This applies in particular to the decisions regarding the long-term vision of reducing greenhouse gas emissions in the EU until 2050. For this reason, the perspective after 2030 has been defined in a directional manner, although the forecasts made for PEP2040 have a 2040 perspective in accordance with statutory requirements.

In 2019, the European Commission published a communication on the European Green Deal, i.e. a strategy whose ambitious goal is to achieve climate neutrality by the EU by 2050 – as a world leader in this field. Poland supported this goal, however, working out a specific national derogation, due to the difficult starting point of the Polish transformation and its socio-economic aspects. In the last dozen or so years, Poland has made great strides in reducing the environmental impact of the energy sector, in particular through the modernization of generation capacity and diversification of the energy generation structure. Our dependence on carbon fuels is still much higher than that of other EU Member States, which is why a **fair (just) transition** is so important to us, which means taking into account the starting point, the social context of the transformation and counteracting the uneven distribution of costs between countries, which is more burdensome for economies with high use of carbon fuels. It should be noted that the costs relate to both the regions of coal (mining and energy production), as well as entire economies, which in a short time incur expenditures for new capacity, often immature economically more expensive technologies, network infrastructure, which is also reflected in the the price of energy.

In 2020, the world was hit by the **coronavirus pandemic**, affecting all global economies. This emergency situation also highlighted the important role of the energy sector, including energy security, for the functioning of the economy of Poland and other European countries. In the coming years, the energy sector will face a number of post-COVID challenges related to, inter alia, the reconstruction or substitution of supply chains in order to conduct investments, mobilize financial resources in budgets strained by the effects of the epidemic, and sometimes – verification of investment plans and accumulation of funds for key projects. It is important that investment decisions are made taking into account the aspect of green and low-carbon economic recovery. Post pandemic recovery efforts are designed to create a **rapid and effective growth impulse** and create new opportunities for the national economy. In addition to protective tools and activities mobilizing domestic public funds, EU support will be used.

The energy transformation will require the involvement of many entities and incurring capital expenditure. In the years 2021–2040 their scale may reach approx. PLN 1,600 billion. Investments in the fuel and energy sectors will involve approximately PLN 867–890 billion. The projected outlays in the electricity generation sector will amount to PLN 320–342 billion, of which approx. 80% will be allocated to zero-emission capacities, i.e. renewable energy and nuclear energy. As a result of transformations in the fuel and energy sector, energy costs may increase. Numerous investments may obtain financial support (operational and capital), which enable changes to take place as quickly as possible and on a larger scale. It is important that the way in which the transformation is carried out ensures socially acceptable energy prices and does not intensify energy poverty.

About PLN 260 billion from EU and national funds under various mechanisms will be allocated to the national energy and climate transformation by 2030, including:

- a. *Cohesion Policy* (approx. PLN 79 billion<sup>1</sup>),
- b. *Recovery and Resilience Facility* (approx. PLN 97.8 billion<sup>2</sup>),
- c. *Just Transition Fund* (approx. PLN 15.6 billion),
- d. *ReactEU* (approx. PLN 1.8 billion<sup>3</sup>),
- e. Other instruments (e.g. priority programs of the National Fund for Environmental Protection and Water Management and funds from the Common Agricultural Policy, approx. PLN 20 billion).
- f. New instruments that will support the transformation of the energy system in Poland, e.g. the Modernization Fund and the national special purpose fund, supplied with funds from the sale of CO<sub>2</sub> emission allowances, i.e. the Energy Transformation Fund (for which preliminary estimations indicate over PLN 47.6 billion)<sup>4</sup>.

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<sup>1</sup> Total allocation for Poland amounts approx. EUR 66,8 billion.

Under the Cohesion Policy, 30% of the European Regional Development Fund and 37% of the Cohesion Fund, i.e. approx. EUR 17.7 billion, should be allocated to climate-related measures.

<sup>2</sup> In current prices under this mechanism, the allocation for Poland amounts to approx. EUR 24.9 billion in non-returnable subsidies and EUR 34.2 billion in the form of loans, which in total amounts to approx. EUR 59.1 billion. 37% of this should be used for climate purposes, which gives approx. EUR 21.9 billion.

<sup>3</sup> Currently, there are no final judgments regarding ReactEU. It is estimated that the allocation for Poland may amount to approx. EUR 2 billion. It is assumed that approx. 20% of these funds will be allocated to the energy sector, which gives approx. EUR 0.4 billion.

<sup>4</sup> According to estimations of the Ministry of Climate and Environment.

