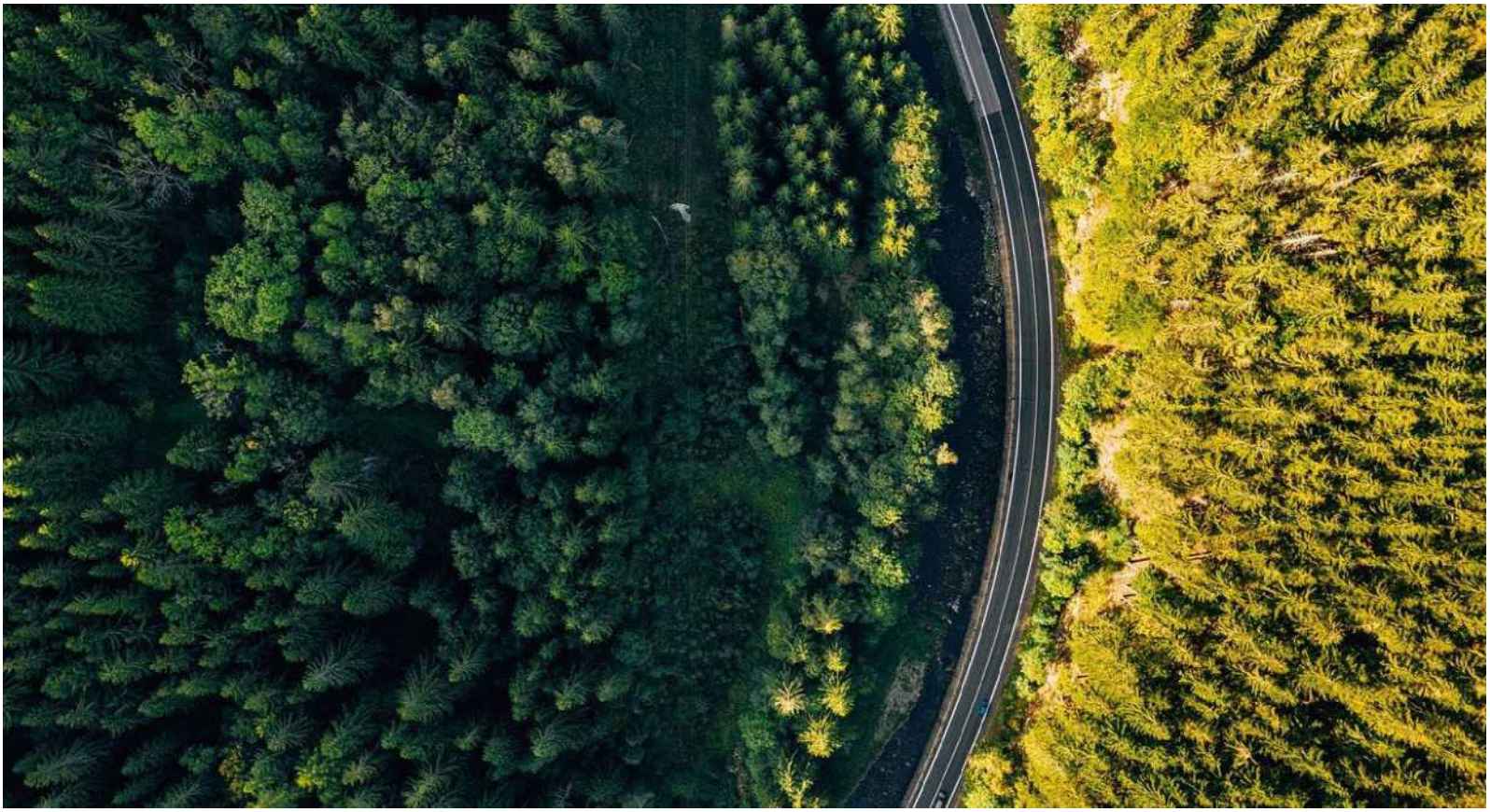
Ministry
Of Climate and

VERSION
PRELIMINARY

National Plan in the field of Energy and Climate by 2030

(2019 update of NECPs) – project of 29.02.202



Warsaw 2024

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Word of introduction

Ladies and Gentlemen,

The commitment to climate neutrality is one of Poland's biggest civilisation challenges in its history, affecting almost all areas of our lives. In order to achieve the EU's climate neutrality objective already in 2050, we need to take concrete action over the years ahead. The "National Energy and Climate Plan 2030" (aKPEiK) contributes to achieving EU climate neutrality in 2050. Before us a generational opportunity to shape a low carbon future and boost economic development.

We give you the first partial update of this strategic document. The National Plan is a key document guiding the Polish transition and, as such, has a decisive impact on the country's energy and climate policy in the medium term.

People were inspired by this document, with their specific needs, dreams and often fears. The strategy's role is to provide a framework for the development of a country that effectively protects health and ensures the well-being of its inhabitants, while ensuring their energy and climate security. We are working to tackle citizens' concerns. This is in their interest to decarbonise and strengthen the economy, to innovate and to tackle climate catastrophes.

Ultimately, the aKEC strategy will be based on two transition scenarios: baseline (*WEM*) and ambitious (with *additional measures* – WAM). The baseline scenario shows developments on the basis of existing instruments and planned policies. The ambitious scenario assumes the implementation of new energy and climate policy instruments, with the aim of accelerating decarbonisation in a way that builds the strength of our economy.

This document presents the first of the two scenarios (i.e.: WEM). It is based on implemented and planned transition policies, thus resembling the business as usual scenario. This is a sustainable aspiration scenario – it shows what will happen if we do not have a climate ambition. It results in a relatively low level of CO2 emission reductions by 2030 and a relatively high level of consumption of coal, gas and other fossil fuels. This scenario does not meet the EU GHG emission reduction target of 55 % compared to 1990. Solutions to achieve Poland's GHG emission reduction target close to that of the EU will be presented in a more ambitious transition scenario (i.e.: Wam), which is undergoing advanced work at the Ministry of Climate and Environment.

The draft update – currently in force – of the National Plan should be submitted to the European Commission by 30 June 2023. Given the delay in drafting the document, the European Commission launched an infringement procedure against Poland. The following draft is therefore necessary in order for the procedure to be concluded with regard to Poland.

Target document with two scenarios: WEM and WAM, will be presented for full public consultation and sectoral arrangements and finalised at the turn of Q2/Q3 2024.

1. INTRODUCTION

A) What is the NECPs and for what purpose it has been developed

Sustainable development of the energy sector and environmental actions are essential to strengthen the national economy and build its competitiveness. A responsible energy strategy should respect equivalent, interacting and complementary objectives: energy security, economic competitiveness, energy efficiency and reduction of environmental impact. In addition to low-carbon development, the energy and climate transition in

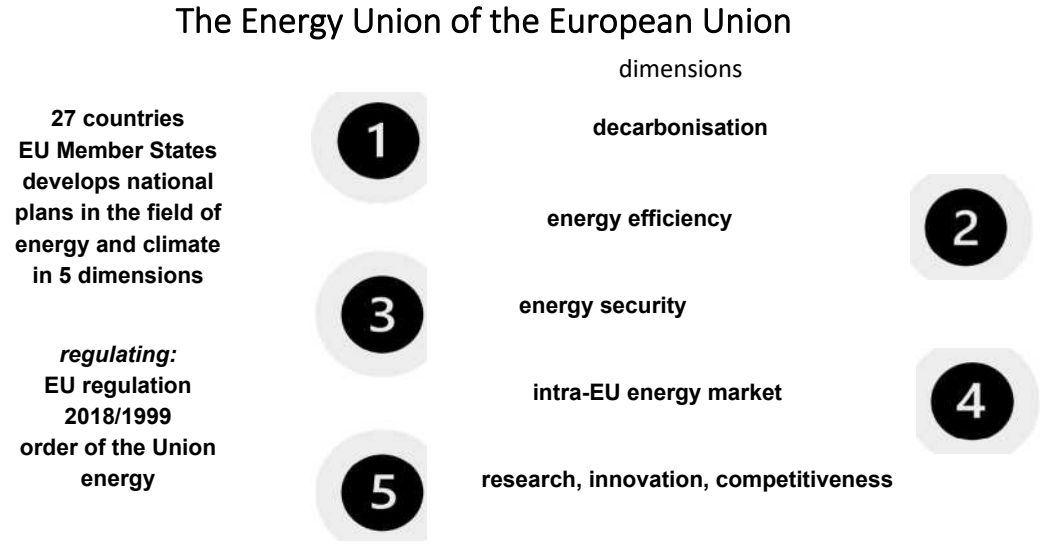
Poland should ensure a stable energy supply for consumers at acceptable prices. Given that transformations will be a long-term, capital-intensive process, covering all sectors of the economy, it is crucial that the changes introduced take into account a fair dimension, i.e. provide a stable strategic framework to adapt sectors, retrain workers in the sector, creating new opportunities for the development of the regions and communities most affected by the negative (but transitional) effects of this transition. A transparent and long-term energy strategy provides a stable framework for systemic mechanisms, sector regulation and investment decisions requiring the involvement of private and public capital. Taking into account the above and the significant sectoral, economic, regulatory and geopolitical developments after 2020, work has started on updating the national strategy guiding the climate and energy transition and identifying the contribution to achieving the EU's 2030 targets.

The European Union (EU) is very committed to international climate agreements. In its response to climate change, the EU also sees an opportunity to build competitive advantages. One of the distinctive features of the Union is to maintain uniform rules for the functioning of markets, which also include guaranteeing a secure, environmentally friendly *and affordable energy supply for consumers, including households and businesses*. Responding to these challenges, the EU *Framework Strategy for a Resilient Energy Union with a Forward-Looking Climate Change Policy was set out in 2015.* The Energy Union is based on **five interrelated and mutually reinforcing dimensions**: energy security, internal energy market, energy efficiency, decarbonisation (with a specific role of renewable energy sources (RES) and research, innovation and competitiveness.

In 2018, EU Regulation 2018/1999 *on the Governance of the* Energy Union was adopted, obliging Member States to develop National Energy and Climate Plans1 (NECPs), which are periodically updated and reported. The development of these documents is the cornerstone of the governance mechanism of the Energy Union, which allows an analysis of whether the EU will meet its climate and energy targets, based on contributions from the Member States. The purpose of clearly defining the scope of the document is to ensure the transparency, consistency, comparability and completeness of the information and the detail of the information.

1The abbreviation NECP is used in Poland and the abbreviation NECP is used in the international nomenclature. *National Energy and Climate Plan*).

This document is an **update of *the National Energy and Climate Plan 2021-2030* (aKPEiK)** of 2019. The drafting of the document follows directly from Article 14 of Regulation (EU) 2018/1999, and Article 15ab of the Energy Law Act indicates that the minister responsible for *energy*, in cooperation with the minister responsible for climate matters, is responsible for drawing up the NECPs, updates and reports. The tasks of both departments are currently carried out by the Minister for Climate and the Environment.

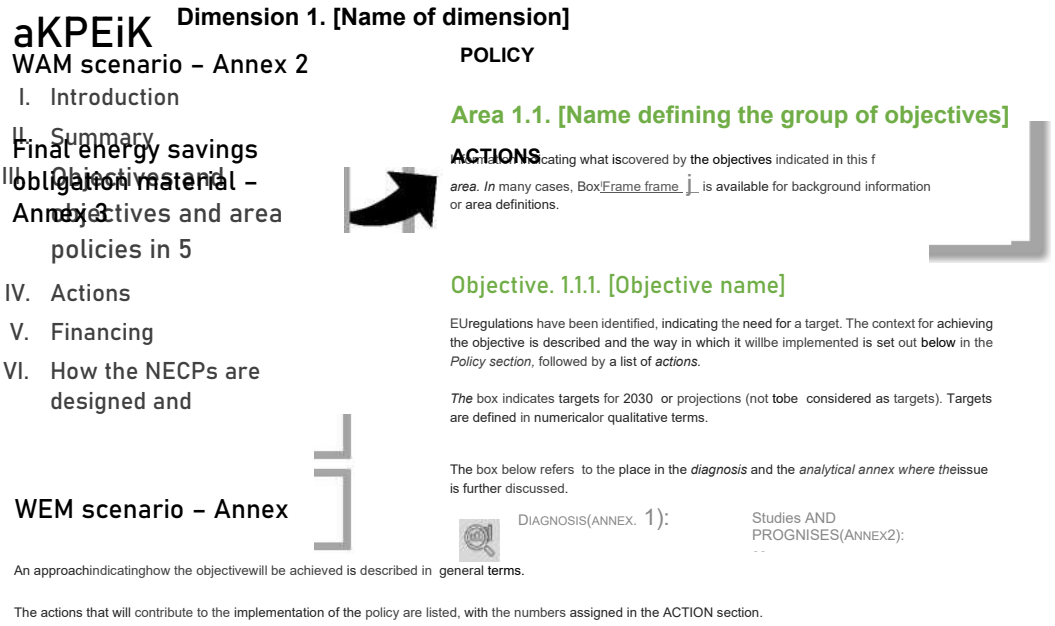


B) How the NECPs are constructed

The scope of the NECPs is regulated by Annex I to Regulation (EU) 2018/1999. The NECP should contain:

(1) general overview,
(2) objectives and targets,
(3) policies and
(4) analytical basis for policies and actions implemented – WEM scenario
(5) analytical basis for assessing the impact of additional policies and actions – WAM scenario.

In order to facilitate the reception of the content of the NECPs updates, it has been developed in a slightly modified way compared to the *National Energy and Climate Plan 2021-2030* of 2019. The following figure presents the elements and construction of the document in a simplified way. The Essential Part (PEPs) presents (III.) ANNEXES **AND CELE in the** five dimensions of the Energy Union, broken down into **areas** where the different **objectives** are grouped together in thematic terms. **The objectives** (marked by the grey box) are preceded by a brief contextual description, followed by a brief definition of the **policy** for achieving them and the **key actions** [directly consistent with the taxonomy included in the first NECP report produced in 2023]. The representation of this structure is the graphic below. The list of actions with a description can be found in Part **IV. ACTIVITIES**. They are assigned to the Energy Union dimension, but may also refer to other dimensions.



Annexes 1 and 2 present the **scenarios of the WEM and WAM [only the WEM currently available]**which are discussed in the next part of this chapter. The results of the WEM scenario form the basis for setting sustainable and realistic targets for Poland. Annex 3 describes the measures to achieve the required end-use energy savings referred to in Article 8. 1 of Directive 2023/1791 and values of the primary energy input factor for electricity from the electricity grid Primary Energy Factor – PEF) for Poland, based on Article 31 of Directive 2023/1791.

(C) WEM and WAM scenario

Regulation (EU) 2018/1999 indicates that the NECPs contain two analytical scenarios: WEM scenario – with

existing policies and measures; and the WAM scenario – with additional policies and measures.

In the previous NECP, the WEM scenario assumes that no additional action is taken after 2018; therefore, forecasts were negligible in the public debate and were not considered as a realistic assessment of Poland's capacity. For the WAM scenario, the objectives set for Poland and all EU countries in the *Clean Energy for All Europeans package are to be met*. In some cases, mandatory targets have been adopted independently of a real assessment of the feasibility of achieving them in national circumstances.

The *Fit for 55 regulatory package – Fit for 55* has greatly expanded the list of objectives and obligations imposed on EU Member States. Having carried out detailed foresight analyses, Poland takes the view that many of them go beyond technical, technological and economic capacity in the short term in 2030. **Therefore, a different approach to scenarios has been adopted in order to identify the real effort and costs of implementing the objectives of the *Fit for 55* regulation and thus a gap in investment, technological, technical and other needs**.

In the aKPEIK, the scenarios are understood as follows:

The WEM scenario (Annex 1) is understood as the baseline **scenario of transition in market and technical conditions** – the projections **are realistic** in technical, organisational and economic terms. In addition to low-carbon trends, account is taken in particular of:

- in the energy sector, the technically possible rate of carbon offsets so that the increase of unstable zero-emission capacity is matched by adequate levels of available capacity and the development of technologies and solutions **to ensure security and stability of energy supply** (capacity sufficiency3); ongoing and planned investments are taken into account, the availability of new technologies to guarantee RES booking, economic optimisation is carried out in forecast simulations based on sectoral models;
- in industry, an assessment of the real pace and depth of changes that may occur in enterprises, taking into account the inputs, the technical feasibility of changing equipment and processes and the actual availability of new technologies,
- the impact on the labour market – in addition to supporting workers linked to the carbon economy, takes into account the fact that transformative jobs should be sustained – the rapidly generated high demand for new technologies causes a large but temporary increase in the demand for specific work, so the risk that a significant part of the jobs may quickly disappear from the market should be mitigated,
- impact on economic development – it is assumed that efforts to reduce greenhouse gas emissions and reduce energy consumption should not limit Poland's economic development too strongly. Our economy still needs to develop and improve living standards, which makes it more difficult to reduce GC emissions and energy consumption than in more developed economies4. Consideration is also given to the continued presence of some of the migrants from Ukraine in Poland, which has an impact on the increase in energy demand.

The WAM scenario (Annex 2) is understood as a **theoretical Fit for 55 scenario,** which assumes the implementation of new energy and climate policy instruments, **with the aim of accelerating decarbonisation and reaching the climate neutrality path, taking into account the specific starting point and national circumstances**. The forecasts implement all *Fit for 55* targets and commitments, mandatory for all EU Member States and indicated individually for Poland, whereby:

- for some of the objectives, the 'matching' of technologies higher than currently assessed as realistic and the use of technically immature technologies, the availability of which is not currently known, was allowed.
- it is assumed that the results will serve as a benchmark for the WEM, **showing the scale of technical, technological and economic needs** compared to a realistic assessment of the feasibility of the energy transition.

3The electricity system must have a certain amount of available capacity to cover demand during periods of inactivity of wind and solar power plants and the so-called reserve capacity.

4Improving the energy efficiency of appliances and processes reduces energy intensity, but economic growth results in an increase in the number of processes and devices that generate additional energy demand.

III. OBJECTIVES AND TARGETS and Area policies

in the 5 dimensions of the Energy Union

Dimension 1. Decarbonisation

Decarbonisation has been considered by the EU as an overarching objective of climate and energy action, including the **first dimension of the Energy Union**. From a national perspective, this objective is understood equally to other dimensions of the climate and energy transition, while the crisis caused by the Russian aggression against Ukraine has highlighted the crucial importance of energy security for the economy, including strengthening energy sovereignty. Without an adequately resilient energy system, it will not be possible to make the transition to a zero-carbon economy.

All sectors have an impact on the level of emissions, albeit to varying degrees. Reducing greenhouse gas (GHG) emissions in some sectors is more difficult than in others and it is not possible to avoid some of the emissions in some areas – according to current knowledge and technology availability. Therefore, climate neutrality is being pursued, which can also be ensured by removals of CO2 emissions.

This part of the NECPs includes objectives and targets related to the reduction of greenhouse gas emissions in general as well as the use of renewable energy sources, which the European Union has recognised as a specific measure to reduce GC. Specific targets have been set in the areas of decarbonisation of electricity, heating, transport, industry and agriculture. The potential of land use, land *-use change, and forestry (LULUCF) was also assessed as a sector that*compensates for a share of emissions from other sectors.

In view of increasingly frequent extreme weather events, adaptation to climate change as well as objectives to improve the quality of the environment, including air, have also been addressed horizontally.

Area 1.1. Reduction of greenhouse gas emissions and increased use of renewable energy sources (general objectives)

This section sets out an **economy-wide GC emission reduction target and for the non-ETS sectors**. Both objectives have been identified on the basis of foresight analyses. **Emission reductions in sectors covered by the Emissions Trading System – EU ETS (EU ETS**) The*European Union Emissions Trading System*) is not defined as an objective, but as a prediction of the impact of the measures taken.

National GHG emissions consist of emissions from different sectors

According to the methodology adopted by the Intergovernmental Panel on Climate Change (IPCC) *Intergovernmental Panel on Climate Change*) emissions are attributed to sectors: (1) energy; (2) industrial processes and product use; (3) agriculture; (5) waste; with (4) LULUCF may lead to offsetting of emissions from other sectors.

The second distribution is linked to the EU trade system emission allowances for sectors covered by the EU ETS, and

The document further sets out objectives and actions by economic sector in a way that is similar to the IPCC classification, making it easier to determine how the overall target will be achieved.

The increase in RES use has been given a particular role in reducing GCs. Therefore, this section also sets a target **for the share of renewable energy sources in gross final energy consumption**.

The existing RED II and the new RED III set sectoral (and specific) objectives for heating and cooling and transport. For the electricity generation sector, EU regulatory targets have been set and Poland provides an estimate of the share of RES in this sector. *Targets and targets for the share of RES in individual sectors – which influence the overall target – are discussed*

For the final consumption of RES gross energy (general target) consists of use of RES in particular in (1) in electricity, (2) heating and cooling, and (3) in transport.

The largest amount of energy is used in Poland for heating purposes, therefore the increase RES in this sector, e.g. 1 pt % means in absolute terms, much higher

in the parts related to the decarbonisation of these sectors.

The new rules under RED III also refer to the setting of targets in the construction and industrial sectors, but the methodology for determining the share of RES in these sectors has not yet been established, making it impossible – in the current circumstances – to set targets in these areas on the basis of detailed, consistent methodological analyses.

Issues relating to local communities and prosumers are defined in the 4th dimension – the intra-EU energy market.

Objective. 1.1.1. Reducing greenhouse gas emissions from the economy (general objective)

In recent years, Poland has been in a process of dynamismising economic and sectoral changes, in line with global low-carbon trends, taking into account specific national circumstances. However, simultaneous economic development and the reduction of carbon intensity and greenhouse gas emissions are a major

challenge for Poland. In December 2020, the European Council increased the **EU's existing target of reducing greenhouse gas emissions** from 40 **% to 55 % compared to 1990 levels. The objective of the increase** in ambition was to become a leader in the implementation of the so-called **Paris Agreement**, the operationalisation of which aims to keep the increase in global temperature below 2 °C above pre-industrial levels, and to strive for no more than 1.5o C. In the 2019 NECPs, Poland set a target for the non-ETS sectors, with a national reduction target of 30 % of GC emissions compared to 1990 set by *Poland later in the Energy Policy adopted in 2021.*

As has been the case so far, EU regulations do not set targets for individual Member States for total GC emissions – countries declare **a contribution to the EU target of 55 % in 2030** compared to 1990 levels regulated by EU Regulation 2021/1119, the European Climate Law5. **When determining the above-mentioned national contribution, it is essential to take into account the national circumstances, the starting point and the real possibilities for reducing emissions, while at the same time allowing the national economy and individual sectors to develop**.

Economy-wide projections indicate that **Poland could achieve a 35 % reduction in greenhouse gases in 2030 (to around: 288 million tonnes of ects Co_2) compared to 1990 [** *the estimates are not intended]*

It is worth highlighting that by 2021 the reduction in domestic GC emissions compared to 1990 was 15 %. Thus, **the 35 % target by 2030 will result in a very significant reduction over less than a decade (i.e. by a further 20 percentage** points). The energy sector accounts for the largest share of GC emissions6, but at the same time the largest reduction in GC emissions will be achieved in this sector (around: 40 % compared to 1990, to around 232 million tonnes of ects CO_2). The main contribution will be made by the wider electricity and heat production sector. At the same time, projections show that the reduction of GHG emissions in other sectors is very difficult, due to the limited range of changes that can be introduced (e.g. agriculture) or because the emission reductions achieved for specific processes do not translate into a reduction in total emissions, as activity in these sectors is increasing (e.g. transport, industry).

POLICY

Decarbonisation **efforts will be pursued in all sectors of the economy**, while preserving energy security and rational spending and burdens on society and economic operators.

The policies and actions identified in the next objectives for economic sectors are further elaborated.

ACTIONS:

The actions identified in the subsequent specific objectives for the relevant sectors will contribute to the achievement of the general objective.

Objective. 1.1.2. Reducing greenhouse gases in the non-ETS sectors (ESR) and estimated reduction in ETS sectors

The Union's decarbonisation policies vary from sector to sector. The energy sectors (electricity and heating), energy-intensive industries and aviation are covered by the European emissions trading system – the EU ETS, with around half of Poland's GC emissions. **Emissions from the EU ETS sectors should be 62 % lower in the EU than in 2005 (** currently 43 %), including through the implementation of Directive (EU) 2023/959, the so-called ETS Directive7. It does not set targets for individual EU Member States. Poland does not specify a

5Article 4 of Regulation EU 2021/1119.
6As understood in the IPCC methodology as combustion of fuels in the energy industry, manufacturing and construction, transport, other sectors; and fugitive emissions from fuels.
7Recital 39 of the ETS Directive – (EU) 2023/959.

contribution in this regard, but provides an estimate of the value it can achieve as a contribution to the EU target.

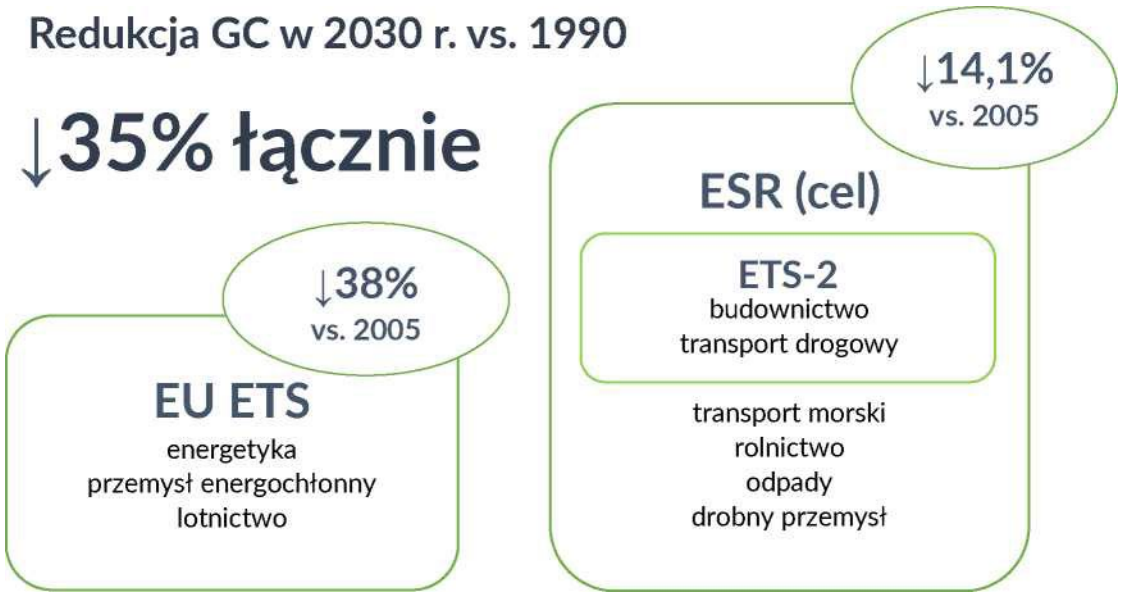
Projections indicate that Poland can achieve around a **reduction in emissions in the sectors covered by the EU ETS compared to 2005 levels. 38 % in 2030** (to approx. 130 million t). *[estimates are not intended]*

EU Regulation 2023/857 (renewing the so-called ESR) for other sectors (buildings, road and maritime transport, agriculture, waste, small industry), so far, has set an EU reduction target of 40 % in 2030 compared to 20058 (so far 29 %). **For Poland, a binding reduction target of 17.7 % in the non-ETS sectors compared to 2005 9** has already been set. —7 % on the basis of the previous ESR Regulation) Poland assessed as an ambitious commitment, which is why the current commitment is all the more assessed as going beyond national possibilities.

Poland is projected to achieve a 14.1 % reduction target for the sectors covered by the Effort Sharing Regulation (ESD, non-ETS) for 2030 compared to 2005 levels (from 192.5 million t to 165.3 million t).

In addition, the new provisions of the ETS Directive are expected to achieve a new target for the construction sector (including households)10 and road transport, by including them under the new greenhouse gas emissions trading scheme. The EU ETS-2/BRT ETS (*buildings and road transport*) to be launched in 2027. This is expected to result in a 43 % reduction in GHG in these sectors across the EU compared to 2005 levels. There are no separate targets for Member States11. Thus, emission reductions in these sectors will continue to be integrated into the implementation of Effort Sharing (ESR) while contributing to the achievement of a separate target for these sectors only. As the Union target is new, there is no precise methodology for setting it. **Therefore, it is not possible**, under current circumstances, **to set a national target for the EU ETS-2,** based on detailed, consistent methodological analyses.

The use of fossil fuels in these sectors will be at the expense of CO_2 emission$_{allowances}$. This will provide an incentive to reduce their consumption, while controlling the risk of price increases and exacerbating poverty (including energy). Technical, economic and social barriers will also hamper fuel change.



8Article 1 of the ESR.
9Annex 1, point 1, ESR.
10The ETS-2 is also intended to cover a number of additional, specific activities, e.g. heating of industrial sites.
11Article 1(29) of the ETS Directive – insertion of Articles 30a to 30k in Directive 2003/87/EC.

POLICY

The reduction target for the **non-ETS sectors** will be implemented on the basis of policies and actions in the various Effort Sharing sectors, as described below. If necessary, Poland will make use of the flexibility mechanisms provided for in the ESR:

- LULUCF flexibility (Article 7);
- use of the adjustment mechanism – raising an additional envelope (Article 10. 2);
- the transfer, lending and transfer of AEAs (Article 5);
- use of the safety reserve (Article 11).

With regard to Poland's contribution to the EU-wide GC emission reduction targets **in the sectors covered by the EU ETS**, the key mechanism is their participation in the system. The desire to avoid having to bear the cost of purchasing emission allowances is an incentive to make investments leading to emission reductions. In addition, the additional sector-specific targets will have an impact on the reduction of emissions related to the overall reduction contribution of the EU ETS sectors.

The contribution to the EU-wide target **in the sectors** of road transport and heating of buildings – **covered by the EU ETS-2** – will be done in particular through participation in the system. The incentive to reduce GC emissions in these sectors is also due to the need to meet other climate and energy objectives.

Further details are the policies and actions identified in the next sectoral objectives.

ACTIONS:

The actions identified in the subsequent specific objectives for the relevant sectors will contribute to the achievement of the general objective.

Objective. 1.1.3. Increase in the share of RES in total gross final energy consumption (overall target)

Directive (EU) 2018/2001 (RED II) provided that the share of RES in gross final energy consumption would be 32 % in 203012, with each Member State contributing nationally. In the 2019 NECP, Poland declared that it would contribute to the EU target by reaching a RES share of 21-23 % in 2030.