## 2. SUMMARY

### Energy Policy of Poland until 2040 (EPP2040)

establishes the framework for the energy transformation in Poland. It contains strategic decisions regarding the selection of technologies for building a low-emission energy system. EPP2040 contributes to the implementation of the *Paris Agreement* concluded in December 2015 at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21), taking into account the need to carry out the transformation in a fair and solidary manner. EPP2040 is a national contribution to the implementation of the EU's climate and energy policy, whose ambition and dynamics have increased significantly in the recent period. The policy takes into account the scale of challenges related to the adaptation of the national economy to the EU regulatory conditions related to the 2030 climate and energy targets, the European Green Deal, the economic recovery plan after the COVID pandemic and the striving to achieve climate neutrality as a contribution to the implementation of the Paris Agreement, according to national potential. The low-emission energy transformation provided for in EPP2040 will initiate broader modernization changes for the entire economy, guaranteeing energy security, ensuring a fair distribution of costs and protection of the most vulnerable social groups.

EPP2040 is one of nine integrated sectoral strategies resulting from the Strategy for Responsible Development. EPP2040 is compatible with *National Energy and Climate Plan for the years 2021-2030*.

EPP2040 **describes the state and conditions** of the energy sector. Afterwards it indicates **three pillars of EPP2040**, on which the **eight specific objectives** of EPP2040 were based, along with the **activities** necessary for their implementation, and **strategic projects**. Presents territorial approach and identified sources of funding EPP2040.

Attached to the document are (1) an assessment of the implementation of the previous state energy policy, (2) conclusions from forecasting analyzes and (3) a strategic environmental assessment of EPP2040.

### PILLARS

#### I PILLAR



Just transition

#### II PILLAR



Zero-emission  
energy system

#### III PILLAR



Good air quality

<p><b>SPECIFIC OBJECTIVE 1.</b> Optimal use of own energy sources</p>	<p><b>SPECIFIC OBJECTIVE 2.</b> Development of electricity generation and network infrastructure</p>	<p><b>SPECIFIC OBJECTIVE 3.</b> Diversification of supplies and expansion of the network infrastructure of natural gas, crude oil and liquid fuels</p>
<p><b>STRATEGIC PROJECT 1.</b> Transformation of coal regions</p>	<p><b>STRATEGIC PROJECT 2A.</b> Capacity market, <b>STRATEGIC PROJECT 2B.</b> Implementation of smart power grids</p>	<p><b>STRATEGIC PROJECT 3A.</b> Construction of the Baltic Pipe <b>STRATEGIC PROJECT 3B.</b> Construction of the second line of the Pomeranian Pipeline</p>
<p><b>SPECIFIC OBJECTIVE 4.</b> Development of energy markets</p>		<p><b>SPECIFIC OBJECTIVE 5.</b> Implementation of nuclear power</p>
<p><b>STRATEGIC PROJECT 4A.</b> Implementation of the Action Plan (aimed at increasing cross-border electricity transmission capacity) <b>STRATEGIC PROJECT 4B.</b> Gas hub,</p>		<p><b>STRATEGIC PROJECT 5.</b> Polish Nuclear Power Program</p>
<p><b>SPECIFIC OBJECTIVE 6.</b> Development of renewable energy sources</p>	<p><b>SPECIFIC OBJECTIVE 7.</b> Development of district heating and cogeneration</p>	<p><b>SPECIFIC OBJECTIVE 8.</b> Improvement of energy efficiency</p>
<p><b>STRATEGIC PROJECT 6.</b> Implementation of offshore wind energy</p>	<p><b>STRATEGIC PROJECT 2A.</b> Development of district heating</p>	<p><b>STRATEGIC PROJECT 8.</b> Promotion of the improvement of energy efficiency</p>

The statutory goal of the **state's energy policy** is energy security<sup>5</sup>, while ensuring the competitiveness of the economy<sup>6</sup>, energy efficiency and reducing the impact of the energy sector on the environment.

The **specific objectives** of EPP2040 cover the entire energy supply chain - from obtaining raw materials, through energy production and supply (transmission and distribution), to the method of its use and sale. Each of the eight specific objectives of PEP2040 contributes to the implementation of three elements of the state energy policy objective and serves Poland's energy transformation.

<sup>5</sup> Pursuant to the Energy Law Act, energy security means the current and future meeting the needs of customers for fuels and energy in a technically and economically justified manner, while maintaining the environmental protection requirements. It means the present and future guarantee of the security of raw material supplies, production, transmission and distribution.

<sup>6</sup> The cost of energy is hidden in every activity and product produced in the economy, therefore energy prices translate into the competitiveness of the entire economy.

### 3. THREE PILLARS OF THE ENERGY TRANSFORMATION

Through the implementation of the goals and activities indicated in PEP2040, a low-emission energy transformation will be carried out with the active role of the end-user and the involvement of the domestic industry, giving an impulse to the economy, while ensuring energy security, in an innovative, socially acceptable way and with respect for the environment and climate.

The **energy transformation** that will be carried out in Poland will be:

- a. **just** – will not leave anyone behind,
- b. **participatory**, carried **locally**, initiated **from bottom up** – everyone will be able to participate,
- c. focused on modernization and **innovation** – it is a plan for the future,
- d. stimulating **economic development, efficiency and competitiveness** – it will be the **motor of economic development**.

**The energy transition will be based on three pillars:**



<b>I pillar</b> Just transition	<b>II pilar</b> Zero-emission energy system	<b>III pilar</b> Good air quality
Transformation of coal regions Reduction of energy poverty New industries related to renewable energy and nuclear energy	Offshore wind energy Nuclear energy Local and civic energy	Heating transformation Transport electrification House with Climate

## **I. Just transition**

– it means providing new opportunities for development to regions and communities most negatively affected by the low-carbon energy transition, while creating new jobs and building new industries that contribute to the transformation of the energy sector. Activities related to the transformation of coal regions will be supported with funds of approx. PLN 60 billion. In addition to the regional approach, individual energy consumers will participate in the transformation, who on the one hand will be shielded from the increase in energy prices, and on the other hand will be encouraged to actively participate in the energy market. Thanks to this, the energy transformation will be carried out in a fair manner and everyone - even a small household - can participate in it. The transformation will use domestic competitive advantages, create new development opportunities and initiate wide modernization changes, giving the opportunity to create up to 300,000 new jobs in high-potential industries, in particular related to renewable energy, nuclear energy, electromobility, network infrastructure, digitization, thermal modernization buildings and others.

## **II. Zero-emission energy system**

– it is the long-term direction in which the energy transformation is heading. It will be possible to reduce the emissivity of the energy sector through the implementation of nuclear energy and offshore wind energy, increasing the role of distributed and civic energy, while ensuring energy security through the temporary use of energy technologies based, among others, on gaseous fuels.

## **III. Good air quality**

– this is a goal that for consumers is one of the most noticeable signs of moving away from fossil fuels; thanks to investments in the transformation of the heating sector (district and individual), electrification of transport and promotion of passive and zero-emission houses, using local energy sources, air quality will significantly improve, which has an impact on the health of the society; clean air in Poland will be the key result of the transformation that will be felt by every citizen.