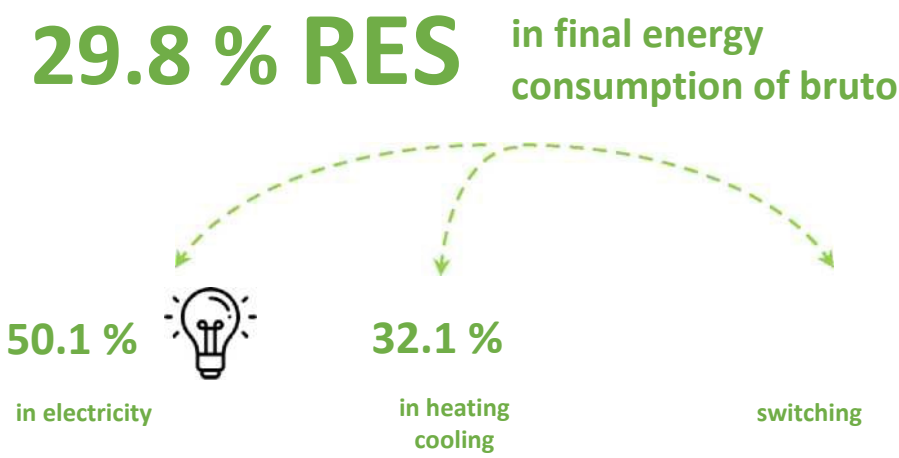
The EU's ambitions have been revised as part of the *Fit for 55 regulatory package – Fit for 55*. The first proposal set a target of 40 % and, ultimately, Directive (EU) 2023/2415 (RED III) set a **target of 42.5 % of EU gross final energy consumption in 2030,13but in** addition the implementation of RePowerEU should increase the share of RES by an additional 2.5 percentage points, so the **EU will aim at 45 %**. In this case too, individual targets for Member States were not indicated, but the *assessment of the impact of the regulation on* the RED III14project indicated that, as an indication, Poland should achieve 31 % of the final gross energy consumption (the calculations carried out at the stage of the proposed EU target – 40 %).

Following the foresight analyses, **Poland declares to achieve 29.8 % share of RES in gross final energy consumption by 2030** as a contribution to the new EU-wide 2030 target. This target will consist of RES consumption combined in electricity, heating and cooling and transport.

The revision of the national 2030 target by 7-9 percentage points compared to the 2019 NECPs is possible thanks to the development of RES in recent years (in particular in the electricity sector) and the popularisation

12Article 3 of RED II.
13Article 1(2)(a) RED III.
14 *Impact Assessment Report Accompanying the Proposal for a Directive of the European Parliament and the Council amending Directive (EU) 2018/2001 of the European Parliament and of the Council, Regulation (EU) 2018/1999 of the European Parliament and of Directive 98/70/EC of the European Parliament and of the Council as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652*, Table 11, link

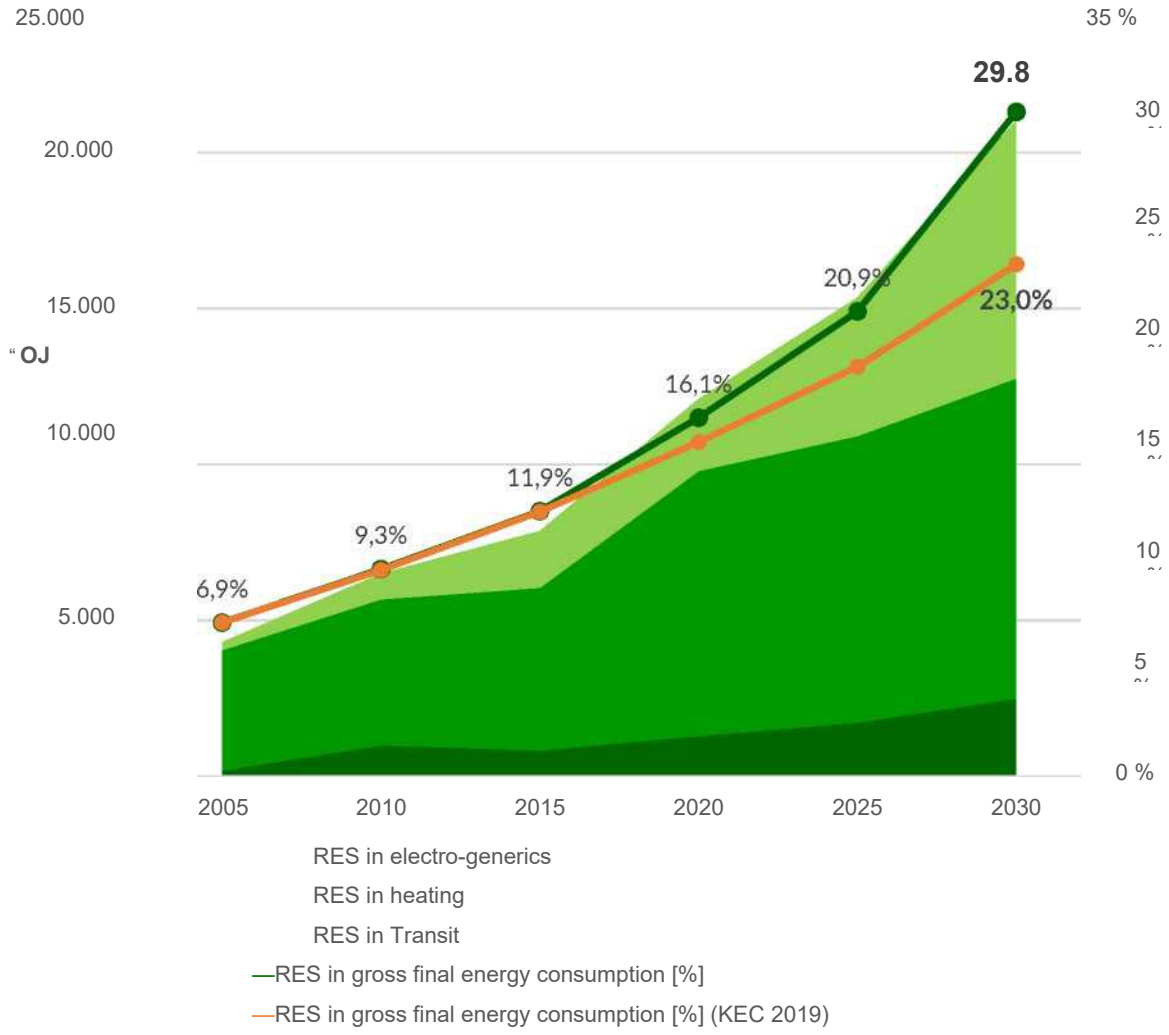
of distributed energy production in prosumer installations. At the same time, given that in 2022 the share of RES in gross final energy consumption was 16.9 %, achieving the above-mentioned target by 2030 will require additional efforts and action to be taken in a determined and consistent manner.



As most energy is used for heating purposes, the share of each percentage point of RES in electricity and transport in absolute terms is a lower contribution to the overall target. Projections indicate that the fastest changes will occur in the electricity sector, where the share of RES in 2030 could reach **50.1 % (8.3 Mtoe)**. The share of RES in heating and cooling can reach **32.1 % (10.3 Mtoe)** and for transport **17.7 % (2.5 Mtoe)**. More detailed area-based assumptions can be found on the following pages.

Given the progress made so far in the development of RES, both the EU and national commitments for 2030 should be considered relatively ambitious. Each sector has different characteristics and challenges. The common feature of all areas in terms of increased greening is the dependence on technological progress, both in the current known ways of generating energy and the solutions accompanying RES (e.g. balancing and energy storage technologies) and in completely new technologies. The transport target is estimated to be the most difficult to achieve.

RES consumption in sectors and final energy consumption compared to the 2019 NECPs



POLICY

The development of renewable energy sources is one of the main tools for decarbonising the economy. In absolute terms, solid biomass energy (including sustainable) will play the largest role in achieving the overall target in view of its predominant role as RES in heating. Efforts will be made to systematically increase the role of other RES. The priority is not only to directly increase the use of the most popular technologies (in particular wind, solar), the deployment of heat pumps and the development of electro-mobility, but above all to provide technical opportunities for RES growth, from adapting energy transmission and distribution infrastructure, developing stable and manageable back-up sources, developing generation and demand flexibility, to developing energy storage to developing alternative fuels infrastructure.

Specificity is the policies and actions identified in the sectoral objectives.

ACTIONS

The actions identified in the next sectoral objectives will contribute to the achievement of the overall objective.

Area 1.2. Decarbonisation and development of RES by sector

As indicated in the description of the overall emission reduction target, decarbonisation efforts in all sectors of the economy must contribute to achieving it. The GC emissions reduction target in the non-ETS sectors and the projections for emission reductions in the sectors covered by the EU ETS are set above, while this part indicates how the decarbonisation of the sectors will be pursued:

- electricity,
- heating,
- transport,
- industry, • agriculture.

Objective. 1.2.1. Reduction of GC emissions in the electricity sector, including the development of RES

The Polish electricity sector has historically been based on coal-fired power plants, due to access to raw materials and political decisions of the last century. Nuclear power was not chosen among stable sources of electricity generation, and the country's hydropower capacity did not allow the construction of significant hydropower capacity. For this reason, our country's decarbonisation starting point was relatively difficult, also taking into account the limited economic capacity of our country.

Over the last 10 years, the national electricity system (NIS) has undergone a rapid change in the structure of installed capacity and electricity production. Between 2020 and 2023, the capacity installed in the KSE increased from around. 47 GW to 66 GW, i.e. by more than 1/3 – mainly RES and gas capacity contributed. Coal-fired power plants, especially those in the poorest technical condition, have the greatest impact on the level of greenhouse gas emissions and the carbon efficiency of electricity generation. In previous years, many investments have been made which have reduced the environmental impact of older coal units. The latest implemented carbon blocks have lower emissions than older units. New renewable capacity – wind and solar power plants – played a key role in decarbonisation, with investments in available capacity also required due to their high weather dependency. Gas-fired power plants, which are less carbon intensive than coal-based units, have been particularly important and therefore constitute a 'bridge' on the path to a zero-emission generation sector. Decarbonisation trends will continue.

Projections indicate that Poland could achieve 46 % emission reductions in the electricity sector15 16 in 2030 compared to 2005 levels *[estimates are not a target]*

Given the **specific role of RES** in decarbonisation, specific targets are set for their development.

RED III and the former RED II **do not indicate obligations for Member States or EU targets to achieve a certain share of RES in electricity consumption**, but capacity increases are taking place faster in this sector than in heating or transport.

The development of RES in electricity is a global trend, including a strong increase in this capacity in Poland, with an increase from around approx. between 2015 and 2023. GW to over 28.8 GW, i.e. around 90 % of newly installed capacity in the national electricity system (KSE)17. This is due to the growing popularity of solar and

15Emission of electricity generation is the sum of GC emissions emitted by generating units (total emissions) divided by the sum of the electricity produced.
16Refers to IPCC methodology category 1A1aii *CHP, which includes energy produced in power plants and combined heat* and power plants.
17*Statistical information on electricity. Monthly Bulletin – December 2023*, No 12 (360), Table 14, ARE S.A. on behalf of MKiŚ and ERO.

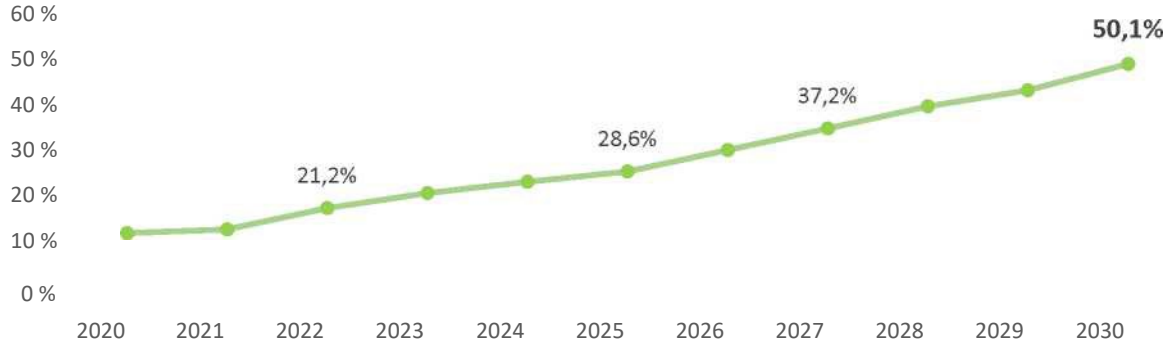
wind energy, although the increase in their share of energy production is much slower due to their dependence on weather conditions. Biomass, biogas and future biomethane plants also play a complementary role. Units with a thermal input above 2 MW in the case of gaseous biomass fuels and above 20 MW (and then 7.5 MW) for solid biomass fuels will be required to **comply with sustainability criteria**, including the purchase of so-called sustainable biomass, which will affect the availability of the raw material and the cost of this fuel. On the other hand, biogas units, which could be an excellent complement to weather-dependent RES, have high operational costs and costs. Poland does not have significant hydrological potential for the important role of flow hydropower plants. However, water energy can be used in pumped storage plants (not included in RES), which, while supporting the need to regulate the system during periods of favourable and unfavourable solar and wind conditions, are also storages.

The forecasts accompanying the previous NECPs indicated that the share of RES in electricity production could reach around. 32 % in 2030 and close to 40 % in 2040. As a result of the dynamic development of onshore photovoltaics and wind energy, as well as support schemes and investments in linear infrastructure, the assessment of possible RES shares in electricity could significantly increase compared to the 2019 NECPs projections.

Projections indicate that Poland could reach around. 50.1 % share of RES in final electricity consumption in 2030 and 59.1 % in 2040 ***[estimates are not a target]***

For 2030, onshore wind farms (with installed capacity) will contribute most to the increase in electricity production from RES. **15.8 GW**) and similar levels of solar power plants (approx. **29.3** GW) and offshore wind (approx. **5.9 GW**) which will operate in the ESC from around 2026. Subsequently, the increase will come from biomass power plants and biogas and biomethane and hydropower plants. The increasing role of reducing the carbon footprint, the popularisation of dispersed energy production in prosumer installations, energy clusters, energy communities or near industrial sites will lead to these sources developing largely independently of public aid. The figure below shows the trajectory for the share of RES in gross final energy consumption in electricity.

Share of RES in electricity consumption by 2030



POLICY

In the following years, coal and lignite-based blocks will be gradually set aside. The speed and sequencing of the deviations will depend on both the **adequacy** of the electricity system and the provision of a stable electricity supply to final customers. The utility of individual plants in a given location (balancing) as well as their technical condition and compliance with emission standards should be taken into account.

During the transitional period, the carbon efficiency of the electricity sector will also be reduced by partially replacing **coal units** by lower carbon gas units. It is expected that their use will peak around. 2030 and then decrease as a result of the increase in zero-emission capacity. **Nuclear energy – to be deployed in the period 2030-2035 – will be of particular importance in replacing gas units in the** role of adequacy.

In 2030, around half of electricity generation will be accounted for by **renewable energy sources**. Onshore wind, photovoltaic and offshore wind, as well as biogas and biomass installations, are expected to play a particular role. In the long term, RES and nuclear energy will be the main tools for reducing emissions in this sub-sector.

In the following years, existing direct support schemes for the development of RES in electricity will be maintained. As of mid-2025, it is also planned to launch additional operating support for existing hydropower, biomass and waste-using power plants for which support has been completed so far – their usefulness for the system is high, but costs are still higher than revenues. At the same time, there is a significant increase in the number of installations built outside support schemes, including those directly connected to the customer. In addition, as in other EU countries, the share of RES installations financed by electricity supply contracts between the two parties to the so-called *power purchase agreement is expected to*increase. The development of RES depends not only on investment in new generation capacity, but increasingly on indirect action to enable RES to operate in the NES. Support will be stepped up for technologies **that ensure integration and safe growth** of the cheapest RES (i.e. other than those reaching economic maturity). Priority shall be given to supporting the modernisation and expansion of distribution and transmission networks (including smart solutions), various energy storage modes, demand-side management mechanisms and ensuring system adequacy and flexibility, including through the development of dispatchable zero-carbon power plants, i.e. hydrogen, biogas, biomethane, ammonia. Due to the insufficient development of these solutions, natural gas-based units and, to a lesser extent, coal-fired power plants will play an important role in filling the electricity balance **during the transitional transition**. Prospectively, in order to achieve deep decarbonisation, the potential of CCS technologies, i.e. the latest coal, new gas and biomass units, will also be assessed.

ACTIONS

- Action 1. Participation in the EU-ETS Emissions Trading System.
- Action 2. Financial instrument – obligation to purchase electricity generated in RES installations.
- Action 3. Financial instrument – RES certificates of origin system.
- Action 4. Financial instrument – auction RES system.
- Action 5. Financial instrument – system of feed-in tariffs and RES subsidies.
- Action 6. Financial instrument – additional operating support for available RES.
- Action 7. Financial instrument – Contracts for Difference (CfD) for electricity generation in offshore wind farms.
- Action 8. Support the development of offshore wind energy.
- Activity 9. Financial instrument – NFOŚiGW Priority Programme – My Pride.
- Action 10. Financial instrument – NFOŚiGW Priority Programme – Energy Plus.
- Action 13. Financial instrument – NFOŚiGW Priority Programme – 'Agroenergy'.
- Action 14. Financial instrument – other programmes of the NFOŚiGW supporting the development of RES.
- Action 15. Financial instrument – other instruments supporting the development of RES.
- Action 16. National Contact Point for Renewable Energy Sources.
- Action 22. Ensure the conditions for the development of SMRs.
- Action 71. Financial instrument – NFOŚiGW 'Energy for Villages' programme.
- Action 72. Research and scientific, educational and commercial projects on CCS and CCUS.
- Action 73. Financial instrument – Modernisation Fund.
- Action 86. Financial instrument – Preferences for electricity generators in high-efficiency cogeneration.
- Action 87. Financial instrument – cogeneration premium.
- Action 88. Financial instrument – Other NFOŚiGW programmes supporting the development of cogeneration.
- Action 105. Development of hydrogen infrastructure.
- Measure 112. Deployment of large-scale nuclear energy.

Objective. 1.2.2. Reduction of GHG emissions from heating, including development of RES

Heating and cooling accounts for about half of energy consumption both at EU level and in Poland. It covers a wide range of end-uses and technologies in buildings, industry and district heating or cooling and has therefore become an important area for target setting.

Heating needs in Poland are largely covered by district heating systems, but also by individual installations. The main source of primary energy in both cases is coal. In 2021, Poland set a target to phase out coal from individual household heating by 2040 and even in urban areas by 2030. **18** Update projections indicate that household demand for coal will be around. Million tonnes, but it is expected that this will not be demand generated by so-called ditches, but by the latest installed top-class, low-carbon and carbon-free boilers burning coal and smokeless coal fuel.

In individual heating, it is difficult to switch away from coal and RES by replacing existing coal installations with alternative solutions such as heat pumps. Deep energy renovation of old buildings is often needed – the cost of which may exceed the expected effects or the condition of the building makes it impossible at all. In addition, the climatic conditions in Poland are characterised by periods of low temperatures during winter periods, where solutions based solely on electric heating in non-thermalised buildings may raise challenges in terms of both thermal comfort and costs. New buildings have higher energy efficiency and are therefore economically and environmentally beneficial.

18In the AKPE, this objective is set out in the section on air quality.

However, a key challenge is the "greening" of **district heating systems**, both in big cities and in smaller cities, where the availability and sourcing of resources is often very limited due to its own structure. It is difficult to find a viable alternative to cogeneration units to ensure the appropriate temperature of the heat carrier, without increasing prices to levels that are unacceptable to consumers. It is possible to use **common photovoltaics, heat pumps and network heat**, but such solutions require both investment and higher operating costs. The**use of geothermal, biomass and biomethane, or waste heat**, depends on local availability. In the future, district heating can also be supported by **technologies using a mixture of natural gas with hydrogen**, as well as solutions based on the use of clean hydrogen as an energy source, as well as other solutions to co-incinerate raw materials combusted with renewable chemicals (e.g. ammonia).

The aim is to ensure that up to approx. By 2040, all heat needs in the economy would be covered by district heating and low- and zero-emission individual sources.

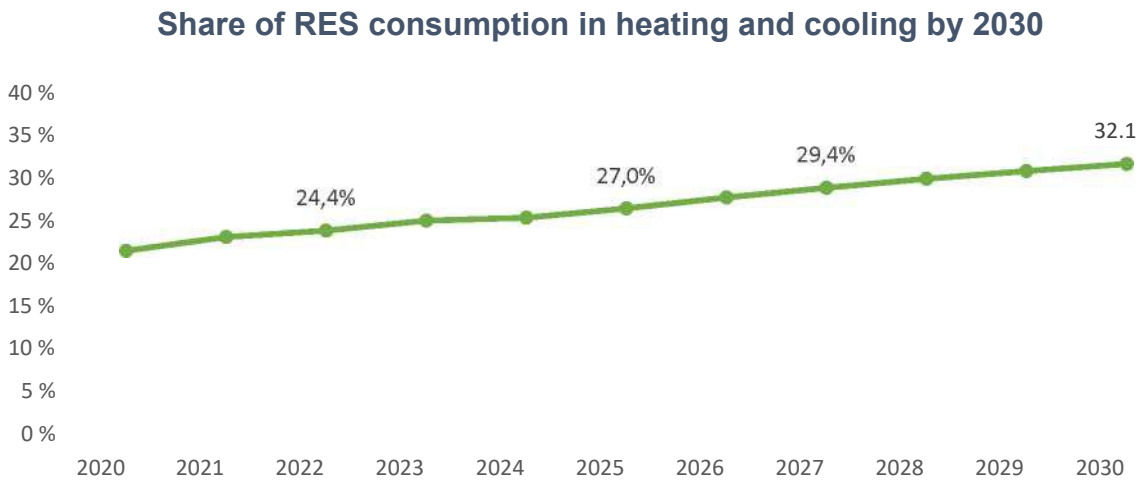
RED III slightly modified the existing targets for the use of RES in heating and cooling. Each Member State is required to increase the share of RES in this sector **by at least 0.8 percentage points on an annual average over the period 2021-2025 and 1.1 percentage points on an annual average over the period 2026-2030**. EU countries should declare such an additional increase so that the EU collectively reaches an average increase of 1.8 percentage points at EU level19.

In 2020, the share of RES in heating and cooling in Poland was 22.1 %, which means that Poland should reach indicative levels: 26.1 % in 2025 and 31.6 % in 2030. Analysis shows that the 2030 target will be exceeded.

Poland sets a target for 2030 of achieving a 32.1 % share of RES in final energy consumption in heating and cooling.

RED III also set obligations to **increase the share of RES and from waste heat and cold in district heating and cooling by around 2.2 percentage points on an annual average** over the period 2021-203020. Given national circumstances, this objective will be very difficult to achieve. *The value of the RES share in the district heating sector will be determined at a later stage of the work on the NECPs.* The figure below shows the trajectory for the RES share in heating and cooling by 2030.

19Article 23 of RED III.
20Article 24 of RED III.



POLICY

Measures taken to increase the share of RES in heating and cooling with regard to **district heating** will be aimed at promoting the use of biomass in cogeneration installations, waste heat, electrode boilers powered by RES electricity, geothermal, large-scale heat pumps and waste thermal treatment installations (also with CO_2capture). Hydrogen and its derivatives, or biomethane and SMR technologies that also allow the use of waste heat, may also be relevant in the future. It should be stressed that during the transition period, especially in large cities, investments are still needed also in gas-fired power plants, although the progressive requirements of the EED on the definition of *energy efficient district heating* will make it necessary to plan their decarbonisation by introducing renewable fuels in an appropriate proportion and time.

Investments in modernising and expanding the heat and cold distribution system as well as promoting heat storage and smart district heating networks are also important. The wider use of linking the electricity and heating sectors can also play an important role in *achieving the*objective.

Poland prioritises the **phase-out of coal from individual household** heating (together with the increasing thermal renovation of buildings) by 204021, with a view to improving air quality in particular. Decarbonisation and "greening" **of individual heating** will largely take place by promoting the use of heat pumps, coupled with photovoltaic installations, in particular in new buildings, due to the increasing energy performance requirements of buildings. Biomass will continue to be used, although in the longer term, EU regulation on pollutant emissions may have a negative impact on the possibility of installing new biomass sources. Increasing the use of RES in individual district heating systems will also encourage the connection of new buildings to the network.

As a result of the reform of the EU ETS, Poland's heating sector will receive an additional 30 % of free CO2 emission allowances, which should be used as a means to accelerate decarbonisation by 2030. In order to account for the funds obtained, **changes will be made to the legislation laying down the rules for setting tariffs for heat and the conditions for using the funds generated by free allocation to finance investments** towards climate neutrality.

Regulatory changes will be made to reduce barriers to the use of RES in heating, preferential conditions for the development of district heating systems using RES, and to place emphasis on the construction of both daily and seasonal heat storage facilities in various technologies, in order to fully integrate unstable renewable energy sources in district heating systems.

ACTIONS

With regard to decarbonisation in district heating:

21Given that current projections indicate household demand for coal of 1.1 million tonnes in 2040, it is expected that households will not burn coal in the 40s.

- Action 1. Participation in the EU-ETS Emissions Trading System.
- Action 10. Financial instrument – NFOŚiGW Priority Programme – Energy Plus.
- Action 11. Financial instrument – NFOŚiGW Priority Programme – 'Poland Geotermia Plus'.
- Action 12. Financial instrument – NFOŚiGW Priority Programme – 'Ciepłownictwo powiatowe'.
- Action 14. Financial instrument – other programmes of the NFOŚiGW supporting the development of RES.
- Action 15. Financial instrument – other instruments supporting the development of RES.
- Action 16. National Contact Point for Renewable Energy Sources.
- Action 17. Financial instrument – NFOŚiGW Priority Programme – New Energy.
- Action 22. Ensure the conditions for the development of SMRs.
- Action 23. Strengthen the efficiency of the use of free CO_2 allowances in heating.
- Action 66. Measures concerning the provision of thermal water in Poland.
- Action 71. Financial instrument – NFOŚiGW 'Energy for Villages' programme.
- Action 72. Research and scientific, educational and commercial projects on CCS and CCUS.
- Action 73. Financial instrument – Modernisation Fund.
- Action 74. Development of clean and efficient district heating systems.
- Action 75. Support for the development of hydrogen systems in heating.
- Action 86. Financial instrument – Preferences for electricity generators in high-efficiency cogeneration.
- Action 87. Financial instrument – cogeneration premium.
- Action 97. Digitisation of district heating networks.

With regard to decarbonisation in individual heating:

- Action 9. Financial instrument – NFOŚiGW Priority Programme – My Pride.
- Action 18.Financial instrument — Program Priority NFOŚiGW — — 'My heat'.
- Action 19.Financial instrument — Program Priority NFOŚiGW — — Clean Air.
- Action 21.Financial instrument — Program Priority NFOŚiGW — — 'Warm Housing'.
- Action 90.Development of energy audits and energy management systems.
- Action 91.Financial instrument — Program Thermo.
- Action 92. Financial instrument – Tax credit for expenditure on thermomodernisation of single-family dwellings.

Objective. 1.2.3. Reduction of GHG emissions from transport, including development of RES [and electro-mobility]

The transport sector currently uses mainly petroleum-derived fuels. Due to the scale of use, the long lifespan of vehicles and the need to provide adequate infrastructure for the integration of the energy carrier into the vehicle (e.g. electric recharging or hydrogen refuelling), the decarbonisation of transport is a major challenge.

Transport is distinguished by type
car/road, rail, air, waterborne
inland, maritime. The apportionment shall also be made
with
whether it is of a passenger nature or

Taking into account both technical considerations and costs, decarbonisation is easier to implement e.g. for **road passenger transport** (where there is a technological readiness for electrification) than for **road freight transport** where heavy-duty vehicles are used, although in both cases the market availability of vehicles should also be taken into account. Aviation and maritime transport are another feature, while rail is largely electrified.

Aviation is covered by the EU ETS, while **maritime transport** was included in the system in 2024 and **road transport** contributes to the so-called effort sharing (ESR – non-ETS). In addition, road transport will be covered by ETS-2. The decarbonisation of air transport and maritime transport is particularly challenging as the use of electricity is limited and alternative fuels, including synthetic fuels, need to be developed.

Directive 2023/959 – The EU ETS introduces an obligation for **shipping companies** to acquire emission allowances for each tonne of greenhouse gas emitted by a ship for 100 % of emissions from intra-EU voyages, 50 % of emissions from voyages from EU ports to third countries and from third countries to EU ports. The obligation to surrender allowances is introduced in stages: 40 % for verified emissions in 2024, 70 % in 2025 and 100 % from 2026.

RED II set a commitment for all EU Member States to reach 14 % of RES in transport. Poland has declared this objective to be achieved, reporting a great difficulty in achieving it, as is a number of other EU countries. The work on the revision of RED II recognised that the decarbonisation of the transport sector could be more optimal by setting emission reduction targets for the transport sector than demonstrating an appropriate share of RES22.

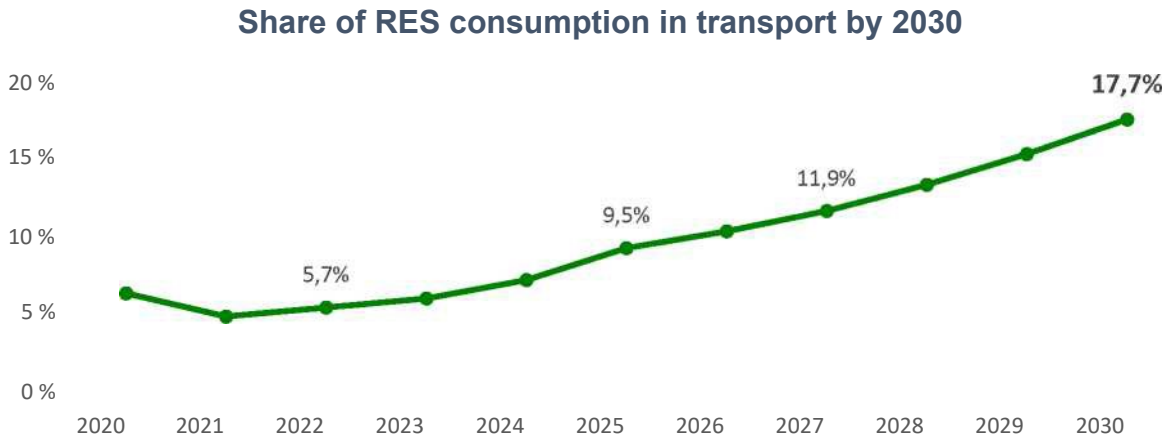
The new targets set out in RED III require EU Member States to **achieve a 29 % share of RES in final energy consumption in the transport sector or a 14.5 % reduction in the greenhouse gas intensity of the transport sector**.23

Decarbonisation targets are being met in particular by increasing the use of biofuels (especially second generation) and by developing alternative fuels (electromobility, hydrogen and its derivatives, e.g. ammonia, synthetic fuels), as well as by increasing vehicle efficiency, walking and cycling.

Poland's transport sector isprojected to emit more in 2030 than in 1990 and 2005, which is due to a much higher activity in the transport sector than was the case after the economic transition. The challenge is primarily to slow down emissions.

22This is particularly the case for electro-mobility, which is taken into account indirectly in transport RES statistics, as opposed to the sector's GC emissions account.
23Article 25 of RED III. The reduction target shall be set compared to the baseline set out in Article 27 paragraph. 1 (point 1) B RED III.

According to projections, the share of RES in final energy consumption in transport24 could reach 17.7 % by 2030.



The achievement of the RES target for transport set at 29 % in 2030 **is assessed as impossible in** Poland, and given the current statistics, this seems extremely difficult also in most EU countries25. After the grey economy was revealed and remedial action had been taken, the share of RES in transport was around 6 % between 2018 and 2021. Economic activity in transport continues to increase and technical conditions do not allow for a sufficiently rapid increase in the use of biofuels, especially in a situation where the base of raw materials that are allowed to meet the targets is systematically changed. It will be important to use biocomponents from agricultural raw materials, given the national potential in this regard, while ensuring economic development, including jobs.

The uptake of e-mobility and mobility using hydrogen as a vehicle's energy source depends on multiple factors, ranging from access to critical raw materials necessary for the production of zero-emission vehicles and thus their market and economic availability, provision of recharging and refuelling infrastructure for alternative fuels, access to skilled human resources and adaptation of electricity grids accordingly. The increase in electricity used in transport to meet the above-mentioned objective is also dependent on an increase in the production of RES in the overall electricity production balance. Other non-fossil fuels, produced from renewable energy sources, such as green methanol and green ammonia (mainly expected use in maritime and inland waterway transport, and heavy land), as well as synthetic natural gas or other synthetic fuels, can also play a role in the decarbonisation of transport.

Furthermore, RED III indicates that the combined **share of advanced biofuels and biogas26 and renewable fuels** *of non-biological origin*(**RFNBOs**) in the energy supplied to the transport sector should be at least 1 % in 2025 and 5.5 % in 2030, including RFNBOs hydrogen of at least 1 percentage point in 2030. According to the Ministry of Climate and Environment estimates, Poland would need around 91.7 thousand t of RFNBO hydrogen (as fuel and raw material for the production of conventional fuels) to meet the above-mentioned 1 % target in 2030.

On the basis of the forecasts, **Poland indicates that approximately could be achieved. 1 % share of advanced biofuels and biogas and RFNBOs in transport in 2025 and 3.5 % in 2030.**

Poland also considers this objective to be very difficult to achieve due to technological and financial barriers and the gradual development of the hydrogen economy. Very restrictive rules governing the possibility of

24The forecasts did not include marine and aviation bunkering, as the statistical reporting methodology has not yet included these elements.
25 In 2022, the EU-28 average was below 10 %. Eurostat summary: link.
26Refers to biofuels and biogas produced from feedstock listed in Part A of Annex IX of RED II.

converting a given hydrogen production into RFBNO are also important.

Promoting the use of alternative fuels requires the deployment of infrastructure. For this reason, uniform rules have been laid down at EU level for Member States in this area. Regulation (EU) 2023/1804 on the deployment of alternative fuels infrastructure – the so-called AFIR Regulation – envisages the **construction of publicly accessible recharging pools for electric vehicles along the main roads and motorways** in Poland every 60 km over the 2025-2030 timeframe, as well as the construction of a **network of publicly accessible hydrogen refuelling stations** every 200 km with a view to 2030. Based on the forecast number of electric and plug-in hybrid electric vehicles and the requirements of the AFIR Regulation, which makes the necessary installed recharging power dependent on the number of vehicles, it appears that, by 2030, approximately will be installed in publicly accessible recharging infrastructure for light-duty electric vehicles. 1.5 GW.

Projections indicate that more than 1.46 million electric and plug-in hybrid vehicles could be registered in Poland in 2030. The number of light-duty vehicles could reach more than 1.45 million (0.8 million BEVs and 0.65 million plug-in hybrids), while over 7000 heavy-duty vehicles, including more than 4.500, could be zero-emission urban (hydro and electric) buses.

For hydrogen-powered vehicles, projections indicate that around 6000 vehicles could be registered in Poland in 2030. Light-duty vehicles can account for more than 5 000 units, while HDVs can be over 950 units, including over 800 hydrogen buses.

POLICY

In general, the reduction of greenhouse gas emissions is achieved by reducing the amount of energy consumed from transport fuels and by switching conventional fuels (fossil fuels produced from oil and natural gas) to zero-carbon or low carbon fuels calculated over the life cycle (renewable fuels). The amount of energy consumed depends on the volume of transport needs and the efficiency of freight and/or passenger transport. Reduction instruments in this case are demand-side management (e.g. through spatial distribution of space functions, optimising transport demand or shaping appropriate social and economic behaviour) and transport with more energy efficient transport solutions, including through the use of logistics tools. In the area of the transformation of transport fuels, instruments are geared towards adapting modes of transport to the use of low- and zero-emission fuels and energy (replacement or retrofitting of rolling stock) and ensuring that such fuels and energy are produced and delivered through a distribution network (fuel stations and electricity charging).

Decarbonising urban transport

Low-carbon transformation of urban transport is one of Poland's priorities, with measures to reduce the transport intensity of the economy, i.e. demand for passenger and freight transport, and to improve the organisation of transport services (e.g. the use of logistics and smart technologies, including in particular traffic management technologies, intermodality, collective transport, organisation of last mile transport). Raising public awareness and promoting environmentally friendly ways to shape and meet transport needs will also be an important course of action, primarily based on transport policies and planning that promote collective, low- and zero-emission transport, but also walking and cycling.

The primary objective of urban transport policy should be to pursue sustainable mobility by creating the conditions for the efficient, efficient and safe movement of passengers and goods, while reducing harmful effects on the environment and living conditions of residents and improving transport accessibility within the city and functional area. In cities, it is crucial to: optimising traffic flows, including speeds, parking policies or supporting urban logistics services. The implementation of these measures reduces energy consumption and reduces exhaust emissions.

An additional element supporting the development of zero-emission urban transport will be the measures

provided for in *the National Recovery and Resilience Plan* (NRP), which aim to further promote Sustainable Urban Mobility Plans. *Sustainable Urban Mobility Plan* (SUMP), as one of the tools contributing to a comprehensive approach to sustainable urban mobility planning and its functional areas, or actions to support public transport.

To speed up the process of replacing the urban bus fleet with zero-emission vehicles in cities with more than 100 thousand inhabitants, only zero-emission buses (electric and hydrogen) will be mandatory. In addition, cities will also be obliged to conclude transport contracts only with operators using such buses.

In addition, there will be an obligation to establish clean transport zones in cities where the limit value of the annual average level of NO_2 nitrogen dioxide is exceeded. This will help to reduce transport emissions where this is particularly important.

Decarbonisation of car transport

In order to stimulate demand for low-emission vehicles, the existence of an obligation for contracting authorities to meet the **minimum shares of clean (low- and zero-emission) vehicles in the pool** *of road vehicles covered by public contracts***, introduced by the Act of 2 December 2021 amending the Act on electromobility and alternative fuels and certain other acts,** thereby implementing Directive 2019/1161 – CVD. The obligation includes the provision by procurers of minimum targets for the share of low- and zero-emission road passenger and freight vehicles (categories M and N) in the total number of vehicles covered by public procurement contracts (with a value equal to or above the EU thresholds) for: the supply of vehicles, selected transport services and public road transport services, during two periods: from 24 December 2021 to 31 December 2025 and from 1 January 2026 to 31 December 2030.

The **Fund for the development of public utility bus transport, which has been in place since mid-2019, is an important support for public transport by bus**. The Fund shall be used to finance the performance of local authorities' own tasks in the area of public service bus transport, with the exception of urban transport. The Fund's resources may contribute to eliminating transport exclusion and increasing access to public transport, in particular where such communication has not functioned or is operating at a level that does not fully meet the needs of the inhabitants of the area.

Under the **National Recovery and Resilience Plan (NRP)**, investments will be made in relation to:

- replacement of buses with zero- and low-carbon buses in peri-urban/rural areas. It will be possible to obtain funding for the purchase of zero- and low-emission buses for newly created extra-urban bus lines, as well as the replacement of rolling stock of extra-urban bus lines at risk of decommissioning;
- purchase of new zero-emission (electric) buses for urban public transport.

Support will be given to the development and **deployment of Intelligent Transport Systems (ITS**), including the National Road Traffic Management System (KSZR), as a tool to achieve sustainable mobility policy objectives. The KSZR will enable dynamic traffic management on the national road network, improve road infrastructure maintenance processes and integrate with ITS systems deployed by other road operators, including in urban areas.

The deployment and optimal **deployment of publicly accessible recharging infrastructure for** electric road vehicles, in line with the AFIR Regulation, will also be key. In addition, steps will be taken to create instruments to support the development of non-public charging infrastructure for road vehicles. This is conditional on the simultaneous development of the connected electricity grid infrastructure to the charging stations.

Improving the coherence of the road network and road safety is akey priority, mainly through the construction of motorways, express roads and urban bypasses on the TEN T network. New investments in this area will be carried out in accordance with the Government Programme for the Construction of National Roads until 2030 (with a view to 2033), which will make it possible to install alternative fuel stations for heavy-duty vehicles on the TEN-T network. In parallel to the new investments, investment activities will be carried out on the existing network of national roads. These include comprehensive reconstruction/extension of national road sections, point-related tasks to improve safety and other tasks aimed at ensuring the proper functioning of the road network. These investments will ensure the smooth flow of long-distance traffic and thus reduce the fuel

consumption of vehicles. These activities will be implemented under the ***Safe Road Infrastructure Programme 2021-2024*** (link) and the multiannual programme entitled ***National Road Network Strengthening Programme by 2030*** (link) In particular, the programme shall aim to maintain the required technical condition of the existing infrastructure, to increase the coherence of the national road network adapted to the circulation of vehicles with a single axle load of up to 11.5 t, and to step up measures to reduce the negative environmental impact of road infrastructure.

It is planned to extend the support programmes to the heavy-duty transport sector, which will allow for a significant increase in the use of electricity and thus result in a significant increase in the share of RES in transport.

Funding under the Connecting*Europe Facility (CEF) plays a major role in financing the deployment* of alternative fuels infrastructure. The CEF aims to support the modernisation and construction of infrastructure located on the trans-European transport network TEN-T, which is particularly important for transport within the European Union.

Fiscal instruments introduced in the Polish legal system play an important role in supporting the achievement of the decarbonisation objectives of road transport. The aim is to reduce the initially higher purchase costs of alternatively fuelled vehicles (tax exemptions) and their subsequent use (depreciation costs).

In addition, the EC adopted in 2022 a vision for development until 2030, which assumes that means of transport in line with the objectives of innovative air mobility and the ecosystem and logistics adopted for it will become an accepted part of the life of EU citizens. It is assumed that the deployment of so-called innovative air mobility technology will start providing regular freight and passenger transport services, initially using aircraft with a pilot on board, although the ultimate goal is to fully automate operations. In view of the technological specificities and the nature of the provision of specialised services, innovative air mobility solutions form part of an area complementary to the functionality of urban transport.

Bearing in mind the further dynamics of decarbonisation change in urban transport, it should be assumed that, in the long term, innovative air mobility based on unmanned platforms and electric vessels (eVTOLs) and related logistics installations and automated traffic management systems will become part of the future multimodal and smart urban mobility, and that ground and air infrastructure enabling the provision of transport services will be widely deployed and integrated.

Decarbonisation of rail transport

Tasks will focus on improving the technical condition of railway lines, building collision-free crossings, implementing modern systems to ensure interoperability, thereby increasing railway safety in the broad sense. These measures progressively contribute to making rail transport more attractive to other modes of transport and, consequently, to shift some passengers and freight to this more environmentally friendly mode of transport. Investments will be made under multi-annual programmes related to the development of rail transport. The **selected railway lines will be further electrified**, which has a particular impact on the reduction of greenhouse gas emissions.

Developed rail infrastructure will contribute to society's choice of rail as the optimal mode of transport, thus reducing air pollutant emissions from other modes of transport, in particular road transport. This will be done through:

- construction and modernisation of rail passenger stops as part of the *Government's programme for the construction or modernisation of railway stops for 2021-2025*. Construction of stops in new locations more convenient for travellers, with technical parameters allowing long-distance (inter-provincial) trains to stop, thus preventing switching to other high-emission modes of transport. In addition, the programme carries out the task of improving the availability of parking spaces for travellers.
- implementation of projects aimed at closing gaps in freight and passenger connections under the Local and Regional Rail Infrastructure – Rail+ Programme by 2029, according to which it is planned to supplement the rail network with rail links (including the preparation of the necessary pre-project and project documentation) for localities with a population of more than 1000 people who do not have access to passenger or freight rail with provincial cities and to improve the internal transport and socio-economic

cohesion of these regions of Poland.

Further actions targeting rail and promoting public transport mean continuing the implementation of the Common Bill project. It provides the passenger with the purchase of a single ticket for the entire rail journey, regardless of the sales channel and the carrier. The price of such a ticket shall be calculated on the basis of a single, entirely new fare. Tickets can be bought in a checkbox and a Bilkom system for routes operated by 10 carriers through the Common Bulletin.

A key element for the satisfaction of rail travellers is driving time. Therefore, intensive efforts will be made to improve the timetable and the long-distance offer, resulting in shorter driving times. In addition, work is underway at the Ministry of Infrastructure on a railway timetable, known as: The horizontal train schedule, which will introduce a fixed network of connections for the period 2030/31-2039/40 (with a 2049/50 perspective) and will take into account the effects of the modernisation and construction of railway lines by the Central Communications Port. Shifting transport from less environmentally friendly resources to rail will be implemented through the development of intermodal transport, in line with the Guidelines *for the Development of Intermodal Transport by 2030 with a perspective up to 2040.* Priority will be the efficiency of train movements and the increase in commercial speeds, especially for freight trains.

As regards the decarbonisation of inland waterway transport, the actions included in the ***National Shipping Programme up to 2030 (KPN2030***) will be implemented. The programme aims to strengthen the role of inland waterway transport at national and local level. The document provides for more than 20 sectoral tasks and 11 investment measures to ensure the proper functioning of inland waterway transport on the access sections used for transport to maritime ports (on the Oder from Gliwice to the seaports of Szczecin and Świnoujście, on the Vistula from Torun to the Gdańsk Sea Port).

Under the NCN2030, sectoral actions will be undertaken to, inter alia, shape the conditions for the development of inland terminals and the integration of inland waterway transport into the intermodal transport system, support the transition of the inland fleet towards low- and zero-emission vessels and climate-resilient vessels, including work on reduced water levels, the development of the River Information Services System (RIS) enabling safe and more economical inland navigation, and the digitalisation of processes related to the operation of shipping market operators.

With regard to the decarbonisation of the inland waterway fleet, the actions identified in the NAP2030 will focus on three areas:

- support for investments in fleet modernisation and acquisition of vessels using alternative fuels and in the construction of a low- and zero-emission fleet and energy-efficient fleet,
- equipping the fleet with systems to increase energy efficiency,
- development of traffic management systems, such as RIS, to increase energy efficiency.

In addition, the NCN2030 points out the need to develop the R & D sector in the use of new technologies, including the construction of environmentally friendly and navigable vessels in the navigation conditions of Polish waterways and the development of transport management systems based, inter alia, on autonomous solutions, as well as the exchange of experience and knowledge transfer and the adaptation of regulations to the introduction of new solutions to the transport market.

Support for shipowners in the process of modernising the fleet referred to above is possible thanks to the operation of the **Inland Waterways Fund** (ISF). At present, shipowners have the possibility to obtain support in the form of preferential loans, financed under the Fund, allowing, inter alia, the purchase of new ships, the replacement of power units for less emission emission, the equipping of ships with waste water treatment facilities and installations, or the replacement of asbestos installations.

In accordance with the provisions of the SNCP2030, an evaluation of the functioning of the Fund will be carried out by 2027 and the support system for the shipping market will be strengthened so that the process of modernising the inland fleet towards low- and zero-emissions is faster and more efficient. Information and education activities will also be carried out on promoting the modernisation of the inland fleet among shipowners.

With regard to the decarbonisationof maritime transport, regulations indicating that the relevant

entities, within their remit, will carry out activities on:

- carrying out checks on the obligation to comply with the provisions of the Act of 15 May 2015 on substances depleting the ozone layer and certain fluorinated greenhouse gases with regard to the operation on ships of refrigeration, air conditioning, electrical switchgear and fire protection systems and fire extinguishers containing controlled substances or fluorinated greenhouse gases;
- carry out checks on the requirements to limit nitrogen oxide emissions from ships under the International Convention for the Prevention of Pollution from Ships (MARPOL Convention): Annex VI – Regulations for the Prevention of Air Pollution from Ships and the Technical Code for the Control of Nitrogen Oxide Emissions from Marine Compression Engines (NOX Code);
- implement the provisions of EU Regulation 2015/757 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, as amended by EU Regulation 2023/957, to include maritime transport in the EU Emissions Trading System and to monitor, report and verify emissions of additional GCs and emissions from additional ship types;

implementation of Regulation (EU) 2023/1805 on the use of renewable and low-carbon fuels in maritime transport.

The inclusion of maritime transport in the EU ETS will contribute to the decarbonisation of greenhouse gas emissions from this sector. Shipping companies and shipowners will have to use zero-emission technologies and fuels (Fuel EU Maritime) if they want to avoid incurring the cost of purchasing greenhouse gas emission allowances.

With regard to the decarbonisation of aviation, theactions included **in the Policy for the Development of Civil Aviation in Poland until 2030 (with a view to 2040)** (link) will be implementedto reduce the negative environmental impact of air transport.

In addition, the reduction of pollutant emissions from air transport can also be achieved through the participation of Polish aviation operators in the EU ETS, complementary to Poland's participation in the Carbon$_{Offsetting}$ and Reduction Scheme for International Aviation (CORSIA), or the implementation of EU Regulation 2023/2405 on ensuring a level playing field for sustainable air transport (ReFuelEU Aviation), which inter alia obliges aviation fuel suppliers to ensure a share of at least 1 % of synthetic fuels in the balance of fuels supplied to airports in 2030/31.

It is necessary to take measures to support waste management as well as the production and distribution of sustainable aviation fuels (SAF) and the financing of activities related to the production of synthetic fuels (RFNBO) in Poland. The main source of funding for these activities should be funds from aircraft operators' fees for surrendering emission allowances under the EU ETS.

Investments will be made at airports resulting from the requirements of Article 12 of the AFIR Regulation concerning the provision of electricity (RES) to aircraft at berth.

ACTIONS

Horizontal actions:

- Action 1. Participation in the EU-ETS Emissions Trading System.
- Action 24. Intelligent Transport Systems (ITS).
- Action 32. Financial support instruments for electro-mobility.
- Action 33. Instruments for non-financial support for e-mobility.
- Action 34. Development of charging infrastructure for electric vehicles.
- Action 36. Development of the Register of Alternative Fuel Infrastructures.
- Action 37. Measures to develop the use of biofuels.
- Action 38. Awareness-building – shaping drivers' environment-friendly attitudes.
- Action 39. Increasing requirements – improving vehicle emissions.
- Action 40. Increasing requirements – Decarbonising transport fuels.
- Action 104. Define the legal framework for the development of infrastructure for the transport of

hydrogen.

- Action 105. Development of hydrogen infrastructure.
- Action 136. Reducing methane emissions from fuel production and distribution processes.
- Action 138. Building competences and creating awareness – Zero-emission transport.

On decarbonising urban transport:

- Action 27. Development of urban transport networks.
- Action 28. Plans for the sustainable development of public transport.
- Action 29. Development of zero-emission public transport in cities.
- Action 30. Creation of clean transport zones.

On decarbonising car transport:

- Action 25. Improving the coherence of national roads.
- Action 26. Financial instrument – Fund for the development of public service bus services.

In terms of decarbonising rail transport:

- Action 41. Modernisation of railway infrastructure.
- Action 42. Development of local and regional railway infrastructure.
- Action 43. Integration of rail transport with other modes of transport.
- Action 76. Support for the construction of innovative hydrogen-powered transport units.

For the decarbonisation of inland waterway transport:

- Action 46. Development of inland waterways of transport importance.
- Action 47. Implementation of requirements for internal combustion engines used in inland navigation.
- Action 48. Revision of the legal framework for bunkering infrastructure for low- and zero-emission marine fuels.
- Action 35. Introduce a financing mechanism for the development of production capacity and refuelling infrastructure for sustainable aviation fuels, in line with Regulation 2023/2405.

In terms of decarbonising maritime shipping:

- Action 44. Ensure the availability of alternative fuels in maritime ports.
- Action 45. The deployment of innovative technologies in maritime vessel traffic management.

On the decarbonisation of aviation:

- Action 35. Introduce a financing mechanism for the development of production capacity and refuelling infrastructure for sustainable aviation fuels, in line with Regulation 2023/2405.
- Action 49. Improving airport infrastructure.
- Action 50. Implementation of innovative solutions in air traffic.
- Action 51. Participation in the International Aviation Offset (CORSIA) system.
- Action 52. Improve the operational efficiency of air transport.

Objective. 1.2.4. Reduction of GC emissions in industry

Industry accounts for 1⁄4 of the EU's energy consumption and has therefore been given special attention

alongside buildings to reduce its environmental impact. A significant part of the sector's thermal energy does not require high temperatures, which increases the range of cheaper renewable energy sources, especially those with a stable generation profile, which is particularly important in the energy-intensive sector. **Improving the energy efficiency of the processes carried out, in particular because of the potential to decrease energy intensity and reduce operating costs, has** a major role to play in decarbonising the sector.

Energy-intensive industries are covered by the EU ETS, therefore the cost of allowances incentivises actions that are proactive and reduce fossil fuel consumption or enable them to be replaced by modern low- and zero-carbon technologies. However, changes are costly and time-consuming and in many cases technologically constrained, which increases production costs. The rest of the industrial activity contributes to the common reduction target (non-ETS sector).

Projections indicate that Poland could achieve a 9 % reduction in emissions/emissions in the industry sector compared to 1990 levels in 2030. *[estimates are not a target]*

RED III requires Member States to aim to **increase the share of renewable sources in industrial** energy consumption by **an indicative increase of at least 1.6 percentage points on an annual average between 2021 and 2025 and 2026-2030**.27

In addition, the EU strongly promotes the use of "green" hydrogen in industry. For this reason, Member States were required that RFNBO **hydrogen represents 42 % by 2030 and 60 % by 2 035 in the structure of hydrogen used for final energy and non-energy purposes.** According to estimates of the Ministry of Climate and Environment, around the 2030 target is required. 270 thousand tonnes of hydrogen RFNBO as target or intermediate raw material for ammonia production. For the last 10 years in Poland, the fertiliser sector has been the largest consumer of hydrogen, which is why around will be necessary to produce ammonia to maintain fertiliser production. 225 thousand t hydrogen RFNBO. **By 2030, it is possible to build up around a renewable hydrogen production capacity in Poland. 43 thousand t28 and 113 thousand t for possible financing from the CfD for hydrogen**. Cover the remaining part of the demand, i.e. approx. 113 thousand tonnes will have to be imported from renewable hydrogen or green ammonia.29

The development of renewable hydrogen production is closely linked to the development of RES. Poland is one of the largest hydrogen producers in Europe, but it comes mainly from steam reforming fossil fuels. Achieving the objectives of RED III in industry will be very difficult for most EU Member States. This huge space for innovative activities can allow surpluses from RES to be managed during particularly favourable weather conditions. However, such actions require profound technological and organisational changes and represent a financial challenge.

Technologies for capturing, storing and using CO2 are also one of the available solutions to reduce emissions$_{in}$ industry. *Carbon Capture, Utilisation and Storage*, CCUS). The use of such installations can reduce emissions in hard-to-abate sectors such as the cement, steel, chemical or petrochemical industry. Investment decisions and participation of operators in CCS projects will depend on a number of factors, such as, inter alia, the cost of emission allowances, fuel and electricity prices, as well as the availability of alternatives to reduce $CO2_{emissions}$. The challenge for the development of CCS projects is the high cost of building infrastructure and the need for coordination along the entire value chain.

The final assessment of the potential for CCS technology development in Poland is also strongly dependent on the verification of the CO2 storage capacity$_{estimates}$. An equally important factor affecting the potential development of CCUS technology in Poland will be the public acceptance of the above-mentioned projects. Social dialogue, reliable and easily accessible information on CCUS technology, will be crucial for its broad

27Article 22a RED III.

28It will be possible following funding from the Recovery and Resilience Facility. *Recovery and Resilience Facility*) under the National Recovery Plan.

29Coverage of hydrogen demand is discussed under Dimension 3.

commercial deployment.

POLICY

[A broader description, beyond hydrogen, will be completed at a later stage of work]

Support for the **emergence of hydrogen valleys is envisaged for the development of hydrogen valleys**, i.e. ecosystems that will build a hydrogen value chain such as hydrogen production, transport, storage and end-use in industry. In the hydrogen valleys, R & D & I projects and investment projects will contribute to cooperation between local, national and foreign stakeholders. Common objectives and shortening the distance between supply and demand centres will enable the exchange of information and experience between participants in hydrogen valleys. A policy for achieving the 42 % share of renewable hydrogen in the total use of hydrogen in industry will be defined – it will include supply lines, how renewable hydrogen and imported green ammonia are managed in various economic sectors in Poland, as well as the way in which import terminals are developed for transhipment of green ammonia in ports and infrastructure for cracking and transmission of ammonia.

ACTIONS

- Action 1. Participation in the EU-ETS Emissions Trading System.
- Action 14. Financial instrument – other programmes of the NFOŚiGW supporting the development of RES.
- Action 15. Financial instrument – other instruments supporting the development of RES.
- Action 22. Ensure the conditions for the development of SMRs.
- Action 67. Financial instrument – energy-intensive industries.
- Action 68. Financial instrument – Contract for Difference (CfD) for hydrogen production in industry.
- Action 69. Support for the construction of renewable and low-carbon hydrogen generation capacity.
- Action 70. Analysis of the need for the construction of a maritime port terminal for the transhipment of ammonia.
- Action 86. Financial instrument – Preferences for electricity generators in high-efficiency cogeneration.
- Action 89. Financial instrument – white certificates system.
- Action 96. Support for ESCO enterprises.
- Action 105. Development of hydrogen infrastructure.

Objective. 1.2.5. Reduction of GHG emissions in agriculture

Agriculture is a source of greenhouse gas emissions, which have been stable over 30 million t eqCO2 for about two decades. Crop production contributes to GHG emissions mainly from nitrogen fertilisation, whereas livestock production is a source of emissions from enteric fermentation (methane) and natural fertilisers. Agriculture is responsible for around 8.5 % of national greenhouse gas emissions. The share of agricultural emissions in the non-ETS group is around 16-17 %.

Reducing GC emissions can lead to a significant reduction in production (decrease in headcount, less fertiliser used), which has a direct impact on food security and dependence on external sources of supply and the emergence of ‘carbon leakage’. The costs of measures to reduce GHG are also important, which may have a negative impact on the development (level of) production, particularly animal production, the health of farms and the increase in food prices.

At the same time, climate change in anomalies and extreme weather conditions accelerates environmental degradation, causing droughts, storms, floods and fires, as well as the spread of diseases and pests. Repeated droughts are a particularly severe phenomenon in Poland. Extreme weather and climate conditions negatively affect yields and quality, and consequently the availability of good quality and affordable food on the market.

They also have serious economic consequences for agricultural holdings, linked to losses caused by weather abnormalities or the fight against diseases and pests.

Agriculture has limited opportunities to reduce gas emissions, due to the specific nature of the biological processes involved in production and the strategic importance of maintaining food security. In Poland, emissions from agriculture are projected to reach 35 thousand kt CO2 in 2030, i.e. a slight upward trend in emissions compared to 2005 will be observed (32 thousand kt CO2 e.g.).

POLICY

A significant part of the measures to reduce GHG emissions in agriculture is implemented through Common Agricultural Policy (CAP) instruments and these are set out in detail in the CAP Strategic Plan 2023-2027. The Strategic Plan is a tool to support sustainable management methods that promote climate and environment-friendly actions that protect soil, water and air and biodiversity. Support is implemented through both annual payments (CAP Pillar I) and multi-annual commitments (investments under Pillar II of the CAP).

ACTIONS

- Action 13. Financial instrument – NFOŚiGW Priority Programme – 'Agroenergy'.
- Action 54. Support for on- farm adaptation and emission reduction measures.
- Action 55. Organic farming activities.
- Action 56. Actions to rationalise the use of fertilisers.
- Action 57. Support for the development of agricultural biogas plants.
- Action 58. CAP (environmental) conditionality.
- Action 59. Eco-schemes under the CAP.
- Action 60. AGRI-environment-climate measures under the CAP.
- Action 61. Support for organic farming under the CAP.
- Action 62. Forest and tree interventions under the CAP.
- Action 71. Financial instrument – NFOŚiGW 'Energy for Villages' programme.

Area 1.3. Contribution of the LULUCF sector to the achievement of the reduction targets

Greenhouse gas emissionreductions are a huge call, but some of them will not be avoided according to the current state of the art. As flora sequesters part of the emissions, activities resulting from the increase inCO_2 removals from the atmosphere by the so- *called LULUCF (land use change and forestry)*mitigate the effects of GHG emissions. This premise underpins both the 55 % GC reduction target set by the European Union by 1990 and the objective of **climate neutrality** by 2050.

The LULUCF sector is related to use land, land use change and forestry.

Includes soil, tree management; plants, biomass and wood. Its peculiarity the LULUCF sector is that it does not only generate emissions but it can also absorb greenhouse gases Every2 from the atmosphere

The rules for accounting the net balance of GHG30 emissions resulting from removals by the LULUCF sector (carbon credit generation) – including emission limits – are set out in detail by EU Regulation 2018/841 (LULUCF Regulation) and its amendments by EU Regulation 2023/839 (LULUCF II Regulation).

The assessment of national possibilities and policies for the production of carbon credits by the LULUCF sector is set out below.

Objective. 1.3.1. Striving to increase greenhouse gas removals by the LULUCF sector

The Union's 2030 target for net greenhouse gas removals is 310 million tec. Co_2 (which is the sum of Member States' net greenhouse gas emissions and removals in 2030). A separate target has been set for each Member State, based on historical data 31.