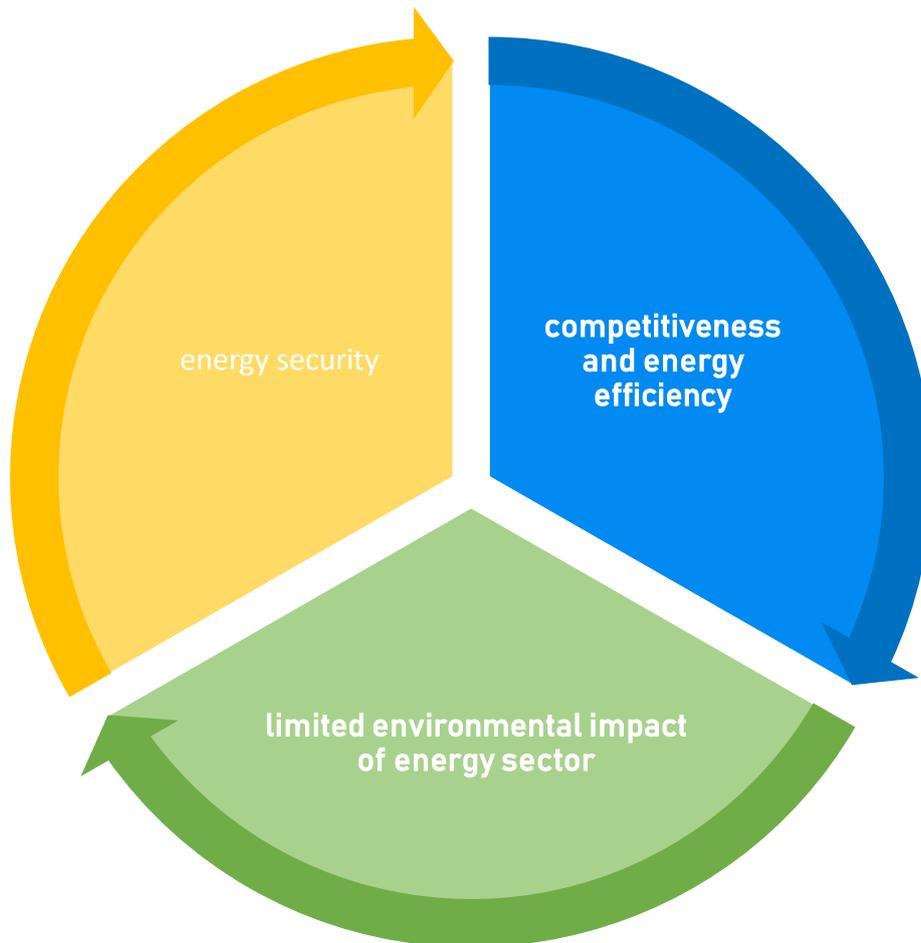
#### 4. KEY ELEMENTS OF EPP2040

<p><b>Energy transformation</b> taking into account electricity self-sufficiency</p>	<p>Installed capacity of <b>offshore wind energy</b> will reach: approx. 5.9 GW in 2030 and up to 11 GW in 2040</p>	<p>There will be a significant increase in installed <b>photovoltaic</b> capacity approx. 5-7 GW in 2030 approx. 10-16 GW in 2040</p>	
<p>Increase in the share of RES in all sectors and technologies. In 2030, the share of renewable energy in gross final energy consumption will be at least 23%</p> <ul style="list-style-type: none"> <li>- not less than 32% in electricity (mainly wind and PV)</li> <li>- 28% in heating (increase by 1.1 pp per year)</li> <li>- 14% in transport (with a large contribution of electromobility)</li> </ul>	<p>In 2030, the <b>share of coal in electricity production</b> will not exceed 56%</p>	<p>The reduction in the use of coal in the economy will take place in a manner ensuring a <b>just transition</b></p>	
<p><b>Energy efficiency</b> will increase – for 2030, a target of 23% reduction of primary energy consumption (compared to PRIMES2007 projection)</p>	<p>TSOe and DSOe investment programs will be focused on the development of renewable energy sources, <b>active consumers</b> and local balancing</p>	<p>In 2033, the first power unit of a <b>nuclear power plant</b> will be launched, with a capacity of approx. 1-1.6 GW. Subsequent units will be implemented every 2-3 years, and the entire nuclear program involves the construction of 6 units.</p>	
<p>By 2040, <b>heating needs of all households</b> will be covered by system heat and by zero or low-emission individual sources</p>	<p><b>Natural gas</b> will be a bridge fuel in the energy transformation</p>	<p>In 2030, the gas network will be able to transport a mixture containing approx. <b>10% of decarbonized gases</b></p>	<p>The infrastructure of natural gas, crude oil and liquid fuels will be expanded, and the diversification of supply directions will be ensured</p>
<p>A number of activities will be aimed at <b>improving air quality</b>, including:</p> <ul style="list-style-type: none"> <li>- development of district heating (4-fold increase in the number of effective heating systems by 2030)</li> <li>- low-emission direction of transformation of individual sources <ul style="list-style-type: none"> <li>- (heat pumps, electric heating)</li> <li>- <b>moving away from burning coal in households</b> in cities by 2030, in rural areas by 2040, maintaining the possibility of using smokeless fuel until 2040</li> <li>- increasing the energy efficiency of buildings</li> </ul> </li> <li>- development of low-emission transport, in <b>particular aiming at zero-emission public transport by 2030</b> in cities of over 100,000 residents</li> </ul>	<p><b>Reduction of the phenomenon of energy poverty</b> to the level of max. 6% of households</p>		
<p>By 2030, <b>GHG emissions will be reduced by approx. 30%</b> compared to 1990.</p>	<p>The most anticipated <b>development of energy technologies and R&amp;D</b> investments includes:</p> <ul style="list-style-type: none"> <li>- energy storage technologies</li> <li>- smart metering and energy management systems <ul style="list-style-type: none"> <li>- electromobility and alternative fuels</li> <li>- hydrogen technologies</li> </ul> </li> </ul>		