For Poland, a **target of 38.098 million tonnes of ects has been set for 2030. CO**32[2] In addition:

- for the period 2021-2025, it should be ensured that emissions from the LULUCF sector do not exceed removals from the LULUCF sector, while managed forest land is accounted for using the forest reference level of 28.4 Mt ekw for Poland. EVERY[2]; for cropland, grassland and wetland land accounting refers to emissions and removals in the base period from 2005 to 2009.
- between 2026 and 2029 removals should follow a linear trajectory based on average removals in 2021-2023 starting with 2022 and end with a target of absorbing 38.098 million tonnes of ects. Every[2] in 2030

Once the requirements of the LULUCF II Regulation are met, Poland will potentially also be able to benefit from the flexibility (compensation) mechanism consisting of transferring surplus removals from the non-ETS sectors, based on the ESR, flexibility related to natural catastrophe accounting, as well as flexibility related to managed forest land for the period 2021-2025 and the land use mechanism for the period 2026-2029, with a maximum value of 22.5 Mt of equities. Every[2] split between the two tax periods.

Taking these issues into account, it is assessed that the GC removal target set for Poland in the LULUCF II Regulation is very difficult to achieve.

Projections show that the LULUCF sector, due to the ageing of stands and the action of destructive or forest-disrupting biotic and abiotic factors, **will not significantly contribute to reducing greenhouse gas emissions.**
Preliminary estimates indicate that greenhouse gas removals in 2030 could amount to around. Million

30Some LULUCF areas generate emissions such as agricultural activities, so the targets refer to the net balance.
31Article 4 of the LULUCF II Regulation.
32Annex IIa of the LULUCF II Regulation.

tonnes of ects. CO_2

Forests are currently the largest sink in Poland, but CO2 absorption capacity is$_{decreasing}$ due to the age of forest stands and the disturbances caused by climate change, such as hurricanes, fires, insect outbreaks and droughts, which reduce growth or even collapse of trees and stands. It should be borne in mind that the most carbon sinks in the intensive growth and development phase, i.e. mainly in young and medium-aged stands when growth is fastest. Measures such as the irrigation of peatlands, afforestation, or the conversion of forests towards more diverse and resilient forests **can only produce the desired effects in the longer term, reaching up to several decades.**

POLICY

The **afforestation of land or the spreading of risk in forest farming over as many tree species adapted to habitat conditions will contribute to the removal and reduction of emissions in** the LULUCF sector, thus minimising the risk of forest decline and preventing fires and maintaining the right age structure of forests. Species depleted and structurally simplified stands will be rebuilt into more diverse areas. **Natural regeneration of the forest** will be initiated wherever possible and justified, using already existing natural regenerations, and **natural succession** will also be used in areas that are difficult to regenerate. It is also planned to use the least intrusive ways of preparing the soil for forest regeneration and, under favourable conditions, to regenerate the forest without soil preparation, in order to reduce associated emissions.

Forest management will support natural processes that **enhance biodiversity in forests**, and the specific type of stand will be dynamic, variable over time to take into account the biological characteristics and ecological requirements of the different tree species and also adapt the stands to the new conditions. **Tree-care cuts** will focus on the stability, viability and sustainability of forests, on improving the quality of production and on favouring tree species and individuals with the capacity to adapt to changing environmental and climate conditions.

The latest developments in the **selection of forest trees will** also be used. **Fire-fighting infrastructure** will be maintained and expanded and hydrogen habitats will be restored. In addition, in the field of forestry, pan-European criteria will be used for sustainable forest management planning, which will mean the need to preserve and strengthen forest resources, maintain the health and vitality of forests, maintain productive functions of forests, preserve forest biodiversity, preserve protective functions and maintain the socio-economic conditions of forests. However, measures to increase sequestration capacity in forests have limitations due to tree life expectancy and will not deliver the expected EU regulation for 2030.

Agriculture will also contribute to increasing soil carbon stocks and reducing its release into the atmosphere. However, it should be stressed that the sink potential in this sector is relatively small and cannot be increased without affecting food security. Measures to increase carbon sequestration in agriculture will be implemented through conditionality standards: reduce conversion of permanent grassland (PG) and peatlands and wetlands to arable land and require minimum soil cover. Investments related to forestry and woodland on arable land and agricultural practices that increase soil carbon stocks and reduce its release into the atmosphere will be supported. These actions are set out in detail in the Strategic Plan for the Common Agricultural Policy 2023-2027. The planned certification system for practices resulting in the permanent fixing of carbon in the agricultural sector, among others, can contribute to increasing carbon removals.

ACTIONS

- Action 58. CAP (environmental) conditionality.
- Action 59. Eco-schemes under the CAP.
- Action 60. AGRI-environment-climate measures under the CAP.
- Action 61. Support for organic farming under the CAP.
- Action 62. Forest and tree interventions under the CAP.
- Action 77. Preparation of forest water management plans.
- Action 78. Defining objectives and principles for sustainable forest management based on the criterion of conservation and appropriate enhancement of forest resources and their contribution to the global carbon stock.
- Action 79. Support for the development of forest areas and improvement of the viability of forests.
- Action 80. Definition of directional forest protection tasks, including fire protection.
- Action 81. Conducting seed management in forestry.
- Action 82. Forest carbon farms.
- Action 83. Restoration and conservation of wetlands, peatlands and wetlands in Natura 2000 and Green Infrastructure sites.
- Action 84. Adaptation of forests and forestry to climate change – small water retention.
- Action 85. Combating forest dying.

Area 1.4. Improving the quality of the environment, including air

The environment is a comprehensive system of natural and anthropogenic elements that coexist and interact. It includes the atmosphere, hydrosphere, land, as well as humans and their activities. Environmental protection focuses on sustainable management of natural resources, minimising negative impacts of human activities on ecosystems

Improving the quality of the environment is a process of introduction
conservation actions and measures,
restoring or improving the overall quality
the environment surrounding us. This includes a variety of
areas such as air, water, soil quality;

and promoting harmonious cooperation between the community and nature. Today's environmental challenges require a global approach and action focused on biodiversity conservation and sustainable development.

This section sets out the objectives for improving the quality of the environment in terms of air status, water status, and waste and waste water.

Objective. 1.4.1. Air quality target

Air pollutant emissions negatively affect the natural environment, including human health. Their most dangerous effects are acidic precipitation, increased greenhouse effect, ozone hole, smog, dust, soil and water pollution, so action to reduce them is strongly desirable.

Air quality is affected by several a variety of factors, including: emissions pollutants, meteorological conditions, topography, use of fossil fuels, activity human or seasonal changes.

Directive (EU) 2016/2284 on the reduction of national emissions of certain atmospheric pollutants (NEC Directive) established obligations for EU countries to reduce anthropogenic emissions of pollutants into the atmosphere33.

Poland has been required to achieve its reduction targets for anthropogenic pollutants into the atmosphere in two periods, which cover the years 2020 to 2029 and from 2030 (compared to the reference year 2005), as outlined below.

		in each year 2020-2029 59 %	*in each year from 2030 onwards* 70 %
Reduction impurities compared to 2005	**SO_2**		
	No_x	30 %	39 %
	NMVOC34	25 %	26 %
	NH_3	1 %	17 %
	PM2,5 (dusts)	16 %	58 %

The biggest problems with inadequate air quality concern urban areas, i.e. large population centres and regions of intensive industrial activity. Exceedances of the limit values for PM10 and PM2.5 and the benzo(a)pyrene target, especially during the winter period, remain an important concern. In addition, in large urban agglomerations there is a problem of exceedances of the limit value for nitrogen dioxide. Emissions from fossil fuel combustion, road transport, industrial production processes and energy are the main sources of pollutant emissions into the air. Concentrated residential areas with individual heat sources using fossil fuels (as well as, to a lesser extent, solid biomass fuels) and areas of cities with heavy vehicle traffic often face exceedances of air quality standards and therefore require a particular focus of action. However, agriculture is the main source of ammonia emissions in Poland. The sector is responsible for almost 96 % of total emissions of this pollutant. There are two main sources: livestock manure and application of natural and mineral fertilisers on agricultural soils.

Poland declares its ambition to reduce atmospheric pollution in line with the objectives set out in the NEC Directive, although current projections indicate that these values will be particularly difficult to achieve for ammonia emissions after 2030.

The use of hard coal in households for heating purposes has a direct impact on air quality, but also affects the needs of hard coal imports and the lack of use on the energy efficiency of the economy. Reducing the use of hard coal in individual boilers is therefore the most important measure to improve air quality in Poland, which is why a target has been set. Although current projections indicate that households will use coal for heating purposes in 2040 at around the level. 1.1 million.

Poland will aim to phase out coal from households by 2040 and in the case of urban areas even in 2030.

POLICY

Measures to reduce air pollutant emissions from the individual heating sector will contribute to achieving the objective of improving air quality, in particular through the development of RES and increasing energy efficiency, adapting quality standards for fuels and combustion installations, road transport, and increasing

NEC Directive33 Annex 2.
34NLZMO – Non-metallic volatile organic compounds

environmental awareness and education.

Actions will focus in particular on zones where the limit values for PM10 and PM2.5 and nitrogen dioxide, the benzo(a)pyrene target are exceeded. In addition, the aim will be to **increase the number of agglomerations and cities above 100 thousand inhabitants** with an average exposure indicator value below the exposure **concentration limit of** 20**µg/m^3, with 25 agglomerations in 2022 and at**least 30 in line with the objective set out in the *State's Green Policy 2030* (link) by 2030. By contrast, the measures set out in the *Update of the National Air Protection Programme until 2025 (with a view to 2030 and 2040)* are intended to ensure that **in 2030 there are no zones in Poland with areas of exposure to the negative effects of air pollution caused by exceedances of air quality standards PM10 and PM2.5.**

In addition, following the finalisation of legislative work at EU level on the draft *Directive on ambient air quality and cleaner air for Europe*, it will be necessary to step up efforts to prepare new additional solutions that will accelerate the pace of improvement in air quality in Poland so that the objectives of the proposed Directive can be achieved. The current design of the draft Ambient Air Quality Directive will generate a large number of tasks to be carried out not only by the government administration, the services of the Chief Inspectorate of Environmental Protection, but also by different types of local government units.

In the agricultural sector, measures to reduce ammonia emissions include the implementation of the so-called Nitrates Programme and the provisions of the Fertilisers and Fertilisation Act, which regulate the use of nitrogen fertilisers. Good agricultural practices in the field of fertilisation shall be promoted through the preparation and dissemination of a Code of Good Agricultural Practice. In addition, support for practices affecting, inter alia, air pollutant emission reductions is implemented under the 2023-2027 CAP Strategic Plan.

However, citizens will have the greatest impact on the actual achievement of the new air quality objectives, as it will be their behaviour and actions in the areas of heating and road transport that will determine whether Poland will meet the challenges posed by the new Directive by 2030. Existing and modified financial support programmes will be a particular incentive for citizens and education will play a major role in addition to regulation.

ACTIONS:

- Action 18. Financial instrument — Program Priority NFOŚiGW— — 'My heat'.
- Action 19. Financial instrument — Program Priority NFOŚiGW— — Clean Air.
- Action 20. Financial instrument — Program Priority NFOŚiGW— — 'Stop Smog'.
- Action 21. Financial instrument — Program Priority NFOŚiGW— — 'Warm Housing'.
- Action 38. Awareness-building – shaping drivers' environment-friendly attitudes.
- Action 53. Reducing the use of fluorinated greenhouse gases.
- Action 58. CAP (environmental) conditionality.
- Action 59. Eco-schemes under the CAP.

- Action 62. Forest and tree interventions under the CAP.
- Action 91. Financial instrument – Termo Programme.
- Action 92. Financial instrument – Tax credit for expenditure on thermomodernisation of single-family dwellings.
- Action 93. Improving the energy efficiency of residential buildings.

Objective. 1.4.2. Water status target

Water pollution is a comprehensive problem resulting from a variety of human activities such as industry, agriculture, municipal management and vehicle emissions. Chemicals, pathogenic micro-organisms and other pollutants introduced into waters have the potential to disturb the balance of ecosystems and pose a threat to the quality of drinking water.

Water pollution can result from a variety of factors, including: wastewater municipal and industrial fertilisers and pesticides from agriculture, pollution from areas urbanised and waste, deposition of substances chemical or degradation of river banks.

Directive 2000/60/EC establishing a framework for Community action in the field of water policy – the so-called Water Framework Directive (WFD) required EU Member States to **achieve good status for all waters**, unless derogations from environmental objectives are proposed in the form of an extension of the deadline for achieving the objectives (Article 4 paragraph derogation). 4. WFD) or setting less stringent objectives (derogation under Article 4 paragraph WFD 5).

Poland will consistently **seek to improve water status**, in particular through the implementation of water management plans and measures in the area of waste water management**.**

POLICY

In order to improve water status, it is necessary to focus on identifying, monitoring and implementing measures to reduce and prevent water pollution and increase the resilience of water management to the effects of climate change in order to protect the environment and ensure access to safe water resources for current and future generations, including improving universal access to water intended for human consumption.

River basin management plans form the basis for decisions that shape the status of water resources and set out rules for their management, including climate change and taking into account the energy sector. Of particular importance in the area of improving water status in Poland is the implementation of the tasks resulting from the **second update of the river basin management plans.** As part of these updates, which were published at the end of 2022/2023, 24690 actions (for an amount of almost PLN 26 billion) are foreseen to be implemented.

The second particularly important component is the construction, extension and modernisation of waste water treatment plants on the basis of the **updated *National Programme for Urban Waste Water Treatment*** (AKPOŚK), which provides for the implementation of approx. 1000 investments, including the construction of 60 new waste water treatment plants.

Priority shall be given to carrying out inventories, a critical review (possible revision) and appropriate prioritisation of plans and programmes, including investment and non-investment activities, with a particular focus on actions resulting from:

a. river basin management plans;
b. flood risk management plans,
c. a plan to deal with the effects of drought,

d. water maintenance plans,
e. national surface water renaturisation programme (failure to adopt),
f. 2030 National Shipping Programme
— and others (including resolutions of the Council of Ministers),
g. a water scarcity programme.

ACTIONS

- Action 44. Ensure the availability of alternative fuels in maritime ports.
- Action 45. The deployment of innovative technologies in maritime vessel traffic management.
- Action 46. Development of inland waterways of transport importance.
- Action 47. Implementation of requirements for internal combustion engines used in inland navigation.
- Action 56. Actions to rationalise the use of fertilisers.
- Action 64. Support for the development of water and wastewater management.
- Action 65. Financial instrument – NFOŚiGW programmes supporting adaptation to climate change.

Objective. 1.4.3. Waste target

Waste can cause air, water and soil pollution and its proper management should reduce its negative impact on the environment.

To factors that affect quantities
waste generated includes, among other things, the population;
number of people living in each individual households, production volume,
the nature and degree of efficiency of the production methods, and
consumption and waste management
may have a negative impact on the environment in particular

Waste management in Poland, as well as its perception by the public, entrepreneurs, service providers, etc., has been changing rapidly in recent years, with an increasing number of modern recycling installations; or thermal waste conversion. This is the result of a change in the approach to waste – it is no longer regarded as unnecessary, unnecessary materials, but as valuable resources to be used. Given the diversity of waste resulting from different industrial processes, products produced, services offered, the possibilities for its applications are broad and, in addition, can partly influence the composition of waste (e.g. post-consumer waste) through product design. Because of the properties, part of the waste cannot be used, so waste disposal technologies are also necessary.

Modern waste management, in line with the EU waste hierarchy and aiming to **implement a circular economic model, requires continuing the above-** described changes in the approach and perception of waste as a resource source (including the possibility of replacing primary raw materials with secondary raw materials from waste), as well as accelerating the development of recycling.

Waste management is subject to a relatively broad scope of EU regulation. The requirements are regulated, inter alia, by:

- Directive 2008/98/EC on waste;
- Directive 1999/31/EC on the landfill of waste,
- Directive 94/62/EC on packaging and packaging waste,
- Directive 2006/66/EU on batteries and accumulators and waste batteries, which will expire on 18 August 2025 and will be replaced by EU Regulation 2023/1542 concerning batteries and waste batteries;
- Directive 2012/19/on waste electrical and electronic equipment (WEEE),
- Directive 2000/53/EC on end-of-life vehicles.

The objectives set at EU level are being met in the framework of the **implementation of the *National Waste Management Plan 2028 (KPGO 2028)* adopted in 2023, which is an** update of the Kpgo 2022. Key waste management targets are set out below. The aim is to reduce the environmental impact of waste.

The general objective in this area is to seek to reduce the environmental impact of waste management through the implementation of circular economy solutions, including through the implementation of waste management plans.

Overall waste management objectives:

1) implementation of waste prevention (WMP) and reduction of waste generation;
2) increasing the levels of preparation for re-use and recycling of municipal waste achieved;
3) minimisation of landfilled waste;
4) increasing the levels of recycling of packaging waste achieved;
5) maintaining a high level of preparation for re-use, recycling and other forms of recovery of construction and demolition waste.

POLICY

Waste management policy aims to reduce waste generation, increase the amount of waste sent for recycling, eliminate poor waste management, raise public environmental awareness of waste prevention and proper waste management. This should contribute to reducing the environmental impact of the waste sector, including the reduction of water, land as well as air pollution.

The targets will be met, inter alia, through the implementation of *the National Waste Management Plan 2028*, adopted in 2023. The waste management policy orientations adopted in KPGO 2028 will be reflected in the regional waste management plans.

Among the activities planned in KPGO 2 028 are, in particular, education and information activities on waste prevention (ZPO) and prevention of littering; supporting the development of ZPO infrastructure and waste recycling; support research into new ZPO technologies and waste management, recommended actions on critical raw materials and to tackle marine and terrestrial littering.

Achieving the objectives requires both the implementation of appropriate systems, regulations and incentives, but also a commitment at societal level in waste reduction and segregation and at all levels of economic activity, from product design, packaging and production processes, to the design of processes related to the transport of products to the provision of services in a way that is rational in terms of waste generation.

ACTIONS

- Measure 142. Awareness-building – circular economy.

Area 1.5. Adapting to climate change

On the one hand, we are taking action to reduce climate change, but on the other hand its impact is already having an impact on both the environment and living conditions. This section outlines the lines of action to adapt societies, economies and the environment to new conditions in the face of the growing challenges of climate change.

Adaptation to climate change is a key part of strategies to address the negative impacts of temperature rises, extreme weather events, biodiversity risks and other climate-related events. The introduction of adaptation measures aims to minimise the damage caused by these changes and to strengthen the resilience of societies to future impacts, by adapting to new weather conditions, temperatures and extreme weather events.

Objective. 1.5.1. Striving for adaptation to climate change

The current global temperature rise is contributing to the severity and frequency of extreme events such as droughts, heavy rainfall and hurricanes. Adaptation to climate change is a key element of strategies to reduce the negative impacts of climate change on society, the economy and the environment. Adaptation actions aim

to minimise climate change risks and strengthen the resilience of the economy and societies to climate change and reduce losses.

Adaptation is particularly important in the agricultural sector, which is sensitive to the state of the environment and weather anomalies. Climate change, by affecting yields and quality, affects the availability of good-quality and affordable food on the market and poses a threat to the economic viability of farms.

Due to the impact of climate change, action needs to cover different areas from agriculture, forestry, construction and energy to water management.

In order to better adapt to climate change, Poland will aim to:

- increasing the resilience of the energy sector – including linear infrastructure – to extreme weather events;
- take into account the need to adapt to climate change in the maintenance and expansion of forest resources, including adaptation of the species composition of forest stands to changing climatic conditions,
- ensuring adequate water resources;
- adapting agriculture and agricultural production to climate change.

POLICY

Sector-specific adaptation measures should take into account their respective areas, i.e. **energy, spatial planning, construction and infrastructure, transport, agriculture, energy**, taking into account common objectives to reduce their energy intensity and environmental pollution. The second component is **LULUCF** adaptation activities, i.e. land use and forest management that will reduce the vulnerability of these sectors to climate change (Objective. 1.3.1).

Each sector requires different actions, but every adaptation should be carried out in two ways. On the one hand, the aim is to adapt existing infrastructure, forests, agriculture and forest areas to climate change and, on the other hand, to take account of the effects of climate change and to reduce the impact on the climate from the planning stage of new solutions, infrastructure or land use. There is also a need for integrated measures between different sectors of the economy.

Adaptation measures already under way in agriculture include water retention, measures to combat animal diseases, investment support, as well as measures to protect soil health, increase the potential of carbon sequestration in soil, and protect biodiversity. These measures are implemented under the 2023-2027 CAP Strategic Plan through the implementation of eco-schemes, agri-environment-climate and afforestation measures, as well as through CAP (environmental) conditionality standards.

ACTIONS

- Action 13. Financial instrument – NFOŚiGW Priority Programme – ‘Agroenergy’.
- Action 14. Financial instrument – other programmes of the NFOŚiGW supporting the development of RES.
- Action 15. Financial instrument – other instruments supporting the development of RES.
- Action 54. Support for on- farm adaptation and emission reduction measures.
- Action 58. CAP (environmental) conditionality.
- Action 59. Eco-schemes under the CAP.
- Action 60. AGRI-environment-climate measures under the CAP.
- Action 61. Support for organic farming under the CAP.
- Action 62. Forest and tree interventions under the CAP.
- Action 63. Actions in the area of rational management of agricultural and forestry land.
- Action 65. Financial instrument – NFOŚiGW programmes supporting adaptation to climate change.
- Action 80. Definition of directional forest protection tasks, including

fire protection.

- Action 84. Adaptation of forests and forestry to climate change – small water retention.
- Action 85. Combating forest dying.
- Action 140. Awareness-building – actions related to adaptation to climate change.

Dimension 2.
Improving energy efficiency

Improving energy efficiency is a multifaceted measure with positive effects in all sectors of the economy and society. Energy efficiency strengthens **energy security** by reducing fuel and energy demand and imports of raw materials. Pro-efficiency measures allow for cost and energy savings, as well as more flexible use of energy. This has an impact on **reducing the environmental impact of the energy sector** by reducing pollutant and greenhouse gas emissions, reducing the use of domestic resources, reducing waste and reusing it in circular loops.

Reducing energy needs through changes in existing processes, as well as taking into account **the energy efficiency first principle in** policy and investment planning, means that energy efficiency can be treated as an energy source. The benefits of reduced energy consumption mean that the drive for increased energy efficiency is defined in the **second dimension of the Energy Union**.

This section of the NECPs includes objectives and targets for achieving certain levels of energy consumption across the economy, taking into account the exemplary role of public administrations, and sets targets for the energy consumption of buildings (new and existing) as they account for the largest amount of energy consumed in Europe.

Area 2.1. Improving energy efficiency in the economy

This section sets out the overall economy-wide targets in terms of primary energy consumption and final energy consumption, as well as energy savings achieved each year. The tasks of the public sector are also presented as part of the exemplary role of public administration in improving energy efficiency.

In simple terms, **primary energy** is energy raw materials or RES, and **final energy** is one energy delivered to the customer final, excluding transformation needs energy and losses.

Directive 2023/1791 on energy efficiency, the so-called EED, establishes a framework of measures to improve energy efficiency across the EU to ensure that the EU's 2030 energy efficiency target is met. The EU target is set as a **11.7 % reduction in final energy consumption in relation to the projections of the so-called PRIMES 2020 Reference Scenario** developed by the European Commission35. In addition, Member States are to collectively ensure that the EU's 2030 final energy consumption does not exceed 763 Mtoe and no more than 992.5 Mtoe for primary energy. Each Member State shall set indicative national contributions for final energy consumption and primary energy consumption36. The Commission's assessment published in December 2023 shows that many Member States face significant challenges in meeting the level of ambition of their national contributions towards the above-mentioned targets37.

Below are the primary and final energy consumption pathways according to the WEM scenario and the PRIMES 2007 and PRIMES 2020 scenarios for Poland (with the adjustment for 2030 submitted by the European Commission in January 2024) and the values resulting from the formula set out in Annex I of the EED for Poland.

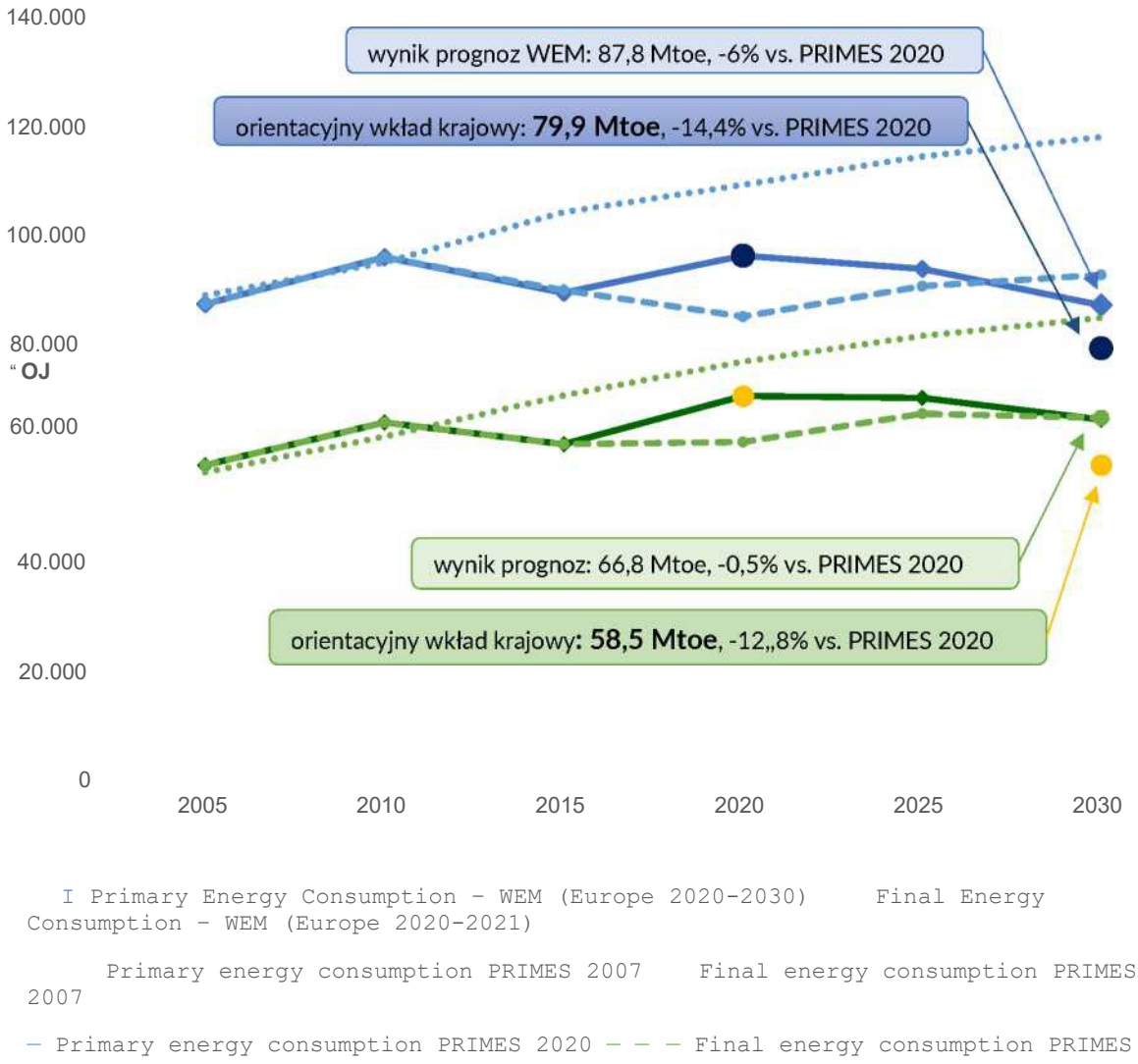
At the same time, it is important to stress **the importance of the energy efficiency first principle introduced in Regulation (EU)** 2018/1999. It should be applied taking into account, in particular, a system efficiency approach and a social and health perspective, paying attention to security of supply, energy system integration and the pursuit of climate neutrality. Consequently, the energy efficiency first principle should help increase the efficiency of individual end-use sectors and of the whole energy system.

35The reference scenario shows the economy-wide and climate and energy projections based on the policy framework put in place until 2020. For Poland, the projections are similar to those presented in the WAM scenario in the NECPs submitted to the European Commission in 2019.

The energy efficiency improvement36 targets set out in the 2019 NECPs referred to the PRIMES 2007 scenario, while under the revised EED, the targets are set in relation to the PRIMES 2020 scenario under the revised EED.

37 The assessment of the NECPs submitted by the Member States points to a significant gap in achieving the targets for reducing primary and final energy consumption due to the limited capacity of individual countries. *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – EU wide assessment of the draft updated National Energy and Climate Plans An important step towards the more ambitious 2030 energy and climate objectives under the European Green Deal and RePowerEU*, link

Primary energy consumption and final energy consumption by 2030



Objective. 2.1.1. Poland's contribution to final energy

According to the EED, EU Member States should ensure that energy consumption is reduced by at least 11.7 % by 2030 compared to the PRIMES 2020 projections[38], so that the final EU energy consumption does not exceed 763 Mtoe. For this reason, each EU Member State should define an indicative contribution to this target with an indicative trajectory. Contributions should be determined on the basis of one of the methodologies set out in the EED, including the formula in Annex I of the EED, which takes into account existing energy efficiency improvement measures, GDP per capita, energy intensity and cost-effective energy savings potential. **For Poland, this figure was 12.8 % for the PRIMES 2020 Reference Scenario[39]**.

Final energy consumption is the consumption of fuels (e.g. used directly in an individual kiln or in the form of petrol for cars) or of the energy (solution heat or electricity forms) supplied to the final **customer.** [7]

Poland will aim to achieve a 12.8 % reduction in final energy consumption (-8.6 Mtoe) in 2030 compared to the PRIMES2020 projections resulting from the EED formula, i.e. reducing energy consumption to

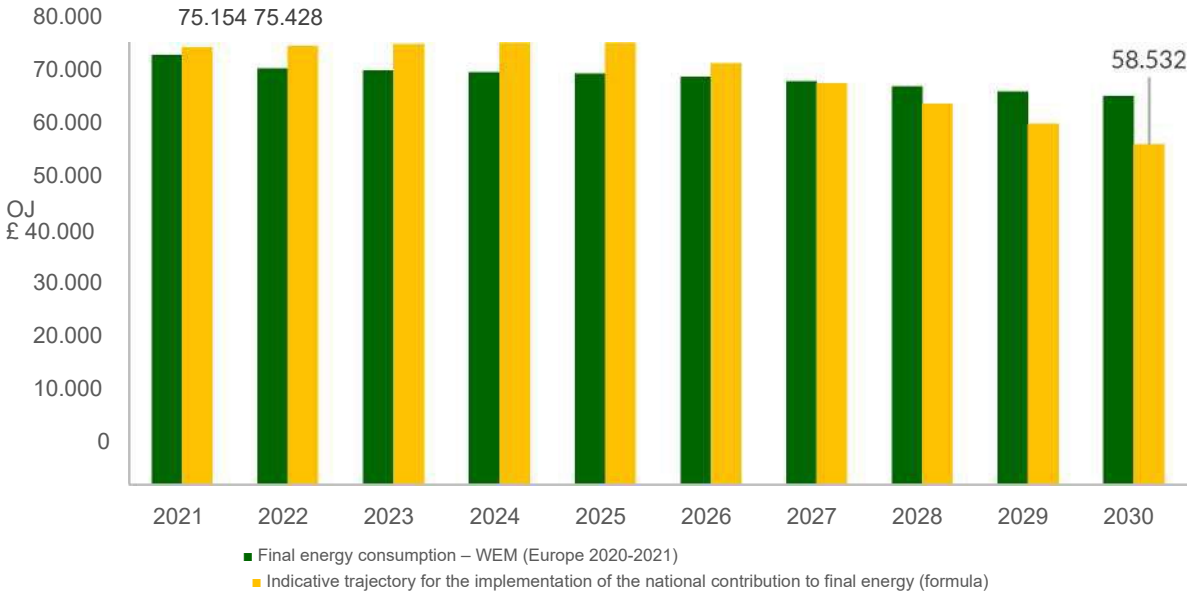
58.5 Mtoe, as an indicative contribution to the EU target. Current projections in the WEM scenario indicate a potential reduction of 0.5 % (-0.3 Mtoe), which for PRIMES 2007 would amount to -21.8 % (-18.6 Mtoe).