## 5. THE GOAL OF THE STATE'S ENERGY POLICY

### The goal of the state's energy policy is:

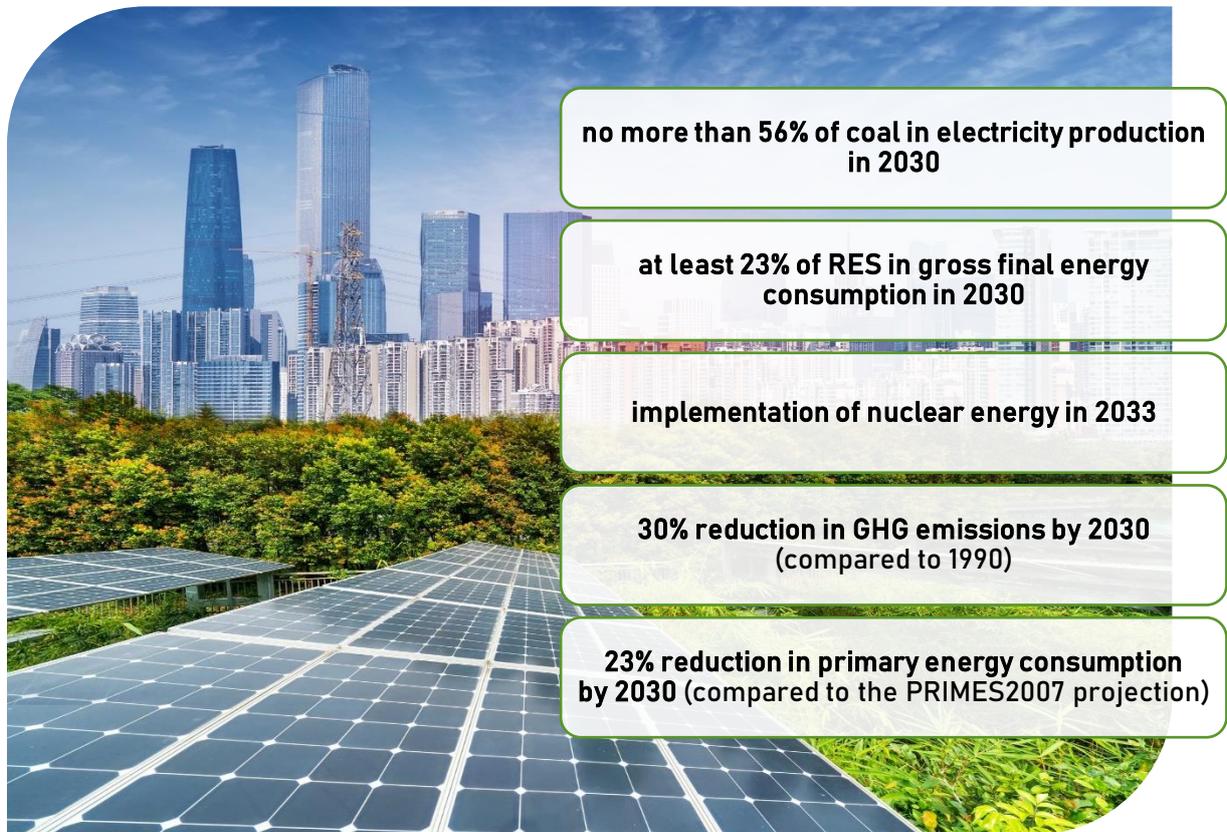
energy security, while ensuring the competitiveness of economy, energy efficiency and reducing the impact of the energy sector on the environment, with the optimal use of own energy resources.



**Energy security** means the current and future meeting the needs of customers for fuels and energy in a technically and economically justified manner, while maintaining the environmental protection requirements. It means the present and future guarantee of the security of raw material supplies, production, transmission and distribution of energy, i.e. the entire energy chain.

The cost of energy is hidden in every activity and product produced in the economy, therefore energy prices translate into the **competitiveness of the entire economy**. At the same time, emissions of pollutants from the energy sector **have an impact on the environment**, therefore creating an energy balance must respect this aspect.

The following indicators were adopted as a global measure of the achievement of the PEP2040 target.



## 6. SPECIFIC OBJECTIVES OF EPP2040

### SPECIFIC OBJECTIVE 1.

Optimal use of own energy sources

### STRATEGIC PROJECT 1.

Transformation of coal regions

The domestic resource potential makes it possible to independently meet the demand for coal and biomass, but most of the demand for natural gas or crude oil must be covered by imports. The rational and economical management of raw materials protection of documented mineral deposits are of key importance due to the scarcity of resources, economic and ecological aspects.

The demand for **hard coal** will be covered by own resources, and the import-export ratio will be complementary. The role of this raw material will be reduced. During the evolutionary transformation of the Polish energy sector, it is necessary for the Polish mining sector to ensure certain supplies of hard coal at competitive prices. For this reason, it is necessary to ensure the profitability of the sector and rational exploitation, use and distribution of this raw material.

The demand for **lignite** will be covered by domestic resources, a short distance from the place of use. Due to their strategic nature, the prospective deposits (Złoczew and Ościstowo) will be secured, however, their exploitation will depend on the investors' decisions. The prices of CO<sub>2</sub> emission allowances, environmental conditions and the development of new technologies will play a key role in their management.

Research and development activities should be focused on searching for innovations aimed at reducing the environmental burden resulting from coal mining and new solutions contributing to low-emission, efficient and flexible use of the raw material (e.g. gasification, liquid fuels).

For social, economic and environmental reasons, the restructuring of the coal regions will be carried out to ensure that a **fair energy transition** leads to economic strengthening, leaves no one behind, and serves future generations. This process is to be supported by financial instruments under the EU Just Transition Mechanism, mobilizing **support funds in the amount of PLN 60 billion**. Detailed solutions in this respect will be included primarily in the national and territorial just transition plans.