Compared to PRIMES 2007, the expected reduction in consumption would be 39 %. Projections in the NECPs 2019 showed a 27.4 % reduction in final energy consumption (-18.4 Mtoe) compared to PRIMES 2007.

Despite pro-efficiency measures, final energy consumption has continued to increase in recent years, due to the relatively high pace of economic development and the improvement in the living standards of society linked to increased energy consumption. This affects forecasts for the following years.

Below, a comparison of projections and expected value under the EED.

Final energy consumption by 2030 according to EED formula and WEM



Historical final energy consumption 2012-2021 [ktoe], taken into account when setting the indicative trajectory for the national contribution

2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
64 427	63 247	61 547	62 299	66 601	70 899	74 879	73 730	71 145	75 154

Source: EUROSTAT

Indicative trajectory for the implementation of the national final energy contribution (by formula) in 20222030 [ktoe]

2022	2023	2024	2025	2026	2027	2028	2029	2030
75 428	75 703	75 978	75 978	72 488	68 999	65 510	62 021	58 532

[39] Corrected PRIMES 2020 scenario of January 2024. Before the revision of the projections for 2030 submitted by the EC in January 2024, the value was 12.6 %.

POLICY

The reduction of final energy consumption will be the result of a number of projects implemented as well as ambitious measures to improve energy efficiency resulting from the implementation of the EED.

Objective. 2.1.2. Poland's contribution to primary energy consumption

In line with the so-called EED, indicates that EU Member States are collectively to contribute to the indicative target that the Union's primary energy consumption does not exceed 992.5 Mtoe in 2030 [40]

Similarly to the national contribution for final energy, the formula should be used whereby the **indicative national contribution should be the reduction of consumption**.

Primary energy is the energy contained in primary energy carriers – in coal, oil crude oil, natural gas and energy directly from the environment – water, wind, solar, geothermal used for production of electricity, heating or cooling and biomass

primary energy by 14.4 % compared to the projection in the PRIMES 2020 scenario41.

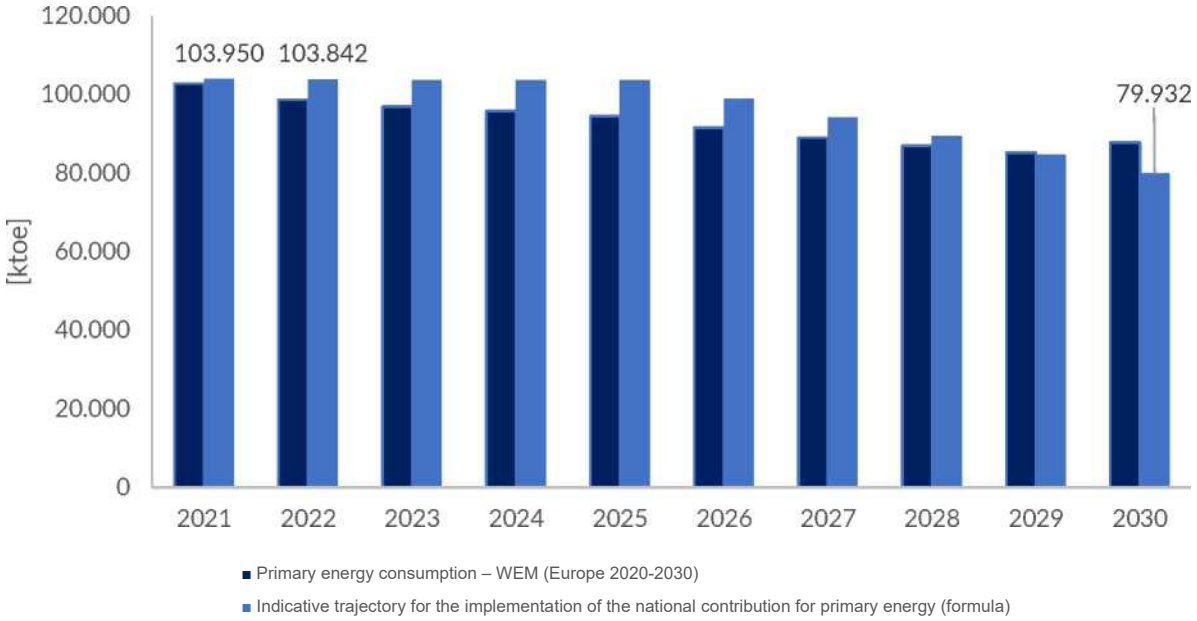
Poland's 2019 NECP target was 23 % compared to PRIMES 2007 (-27.3 Mtoe). The current level expected for Poland on the basis of the EED formula is as high as 32.6 % for PRIMES 2007. In absolute terms, this means that primary energy consumption should be lower in 2030 than in 2020, the economic slowdown caused by the COVID-19 pandemic.

Detailed analyses carried out for the AKPIC, including forecasts of economic activity, indicated that meeting the target would require a reduction in economic growth or very intensive efforts to improve the efficiency of processes, the replacement of fossil fuels, the scale of which is not feasible in such a short perspective.

Poland will aim to achieve a 14.4 % reduction in primary energy consumption (-13.4 Mtoe) in 2030 compared to the PRIMES2020 projections resulting from the EED formula, i.e. reducing consumption to 79.9 Mtoe, as an indicative contribution to the EU target.
Current projections in the WEM scenario indicate a potential reduction of 5.9 % (-5.6 Mtoe), which would be -26 % for PRIMES 2007 (-30.8 Mtoe).

Primary energy consumption by 2030 according to EED formula and WEM

41Before the revision of the projections for 2030 provided by the EC in January 2024, the figure was 13.5 %.



Historical primary energy consumption 2012-2021 [ktoe], taken into account when setting the indicative trajectory for the national contribution

2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
92 797	93 402	89 494	90 054	94 832	99 076	104 059	100 195	96 859	103 950

Source: EUROSTAT

Indicative trajectory for the implementation of the national primary energy contribution (by formula) in 2022-2030 [ktoe]

2022	2023	2024	2025	2026	2027	2028	2029	2030
103 842	103 734	103 734	103 734	98 973	94 213	89 453	84 692	79 932

POLICY

The reduction of final energy consumption will be the result of a number of projects implemented as well as ambitious measures to improve energy efficiency resulting from the implementation of the EED.

Objective. 2.1.3. Generation of final energy savings

The EED (Article 8) requires EU Member States to **achieve new final energy consumption savings each year**, calculated as a percentage of average actual energy consumption between 2016 and 2018 (i.e.: 70793 ktoe):42

- 2021-2023— —0.8 % annual final consumption energy(i.e.: 566 ktoe);
- 2024-2025— —1.3 % annual final consumption energy(i.e.: 920 ktoe);
- 2026-2027— —1.5 % annual final consumption energy(i.e.: 1062 ktoe);
- 2028-2030— —1.9 % annual final consumption energy(i.e.: 1345 ktoe).

Final energy consumption – FEC2020-2030	
Year	**ktoe**
2016	66 601
2017	70 898
2018	74 879
Average	**70 793**

42On the basis of: *Complete energy balances* (NRG_IND_EFF), Eurostat.

The total cumulative final energy savings to be achieved in the period 2021-2030 were calculated at 44870 ktoe. In accordance with Article 8, paragraph The second subparagraph of Article 1 of the EED shall decide how to distribute the calculated amount of new savings over each of the periods mentioned above, provided that the required cumulative cumulative end-use energy savings are achieved at the end of the obligation period.

Poland sets the path towards achieving between 2021 and 2030 at – 44870 ktoe, according to the trajectory in the table below.

year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
End-use energy savings (ktoe)										1255	Total cumulative end-use energy savings (by 2030)
									1225	1225	
								1205	1205	1205	
							1180	1180	1180	1180	
						1150	1150	1150	1150	1150	
					1130	1130	1130	1130	1130	1130	
				984	984	984	984	984	984	984	
			552	552	552	552	552	552	552	552	
		503	503	503	503	503	503	503	503	503	
	552	552	437	437	437	437	437	437	372	372	
total (ktoe)	**552**	**1055**	**1492**	**2476**	**3606**	**4756**	**5936**	**7141**	**8301**	**9556**	**44 870**

In addition, in accordance with Article 8, paragraph 3 The EED should achieve a **share of the required amount of total cumulative final energy consumption savings among people affected by energy poverty, vulnerable customers and people living in social housing**. It is at least equal to the arithmetic average share of the indicators for 2019, as shown below.

Indicators of energy poverty as referred to in Article 8 paragraph 3 EEDs

energy poverty rate	value (%)	designation
Inability to maintain adequate room temperature	**4,20**	[ilc_mdes01]
Arrears on energy bills	**5,80**	[ilc_mdes07]
Total population living in a dwelling with leaking roof, damp walls, floors and foundations or crushed windows or floors	**10,80**	[ilc_mhod01]
At risk of poverty	**15,40**	[ilc_li02]
average	**9,05**	

Poland will aim to achieve total cumulative end-use energy savings among people affected by energy poverty of 2678 ktoe in 2024-2030.

POLICY

The final energy savings obligation in Poland has been implemented since 2021 through an energy efficiency

obligation **scheme – an energy efficiency** certification scheme – and alternative policy measures. As of 2024, Poland will continue its approach in meeting the new Article 8 paragraph target. 1 EED. It is planned to maintain the existing level of the obligation for obliged entities under the energy efficiency certification scheme, the remaining part of the total cumulative savings required will be provided by Poland through the alternative measures set out in Annex 3 to this document.

ACTIONS

- Action 29. Development of zero-emission public transport in cities.
- Action 31. Fuel charge and issue charge.
- Action 89. Financial instrument – white certificates system.
- Action 90. Development of energy audits and energy management systems.
- Action 91. Financial instrument – Termo Programme.
- Action 92. Financial instrument – Tax credit for expenditure on thermomodernisation of single-family dwellings.
- Action 93. Improving the energy efficiency of residential buildings.

Area 2.2. Low-carbon construction

Around the EU, buildings are responsible for around 40 % of the energy consumed and 36 % of direct and indirect energy-related GC emissions, with heating, cooling and domestic hot water accounting for 80 % of the energy consumed by households.

The EU's determination to reduce the environmental impact of buildings is demonstrated by setting a target for **RES consumption in buildings**, as well as by setting out a new system for greenhouse gas emission allowance trading – **ETS-2**. These mechanisms are designed to incentivise the reduction of the use of fossil fuels in buildings.

However, priority should be given to reducing (rationalisation) thermal needs. Technological progress in construction makes it possible for new buildings to have much lower thermal needs than existing ones, which is why great attention is paid to this but to reduce the energy intensity of existing buildings. This aims to reduce energy demand in the economy and reduce GC emissions, but also reduce energy bills. **The Renovation Wave** is also considered as a means to fight energy poverty and will also have an impact on improving air quality.

This section discusses targets for existing buildings and commitments for new buildings.

Objective. 2.2.1. Reducing the energy needs of existing buildings

According to Article 2a of Directive 2010/31/EU on the energy performance of buildings (the so-called EPBD, currently under revision), EU Member States should develop **long-term building renovation strategies**.

Those documents were intended to serve as a supplement to the NECPs43. *The Polish Long-Term Building Renovation Strategy* was submitted to the European Commission in 2022. The document sets out the necessary measures to achieve high energy efficiency and low-emission buildings in Poland by 2050. The achievement of the target will entail, inter alia, improving the energy performance of buildings, improving air quality by reducing greenhouse gas emissions into the atmosphere, and will have a positive impact on the generation of new jobs linked to thermomodernisation of buildings.

Following an analysis of costs and effects, a **recommended scenario was adopted,** which envisages a widespread shallow energy renovation **with the gradual uptake of deep, more comprehensive energy**

43One of the objectives of establishing the obligation to develop NECPs was that they should integrate all energy and climate action and reduce the number of documents produced. However, for building renovations, a derogation was adopted, due to the depth of the expected material and its variability. Documents are not considered as an annex to the NECPs.

renovation with a view to 2030.

Shallow energy renovation consists primarily of replacing a carbon-intensive heat source, such as a coal-fired boiler, with an eco-device. *Deep energy renovation* requires additional measures, such as heating the building, replacing windows or installing a green heat source. The assessment of the economic efficiency of shallow and deep energy renovation confirms that, under current market conditions, energy renovation is profitable in a large part of buildings.

The planning of the National Renovation Wave must also take into account market rights – too high national renovation rates will lead to unjustified increases in the prices of materials and services, and may be subject to unfair performance.

The objective of reducing the energy demand of existing buildings is 7.5 million thermal renovations by 2050,with the priority of eliminating the use of coal in residential buildings.

The expected detailed effects of the renovation scenario implemented are set out below:

By 2027, all buildings with a primary energy ratio of the building (EP) greater than **330 kWh/(m²·year)** shall be refurbished and by 2035 buildings with an EP ratio greater than **230 kWh/(m²·year). By**contrast, in 2045 all buildings will have an EP index of no more than **150 kWh/(m²·year).**

By 2050, **65 %** of buildings will achieve an EP ratio of no more than **50 kWh/(m²·year)**, **22 % between 50 and 90 kWh/(m²·year)**, the remaining 13 % of buildings that cannot be technically or economically upgraded as far as possible will reach the EP ratio of **90-150 kWh/(m²·year).**

Between **2021 and 2050**, **751 thousand buildings will be thermomodernised**, with **236 thousand buildings by 2 030.271 thousand buildings** in 2030-2040, 2040-2050 – 244 thousand.

In 2021-2050, the cumulative number of thermal renovations (for each building several thermal renovations during that period), approximately **7.5 million total thermal renovations** were planned, with: **between 2021 and 2030 – 2.4 million**; 2031-2040 – 2.7 million; 2041-2050 – 2.4 million.

In total, economically viable energy renovation potentially achieves a reduction in CO2 emissionsof more than **37 million tonnes per year**, which is about. **10 % of Poland's total** annual greenhouse gas emissions and to achieve total **final energy savings in all residential buildings of 147 TWh**.

It was accepted that 10 years is the maximum simple payback time for deep energy renovation in buildings with poor energy standards based on its own heat source in the absence of access to the district heating network.

POLICY

The phasing out of coal from households and thermomodernisation is one of Poland's main priorities. It is assumed that the share of deep energy renovation in the activities carried out will gradually increase while thermomodernisation of other buildings is applied in stages.

Measures, as well as support measures, will be targeted to ensure an average annual rate of energy renovation at around the level. **3.8 %**, with energy renovation to no more **than 50 kWh/(m²·year)** being the dominant solution only after 2035, which should allow sufficient time to build the right competences and capacities among suppliers of the necessary technological solutions.

The removal of obstacles to the sector and the provision of financial support for the necessary initial investments, as well as for the most energy-intensive buildings in particular, while prioritising the most cost-effective renovations and measures to combat energy poverty, will be reflected in Poland's planned measures.

ACTIONS

- Action 19. Financial instrument – NFOŚiGW – Clean Air Priority Programme.
- Action 20. Financial instrument – NFOŚiGW Priority Programme – 'Stop Smog'.
- Action 21. Financial instrument – NFOŚiGW Priority Programme – 'Cieppal Housing'.

- Action 90. Development of energy audits and energy management systems.
- Action 91. Financial instrument – Termo Programme.
- Action 92. Financial instrument – Tax credit for expenditure on thermomodernisation of single-family dwellings.
- Action 93. Improving the energy efficiency of residential buildings.

Objective. 2.2.2. New zero-emission construction

Under the current approach, all newly created buildings are **nearly zero energy buildings** (*NZEBs) – a building* with very high energy performance, with nearly zero or very low energy required to be covered to a very significant extent by renewable energy sources, including those located on-site or nearby.

In the current legal order,44 such a building is characterised by parameters in the area of **maximum values for the annual non-renewable primary energy demand (EP) and thermal insulation requirements in the building envelope**. In practice, these parameters oblige the investor to make extensive use of RES as part of the construction of a building.

Bearing in mind the provisions of the new Energy Performance of Buildings Directive (EPBD), all new buildings will have to be built with an even higher energy standard, with **only zero-emission buildings being constructed from 2030**. In line with the provisions of the new Directive**, the EPBD will be buildings with no or very small energy requirements, not generating any CO2 emissions**directly **on sitefrom fossil fuels and no operational greenhouse gas emissions, or generating very small operational amounts of such emissions**. This will only be possible if such buildings are connected to energy efficient district heating systems or even greater use of RES.

In the context of the use of RES, as an enabling condition, if technically appropriate and economically and functionally feasible, the use of solar energy installations for the energy supply of buildings will be introduced.

The energy demand target for new buildings is to ensure that all new buildings built in Poland are zero-emission from 1 January 2030 and for buildings occupied by public authorities from 1 January 2028.

POLICY

However, in view of the need for a rational and efficient housing policy, as well as the continuing shortage of housing, at affordable prices for society, measures will be taken to alleviate the burden on Polish society in this area.

The planned action will be an analysis/review of existing technical and construction regulations in the field of energy efficiency. As a first step, it will be verified **whether the requirements laid down in the legislation take due account of the state of the art in the construction sector.** It will be necessary to determine whether the construction products, equipment and technologies used make it possible to meet the requirements of the legislation or make them more stringent. The analysis will guide action in the area of possible support actions in the field of high-efficiency technical and installation solutions, construction products, etc.

It will be necessary to assess the need to support the development, application and dissemination of these innovative solutions, which, due to their initial phase of existence, are particularly expensive to implement.

Support activities will not only focus on possible targeted aid programmes or preferential sources of funding, but will also focus on **increasing the supply of qualified experts, co-financing of research work.**

ACTIONS

- Action 19. Financial instrument – NFOŚiGW – Clean Air Priority Programme.

44Parameters set out in the Regulation of the Minister for Infrastructure of 12 April 2002 on the technical conditions to be met by buildings and their location

- Action 95. Increasing requirements – technical and construction regulations and requirements laying down standards for the design of buildings.

Dimension 3. Energy security

Access to energy is a prerequisite for the functioning of the economy, including basic human needs. Therefore, **energy security** is the **third dimension of the Energy Union** and at the same time is a prerequisite for achieving all energy transition objectives. From a national perspective, energy security is a priority and strengthening energy sovereignty has become crucial in the face of the impact of the crisis caused by the war in Ukraine. Guaranteeing a secure supply of fuels and energy – as simplified as energy security – requires that changes in the energy sector take place in a planned manner and should therefore be based on specific assumptions and targets. While moving towards climate neutrality involves moving away from fossil fuels, it is essential to guarantee the security of supply of these raw materials to the economy and consumers during the transition period. Ultimately, zero-emission technologies and energy storage should be sufficiently developed to cover transport energy demand with certainty and at an acceptable cost; electricity in a saturated system with renewable sources dependent on atmospheric conditions; provide thermal comfort in buildings and that companies produce products and services based on clean but accessible energy.

This part of the NECPs includes the assumptions and objectives relating to the certainty of covering demand **for natural gas, oil and liquid fuels**; it then identified issues related to the coverage of **coal** demand, as well as the need for nuclear fuel and hydrogen and its derivatives. A further area of this dimension is the certainty of covering **electricity and heat** demand. Topics are ranked without prioritisation.

Area 3.1. Ensuring energy security – general objective

In legal terms, *energy security* is the state of the economy capable of covering consumers' current and forward-looking demand for fuels and energy in a technically and economically justified manner, while respecting environmental protection requirements45.

This section sets out the overall energy security objective resulting from the achievement of the segment-specific targets
the fuel and energy sector, which is defined in the subsequent areas of Dimension 3.

From a practical point of view, from the side supply chain – *energy security*:
certainty of covering demand for raw materials energy (national resources or imported) for the economy; certainty transport and distribution of those raw materials and fuels;
then, the certainty of electricity production; and heat, as well as their transmission and distribution to end-recipients.

Objective. 3.1.1. Ensuring energy sovereignty

The energy crisis, which started in 2021 and was exacerbated by the outbreak of the war in Ukraine in February 2022, made energy security necessary for the first time in many years to intervene directly and immediately. Areas to be strengthened have also emerged in order to reduce the risk of disrupting the security of fuel and energy supply and the impact of one event on fuel and energy prices and, consequently, on inflation.

Both EU and national energy policies have started to strongly emphasise the importance of **energy sovereignty and of strengthening resilience to geopolitical disturbances**, which should be understood as the ability to meet fuel and energy demand regardless of actors' actions and external situations. This also means ensuring a degree of diversification of imports that, in a situation of disturbance in one energy sub-sector, ensures a limited impact on the situation in the sector as a whole and on the increase in energy prices.

Poland sets the goal of ensuring energy sovereignty in a **sustainable manner and striving to strengthen it. In this context, Poland will aim to ensure a rate of energy independence above the EU average.**

Due to the multidimensional nature of energy sovereignty, no measure makes it possible to fully assess the achievement of the target. This is affected by the fulfilment of the other objectives set out in this dimension – from optimisation of the mining structure, diversification of energy consumption patterns to diversification of raw material supplies, and if not fulfilled, the assessment of ensuring energy sovereignty depends on the existence of strong disruptions in energy supply or an increase in energy prices to levels unacceptable by the economy.

POLICY

An appropriately diversified **fuel mix of primary and final energy consumption** in the economy and the **preservation of a limited level of import dependency** will contribute to ensuring energy sovereignty and consequently the resilience of the economy. **Diversification of the generation structure** based on a structurally differentiated increase in the use of domestic, in particular, zero-carbon energy sources (where grid safety conditions are needed to cover electricity demand) will contribute to this. Despite its multidimensional advantages, the implementation of nuclear energy will increase import dependency, but may have a positive impact on energy sovereignty, given the possibility of building up long-term fuel stocks and, at the same time, maintaining them at a certain level as a result of international standards.

While the gradual replacement of fossil fuels by zero-carbon energy sources and alternatives will be sought,

45In accordance with Article 3(16) of the Energy Law Act.

an **adequate level of diversification of natural gas and oil supplies** is necessary during the transitional transition period. With regard to the demand for hard coal, efforts will be made to cover the demand for this raw material with domestic resources, which will be particularly challenging for household and other small-scale consumers' demand. In the area of **coverage of electricity demand**, the aim will be to be **able to cover** demand with its own generation sources (due to the lack of impact on the availability of energy in neighbouring countries' systems), which does not exclude the interconnection of energy exchanges with these countries. Due to the specificities of the sector, the heat demand will be covered by own sources.

Details are the policies and actions identified in the next specific objectives.

ACTIONS

Actions described under the following specific objectives will contribute to the achievement of the objective, from those affecting the diversification of the supply of raw materials, to ensuring that electricity and heat demand is covered and fossil fuels are replaced by their own sources and raw materials.

Area 3.2. Coverage of demand for hard coal

Hard coal has been the basis for many years to cover primary energy demand in Poland, but this trend is changing due to Poland entering the energy transition path. In the following years, the use of coal will be gradually replaced by zero-carbon fuels and, on a transitional basis, also by natural gas, which is less carbon intensive than coal, but it is also necessary to cover the demand for this raw material during this period. For this reason, this section sets out how this will be done.

Poland does not set a target for the use of lignite, as its use is directly linked to the work of the power plant powered by the above-mentioned raw material. For this reason, decisions on the work of these generation units are decisive in this area, taking into account the impact on the social aspects of ending mining in a given region.

Objective. 3.2.1. Ensure that demand for hard coal is covered by domestic raw material

The domestic raw material covers most of the demand for hard coal. In 2022, extraction accounted for 83 % of46 consumption, but due to its physico-chemical characteristics, the domestic raw material primarily meets the needs of the professional energy sector. Household demand is partly covered by imported raw material.

While the energy use of coal is linked to emissions, the fuel-based sources have the advantage of their availability to produce energy linked to the time of demand. For this reason, the reduction in the use of coal must be correlated over time with the construction of new, secure and stable sources and the achievement of technological maturity and other economic solutions such as energy storage. This is the main determinant of demand for domestic raw material.

The use of coal in the national economy is largely influenced by EU climate and energy regulations. In addition to the overall targets for reducing GC emissions, they are also shaped by methane emission reduction regulations. The Regulation on methane emissions reduction in the energy sector and amending Regulation (EU) 2019/942 aims to preserve and improve the environment by reducing methane emissions from fossil energy produced or consumed in the EU. The regulation also addresses the reduction of methane emissions from the coal sector and imposes, inter alia, reductions in methane emissions on mining companies: up to

46 *Balance of First Energy 2022*, ARE S.A. on behalf of MKiŚ 2023, link

5 t/kiloton of coal mined by 1 January 2027 and up to 3 t/kiloton of coal mined by 1 January 2031, which will create additional challenges in Polish circumstances.

Coal mining and coal-based energy represent a relatively large segment of the national economy, therefore the way the transition is carried out must also take into account the just dimension of the transition of coal regions. For this reason, two social agreements have been concluded to ensure the stability of the mine shutdown process47.

In 2022, a request was submitted to the European Commission on the so-called: A new support system for the hard coal mining sector, which took into account the 2021 social contract for the transformation of the hard coal mining sector. To prevent companies from going bankruptcies, the system provides for subsidies where the difference between costs and revenues is positive, but at the same time a reference price mechanism and certain extraction limits are established. The notification process is planned to be completed in 2024.

Projections indicate that domestic energy coal mining will not exceed 30 million tonnes in 2030. The availability of domestic raw material will affect the level of use in the economy.

POLICY

Domestic mining will be the main source of coverage of demand for hard coal and imports should only be complementary, and priority is therefore to ensure the highest possible economics of raw material extraction in the country. Nor does it exclude the development of innovations in the extraction and use of raw materials that can allow for a more efficient and ‘clean’ use of the raw material.

Social contracts48 aim to ensure the supply of raw materials to the economy, while aiming at a fair implementation of the energy transition – taking into account the impact on coal workers and entire coal-dependent regions. In the event of a very significant market change – e.g. as a result of significant increases in EUA prices, price decreases or faster than projected energy transition, the timetable for mine closures should be renegotiated, respecting labour rights.

47The just transition of coal regions and the so-called social agreements are addressed in the fourth dimension.
Social48 agreement on the transformation of the hard coal mining sector and selected transformation processes of Śląskie Province of 2021 and Social Agreement on the transformation of the electricity and lignite mining sectors of 2022.

As the characteristics of the national raw material primarily correspond to the needs of the professional energy sector, reducing household demand for hard coal and moving away from its use in this segment by 2040 remains a priority, thus reducing import needs and affecting air quality.

ACTIONS

- Action 115. Efficient management of the country's strategic raw materials.
- Action 130. Providing support for coal regions.
- Action 137. Research project – drainage using underground directional drilling technologies.

Area 3.3. Covering natural gas demand

Natural gas accounts for a significant part of the country's primary energy demand, and the demand for this raw material will not fall earlier than in 2030, in which case a peak in demand is expected. Given its bridging role in the energy transition, it is essential to ensure the security of supply of this raw material to consumers.

Due to limited national resources natural gas, most demand it is covered by imported raw material, and own mining outside the country.

This section sets out the objectives of diversifying the supply of natural gas from outside the country, covering part of the demand for raw material with own resources, and providing well-developed and efficient domestic infrastructure that enables customers to access the raw material.

In addition to defining policies and actions to cover the demand for natural gas, it is also necessary to define targets for preparedness to cope with constraints or interruptions in the supply of raw material, which is also included in this part of the document.

Some of the issues related to gas infrastructure and the certainty of covering raw material needs are also discussed in the 4th dimension, in area 4.2.

Objective. 3.3.1. Diversification of natural gas supplies (imports)

The crisis in the energy markets of 2021-2022 has shown how important it is to ensure a sufficiently deep diversification of the supply of raw materials, with a view to making domestic demand for a given raw material dependent on imports. In 2022, supplies of non-domestic natural gas accounted for almost 87 % of natural gas49 consumption, with a total demand of around 16.6 billion m^3. However, it should be noted that demand in 2022 was historically low due to the crisis and does not correspond to annual consumption in pre- and post-crisis periods.

Poland's situation with regard to natural gas was much better than in other European countries, as infrastructure investments (e.g. the LNG terminal in Świnoujście and Baltic Pipe) were made in time to allow the contract with the Russian company Gazprom not to be renewed.

49 *Balance of First Energy 2022*, ARE S.A. on behalf of MKiŚ 2023, link

Their implementation also provides opportunities to strengthen Poland's role in the context of gas transmission and trade in the region.

In the area of diversification of natural gas supplies, the objective is to maintain the achieved independence from single source (or direction) supply during the transition period and the possibility to export to countries interested in the use of cross-border infrastructure, thus allowing the contracting of supplies on market terms.

The target may change in the long term, when domestic demand falls to a level where the use of natural gas in the economy is so low that the risk of disruptions in natural gas supply for the energy sector and for private customers is eliminated by domestic and cross-border extraction.

POLICY

The objective of diversifying natural gas supplies will be pursued by:

- ensure that natural gas supplies can be taken off, by ensuring adequate protection and maintaining full functionality:
  - on connections with neighbouring countries' systems (Germany, Lithuania, Czech Republic, Slovakia, Ukraine), on the Baltic Pipe pipeline, allowing imports from the Norwegian shelf, with the LNG regasification terminal in Świnoujście
- construction of an FSRU LNG terminal in the Gulf of Gdańsk,
- the provision of well-developed and efficient transmission infrastructure within the country,
- the commitment of energy companies to diversify supplies of natural gas from abroad – until 2026 the share of natural gas imported from a single source in a given calendar year must not exceed 33 %. The results of the cyclical monitoring of the security of supply of gaseous fuels will form the basis for determining this level in the years to come and beyond.

ACTIONS

- Action 99. Maintenance of efficient interconnections and LNG terminal in Świnoujście.
- Action 101. Construction of the FSRU terminal in the Gulf of Gdańsk.

Objective. 3.3.2. Maintaining the national level of natural gas extraction

Although the main source of demand non-domestic supplies for natural gas in Poland, part In Poland, natural gas is being extracted demand is covered by domestic extraction. high-methane and nitrogen-rich which differ The local use of the raw material reduces the physical characteristics and value of transport, and at the same time it is heating. For that reason, the latter activities contributing to GDP growth. Activity is used only locally, and it also affects national livelihoods technical competences that can also be used in other areas related to the transition and the functioning of the economy.

In Poland, natural gas is being extracted high-methane and nitrogen-rich which differ physical characteristics and value heating. For that reason, the latter it shall only be used locally.

Domestic extraction of methane-rich and nitrogen-rich natural gas remains relatively stable. In 2022, it stood at around Billion m^3 (expressed as high-methane natural gas)50, which corresponded to ca. 20 % of the raw material needs.

The objective is to maintain stable domestic natural gas production by 2030.

The main way to cover natural gas demand will continue to be to import and own extraction outside the country. Looking ahead, when demand for raw material declines, the rate of decline in domestic production is likely to be lower than the reduction in imports, although this may change based on changing market conditions.

POLICY

Maintaining stable domestic natural gas production requires continuing exploration of new deposits that will replace exploited deposits, as well as increasing the efficiency of extraction, including through the use of innovative extraction methods. This is beneficial for both consumers and operators in the exploration and extraction industry, as natural gas from its own production is normally characterised by the highest price competitiveness.

ACTIONS

- Action 115. Efficient management of the country's strategic raw materials.

Objective. 3.3.3. Ensuring the adequacy and development of natural gas transmission, storage and distribution infrastructure

Ensuring the proper condition of gas infrastructure, its expansion and sufficient storage capacity in relation to consumption are factors affecting the current and forward-looking security of natural gas supplies to customers.

The national transmission system is powered
imports of gaseous fuels from abroad, domestic, underground mining

Therefore, activities in this area are strictly defined in the *Energy* Law Act and regulated by the President of the Energy Regulatory Office (URE). The situation is monitored in detail by both the minister responsible for energy and, as regards the supervision of gas transmission infrastructure, by the Government Plenipotentiary for Strategic Energy Infrastructure. The gas transmission system operator (TSO) plays a key role. As infrastructure investment times and perspectives are long-term, TSOs are designated in a long-term perspective. The President of the ERO appointed the TSO Gaz-System S.A. to act as TSOs until 6 December 2068. In addition to TSOs, there are also gas distribution system operators, natural gas liquefaction system operators and storage system operators.

Entities carrying out tasks in the area of the operation and development of the transmission and distribution system and natural gas storage face challenges related to the need to adapt facilities and equipment for transporting and storing also other

Statistical50 surveys of the Minister for Climate and the Environment, link

decarbonised gases, i.e. biomethane, hydrogen, synthesis gases, as well as in the area of cybersecurity.

The aim of the measures taken is **to ensure an adequate level of security of supply and stability in the operation of gas infrastructure to cover current and forward-looking demand for natural gas, including in the regional context, as well as the possible adaptation of infrastructure to the transport capacity of decarbonised gases, in line with market rationale and technical possibilities.**

POLICY

Ensuring the proper condition and development of natural gas infrastructure will be based on the regulated activities of dedicated operators. So far, the **transmission system operator** will carry out the tasks set out in the development plans to meet current and future demand for gaseous fuels for a period of 10 years (currently in force for the period 2024-2033), and **distribution system operators** will continue to develop and implement such plans over a 5-year perspective. The storage system operator will also carry out the tasks set out in the development plan to meet current and future demand for storage capacity for a period of 10 years.

The plans shall be determined on the basis of technical analyses and forecasts of raw material demand and investments should take into account the possibility of transporting decarbonised gases.

ACTIONS

In particular, the following will contribute to the achievement of the objective:

- o Action 102. Increasing the capacity and reception capacity of the natural gas storage system by Action 103. Development and modernisation of the transmission and distribution system in accordance with the adopted development plans and their updates.

Objective. 3.3.4. Ensuring preparedness to deal with natural gas supply constraints

Disruption of the supply of natural gas to the national gas system or unforeseen situations affecting its operation and covering customers' needs and exceptionally high demand require specific safeguards.

This area is regulated by EU Regulation 2017/1938 on the security of gas supply, which sets out, inter alia, liability issues, supply and infrastructure standards, risk assessments and the need for preventive and emergency plans. In accordance with Article 8, paragraph 2 (a) to (b) Poland has a **Preventive Action Plan and an Emergency** Plan – both documents were updated in 2023. Updates are carried out every 4 years or more frequently when needed.

The *Preventive Action Plan 2023* (link) sets out measures to remove or mitigate risks and threats to the supply of high-methane natural gas, and describes Poland's capacity to supply natural gas in line with the standards laid down in EU Regulation 2017/1938. The document also refers to the nitrogen-rich gas segment. Particular attention was paid to ensuring compliance with the standard for the supply of customers belonging to the group of protected customers within 30 days of exceptionally high demand for natural gas, with the probability that demand will occur once in 20 years (in Poland it is approx.: 1 226.8 million m 3).

The document also contains the main elements of regional cooperation and a description of the mechanisms used for cooperation between Member States in the relevant risk groups.

The *Emergency Plan* (link) sets out: (a) the responsibilities of market participants and the competent authority for security of gas supply (within the meaning of Article 3 paragraph 2 Regulation (EU) 2017/1938); (b) rules for monitoring the national natural gas market; (C) roles, procedures to be followed, means available, communication patterns between actors in the event of individual crisis levels; (D) actions taken by public administrations, energy undertakings, gas transmission system operator or combined gas system operator, gas distribution system operator, natural gas liquefaction system operator and storage system operator, at each crisis level; (e) the role of the competent authority and the modalities to be followed in the event of a crisis, including the use of market-based and non-market-based measures.

The aim is to ensure a comprehensive system of preparedness to deal with natural gas supply constraints in emergency situations and increased demand for raw material.

POLICY

Preparedness to deal with natural gas supply constraints in emergency situations is primarily based on having adequate transmission and storage infrastructure as well as on an efficient set of procedures and solutions to avoid or significantly reduce crisis situations.

To this end, the **preventive action plan** and the **emergency plan** will be updated periodically and the verification of its implementation and effectiveness will be based on monitoring and reporting so far. Entities implementing the measures set out in the ***Preventive Action Plan 2023*** are required to report quarterly to the minister responsible for energy on the implementation of measures to improve the security of gas supply. The reports shall include the timetable of work, the expected date of completion of the investment, the risks to the implementation of the investment identified by the implementing entity and its impact on the crisis scenarios identified in *the current Risk Assessment* and the *Preventive Action Plan*. In addition, by 1 September each year, the transmission system operator, in consultation with undertakings importing natural gas in Poland, shall prepare a report on the preparation of the gas system for the winter season, taking into account an analysis of the coverage of peak demand for natural gas under non-fault conditions. At the same time, the minister responsible for energy shall draw up **a report on the results of monitoring the security of supply of gaseous fuels**.

ACTIONS

- Action 100. Periodic updating of the Preventive Action Plan and Emergency Plan and monitoring the implementation of the tasks included in the Preventive Action Plan.

Area 3.4. Covering demand for oil and liquid fuels

Oil is a strategically important energy raw material for the domestic economy, and global demand for this raw material will not fall earlier than in 2030, when demand is forecast to peak. Oil will continue to play a key role in the transport sector beyond 2030 and its economic importance will remain high, not least in view of its growing role in the petrochemical sector.

Due to limited domestic oil resources crude, the vast majority demand is covered by raw material from import

The Russian Federation's aggression against Ukraine in February 2022 made it necessary to redefine strategic priorities for the oil and oil fuel energy sector. The embargo on Russian oil and liquid fuels and, as a consequence, the cessation of imports of crude oil and fuels from Russia has led to profound changes in the energy security system of EU countries as regards the supply of energy raw materials.

This section sets out the objectives of diversifying supplies of crude oil and liquid fuels from outside the country, as well as providing well-developed and efficient domestic infrastructure that enables customers to access oil and liquid fuels.

Objective. 3.4.1. Diversification of oil supplies (imports)

As a result of changes in the structure of the supply of energy raw materials, the oil import route using the 'Przyjaźń' pipeline until 2022 was replaced by maritime supplies via Naftoport in Gdańsk, which increased the use of naphtoport infrastructure and the Pomorskie pipeline to the maximum technical capacity. The shift in the focus of the oil supply system from East to maritime supplies made the 'Przyjazń' pipeline a marginal role in Poland's fuel security system.

Changes in the structure of energy security in Germany have also led to a significant increase in the role of naphtoport and Polish transmission infrastructure. In 2023, the supply of oil from naphthoport to two East German refineries in Schwedt and Leun accounted for 75 % of their demand. It should be stressed that even the expansion of the reception capacity of the port of Rostock and the Rostock-Schwedt pipeline will not reduce the importance of the transit of oil through Poland, but will still be crucial and will account for around 50 % of the import needs of Leuna and Schwedt refineries.

This infrastructure is therefore of crucial importance for both Poland and Central Europe, which makes it necessary to ensure its continued operation, including the possibility to carry out repair and modernisation works on the infrastructure in question.

This situation calls **for the development of internal infrastructure aimed at ensuring that oil imports by sea can be increased.** The overriding objective remains to ensure the uninterrupted supply of crude oil to refineries in Poland and abroad, including in crisis situations.

Poland sets the target for 2030 to continue to ensure the stability of the supply of oil by sea to domestic and foreign refineries, while expanding transmission and transhipment infrastructure.

POLICY

Following the outbreak of the war in Ukraine, the change and diversification of Poland's oil imports, including the increased supply of oil tankers of its various species, make it necessary to prioritise investment priorities for the expansion of demand and transmission infrastructure, including the Pomorskie oil pipeline and naphtoport.

Since the Polish fuel market is liberalised, it is crucial to ensure that the needs of the refining sector are properly forecasted in order to provide an adequate basis for investor decisions. To this end, since 2019 the Government Strategic Reserve Agency has been producing forecasts of national storage requirements for emergency and commercial stocks of fuels and oil for a period of 10 years, which are updated cyclically every

2 years.

A summary of the forecast volume of stocks and storage capacities shows that in subsequent years there is a surplus of spare capacity over storage needs for emergency and operational stocks. At the end of 2023, the surplus stood at 4 %. Given the current oil storage capacity and the forecast of raw material demand, no new reservoirs are expected to be built by 2030.

The objective of ensuring uninterrupted oil supply will be pursued by:

- ensuring the functioning and development of the transhipment capacity of the naphthoport in Gdańsk;
- the provision of well-developed and efficient transmission infrastructure within the country, including its extension through the construction of the 2nd Pomorskie pipeline;
- cyclical analysis of market needs for oil and fuel storage;
- improving the technical conditions for the use of underground oil and fuel storage facilities.

ACTIONS

- Action 109. Monitoring of oil and liquid fuel storage needs.
- Action 110. Support for investments aimed at diversifying and increasing oil supplies, including, inter alia, increasing the transhipment capacity of naphtoports, construction of the second strand of the 'Pomorskie' pipeline.

Area 3.5. Forward-looking coverage of nuclear fuel demand

There are no nuclear power plants in the Polish energy system, but the **first unit of the first large-scale nuclear power plant** is planned for the period 2030-2035. With the next units to be deployed, also as part of the private partnership investment, the total installed capacity of large-scale nuclear units could reach close to 7.4 GW (net) in 2040 and around. GW (two consecutive blocks). In addition, several companies also state that they are willing to build *small modular reactors (SMRs*). For this reason, this section sets out an approach to ensuring a secure supply of nuclear fuel, but also a reference to national reserves of uranium deposits.

Nuclear rules are strictly standardised internationally and compliance with them is a key premise in the area of nuclear safety.

Objective. 3.5.1. Ensuring a secure supply of (import) nuclear fuel

The security of supply of nuclear fuel depends on the security of supply of uranium concentrate, access to fuel cycle services, as well as the certainty and reliability of the transport of nuclear materials at different stages of the fuel cycle and the transport of finished nuclear fuel. The rules for the supply of uranium and nuclear fuel cycle services within the EU are governed by the Euratom Treaty.

Uranium ore deposits are distributed in different parts of the world, mainly in politically stable countries. The economic viability of uranium mining depends mainly on its market price. Now, as demand is increasing, uranium prices are rising, which will encourage mining companies to manage new deposits. According to the findings of *the Polish Nuclear Energy* Programme 2020 (link), uranium and fuel should be supplied from safe countries, in particular from EU countries or more broadly from the OECD. Nuclear fuel supply contracts are concluded by power plant owners in advance for a period of at least several years and cover all nuclear fuel cycle services needed to create the final product in the form of reactor fuel assemblies. Such contracts shall be notified to the Euratom Supply Agency. *Euratom Supply Agency*), which has instruments to protect Member States from possible fuel availability problems.

Poland sets a target for 2030 of at least 5 years of fuel supply once the first unit of Poland's nuclear

power plant is in operation.

POLICY

With a view to energy security, the creation of multi-annual stocks of nuclear fuel will be pursued. The accumulation of several years' stock of this fuel is relatively easy to implement, due to its specificity.

The purchase of fabrication services (production of finished fuel assemblies) for nuclear power plants in the first phase of operation of Polish nuclear energy (e.g. for the first and second fuel inputs) will be linked to the purchase of a specific technology. It is a global practice for the technology provider to also provide factory services in the first few years of reactor operation (and potentially in the following years) and to have access to data for fuel fabrication by third parties (to avoid monopolistic practices).

Poland will seek to ensure that uranium and fuel can be supplied from safe countries, in particular from EU countries or the OECD more broadly.

ACTIONS

- Action 22. Ensure the conditions for the development of SMRs.
- Action 112. Deployment of large-scale nuclear energy.

Objective. 3.5.2. Inventory of domestic uranium deposits

Analyses to date show that Poland does not have industrial quantities of conventional uranium, but there is potential for unconventional deposits. These include, for example, uranium co-occurring in ashes, phosphate rocks or copper deposits, which is treated as copper waste (in the Lubin-Serosovice area).

Their exploitation would require a detailed inventory of conventional and unconventional deposits and analysis of their technical and economic feasibility for domestic industry, including nuclear energy.

POLICY

Poland has uranium deposits, both conventional and unconventional. At present, the extraction of uranium in Poland, due to, inter alia, its uneven distribution in deposits and the size of deposits would be unprofitable. By contrast, national uranium deposits (resources) represent potential that can be exploited in the future.

By 2030, an analysis of the magnitude of potential uranium deposits, particularly unconventional, will be carried out and the possibility of obtaining it will be assessed, including the possibility of commercialising the use of uranium for the production of nuclear fuel for Polish nuclear power plants.

ACTIONS

- Action 145. Preliminary identification of the magnitude of potential uranium deposits.

Area 3.6. Prospective coverage of hydrogen and its chemical derivatives

Hydrogen (and its derivatives such as ammonia, methanol) is a gas that can make an important contribution to the low-carbon energy transition. It can be **used in industry, transport as well as electricity and heating**, in particular for absorbing surplus energy from RES and balancing the system. Poland is currently the third

producer of hydrogen in Europe and the fifth in51the world, but it is so-called grey hydrogen, derived from steam transformation of fossil fuels, while the implemented climate and energy policy requires renewable energy to be used to produce hydrogen – so-called green or renewable hydrogen.

RED III provides a fairly high bar for the hydrogen industry, which is at an early stage of development. The limited availability of hydrogen in neighbouring countries – also due to their transition, as well as the risk of dependence on imports in a non-developing market, lead to the first move towards building own production capacities. Targets for domestic **hydrogen production as well as for the provision of hydrogen transport and storage infrastructure** are set out below.

Objective. 3.6.1. Ensuring domestic hydrogen production

In the section on emission reductions in industry (Objective. 1.2.4) shows how important renewable hydrogen is expected to play in the transformation of this sector. RED III obliges Member States to ensure that **hydrogen accounts for 42 % by 2030 and 60 % by 2 035 in the structure of RFNBOs used for final energy and non-energy purposes in industry** 52. For the electricity sector, hydrogen will be supported by managing surplus RES. Combusted in heating can effectively replace natural gas in the longer term. Also in the longer term, cross-sectoral flows should take place in order to make the best possible use of renewable sources, so that energy that will not be demanded at any given time can be stored.

According to calculations by the Ministry of Climate and the Environment, Poland will need more than **300 thousand tonnes of RFNBO hydrogen** to be used in industry and transport in 2030. It is estimated that **around 2 GW** of capacity from low-carbon sources and processes (according to the Polish Hydrogen *Strategy to 2030 with a perspective up to 2040 (*link)HYPERLINK "https://www.gov.pl/web/klimat/polska-strategia-wodorowa-do-roku-2030") can be achieved in 2030, which **will enable the production of 193.5 thousand tonnes of renewable hydrogen per year**. However, this volume will not cover all the demand for low-carbon and renewable hydrogen in Poland in 2030, so raw material imports are needed to cover the missing values.

The aim is to ensure that renewable and low-carbon hydrogen, as well as their chemical derivatives, is sufficient to meet the needs arising from the energy transition.

POLICY

In order to ensure access to renewable hydrogen, **the *Polish Hydrogen Strategy for 2030 will be updated with a view to 2040***. The document will set out the development paths for the RFNBO hydrogen market in Poland, indicating the most optimal scenarios. This will make it possible to answer the questions of whether, from an economic and energy security point of view, it is preferable to import or to produce RFNBOs hydrogen in Poland. The efficiency of the use of renewable sources should also be taken into account and therefore further analyses should also take into account cross-sectoral flows, from electricity to exploiting the potential of municipal waste for hydrogen production.

At the same time, work will continue on the preparation of **a comprehensive legislative package that** will set out the rules for the functioning of the hydrogen market and **support instruments** for the production of zero-carbon hydrogen based on a contract for difference model.

Existing initiatives stemming from the 2021 agreement to *build a hydrogen economy,* as well as under the so-called hydrogen valleys, will be further developed.

ACTIONS

- Action 68. Financial instrument – Contract for Difference (CfD) for hydrogen production in industry.

51[source to be supplemented]
52Article 22a of EU Directive 2023/2413 – RED III.

- Action 69. Support for the construction of renewable and low-carbon hydrogen generation capacity.

Objective. 3.6.2. Ensuring the development of infrastructure for the transport of low-carbon hydrogen

In view of the development of the hydrogen market, it will be necessary to build a completely new transmission infrastructure for renewable hydrogen, in particular interconnections. Thanks to its central geographical and political position, Poland has a very important role to play in this process, as it can both be a transit country between the Baltic Sea region and Germany and be responsible for coordinating trade in hydrogen throughout the Central and Eastern European region, including Ukraine. The development of such infrastructure will greatly contribute to Poland's role as a real integrator of the regional hydrogen market.

At the same time, in Poland, production centres will in many cases be remote from the places where hydrogen is used, resulting in the need to develop infrastructure for the transmission and distribution of hydrogen, ammonia or their derivatives. It is important to develop both suitable pipelines and transhipment terminals. Natural gas infrastructure may be used partly for hydrogen.

The aim is to ensure the construction and development of security infrastructure for the transport of hydrogen or its chemical derivatives to cover the current and forward-looking demand for these energy carriers and raw materials.

POLICY

To ensure the development of infrastructure for the transport of hydrogen, **rules on the functioning of the hydrogen market, hydrogen networks and transmission and distribution will be developed**. At the same time, the update of the hydrogen strategy will identify critical hydrogen or ammonia infrastructure projects for the hydrogen economy. In particular, the regulations will constitute implementation of the so-called. The third gas package (in the *Energy Law*Act); a regulation on technical conditions and location of hydrogen refuelling stations and a regulation on technical conditions and siting for hydrogen networks, hydrogen storage facilities and associated facilities will be defined (both implementing regulations for the *Construction Law*Act).

Poland will also support the initiative to build the Nordic-Baltic Hydrogen Corridor and other infrastructure for the cross-border transport of hydrogen. Such measures allow for real verification of import potential, as well as the possibility of wider knowledge sharing in the context of efficient transport and storage of hydrogen.

ACTIONS

- Action 104. Define the legal framework for the development of infrastructure for the transport of hydrogen.
- Action 105. Development of hydrogen infrastructure.
- Action 106. Support for the implementation of the Nordic Baltic Hydrogen Corridor and other infrastructure for the transport of hydrogen with a cross-border dimension.

Objective. 3.6.3. Development of hydrogen storage infrastructure

Renewable hydrogen can be a stabilising element for the operation of the power grid, as storage can be transformed back into electricity using fuel cells. It is therefore important to develop storage infrastructure, which can take place both underground and in above-ground reservoirs. According to *the Polish Hydrogen Strategy for 2030 with a view to 2040 (PSW)*, potential underground hydrogen storage facilities, such as

depleted oil and gas fields, aquifers, abandoned mines, were considered to be the most optimal solution on the economic side, as well as in terms of hydrogen characteristics, **salt caverns**.

This is because Poland's potential to store hydrogen in salt caverns is estimated at up to 10 000 TWh and is considered to be one of the largest in Europe.

On the other hand, storage of hydrogen in above-ground storage may be necessary when hydrogen technologies start to be deployed on a massive scale and an increase in demand and consumer numbers will necessitate the construction of large buffer tanks.

POLICY

Considering the importance of hydrogen for achieving the energy transition in a safe way and taking into account the Union's climate targets, it is of utmost importance to identify the storage potential of hydrogen. For this reason, a document will be drawn up specifying the state of knowledge regarding underground storage of hydrogen, the selection of on-board and voids deposits of stone salt in Poland for underground storage of hydrogen, and indicating the technologies applicable to the construction and use of an underground hydrogen storage facility in salt caverns in Polish conditions. Participation in international initiatives that will improve knowledge on hydrogen management can also be important for identifying potential.

ACTIONS

- Action 104. Define the legal framework for the development of infrastructure for the transport of hydrogen.
- Action 106. Support for the implementation of the Nordic Baltic Hydrogen Corridor and other infrastructure for the transport of hydrogen with a cross-border dimension.
- Action 107. Support for the implementation of the 'Programme for the development of hydrogen storage in caverns salt for strengthening Poland's critical infrastructure' to the GOSPOSTRATEG programme procured at the National Centre for Research and Development.

Area 3.7. Covering electricity demand

Covering electricity demand is a condition for the functioning of the economy and, unlike fuels, storage is limited in nature, so electricity security appears to be the most delicate component of energy security.

Security of electricity supply consists of many elements. The first is the provision of raw materials for energy generation, as mentioned in the previous pages of this document. Next, energy generation certainty – there has been a significant change in this area over the last decade due to successive increases in RES capacity depending on weather conditions. The paradigm of sufficient available capacity (so far coal capacity) had to be complemented by the need to provide some flexible capacity (such as gas capacity) as well as other solutions to cover demand. Another component of electricity security is adequately developed and properly managed transmission and distribution infrastructure. The increasing occurrence of situations requiring intervention also requires adequate preparation and mitigation solutions.

All the above-mentioned elements are listed below in the form of objectives. Some of the issues related to electricity infrastructure and the certainty of covering electricity demand in this context are also addressed in the 4th dimension, in area 4.1. The reduction of GHG emissions from the sector and the development of RES in the sector are dealt with in the *Objective. 1.2.1.*

Objective. 3.7.1. Ensuring capacity adequacy

The introduction to the capacity adequacy target is a description accompanying objective 1.2.1., which discusses the GC emission reduction target in the electricity sector in the light of developments in the sector in recent years.

The increase in the use of RES is extremely needed in the context of decarbonising the electricity sector, but the cheapest, most popular and no variable RES costs, based on solar and wind energy, cannot be considered as sources of security of supply. It is appropriate to develop in parallel stable and steerable RES generation units that are independent in the weather, while promoting solutions aimed at current and local self-consumption of energy.

Coal-fired units, which have been the basis for electricity production in Poland for decades, have changed their role in recent years towards refilling the daily electricity balance – beyond what is generated by RES depending on weather conditions. These units are successively set aside, taking into account the system's needs for the amount of available power in the system.

In order to ensure adequacy and at the same time to provide more flexibility in the system, some have been created in recent years. 2 GW of new **gas capacity** and up to approx. 4.4 GW of further gas capacity may be created as a result of the implementation of contracts concluded in previous capacity auctions. As a result of the energy crisis in 2021 and 2022, some of the previously planned projects have been re-examined, while investment decisions based on new solutions are being taken. This is evident, inter alia, in the conclusion of capacity contracts for ca. 2 GW of electrochemical storage capacity.

In order to provide a financial impulse for capacity ensuring adequacy, a capacity market is in place in **Poland since 2021.** The mechanism, on the one hand, encourages existing available units to stay on the market longer than the economic balance would suggest, as well as an incentive for investors to develop new projects based on capacity adequacy solutions.

Nuclear energy, which will be deployed in the NES after 2030, will play a crucial role in covering needs for adequacy. This will have a positive impact not only on the capacity balance but also on the decarbonisation of the electricity sector.

Poland sets the objective of ensuring the security of electricity supply to final customers in line with the national security standard (currently LoLE 3h).

POLICY

In order to ensure capacity adequacy at least until 2030, a capacity market will be operational. Its operation is intended both to maintain the necessary amount of existing capacity and to encourage investors to build new stable and available capacities, without which the development of weather-dependent RES – photovoltaics and wind power plants – will not be intensified. Various other forms of support will support decarbonised gas solutions, i.e. biomethane or hydrogen, so that they can provide an alternative to fossil fuels from a forward-looking perspective.

A critical element of the capacity adequacy policy is the deployment of nuclear power, the first of which will be operational in the period 2030-2035. The capacity of large-scale nuclear power plants in 2040 should reach 7.4 GW (and up to 9.4 GW in the longer term) and could also be complemented by small modular reactors – SMRs, depending on the degree of commercialisation, availability and deployment costs of this technology.

ACTIONS

- Action 22. Ensure the conditions for the development of SMRs.
- Action 73. Financial instrument – Modernisation Fund.
- Action 105. Development of hydrogen infrastructure.
- Action 111. Financial instrument – Capacity market.
- Action 112. Deployment of large-scale nuclear energy.

Objective. 3.7.2. Ensuring flexibility of the system electricity for better integration of RES

The increase in the share of the national energy mix of RES generation, the generation of which is highly weather-dependent and variable over time, makes it increasingly challenging to cover electricity demand and power in the electricity system. One response to this challenge is to increase the flexibility of the electricity system.

In recent years, the flexibility of the system has been mainly provided by generation units: gas, cogeneration, coal and pumped storage. The ability to use these resources to provide system flexibility depends, inter alia, on their technical parameters. However, the increasing share of RES in electricity generation poses a challenge for those generation units that will have to be supported by other sources of flexibility, including storage or demand *side response*(DSR) to ensure flexibility in the electricity system.

In the future, NSEs can play an important role in ensuring flexibility, DSR-based solutions, warehouses or aggregators, whose market rules are further specified in national law on an ongoing basis. Their development will be supported by a gradual roll-out of smart metering and smart grids to enable efficient communication between system participants – generators, customers and operators. Greater flexibility of the NES can also be ensured by promoting the active participation of participants in the electricity market, including the balancing market, as well as in selected cases in the capacity market. Storage will develop battery storage technologies and increase the share of other storage technologies, including those using hydrogen and other decarbonised gases.

The development of flexibility of the electricity system will be supported by the implementation of EU electricity market law, including the existing provisions of Regulation (EU) 2019/943 on redispatching (Article 13) or on network tariff formation (Article 18), and Directive (EU) 2019/944 on aggregation (Articles 13 and 17), active forms of market participation of the least active market participants (Articles 15 and 16) or flexibility services (Article 32). Flexibility services already allow for the introduction of solutions at the level of distribution system operators to ensure that customers, storages and generators are involved in managing network congestion. DSOs are currently piloting projects in this regard. Ultimately, the possibility to purchase flexibility services will be taken into account when developing network development plans.

Flexibility of electricity systems will be a key element in the path to a decarbonised energy system.

The aim of the measures is to increase the share of distributed renewable generation, storage and DSR in ensuring flexibility in the electricity system.

The objective will be achieved by increasing the possibilities for active participation of electricity market participants in the balancing market and by increasing the catalogue of services for the flexibility of the electricity system.

POLICY

The aim will be to ensure the conditions for the progressive development of other solutions that ensure or increase system flexibility and improve the integration of RES into the NES. Low- and zero-carbon forms of energy storage, including battery and decarbonised gases, will be promoted, as well as the implementation of demand and supply-side flexibility mechanisms, aggregation, tariffs and dynamic prices, increasing the share of storage and DSR in the electricity market and increasing the share of other participants in the balancing market. The possibility for DSR and storage facilities to participate in the capacity market will continue.

In order to increase the flexibility of the NSEs, it will be necessary to provide adequate legal solutions and to develop a concept of market integration mechanisms for RES in view of the challenges of increasing production and installed capacity in the electricity system, including market services provided by RES, taking into account the location of RES in the grid, cooperation between RES and storage, and services affecting the balancing of the electricity system and the conditions for the operation of the electricity grid. Priority will be given to developing and modernising the electricity grids (transmission and distribution) so that the system is capable

of receiving energy from generation sources and ensuring an adequate energy flow in the system.

As the ability to balance a highly saturated system with weather-dependent renewables will become increasingly challenging, flexibility issues will be a priority in the transformation efforts undertaken.

ACTIONS

- Measure 113. Actions to ensure the flexibility of the energy system in order to adapt to the envisaged changes to the NES.
- Action 117. Measures to increase the flexibility of the energy system with regard to renewable energy generation.
- Action 127. Measures to integrate and improve the functioning of the electricity market.

Objective. 3.7.3. Ensuring preparedness to prevent and deal with electricity supply constraints

The risk of a situation of curtailment of electricity supply or of an electricity crisis resulting in disruptions or interruptions in the supply of electricity to customers requires the definition of preventive or mitigating actions and procedures to be applied in the event of a materialisation of risks.

This area is partly regulated in Regulation (EU) 2019/941 on risk-preparedness in the electricity sector, which sets out, inter alia, the responsibility of the authority, the procedures for identifying national and regional electricity crisis scenarios and cooperation, and in particular requires Member States to develop national risk-preparedness plans. Poland has a Risk Preparedness Plan**,** which according to the Regulation was adopted in 2022.

In addition, restrictions on electricity supply and measures taken by the electricity transmission system operator in the event of a threat to the security of electricity supply are comprehensively regulated by the provisions of the Energy Law Act of 10 April 1997 and the Regulation laying down detailed rules and procedures for imposing restrictions on the sale and consumption of electricity.

In addition, the electricity transmission system operator (OSPE) shall draw up action plans for the event of major-scale failures in the electricity system and for its recovery from a failure. The relevant provisions are also provided for in EU Regulation 2017/2196 establishing a network code on electricity emergency and restoration, under which TSOE is required to develop and apply a restoration plan.