The demand for **natural gas and crude oil** will be mainly met by imported raw materials. Activities aimed at diversifying the directions and sources of supplies will be implemented. At the same time, domestic deposits (including unconventional ones) will still be sought to replace the supply from depleted deposits. Part of the demand for oil and natural gas will be reduced by the growing importance of biofuels and alternative fuels (including electricity, biometan, LNG, CNG, hydrogen).

The demand for **renewable raw materials (biomass)** will be covered in the shortest possible distance from production. Efforts will be made to increase the role of waste biomass in order to avoid competition with other sectors. The potential accumulated in non-agricultural waste and sewage should also be used.

**SPECIFIC OBJECTIVE 2.**

Development of electricity generation and network infrastructure

**STRATEGIC PROJECT 2A.**

Capacity market,

**STRATEGIC PROJECT 2B.**

Implementation of smart power grids

The power balance must ensure stability of energy supplies and flexibility of the power system operation, as well as the fulfillment of international obligations and respond to changes in the energy market and global trends. At the same time, only efficient and sufficiently developed infrastructure will ensure security of energy supply. The expansion of the generation and grid infrastructure will lead to the creation of an almost new power system by 2040, largely based on zero-emission sources.

Poland will strive to **be able to cover the demand for power with its own resources**. Domestic coal resources will remain an important element of Poland's energy security, but the increase in demand will be covered by sources other than conventional coal capacities. The share of coal in the structure of energy consumption will reach no more than 56% in 2030, and with increased prices of CO<sub>2</sub> emission allowances, it may even drop to 37.5%. **Renewable sources** will play an increasingly important role - their level in the structure of domestic net electricity consumption will amount to no less than 32% in 2030, which will primarily be enabled by the development of photovoltaics and offshore wind farms, which due to the economic and technical conditions have the greatest growth prospects. In order to achieve such a level of RES in the balance sheet, it is necessary to develop **network infrastructure, energy storage technologies**, and also to expand **gas units** as regulating capacities. In 2033, **nuclear power** will be implemented (a total of 6 nuclear units with a total capacity of 6-9 GW), which will strengthen the base of the system and will affect the **reduction of emissions** from the sector. Also, in order to reduce the emission of pollutants from the energy sector, low-efficiency generating units will be gradually phased out and replaced with higher-efficiency capacities (including cogeneration). **In the perspective of 2040, an almost new power system will be built**, the strong foundation of which will be low and zero-emission sources.

**The development of the transmission infrastructure** will allow for receiving power from existing and new sources (including wind and nuclear energy) and improvement of the reliability of power supply, as well as increasing the possibility of cross-border exchange, while maintaining the principle of self-sufficiency of generation capacities in Poland. Investments in **distribution systems** (restoration of the network, cabling of the medium voltage grid) will improve the quality of supply to end users, which means in particular reducing the length of interruptions in energy supply. Moreover, the investments will contribute to the gradual transformation of the passive (one-way) network into an active (two-way) network. In order to improve the efficiency of operation in emergency situations, a digital communication system between distribution system operators will be implemented and the infrastructure will be equipped with control devices. In addition, **smart power grids** will be implemented to integrate the behavior and activities of all connected entities and users.

**SPECIFIC OBJECTIVE 3.**

Diversification of supplies  
and expansion of the network infrastructure of natural gas, crude oil and liquid fuels

**STRATEGIC PROJECT 3A.**

Construction of the Baltic Pipe

**STRATEGIC PROJECT 3B.**

Construction of the second line of the Pomeranian Pipeline

Poland's strong dependence on **natural gas** supplies from one direction requires diversification activities. For this purpose, the Baltic Pipe (Norway-Denmark-Poland connection) will be built, the LNG terminal in Świnoujście will be expanded and the FSRU floating terminal in the Gulf of Gdańsk will be built. Connections with neighboring countries will also be developed. To enable the further development of the gas market, take advantage of natural gas import opportunities and eliminate the so-called white spots, the national transmission and distribution network will be expanded (also with the use of local LNG regasification stations and biogas) as well as the storage infrastructure. This is important because natural gas is a transition fuel of transformation.

In an even greater extent Poland is dependent on **crude oil** supplies, therefore it is necessary to ensure conditions for crude oil reception and an efficiently functioning internal infrastructure. The possibility of deliveries by sea will be increased, which will be facilitated by the expansion of the Pomeranian Oil Pipeline, as well as crude oil and liquid fuel storage bases. Deliveries of petroleum products depend on a properly developed network of pipelines, especially in the southern part of Poland, which will also be expanded, e.g. the Boronów-Trzebinia pipeline.

**SPECIFIC OBJECTIVE 4.**

Development of energy markets

**STRATEGIC PROJECT 4A.**

Implementation of the Action Plan (aimed at increasing cross-border electricity transmission capacity)

**STRATEGIC PROJECT 4B. Gas hub,**

**STRATEGIC PROJECT 4C. Development of electromobility**

**The electricity market** is undergoing further liberalization. The active participation of consumers in the energy market and the strengthening of their position in this market is promoted. This means broadening the information policy, enabling consumers to actively participate in the energy market through, inter alia, participation in DSR and arranging general distribution agreements. In order to protect the competitiveness of Polish energy-intensive enterprises, also this group will be addressed with mechanisms reducing the level of burdening with the costs of support schemes. To ensure better working conditions of the transmission and distribution networks, selected services will be developed and acquired, including DSR and system services, it will also be possible to create local balancing zones. Cross-border transmission capacity will be gradually increased thanks to the implementation of the Action Plan, which is part of the systematic expansion of the electricity transmission network in Poland.

**The natural gas market** will be subject to further liberalization, and the means to achieve this goal will be, inter alia, releasing trading companies from the tariff obligation for the last group of recipients, i.e. households. It is also important to strengthen Poland's position on the European gas market, which will be mainly due to the creation of a regional center for gas transmission and trade (hub). For this

purpose, it is necessary to further develop the service and trade offer. Market development will also take place due to the progressive gasification of the country and an increase in gas consumption in segments that have so far accounted for a small part of total consumption, e.g. in households, industry, heating, electricity, including units that can play the role of backup units for unstable RES, and transport.

**The petroleum products market** is relatively stable, although it will undergo transformations in the coming years. It is necessary to organize the ownership structure of the fuel market segments, so that refining companies concentrate on the production and trade of fuels, and that the state has control over the infrastructure essential for fuel security. The market must respond to the increase in the use of petrochemicals in the economy (from 3D printers to the construction industry), but also take measures to reduce the emission from traditional fuels. At the same time, part of the demand for petroleum products will be covered by the greater use of **biocomponents and alternative fuels** (LNG, CNG, hydrogen, synthetic fuels) and the **development of electromobility**.

**The hydrogen market** will be subject to development, supported by successive regulatory work and adjustment of support schemes for investment, research and development activities and the evolution of domestic technological resources. It is necessary to use the favorable conditions for the improvement and financing of hydrogen technologies created under the EU policy (European Green Deal, reform of the European gas market). In the long term, the development of hydrogen technologies with the simultaneous expansion of the hydrogen economy value chain will support the increase in the share of renewable energy sources (Power-to-x energy storage technology), give a new role to the gas sector in terms of storage, transmission and distribution of mixtures of natural gas and hydrogen and will be a tool for decarbonising transport and industry. In parallel to the planned European regulations, national law governing the development of the hydrogen market will be created.

#### SPECIFIC OBJECTIVE 5.

##### Implementation of nuclear power

#### STRATEGIC PROJECT 5.

##### Polish Nuclear Power Program

In 2033, the first **nuclear power unit** with a capacity of 1-1.6 GW will be launched, the next ones will be launched within 2-3 years - the entire nuclear program assumes the construction of 6 units by 2043. The terms results from anticipated shutdowns in the National Power System, which is also associated with an increase in demand for electricity. Nuclear power plants ensure the **stability of energy generation with zero emissions of air pollutants**. At the same time, it is possible to **diversify the structure of energy production at a reasonable cost**. The currently used technologies (generation III and III+) as well as stringent global standards in the field of nuclear safety ensure high **safety standards for nuclear power plant operation** and waste storage. A significant part of the nuclear program can be implemented with the participation of Polish companies.

The implementation of nuclear power requires prior legal changes to improve program implementation, as well as completion of work on the financing model. Upon completion of the research, the final location selection for the first and subsequent blocks of nuclear power plants will be made and a new repository for low- and intermediate-level waste will be launched. The technology and general contractor will also be selected. Activities will also be conducted to ensure **adequate human resources** - both for the construction of the power plant and its proper operation, as well as for the nuclear supervision.

There is also a potential for the use of high temperature reactors (HTR), which, not being an alternative to large-scale light-water nuclear power plants, could in the future be used mainly as a source of technological heat for industry.

**SPECIFIC OBJECTIVE 6.**

Development of renewable energy sources

**STRATEGIC PROJECT 6.**

Implementation of offshore wind energy

The increase in the role of renewable energy sources arises from the need for a low-emission energy transformation through diversification of the energy balance and reduction of its emissions, as well as the contribution to the EU-wide 32% RES target in gross final energy consumption, but also from the global trend of using this energy with falling technological costs. Poland declares to achieve at least **23% share of RES in gross final energy consumption in 2030** (*in electricity* - at least 32% net, *in heating and cooling* - an increase of 1.1 percentage points every year, *in transport* - 14%). Taking into account the expected technological progress, **offshore wind farms whose introduction is a strategic decision regarding the development of key competences in this area in Poland, allowing for economic growth**, will play a special role in achieving the RES target. Further expansion of **photovoltaics** is expected, the operation of which is correlated with summer peaks in electricity demand, as well as development of onshore wind farms that generate electricity in similar time intervals as offshore wind energy. There is also envisaged an increase in the importance of **biomass, biogas, geothermal energy** in district heating and **heat pumps** in individual heating, and in transport it is necessary to increase the use of **advanced biofuels and electricity**.