Every two years, the minister responsible for energy shall draw up a report on the results of the monitoring of the security of electricity supply, which comprehensively presents the state of the electricity sector, including a forecast of balancing the supply of electricity with demand in the following 5 years and the possibility of balancing supply over a period of 5 years to at least 15 years.

The aim is to reduce the risk of a situation resulting in a curtailment of electricity supply to customers or to prevent a crisis in the electricity sector, in particular in the event of an emergency situation, regardless of the causes and scale of the impact, by providing for appropriate legal provisions, documents and procedures to enable preventive, mitigating or restoring electricity supply and the proper operation of the electricity system.

POLICY

Preparedness to prevent and deal with electricity supply constraints in emergency and crisis situations shall be based primarily on having adequate technical resources to ensure sufficient capacity to generate, store, transmit and distribute electricity by qualified personnel, and a set of procedures and arrangements to take appropriate action, professionally manage resources and avoid or manage crises and mitigate their consequences should they occur.

To this end, in accordance with the deadlines laid down by law and the needs for ensuring the energy security of the State, the following will be updated:

- the Energy Law Act;
- a risk-preparedness plan;
- Regulation on detailed rules and modalities for imposing restrictions on the sale and consumption of electricity,
- Regulation laying down detailed rules for determining the qualification of persons involved in the operation of equipment, installations and networks,
- restoration plans and a forthcoming report on the results of the monitoring of security of electricity supply.

ACTIONS

- Action 112. Deployment of large-scale nuclear energy.
- Action 111. Financial instrument – Capacity market.
- Action 116. Strengthening cybersecurity in the energy sector.
- Action 118. Prevention and congestion management.
- Action 120. Modernisation and extension of transmission lines within the NES to allow for an increase in cross-border flows.
- Action 128. Development and modernisation of transmission networks.

Dimension 4.
Intra-EU energy market
and the social dimension of the transition

One feature of the functioning of the European Union is the existence of an internal market which, on the one hand, ensures the free movement of goods, persons, services and capital and, on the other hand, is based on common operating rules. For this reason, the energy market is also a component of the EU internal market in order to reduce barriers to trade (technical, physical and regulatory), to approximate tax and price policies, while ensuring uniform norms and standards. They address not only technical issues and joint risk preparedness plans, but also a certain level of consumer protection and, in some dimensions, the just dimension of the transition. For these reasons, the issues of the **intra-EU energy market** have been identified as the **fourth dimension of the Energy Union**, ensuring that it is based on the fundamental principles of the functioning of the European Union.

This section of the NECPs includes the objectives and targets related to the transmission infrastructure for natural gas, oil and electricity, as well as in the areas of social aspects of energy poverty, consumer protection and a just transition.

Area 4.1. Efficient and sufficient electricity infrastructure, interconnections

Properly developed and maintained and managed electricity transmission infrastructure is intended to ensure that energy is transferred from generation units to the transmission system and distributed to electricity distribution systems, ultimately to final customers. It also provides opportunities for efficient energy exchange with neighbouring countries' systems as well as the wider European electricity systems.

This section discusses the objectives of ensuring the adequacy and development of national infrastructure as well as interdependencies with neighbouring countries' systems.

The content presented in this section builds on the issues discussed in the 3 rd dimension in area 3.6.

Objective. 4.1.1. Ensuring the proper condition of electricity infrastructure

Ensuring an adequate condition, developing electricity infrastructure and building interconnections are factors affecting the current and forward-looking security of electricity supply to customers.

Linear electricity infrastructure divides go to the transmission system and systems distribution from which energy comes from to final recipients

Therefore, activities in this area are strictly defined in the *Energy* Law Act and regulated by the President of the Energy Regulatory Office (URE). The situation is monitored in detail by both the minister responsible for energy and – as regards the TSO's key import capacity – by the Government Plenipotentiary for Strategic Energy Infrastructure. The electricity transmission system operator (OSPE) plays a key role. As the time of infrastructure investment and the outlook are long-term, TSOEs are fixed on a multi-annual basis. The President of the ERO appointed Polskie Sieci ElektroEnergia SA to act as OSPE until the end of 2030. The five largest distribution system operators and more operators of a more local nature are present on the market, with the first group being monitored more closely by the President of the ERO.

Entities carrying out tasks in the field of the operation and development of the transmission and distribution system face challenges in terms of the need to handle the increasing capacity of the system and, in particular, weather-dependent RES. This generates the need to develop grids in a smart direction and in distribution networks to be transformed into bidirectional networks (i.e. ensuring supply to and off-take from the customer for prosumers).

The electricity transmission system is based on a backbone network that is built and managed by the electricity transmission system operator. The backbone network is essential for the proper functioning of the national electricity system while ensuring:

- the reliability of the supply to customers, including large urban agglomerations, by meeting the n-1 criteria of energy security and the performance parameters of the network;
- connection and exit of capacity from existing and built generation sources, including RES,
- fulfil the capacity to exchange capacity with the EU's neighbouring countries, as required by legislation.

The backhaul network allows for flexible adaptation to the different scenarios of the NES operation, even if the role of the transmission network is limited to a booking function, which is intended only to guarantee operational security.

Polskie Sieci ElektroEnergia S.A. plans to develop the transmission network in line with the increasing demand, energy market requirements and the needs of NES users. **In recent years, there has been a very intense development of RES, which requires a well-developed and adapted linear infrastructure, and the development of transmission and distribution grids has become a priority in the transformation of the electricity sector**. At the same time, the dependence of wind and solar power plants on weather

conditions, as well as more frequent extreme weather events, pose more and more challenges for OSPE.

Key national targets for electricity infrastructure are:

- **ensuring security of electricity supply** – understood as the capacity of the power system to ensure secure operation of the electrical network and to balance supply with demand;
- **ensure the long-term ability of the electricity system** to meet reasonable needs for transmission of electricity domestically and across borders, including the development of transmission and distribution grids and, where applicable, the development of interconnections with other electricity systems.

In view of the significant challenges posed by the dynamic development of power in distributed energy sources and the integration of RES, it is necessary to support the development of grid infrastructure, as the scale of the necessary investments is extremely large, while at the same time making it necessary to build a new low-carbon electricity system that ensures electricity security.

POLICY

Ensuring the adequacy and development of electricity infrastructure will be based on the regulated activities of professional operators. So far, the **transmission system operator** will carry out the tasks set out in the development plan to meet current and future electricity demand for a period of 10 years (currently in force for the period 2023-2032), and **distribution system operators** will carry out such plans over a 5-year period.

It is essential

Measures taken in the area of efficient electricity transmission and distribution infrastructure should be aimed at:

- security of supply, including through interoperability, adequate connections and secure and reliable system operation,
- ensuring sufficient transmission capacity resulting from forecasted electricity and power demand of each NES area by 2032;
- connection and exit of capacity from new generation sources (both conventional and RES),
- ensuring that new energy consumers can connect
- increasing the reliability of the supply of large collection centres,
- enhancing the ability to regulate tensions,
- creating conditions for the safe operation of the NES, ensuring cooperation between energy sources with diverse generation technologies and different working characteristics,
- increasing the operational flexibility of the transmission system to allow the withdrawal from traffic of important network elements which are difficult to switch off in the current form and load.

ACTIONS

- Measure 113. Actions to ensure the flexibility of the energy system in order to adapt to the envisaged changes to the NES.
- Action 116. Strengthening cybersecurity in the energy sector.
- Action 117. Measures to increase the flexibility of the energy system with regard to renewable energy generation.
- Action 128. Development and modernisation of transmission networks.

Objective. 4.1.2. Increasing the availability and capacity of current electricity cross-border connections

ThePolish National Electricity System (NEC) operates within the synchronous area of continental Europe. The Polish electricity transmission system operator PSE SA is a member of the ENTSO-E association of European operators. The continental Europe synchronous area is coordinated by the ENTSO-E Regional Group for Continental Europe (RGCE).

The Polish NES is also adjacent to the systems outside the synchronous area, i.e. with the system Lithuanian, Swedish and Belarusian and Russian. With the last two systems there are no electricity NSEs

The Polish NES is constantly evolving as a result of the connection of new generation units and customers, as well as the integration of electricity markets in the EU. Market integration is directly responsible for gradually increasing capacity on cross-border connections (interconnection, cross-zonal), by reducing system constraints and increasing the use of cross-border interconnection capacity. 2022 saw the connection of the Ukrainian and Moldovan Continental European systems to the area of synchronous Europe. With Ukraine's electricity system, the KSE has two cross-border connections, of which 400 kV Rzeszów – Hopper of EJ was integrated into synchronous work in 2023 after over 40 years of non-use. **Currently, a key integration project of geopolitical importance is the connection to the synchronous electricity systems of the Baltic States (Lithuania, Latvia and Estonia) planned for February 2025. The** NSE has one connection with the Lithuanian system, which has been operating since 2015 asynchronously connecting the systems of Poland and Lithuania. A second link is under preparation, which will ensure the safety and efficiency of the Baltic States' synchronous work in the synchronous area within continental Europe.

Poland focuses on increasing the use of electricity cross-border connections by optimising the use of existing connections and removing bottlenecks in individual national systems, including by:

- construction of missing lines inside national systems,
- expansion or expansion of cross-border connections
- further optimising the methods of making available these transmission capacities,
- the installation of network equipment to facilitate transmission where necessary and possible.

Against this background, investments related to the development of the NES and cross-border connections are foreseen by 2030, including:

- construction of a new Poland-Lithuania cross-border link (Harmony Link) to securely synchronise the electricity systems of the Baltic States with continental Europe;
- support Baltic States to synchronise with continental Europe in February 2025.
- further improve energy flows on the current synchronous profile (Germany, Czechia and Slovakia) within the CORE capacity designation region.

With a view to 2030, the capacity of Poland's current cross-border connections is expected to be increased as a result of the construction of the Harmony Link cross-border link.

In line with EU law, TSOEs should maximise interconnection capacity offered for cross-border trade. The provisions of Regulation (EU) 2019/943 required TSOE to make available to market participants cross-zonal capacity of not less than 70 % of the capacity at a given border or for critical network elements (CNEC), determined taking into account operational security limits (so- *called 70 % CEP target*). In doing so, Poland adopted an Action Plan in 2019. The measures adopted under the Action Plan are being implemented, including network investments to increase cross-border capacity. The increase in capacity available for interconnection trade follows a planned schedule, i.e. linear (the so-called linear trajectory), gradually reducing structural constraints. According to the Action Plan, **the deadline for reaching the above 70 % limit at all Polish borders (synchronous and asynchronous) is 31 December 2025.**

In addition to increasing the volume of cross-zonal trade, which is already clear, achieving this objective will contribute to aligning wholesale electricity prices in the region and mitigate the impact of external factors (e.g. CO_2 emission allowance prices – EUA) on the price of electricity in Poland.

The aim is to increase the use of cross-border transmission capacities, inter alia by building a Poland-Lithuania link, which will at the same time ensure the safe operation of the synchronised electricity systems of the Baltic States and those of continental Europe, as well as to continue the implementation of EU legislation aimed at increasing the integration of electricity systems.

POLICY

Poland will aim to increase the capacity of cross-border electricity connections in order to increase the possibility of trading electricity. In order to achieve this, it is necessary to:

- making optimal use of existing cross-border connections by reducing network congestion in the NES and monitoring on an ongoing basis the application of capacity allocation rules;
- implementation of a project to synchronise the Baltic States' electricity systems with the synchronous area of Continental Europe after these Baltic States' electricity systems have been disconnected from synchronous work with the UPS/IPS system;
- ensure the completion of the second link between Poland and Lithuania according to the optimal technical solution and making maximum use of EU funds (including CEF);
- continue the cooperation between Poland and Ukraine's electricity systems within the continental Europe synchronous area.

ACTIONS

- Measure 119. Optimising the way available cross-border capacity is allocated.
- Action 120. Modernisation and extension of transmission lines within the NES to allow for an increase in cross-border flows.
- Action 121. Regional Cooperation Activities (BEMIP) for the implementation of projects related to the synchronisation of Baltic States' systems with Continental Europe.
- Action 122. Market and transmission system integration activities of Ukraine.
- Action 123. Monitoring the use by TSOEs of revenues resulting from the allocation of interconnections.
- Action 124. Monitoring the implementation of PCI projects in the electricity area.
- Action 125. Support investments financed by the Connecting Europe Facility (CEF) in the electricity sector.
- Action 126. Obtaining support for strategic projects by inserting them into the next PCI lists.
- Action 127. Measures to integrate and improve the functioning of the electricity market.

Area 4.2. Efficient and sufficient gas infrastructure

Objective. 4.2.1. Ensuring the proper condition of natural gas infrastructure

The natural gas transmission system consists of two cooperating systems managed by the transmission system operator:

- a national transmission system consisting of high-methane natural gas E and Lw nitrogen-rich natural gas systems, and
- gas transit pipelines system.

Maintaining adequate efficiency and developing infrastructure for transmission, distribution and storage of natural gas is one of the main factors affecting not only the level of security of supply of gaseous fuels to the country, but also the competitiveness of the economy, civilisation development, market integration, the decarbonisation of greenhouse gases and the fight against air pollution. The state of operation and development of gas transmission and distribution infrastructure is monitored by the minister responsible for energy, the Government Plenipotentiary for Strategic Energy Infrastructure and the President of the URE.

The aim is to maintain a well-developed and efficient gas infrastructure that will provide domestic customers with access to raw materials, increase commercial opportunities for domestic operators and create diversification opportunities for foreign operators.

POLICY

The development of the gas system will be carried out by ensuring the conditions for the proper functioning of existing infrastructure and the implementation of new investments at a scale and to the extent appropriate to market needs and trends.

ACTIONS

- Action 99. Maintenance of efficient interconnections and LNG terminal in Świnoujście.

- Action 101. Construction of the FSRU terminal in the Gulf of Gdańsk.
- Action 102. Increasing the capacity and reception capacity of the natural gas storage system.
- Action 103. Development and modernisation of the transmission and distribution system in accordance with the adopted development plans and their updates.

Area 4.3. Efficient and sufficient fuel infrastructure

Objective. 4.3.1. Ensuring the right state and development fuel transmission and distribution infrastructure

Ensuring an adequate condition, expanding distribution and transmission infrastructure and building new interconnections are factors affecting the current and forward-looking security of supply of fuels to customers.

National fuel transmission and distribution system liquid is powered by plant production refinery in Płock and Gdańsk, and imports by sea and land.

As a result of Russia's military aggression against Poland stopped importing liquid fuels from Russia in 2023, with the exception of LPG, whose imports from Russia will be fully completed by 20 December 2024.

Changes in the structure of the supply of liquid fuels to Poland have made the supply of fuel by fuel terminals in the maritime ports of Szczecin, Świnoujście, Gdańsk and Gdynia crucial in this respect. The importance of onshore supplies from Germany, Czechia, Slovakia and Lithuania has also increased. The change in the focus of supplies creates new logistical challenges for Poland in the transport of liquid fuels by road and rail.

In February 2023, GK PERN and Orlen opened a new Boronów-Trzebinia product pipeline, increasing the energy security of southern Poland, as well as realising plans for a potential extension of the European Fuel *Pipeline Network (CEPS) pipeline system to*Poland, which could have a positive impact on the fuel security of NATO's eastern walls.

Poland sets the target for 2030 to continue ensuring the stability of the functioning of liquid fuel transmission and distribution systems and their further expansion.

POLICY

In view of the change in the structure of fuel supply, the primary objective of transmission and distribution systems is to ensure their stable functioning and to ensure an adequate supply of fuels on the market. Poland will continue its existing policy on fuel security primarily in view of the projected further increase in domestic fuel demand, but also in view of Poland's political and allied interests.

The objective will be pursued by:

- maintain efficient logistics facilities with neighbouring countries' systems (Germany, Czechia, Slovakia, Ukraine, Lithuania) and maritime fuel terminals;
- ensuring the operation and development of transhipment capacity of maritime fuel terminals (including LPG) in Szczecin, Świnoujście, Gdańsk and Gdynia, including the Dębogórz publishing base;
- expansion of the capacity of fuel bases;
- measures to extend the CEPS fuel pipeline system to Poland;

- cyclical analysis of market needs for oil and fuel storage.

ACTIONS

[actions to be completed at a later stage]

- Action 108. Measures to ensure well-functioning fuel supply logistics, as well as support for investments in the development of transhipment, transmission and storage infrastructure in Poland, support for measures aimed at extending the European Fuel Pipeline Network (CEPS) system to Poland.
- Action 109. Monitoring of oil and liquid fuel storage needs.
- Action 115. Efficient management of the country's strategic raw materials.
- Action 126. Obtaining support for strategic projects by inserting them into the next PCI lists.

Area 4.4. Development of distributed energy

Objective. 4.4.1. Development and integration of prosumers

The definition of **prosumer** appeared in the Polish legal system for the first time in 2016 (Renewable Energy Sources Act). Subsequently, a **collective prosumer and a tenant was introduced, which**made it possible to integrate multi-family buildings into the system. In addition to these, there will also be a so-called **virtual prosumer**, allowing people who do not have a place on their farm to have their own micro-installation.

At the end of 2023, almost 1.4 million renewable self-consumers produced self-consumption in Poland, based on ca. GW almost exclusively installed in photovoltaic micro-installations53. A particularly dynamic development took place between 2019 and 2022, when more than 1 million new prosumers started operating in the national energy market.

The extremely dynamic development of prosumer energy required a change in the settlement system for prosumers to ensure a stable development of distributed energy and a fair distribution of the cost of living for all energy market participants and to ensure adequate benefits for prosumers. As a result, since April 2022, the energy injected by prosumers into and off the electricity grid has been accounted for in **a valuable net billing system** (previously net-metering). The need to amend the system was also due to the need to transpose this solution into the Polish legal system in accordance with Directive (EU) 2019/9414 on common rules for the internal market in electricity.

As in the case of large-scale RES sources, and for micro-installations, electricity networks – transmission and distribution in turn – are a bottleneck for development. Therefore, the further development of this market segment is closely linked to grid investments and increased energy storage capacity. The combination of storage facilities with generating installations makes it possible to connect more prosumers, but without having a significant negative impact on the management of the network, both during periods of large RES production and in low generation periods54. The implementation of RED III (Articles 16-16e) in the area of administrative simplification will also be important for the development of prosumerism, although this will be an organisational challenge.

53*Statistical information on electricity. Monthly Bulletin – December 2023*, No 12 (360), Table 24, ARE S.A. on behalf of MKiŚ and ERO.

54Prosumers then use the energy they produce and do not increase demand. Thus, peak demand is lower, which reduces the reserve capacity needs that need to be present in the system for this purpose and generate additional costs.

It is estimated that in 2030 Poland can operate around. 2 million prosumers. *[estimates are not intended]*

POLICY

The development of prosumer energy will continue to be supported by developing programmes to **subsidise photovoltaic micro-installations, but including energy storage facilities**.

The desired direction of change in the development of prosumer energy is to make prosumers **aware** of market participants, which is a prerequisite for the further dynamic development of prosumer energy. With the use of energy storage, they will manage their demand (DSR) to the greatest extent possible to consume energy from their own facilities, thus reducing the burden on distribution grids. The development of **smart grids** will provide significant support to prosumers in this area. This is also intended to reduce the need to build additional reserve capacity and to force a significant reduction in the work of other generation units.

An economic incentive to do so will be **provided by billing at hourly prices**, which naturally rewards the highest possible level of **self-consumption and the injection of energy into the grid at a time when there is greater demand**, thereby helping to balance the electricity system.

Regulatory policy and financial support will also target **distribution network operators' efforts to expand and upgrade networks** to better adapt to the growing market share of prosumers. Increasing installed capacity and micro-installations change system operation characteristics to distributed generation, requiring new solutions and network operation in bidirectional mode.

ACTIONS

- Action 2. Financial instrument – obligation to purchase electricity generated in RES installations.
- Action 9. Financial instrument – NFOŚiGW Priority Programme – My Pride.
- Action 10. Financial instrument – NFOŚiGW Priority Programme – Energy Plus.
- Action 13. Financial instrument – NFOŚiGW Priority Programme – 'Agroenergy'.
- Action 14. Financial instrument – other programmes of the NFOŚiGW supporting the development of RES.
- Action 15. Financial instrument – other instruments supporting the development of RES.
- Action 19. Financial instrument – NFOŚiGW – Clean Air Priority Programme.
- Action 71. Financial instrument – NFOŚiGW 'Energy for Villages' programme.

Objective. 4.4.2. Development and integration of local energy communities

The development of community-based community-based energy is one of the main avenues of the energy transition, and an appropriate choice of renewable energy technologies, based on the existing local potential of RES, can ensure self-sufficiency for local communities and significantly improve security of energy supply in rural areas. The dispersal of generation units and their distribution close to customers is crucial in this process, allowing for a rational and efficient use of the existing RES potential and reducing losses in the transmission and distribution of electricity. The scope of local initiatives and prosumerism was defined by the55 RED II Directive and RED III sets out further amendments to contribute to their wider dissemination.

In particular, **energy clusters and energy cooperatives, which organise themselves to generate, distribute and** store electricity for the benefit of the members of their community, are to be the forerunners in the national market. Citizen **energy communities** were also defined in 2023 that can generate and sell electricity from RES, but the primary objective is to provide environmental, economic or social benefits to their members, shareholders or associates or the local areas in which they operate.

In the development of local energy communities, it is crucial to strive for their **self-sufficiency**, so that they do

55Articles 20-22 of RED II.

not need to reserve capacity outside their "system" – it should be a support and not a challenge for distribution system operators. Their main objective should be to cover their energy needs based on their own generation sources.

The RED III Directive (Articles 16-16e) laid down obligations to create **new opportunities in Member States to accelerate investments in RES by streamlining the investment process for RES** (authorisation procedures for new investments). This will be extremely important for the development of local energy, but will require a very large administrative effort.

It is estimated that in 2030 Poland can operate around. 300 energy communities *[estimates are not intended]*

POLICY

Strengthening the role of energy clusters and energy cooperatives in the national energy system will be ensured by setting transparent rules for cooperation within energy clusters, including administrative **and legal improvements and a special support scheme, as well as by stimulating the development of** energy cooperatives supporting the development of distributed energy in rural areas. Efforts will be made for energy communities to develop towards **self-sufficiency**.

Promoting them in local authorities and **improving the investment process will be crucial for the development of local** communities. The aim will be to speed up the path for issuing permits for new investments, but the actual implementation of the RED III Directive into Polish law will require many profound organisational and administrative changes. A dedicated handbook, which will provide investors with a comprehensive knowledge of the investment process, will also provide significant support to stakeholders.

Smart solutions will continue, which will allow efficient and informed management of the balancing and production of energy by these actors. Furthermore, modernisation of distribution system management systems as well as the development towards smart grids will have a positive impact on the development of this market segment.

ACTIONS

- Action 13. Financial instrument – NFOŚiGW Priority Programme – 'Agroenergy'.
- Action 15. Financial instrument – other instruments supporting the development of RES.
- Action 57. Support for the development of agricultural biogas plants.
- Action 71. Financial instrument – NFOŚiGW 'Energy for Villages' programme.

Area 4.5. Just transition and consumer protection

The transition to a low-carbon economy will bring many benefits, but, like any change, requires careful action to address the potential negative impacts of change. For this reason, there is a strong emphasis on the need to ensure **a just dimension** of the transition, which should take into account two aspects, both of which are addressed in this area.

As a first step, it is worth noting that the transition, especially during the transition period, may result in higher energy prices. On the one hand, the use of fossil fuels is charged with additional charges, on the other hand new technologies requiring support, and the operation of renewables, backup and balancing sources also increases the costs of energy supply. For this reason, it is necessary to protect the social groups most at risk of **energy poverty**.

The second aspect in the context of a just transition is **to provide support to coal-based coal regions** in previous decades, so that the socio-economic problems of these regions are not adversely affected.

Objective. 4.5.1. Reducing energy poverty

Energy poverty, understood as a situation where a household is unable to provide sufficient levels of heat, cooling, lighting and electricity to power electrical appliances. This phenomenon is a complex issue that combines social, technical and economic issues. Energy poverty affects both rural and urban areas, single-family houses and multi-apartment buildings. It depends, among other things, on the quality of the housing fabric (low energy efficiency of buildings), the availability of energy carriers, the level of household income, and behavioural factors (bad habits and habits of energy consumers). In view of its complexity, tackling this negative phenomenon effectively requires a precise identification of its causes and solutions tailored to the individual situation of the household.

At Union level, Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 and Regulation (EU) 2018/1999 of the European Parliament and of the Council of 11 December 2018 provide for the need to monitor the number of households in energy poverty. Directive (EU) 2023/1791 of the European Parliament and of the Council of 13 September 2023 *on energy efficiency and amending Regulation (EU) 2023/955 introduced* the first EU-wide definition of energy poverty.

Projections indicate that Poland may stabilise energy poverty at no more than 11 % in 2030 and no more than 7 % in 2040.

POLICY

Pursue a comprehensive state policy addressing energy poverty. An important element is the monitoring of the number of households in energy poverty, as well as the continuation and possible adaptation of publicly funded programmes (including the EU) to the needs of energy poor consumers, in particular those aimed at financing energy efficiency modernisation measures. Comprehensive public policies will reduce energy poverty and increase the protection of vulnerable customers.

ACTIONS

- Action 9. Financial instrument – NFOŚiGW Priority Programme – My Pride.
- Action 10. Financial instrument – NFOŚiGW Priority Programme – Energy Plus.
- Action 14. Financial instrument – other programmes of the NFOŚiGW supporting the development of RES.
- Action 18. Financial instrument— — ProgramPriority NFOŚiGW — — ‘My heat’.
- Action 19. Financial instrument— — ProgramPriority NFOŚiGW — — Clean Air.
- Action 20. Financial instrument— — ProgramPriority NFOŚiGW — — ‘Stop Smog’.
- Action 21. Financial instrument— — ProgramPriority NFOŚiGW — — ‘Warm Housing’.
- Action 91. Financial instrument— — Program Thermo.
- Action 92. Financial instrument – Tax credit for expenditure on thermomodernisation of single-family dwellings.
- Action 93. Improving the energy efficiency of residential buildings.
- Action 131. Reducing energy poverty and protecting vulnerable customers.

Objective. 4.5.2. Support for coal regions

There are several regions in Poland that are particularly dependent on the extraction, processing, transport and exploitation of coal and lignite. Poland has experience from previous decades when the closure of mines has caused negative socio-economic impacts, therefore the accelerated energy transition requires recognising the risks for coal regions. At the same time, proper governance of the process can create new jobs in the sectors and areas necessary for the transition.

In 2021, a **social contract was concluded for the transformation of the hard coal mining sector and selected transformation processes of Śląskie Province** (link) whichincludes, in particular, a mechanism to finance subsidies to reduce the production capacity of mining companies and defines social protection for employees of closed mines. The capacity reduction programme aims to systematically reduce hard coal production until it is completely extinguished. Shutdowns and closures will follow a fixed schedule. According to the social contract, the last mine will complete the mining activity no later than 2049.

In the following years, coal and lignite-based blocks will gradually be removed from the capacity structure by 2049. The speed and sequencing of the deviations will depend both on the adequacy of the power system. The legal regulations adopted in 2023, i.e. the Act of 17 August 2023 on social protection for workers in the electricity sector and the lignite mining industry (Journal Of Laws, item 1737), which, in addition to providing social protection for workers, will aim to support actors in an evolving drive towards the energy transition by phasing out electricity generation in carbon-intensive units while developing low- and zero-carbon sources. The provisions of this Act were notified to the European Commission, which declared the State aid provided for by the Act compatible with the EU market.

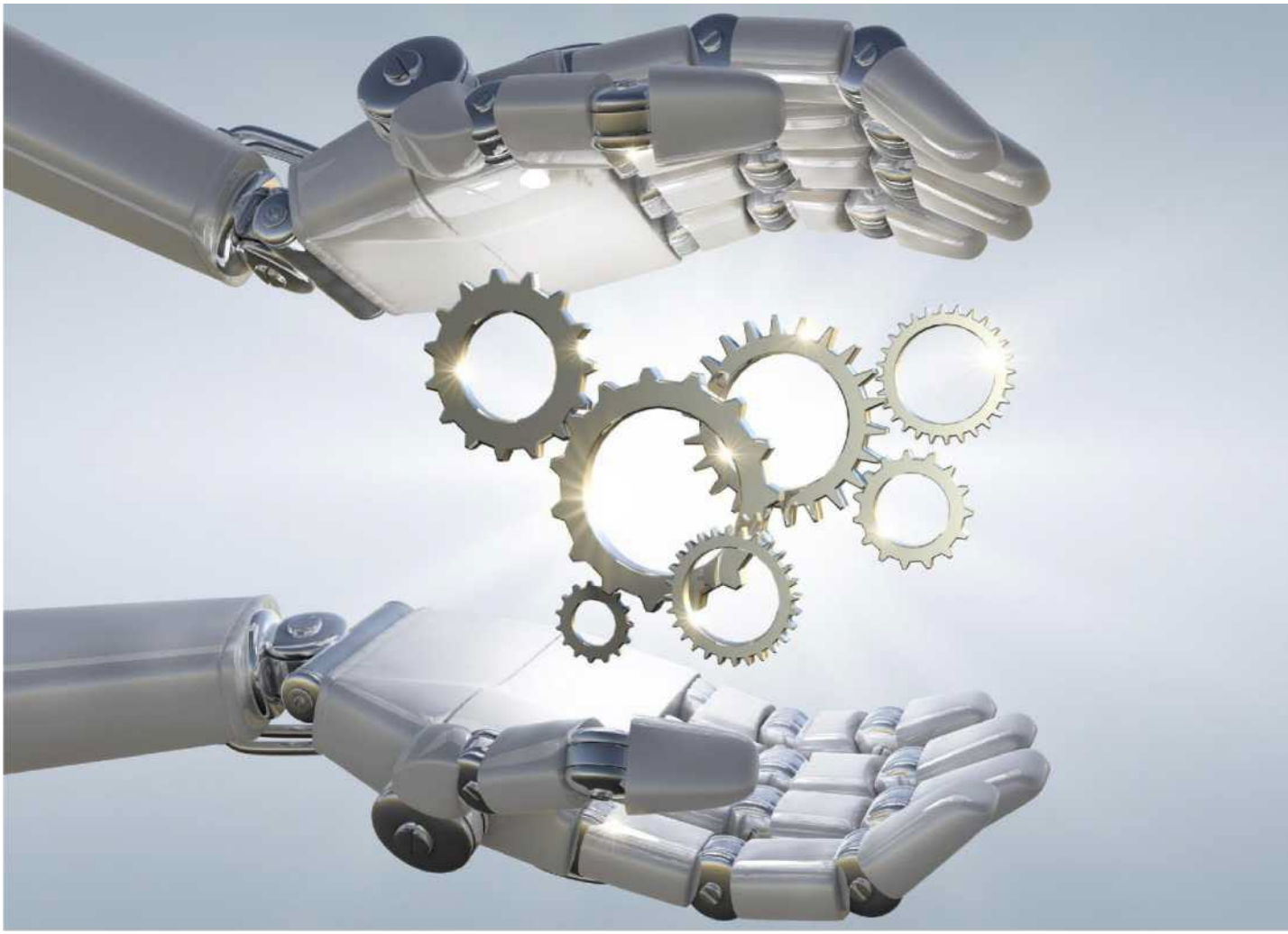
POLICY

Support will be provided for a just transition of coal regions, using territorial just transition plans, with a specific role for the Just Transition Fund.