The distributed energy sector based on renewable energy generation, sale, storage or participation in DSR programs by individual entities (e.g. active consumers, renewable energy prosumers and others) and energy communities (e.g. energy clusters, energy cooperatives) will also develop. By 2030, an approx. 5-fold increase in the number of prosumers and an increase in the number of energy sustainable areas at the local level to 300 is expected. For the safety of the National Power System operation, the connection of an unstable energy source in the future will be associated with the **obligation to ensure balancing** in periods when RES does not supply electricity to the grid. **RES support mechanisms** will put in a privileged position solutions ensuring maximum availability, with relatively the lowest cost of energy production and meeting local energy needs, as well as hybrid solutions combining various renewable energy technologies, self-balancing, e.g. using energy storage.

**SPECIFIC OBJECTIVE 7.**

Development of district heating and cogeneration

**STRATEGIC PROJECT 7.**

Development of district heating

Covering heat needs takes place at the local level, therefore it is extremely important to ensure **energy planning at the level of municipalities** and regions - this is crucial for rational energy management, improving air quality and extracting local potential. A useful tool will also be the launch of a nationwide heat map, which will facilitate the planning of covering thermal needs. As the main goal it is indicated that in 2040 all heat needs of households should be met in a zero- or low-emission manner.

In areas where there are technical conditions for supplying heat from an energy-efficient district heating system, **customers should use district heat in the first place**, unless they apply a more ecological solution. It is necessary to consistently enforce this obligation. By 2030, **approximately 1.5 million new households** will be connected to the district heating network. At the same time, a new market model will be developed so that the heat prices are acceptable to consumers, and at the same time allow covering justified costs together with the return on invested capital. At the same time, **the goal is that in 2030 at least 85% of the heating or cooling systems**, in which the ordered capacity exceeds 5 MW, **meet the criteria of an energy-efficient heating system**. This will be due to the

development of **high-efficiency cogeneration, the conversion of power plants into combined heat and power plants, increasing the use of renewable energy and waste in district heating**, modernization and expansion of heat and cold distribution systems, and popularization of heat storage and smart grids.

To cover **heat needs individually**, sources with the lowest possible emission (heat pumps, electric heating, natural gas, smokeless fuels) should be used and **coal should be removed - in cities by 2030, in rural areas by 2040**. Moreover, activities related to the monitoring of emissions in single-family houses will be intensified in order to properly address the most urgent information and education activities.

#### SPECIFIC OBJECTIVE 8.

Improvement of energy efficiency

#### STRATEGIC PROJECT 8.

Promotion of the improvement of energy efficiency

Poland sets the national target for improving energy efficiency by 2030 at the level of **23% in relation to primary energy consumption** according to the PRIMES 2007 forecast. The potential for improving energy efficiency lies in almost the entire economy. It is also associated with the implementation of new technologies and the growth of innovation in the economy, influencing its attractiveness and competitiveness. Pro-efficiency measures lead to a reduction in energy consumption and energy costs, although the benefits should often be considered in the perspective exceeding the payback period of these investments.

The increase in the energy efficiency of the economy will be created by the obligation of a group of entities to improve energy efficiency or purchase energy efficiency certificates, but also by using legal and financial incentives for pro-efficiency activities. The exemplary role of the public sector is also of great importance, resulting in investments that will be characterized by innovation and higher energy efficiency norms and standards, as well as improving awareness of rational energy consumption with the full involvement of the society (local communities, entrepreneurs) focused on energy-efficient devices, products and technologies.

Inefficient use of energy is strongly related to the problem of **low emissions** (burning of low-quality coal and household waste; improper operation of the installation; burning of coal in local heating plants with low efficiency; transport emissions). The main tool to deal with the problem is the widespread **thermomodernization of residential buildings and ensuring effective and ecological access to heat**, which will also reduce the problem of **energy poverty by 30%, i.e. to a maximum level of 6% of households in 2030**. The development of electromobility and hydro-mobility as well as a number of activities planned for the enlargement of the alternative fuels market will contribute to the reduction of transport emissions. In the area of **public transport**, it is planned to strive for a deep reduction of GHG emissions, and **in cities of over 100,000 inhabitants - achieving zero-emission public transport from 2030**.