The activities will aim to provide social protection for workers and create new specialisations in the regions and sustainable jobs, but above all to build new industries contributing to the transformation of the sector. In particular, they should influence the development of RES, the hydrogen economy and other alternative fuels, e-mobility, energy storage, digitalisation, but also adaptation to climate change and improvement of air quality.

ACTIONS

- Action 130. Providing support for coal regions.
- Action 144. Training and further training of human resources for the economy in the climate and energy transition.



Dimension 5.
Research, innovation and competitiveness

Achieving climate neutrality in the EU requires huge changes in all areas of life and the economy. The solutions currently available do not allow them to be implemented for technical, technological or economic reasons, so the next decades are the time for R & D to bring us much closer to this goal. Not only with a view to reducing GC emissions, but also the need to ensure Europe's global competitiveness**, research, innovation and competitiveness have been identified as the fifth dimension of the Energy Union.**

This section identifies key areas of action in the above areas from the point of view of the transformation in the Polish context. *At this stage of work, no areas have been identified in this dimension.*

Objective. 5.1.1. Securing R & D funding

R & D activities lead to solutions that respond to the broadly identified development needs in different areas of life and functioning of economies. They should support the exploitation of the country's competitive advantages and make it more attractive to invest and foster innovation. Therefore, they should be guided by specific state policies, updated in the light of discoveries and achievements.

In 2022, *your Science Policy (* link) was adopted, which sets out the orientations for science and higher education activities. The implementation of the *State's Scientific Policy* aims, among other things, to improve Poland's position on the international stage and to increase the impact of science and higher education on the country's economic and social development.

While the document sets out the objective of increasing research investment across the economy, it is estimated that a significant part of this expenditure will be spent on energy transition and the broader path towards a climate-neutral economy. Unlike in other areas, increasing research investment is an end in itself.

Poland sets a target to increase research spending to 2.5 % of GDP by 2030.

However, the broader context of *State Science Policy (PNP)* should be highlighted. Its implementation aims, among other things, to improve Poland's position on the international stage and to increase the impact of science and higher education on the country's economic and social development. It aims to support high-quality research and optimal use of scientific knowledge and ensure the autonomy of universities. The priorities set out in this document translate into coherence, synergies and the development of international cooperation in the higher education and science system. The PNP is the basis for the implementation of the country's strategic and development programmes. The implementation of the State's scientific policy is financed through expenditure on higher education and science determined on the basis of Article 383 of the Higher Education and Science Act and the limits on expenditure of the relevant budget parts.

Objective. 5.1.2. Development in areas conducive to the transition to a climate-neutral economy

Natural resources and environment (covering three areas: *Energy and climate, resources and biodiversity, and Food and*Bioeconomy) are one of several PNP priorities.

An important objective of the state's scientific policy is to **support the energy transition, ensure energy security** while preserving the competitiveness of the economy, energy efficiency and reduce the environmental and climate impact of the energy sector. Such challenges translate into technological developments in the following sub-areas under the **Energy and Climate Area:**

- **industry climate neutrality**;
- **energy efficiency** (increasing energy efficiency in industry and construction) and respect for energy in the context of environmental care;
- **energy storage** (e.g. new materials, hydrogen use, biogas plants);
- **smart grids and digitalisation** (increasing efficiency, smart control and metering, connecting distributed sources and 'green' energy to the system);
- **renewable energy generation technologies**, including bioenergy, wind energy, photovoltaics, geothermal;
- **low- and zero-emission transport** (electromobility, alternative fuels, fuel cell vehicles);
- **hydrogen technologies** (production of hydrogen, in particular from zero-emission sources, hydrogen purification, transmission, fuel cells, use and cost reduction in all areas);

- **nuclear energy** (new generation III and IV reactor technologies and modular or high temperature solutions);
- **social aspects of the energy transition** (reducing the social costs of the transition to a low- and zero-carbon economy, the transformation and transformation of post-mining regions).

Within the area ***Resources and Biodiversity***, the **PNP** identifies the following sub-areas:

- adaptation to climate change, including protection against drought and flooding;
- increasing the potential conditions for water retention, i.e. a systemic capacity to collect water resources and keep them in the environment for a longer period of time;
- protecting soils from degradation and remediation of already degraded soils;
- support solutions for various forms of retention (large and small, soil and landscape), including natural retention (implemented through measures aimed at protecting water resources by restoring or maintaining natural ecosystems).

Within the area ***Resources and Biodiversity***, the **PNP** identifies the following sub-areas:

- adaptation to climate change, including protection against drought and flooding;
- increasing the potential conditions for water retention, i.e. a systemic capacity to collect water resources and keep them in the environment for a longer period of time;
- protection of soils from degradation and remediation of already degraded soils;
- support solutions for various forms of retention (large and small, soil and landscape), including natural retention (implemented through measures aimed at protecting water resources by restoring or maintaining natural ecosystems).

In contrast, research in the area of ***Food and the Bioeconomy*** focuses on the following areas:

- bioeconomy resources in agriculture, aquaculture and forestry and their productivity in the context of the development of the bioeconomy;
- production and use of bio-waste from agriculture, aquaculture and forestry and bio-waste from the municipal sphere, given its importance in circularity, including bioenergy production;
- the potential for producing biomass from different sources, including waste and its use for bioenergy;
- use of natural resources, in particular ligno-cellulosic raw materials;
- the impact of the bioeconomy on climate, water quality and air protection;
- waste management and resource efficiency (including collection, recycling, circular economy) and issues relating to the development of waste prevention infrastructure and the development of a separate collection system for municipal waste that ensures the extraction of recyclable waste and the development of bio-waste treatment facilities

Research planning should cover these areas in a holistic and interdisciplinary manner. The practical implementation of solutions may require major technological breakthroughs, so it remains important to create efficient mechanisms for concentrating resources and human resources

ACTIONS

- Action 22. Ensure the conditions for the development of SMRs.
- Action 26. Financial instrument – Fund for the development of public service bus services.
- Action 29. Development of zero-emission public transport in cities.
- Action 32. Financial support instruments for electro-mobility.
- Action 34. Development of charging infrastructure for electric vehicles.

- Action 57. Support for the development of agricultural biogas plants.
- Action 72. Research and scientific, educational and commercial projects on CCS and CCUS.
- Action 112. Deployment of large-scale nuclear energy.
- Action 116. Strengthening cybersecurity in the energy sector.
- Action 132. Gradual increase in R & D (R & D) budgets, including in areas conducive to the transition to a climate-neutral economy.
- Action 133. Implement strategic research and development agendas on topics conducive to the transition to a climate-neutral economy.
- Action 134. Update of State Scientific Policy.
- Action 135. Conceptual design and high Temperature Gas cooled Reactor (HTGR).
- Action 136. Reducing methane emissions from fuel production and distribution processes.
- Action 137. Research project – drainage using underground directional drilling technologies.
- Action 138. Building competences and creating awareness – Zero-emission transport.
- Action 139. Scientific and educational research and projects on rational and low-carbon agricultural production.
- Action 140. Awareness-building – actions related to adaptation to climate change.
- Action 141. Awareness-building – nuclear energy.
- Measure 142. Awareness-building – circular economy.
- Measure 143. Awareness-building – renewable energy sources.
- Action 144. Training and further training of human resources for the economy in the climate and energy transition.
- Action 146. Financial instrument – Horizon Europe.

Objective. 5.1.3. Development of human skills for the climate and energy transition

Achieving a responsible climate and energy transition is a multi-annual process that also requires adaptation and staffing and skills development, consistent with priority development directions, sectoral challenges and needs and the evolving technological developments. Skills are essential for social, industrial and economic development, as well as for gaining greater public acceptance for change, especially in communities and regions exposed to the negative impacts of the energy transition. The demand for staff in the transition process is enormous, especially in terms of parallel processes and investments in similar low-carbon development areas in many European countries (e.g. RES, large-scale and small-scale nuclear energy, energy storage, balancing technologies, maintenance of conventional generation units, hydrogen technologies – including electrolysers, energy management, energy management, thermomodernisation of buildings, grid infrastructure, electromobility, automation and digitalisation of solutions, and other modern energy solutions). Skills shortages can be one of the key bottlenecks in the energy transition.

In this context, together with the setting of objectives, policies and transformative actions in the various sectors of the economy (referred to in the above chapters), actions will be carried out on the adaptation of education profiles, skills and competence development, which will contribute to the recruitment of highly skilled human resources, industrial development and the creation of high value-added jobs for the national economy. It is an investment in the future, as human know-how is also a valuable asset. . The above measures will make it possible to carry out tasks in the area of climate and energy policy in an optimal and efficient manner, to exploit Poland's competitive advantages and to strengthen its competitiveness. The creation of a pool of specialists in different fields will be able to respond to the challenges faced by Poland's energy in the coming decades.

ACTIONS

Dimension 1. Decarbonisation

Action 1. Participation in the EU-ETS Emissions Trading System.

The emissions trading system in operation in the EU since 2005 covers installations in the economic sectors emitting greenhouse gases (energy, industry) and aircraft operators (flights within the EU and EEA) and shipping companies (EU and EEA voyages). Each installation, aircraft operator or shipping company covered by the scheme must account for its greenhouse gas emissions annually with emission allowances (EUA). The need to buy allowances motivates obliged entities to participate in the scheme to decarbonise.

Action 2. Financial instrument – obligation to purchase electricity generated in RES installations.

The action consists of an obligation on the obliged seller to purchase energy from RES installations of less than 500 kW. The obligated seller determines which entity must buy and account for energy from renewable energy sources. The list of obliged sellers is published annually by the President of the Energy Regulatory Office.

Following the amendment of the provisions of Commission Regulation (EU) 2023/1315 of 23 June 2023 amending Regulation (EU) No 651/2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty and Regulation (EU) 2022/2473, it is planned to lower the electricity capacity threshold for an installation subject to this mechanism from 500 kW to 400 kW in the second half of 2024 and to 200 kW as of 1 January 2026.

Action 3. Financial instrument – RES certificates of origin system.

Energy producers in RES who started their installations before 1 July 2 016 are entitled to receive support in the form of certificates, i.e. property rights to certificates of origin for RES. The certificates result from the registration of those certificates of origin in a register kept by the Commodity Exchange. Certificates are also traded on the Commodity Exchange, where they are purchased by consumers and energy companies legally obliged to redeem RES certificates of origin. The amount of the obligation is determined by order of the minister responsible for energy in relation to energy used for self-consumption or sold to final customers. Support in the form of certificates shall be granted to manufacturers for a maximum period of 15 years, not later than 30 June 2031.

Action 4. Financial instrument – auction RES system.

Support scheme for RES sources awarded in auctions, broken down into technology baskets and capacity of installations. It concerns both smaller sources, i.e. below 1 MW and larger, i.e. above 1 MW. It guarantees generators a fixed revenue equal to the price for energy from the winning bid in the CfD auction for 15 years.

Following a positive decision by the European Commission on the compatibility of State aid with the EU internal market, it is planned to include in the auctions modernised RES installations with an installed electricity capacity of more than 1 MW. Modernisation with the right to participate in RES auctions is foreseen for power generators in RES installations that are in a state of technical condition for their continued operation.

Action 5. Financial instrument – system of feed-in tariffs and RES subsidies.

The support scheme for small RES sources (i.e. up to 1 MW) is based on FIT (*feed-in tariff)*and FIP (*feed-in premium*). Both systems are foreseen for biogas, biomass and water installations, while the FIP also covers biomethane installations. The FIT system is intended for RES installations with a total installed capacity of up to 500 kW, while the FIP system is between 500 kW and 1 MW (for biomethane with a total installed capacity of up to 1 MW).

After the European Commission has issued a positive decision on the compatibility of state aid, it is planned to extend the system to modernised RES installations with a capacity of up to 1 MW. As in the case of RES auctions, RES installations will be able to enter the system after modernisation, whose capital expenditure will amount to at least 25 % of the eligible costs of constructing a new reference installation.

Action 6. Financial instrument – additional operating support for available RES.

As of 1 July 2025, support will be provided for RES installations providing a stable energy supply that has expired and can still be operated, but with high operating costs exceeding the revenues generated. Operating support will be granted in two models, depending on the capacity of the installation. It will target the power plants:

-water,
biomass (including biomass combustion plants, hybrid systems and multi-fuel combustion plants),
biogas and waste-using biogas (waste thermal treatment facilities into high-efficiency cogeneration).

For the above installations with a capacity of more than 1 MW, it is planned to launch **operational support auctions. They** will guarantee a fixed income for generators over a period of one year and the possibility to re-enter the support in the following year. The maximum period of support will also not extend beyond 31 December 2034.

For installations with a capacity of less than or equal to 1 MW (in the case of hydropower plants up to 5 MW), a **market price surcharge (FiP) scheme** will apply for a further 10 years after the end of the initial support period.

Action 7. Financial instrument – Contracts for Difference (CfD) for electricity generation in offshore wind farms.

The measure supports electricity generators in offshore wind farms. It will give them the right to cover the negative balance of the price of the electricity produced. This means covering the difference between the market price of energy and the price allowing generators to cover the costs of generating electricity at sea.

The support scheme for offshore wind power installations is based on the concept of a bilateral contract for difference. Electricity generators in offshore wind farms that will be admitted to the support scheme will be entitled to cover the negative balance. The amount of support provided shall be determined as the product of the planned capacity.

installed offshore wind farm and 100 000 hours. This allows for an optimal distribution of support over a period of maximum 25 years. In the auctions foreseen for 2025, 2027, 2029 and 2031, the right to cover the negative balance will be allocated to installations with a total capacity not exceeding 12 GW, while auctions in the following years will be carried out in line with the development of the farms.

Action 8. Support the development of offshore wind energy.

The measure consists of providing solutions to achieve an efficient and sustainable development of offshore wind energy in Poland. These include regulatory frameworks, human resources training, awareness-building, building the national supply chain of materials and services, and permitting and agreements, including environmental ones.

Activity 9. Financial instrument – NFOŚiGW Priority Programme – My Pride.

The scheme co-finances the construction of photovoltaic micro-installations, energy storage facilities, heat storage or heat pumps, solar collectors and energy management systems by individual beneficiaries.

Action 10. Financial instrument – NFOŚiGW Priority Programme – Energy Plus.

The scheme includes co-financing for projects to reduce negative environmental impacts resulting, for example, in

improving air quality, reducing the consumption of primary raw materials, and improving energy efficiency. The beneficiaries of the scheme are entities engaged in an economic activity.

Action 11. Financial instrument – NFOŚiGW Priority Programme – 'Poland Geotermia Plus'.

The programme includes funding for the modernisation of existing heating plants/heat plants/geothermal power plants/existing sources of energy generation based on a geothermal source in order to improve operational performance.

Action 12 Financial instrument – NFOŚiGW Priority Programme – 'Ciepłownictwo powiatowe'.

The scheme includes projects to reduce greenhouse gas emissions (investment in RES for heat production), develop district heating systems and replace carbon-intensive heat sources owned by private individuals.

Action 13. Financial instrument – NFOŚiGW Priority Programme – 'Agroenergy'.

The programme includes subsidies for the purchase and installation (including advice) of photovoltaic, wind, heat pump and hybrid installations for agricultural operators.

Action 14. Financial instrument – other programmes of the NFOŚiGW supporting the development of RES.

The action includes funding for projects aimed at the construction or modernisation of electricity systems to enable their connection to RES, and the construction or modernisation of RES units, other than those mentioned above, of a regional or individual nature.

Action 15. Financial instrument – other instruments supporting the development of RES.

The measure covers the financing of activities aimed at the construction or modernisation of electricity systems to enable the connection of RES and the construction or modernisation of RES units of a regional or individual nature (excluding funds from the NFOŚiGW).

Action 16. National Contact Point for Renewable Energy Sources.

The action consists of creating a point where the applicant can find information on what administrative procedures are necessary for a given RES project and how they should be carried out.

Action 17. Financial instrument – NFOŚiGW Priority Programme – New Energy.

The programme is aimed at entrepreneurs. Finance projects implementing new or significantly improved technologies or solutions in its own operations, aimed at improving the efficiency of the use of natural resources, reducing human impact on the environment or strengthening the resilience of the economy to environmental pressures.

Action 18. Financial instrument – NFOŚiGW Priority Programme – My Heat.

The scheme provides financial support for the development of individual heating and the development of prosumer energy in the area of air, waterborne and ground heat pumps in new single-family residential buildings.

Action 19. Financial instrument – NFOŚiGW – Clean Air Priority Programme.

The programme includes funding for the comprehensive energy renovation of buildings and the replacement of old and inefficient solid fuel heat sources with modern heat sources meeting the highest standards. The aim is to improve energy efficiency and reduce emissions of dust and other pollutants into the atmosphere from existing single-family residential buildings or newly built single-family dwellings.

Action 20. Financial instrument – NFOŚiGW Priority Programme – 'Stop Smog'.

The programme implements low-carbon projects (thermomodernisation, replacement of heat sources) for the least affluent households in single-family dwellings. In particular, it is addressed to those farms where the members are persons entitled to cash benefits (under the Act of 12 March 2004 on social assistance).

Action 21. Financial instrument – NFOŚiGW Priority Programme – 'Cieppal Housing'.

The programme aims to improve air quality and reduce dust and greenhouse gas emissions by replacing inefficient heat sources and improving energy efficiency in dwellings in multi-apartment buildings.

Action 22. Ensure the conditions for the development of SMRs.

The action consists of ensuring the conditions for the deployment and operation of SMRs by private parties, including but not limited to: development of human resources and competences, public awareness building and capacity building for Polish industry.

Measure 23: Strengthen the efficiency of the use of free CO_2 allowances in heating.

The action will consist of amending the regulation on the principle of setting tariffs for the sale of heat to include the accounting of free CO_2 emission allowances and the conditions for the use of funds generated by the free allocation of allowances to finance investments.

Action 24. Intelligent Transport Systems (ITS).

The action covers the provision of services related to the different modes of transport and traffic management, allowing better information to different users and ensuring safer, more coordinated and "smart" use of transport networks.

Action 25. Improving the coherence of national roads.

The action consists of creating a coherent network of national roads ensuring the efficient operation of road passenger and freight transport.

Action 26. Financial instrument – Fund for the development of public service bus services.

The measure includes financial support for local government units which are organisers of collective public transport to carry out their own tasks in the area of public service bus transport, excluding urban transport. The co-financing is granted in the form of a contribution to the deficit amount of a single line of communication.

Action 27. Development of urban transport networks.

The action consists of creating a coherent urban road network ensuring the efficient operation of road and rail transport.

Action 28. Plans for the sustainable development of public transport.

The action concerns the establishment of plans for the sustainable development of public transport in order to define its main objectives and orientations.

Action 29. Development of zero-emission public transport in cities.

The measure consists of supporting sustainable urban mobility by, inter alia, co-financing projects consisting of reducing emissions from public transport. This includes the replacement of rolling stock with zero-emission rolling stock (trams, trolleybuses or buses), the construction, reconstruction and modernisation of infrastructure for urban transport and the digitalisation of the urban mobility system. These programmes will be implemented by the NFOŚiGW (zero-emission buses, bus and hydrogen refuelling infrastructure) and the Centre for EU Transport

Projects – CUPT (trams, other urban transport infrastructure).

Action 30. Creation of clean transport zones.

The action will consist of identifying areas in cities where the traffic of emitting vehicles will be reduced. In the case of cities with more than 100 thousand inhabitants where NO2 emission standards in the air are exceeded, the creation of zones will be mandatory.

Action 31. Fuel charge and issue charge.

[Description to be completed at a later stage]

Action 32. Financial support instruments for electro-mobility.

The measure includes a number of financial support programmes for the development of e-mobility, in particular the 'My Electric' programme,which aims to support the purchase or leasing of electric vehicles by individuals, entrepreneurs, local authorities, social organisations.

It is planned to launch a programme entitled 'Support for the purchase or leasing of zero-emission vehicles of categories N2 and N3', which will aim to support Polish transport companies in purchasing zero-emission heavy goods vehicles in order to maintain their competitive position on the European market.

Action 33. Instruments for non-financial support for e-mobility.

Incentives for zero-emission vehicle users are expected to be maintained, including: exemption of electric vehicles from parking charges on public roads in tolled parking areas, authorisation of BEVs and FCEVs to use lanes separate for buses.

The preference for electric and hydrogen vehicles in excise duty will be maintained. The question of changing the way excise duty is charged on combustion vehicles will be considered.

In addition, a reduction in the depreciation amount for ICE vehicles is foreseen from 2026 – for vehicles emitting more than 50 g $CO2_{per}$ kilometre, a new, reduced car depreciation limit of PLN 100 thousand will apply, while cars emitting up to 50 g CO2 per km will continue to be entitled to the 'old' limit of PLN 150 thousand. Zero-emission vehicles, i.e. electric and hydrogen, will be subject to the highest limit of PLN 225 thousand.

Action 34. Development of charging infrastructure for electric vehicles.

Further financial support is foreseen for the construction of recharging infrastructure with a focus on recharging stations for heavy-duty vehicles, to be set up along the roads along the TEN-T network corridors. This is necessary and complementary to supporting the development of the distribution network for recharging stations.

Action 35. Introduce a financing mechanism for the development of production capacity and refuelling infrastructure for sustainable aviation fuels, in line with Regulation 2023/2405.

[Description to be completed at a later stage]

Action 36. Development of the Register of Alternative Fuel Infrastructures.

Actions for the development of a register containing the coordinates of publicly accessible natural gas, hydrogen and recharging stations, the current prices of alternative fuels and the availability of recharging points installed in publicly accessible recharging stations.

Action 37. Measures to develop the use of biofuels.

The action consists of ensuring the conditions for the development of biofuels, including, but not limited to: regulatory preparation, financial instruments, awareness-building.

Action 38. Awareness-building – shaping drivers' environment-friendly attitudes.

Promotion measures for drivers, passengers and vehicle manufacturers aimed at promoting the use of environmentally friendly solutions in road transport. It includes the organisation of conferences, webinars, training courses, projects, competitions or other promotional activities.

Action 39. Increasing requirements – improving vehicle emissions.

The action consists of the use of a classification of Euro standards setting emission limits for passenger cars and light commercial vehicles, trucks, buses and scooters and motorcycles.

Action 40. Increasing requirements – Decarbonising transport fuels.

Actions to reduce the life cycle consumption of transport fuels to 88.4 g. EVERY$_2$/MJ. Entities implementing the National Reduction Target are required to submit annual reports. Failure to achieve the target is punishable by a financial penalty.

Action 41. Modernisation of railway infrastructure.

The measures aim to support investments in the modernisation of railway infrastructure, modernisation of passenger and freight rolling stock, modernisation of railway stations.

Action 42. Development of local and regional railway infrastructure.

The measures are intended to support investments in the development of the rail network, the construction of new railway lines, point investments such as the construction of new stops, mijanks or rail links, and the implementation of rail traffic management systems.

Action 43. Integration of rail transport with other modes of transport.

The measures are intended to support investment in the promotion of public rail transport by developing public passenger transport and integrating other passenger services into it.

Action 44. Ensure the availability of alternative fuels in maritime ports.

includes the expansion of alternative fuels infrastructure for the bunkering of ships with liquefied natural gas and the provision of electricity to ships in Polish TEN-T ports (i.e.: Gdańsk, Gdynia, Szczecin and Świnoujście), which are also essential ports for the national economy. LNG can also be delivered to vessels by tankers – there is no obligation under the AFIR Regulation to build a permanent infrastructure in this regard.

Action 45. The deployment of innovative technologies in maritime vessel traffic management.

The action includes the use of advanced navigation systems, marine environment monitoring, ship control automation and the use of satellite data and sensors to optimise routes and avoid collisions. It is also the development of maritime communications and the integration of technologies to increase the efficiency and safety of shipping.

Action 46. Development of inland waterways of transport importance.

The action aims to modernise and build new waterways in international navigability classes. Developments in this area allow freight to shift freight from road to low-carbon waterborne transport and ensure improved accessibility to seaports. In addition, the action ensures the restoration of navigability classes on waterways of regional importance.

Action 47. Implementation of requirements for internal combustion engines used in inland navigation.

The aim is to introduce requirements for internal combustion engines to be installed in non-road mobile machinery.

The aim is to reduce emissions of gaseous and particulate pollutants from these engines. Manufacturers are required to obtain an approval certificate for the engine type before placing engines on the market.

Action 48. Revision of the legal framework for bunkering infrastructure for low- and zero-emission marine fuels.

[Description to be completed at a later stage]

Action 49. Improving airport infrastructure.

The objective of the action is to adapt airport infrastructure to the increasing number of passengers and air operations and to improve the connectivity of regional airports to the road and rail transport network.

Action 50. Implementation of innovative solutions in air traffic.

The objective of the action is to implement a modern air traffic management system to increase the capacity of the ATM network, improve safety indicators or reduce the negative environmental impact of aviation.

Action 51. Participation in the International Aviation Offset (CORSIA) system.

This scheme includes a Carbon Offsetting and Reduction Scheme for International Aviation, which uses market-based environmental policy instruments to offset CO2 emissions. Aircraft operators are obliged to buy carbon credits from the carbon market.

Action 52. Improve the operational efficiency of air transport.

The action aims to systematically modernise the aviation fleet with low-emission and lower CO2 emitting vehicles. In addition, the action includes optimising air corridors, increasing airspace capacity as well as increasing taxiway capacity.

Action 53. Reducing the use of fluorinated greenhouse gases.

Action to reduce emissions of fluorinated greenhouse gases by restricting the placing on the market of bulk HFCs and those contained in the equipment, a record-keeping order, an order to recover F-gases, the obligation to certify personnel and economic operators, the prohibition of the use of primary F-gases with GWP of 2500 or more for servicing or maintenance of refrigeration equipment, and restricting the placing on the market of passenger vehicles equipped with air-conditioning systems containing F-gases with GWP of 150 or more.

Action 54. Support for on-farm adaptation and emission reduction measures.

Measure consisting of supporting climate protection investments undertaken by agricultural holdings through the construction of agricultural biogas plants of up to 50 kW and the installation of photovoltaic modules of up to 50 kW, as well as co-financing for schemes improving the energy efficiency of farm buildings used for agricultural production, such as the construction, conversion or purchase of biomass boilers, heat recovery systems, roof glasses, LED lighting and thermomodernisation of farm buildings used for agricultural production.

Action 55. Organic farming activities.

Action to support farmers by discontinuing and sustainably using agricultural, veterinary and food chemistry in the food production process, activating biological processes through the use of natural inputs and ensuring sustainable soil fertility, plant and animal health.

Action 56. Actions to rationalise the use of fertilisers.

Actions aimed at protecting soils and waters and reducing soil pollution caused by fertilisation of farmland and preventing soil degradation.

Action 57. Support for the development of agricultural biogas plants.

The measure consists of ensuring the conditions for the installation of agricultural biogas plants by private operators, including, but not limited to: regulatory preparation, human resources development, financial instruments, awareness building, issuing environmental consents.

Action 58. CAP (environmental) conditionality.

Conditionality is a group of principles consisting of GAEC and SMRs that a farmer has to respect on his farm in order to receive CAP support in full. It is also the basis for defining the requirements for additional voluntary activities undertaken by the farmer.

For the objective of reducing GC emissions and increasing removals and reducing emissions in the LULUCF sector in agriculture, the most important standards are: GAEC 1 – maintenance of permanent grassland at a certain level throughout the country, GAEC 2 – protection of wetlands and peatlands, GAEC 6 – minimum soil cover requirement in the most sensitive periods.

For the purpose of reducing pollutant emissions into the air, GAEC 3 – the ban on burning agricultural land – is of utmost importance.

Action 59. Eco-schemes under the CAP.

A group of interventions under Pillar I of the CAP promoting agricultural practices beneficial for the environment, climate and animal welfare. These are annual, voluntary and additionally paid practices, adapted to national circumstances and needs, to protect soil, water, climate, animal welfare and biodiversity in agricultural production.

Eco-schemes are the most important to reduce GHG emissions in agriculture: ‘Carbon farming and nutrient management’, ‘Integrated crop production’. Part of the eco-scheme practices ‘Coal agriculture and nutrient management’ also pursues the objective of reducing emissions of ammonia and other air pollutants and increasing removals and reducing emissions.

in the LULUCF sector. The payment is granted to the area or to animals (in the case of animal welfare eco-scheme interventions).

Action 60. AGRI-environment-climate measures under the CAP.

A group of interventions under Pillar II of the CAP, which consists of the application of payments to compensate for additional costs incurred and income foregone to farmers who voluntarily use production methods conducive to preserving biodiversity, landscapes and environmental resources, in particular soil and water. Key practices promoted by agri-environment-climate interventions include: extensification of the agricultural use of meadows and pastures (including in Natura 2000 areas), preservation of old traditional orchards, protection of biodiversity on arable land. All these practices have a positive impact on the climate. The payment shall, as a general rule, be granted to the area.

Action 61. Support for organic farming under the CAP.

Support voluntary commitments by farmers who undertake to maintain or switch to organic farming practices and methods as defined in Union and national legislation. The following crop groups shall be supported under the interventions: agricultural, vegetable, herbaceous, primary, berries, extensive orchards, forage and permanent grassland. Payment to the area. In addition, a premium for extensive livestock farms is applied.

Action 62. Forest and tree interventions under the CAP.

A group of interventions under Pillar II of the CAP for farmers who may receive support for: afforestation of agricultural land, the creation of field trees, the establishment of agroforestry systems and the enhancement of the biodiversity of private forests. Forest and tree interventions contribute to carbon sequestration and thus to climate change mitigation. They also have beneficial effects on soils and water conditions, including preventing erosion and increasing retention in rural areas. They also have important functions in protecting biodiversity and enhancing the landscape. They are an important element in addressing the effects of drought, reducing water losses from the soil and contributing to reducing surface run-off.

Action 63. Actions in the area of rational management of agricultural and forestry land.

Action to protect agricultural and forest land from other uses and support for regeneration of acidified soils as a result of anthropogenic effects.

Action 64. Support for the development of water and wastewater management.

The measure includes, inter alia, the implementation of investments necessary for agglomerations with a population equivalent (p.e.) ≥ 2000 to comply with the conditions of Directive 91/271/EEC, the development of water management in industrial plants and agglomerations, the co-financing of water conservation projects and the minimisation of drought in Poland and the increase of the population benefiting from an improved urban waste water treatment system ensuring increased biogenic removal.

Action 65. Financial instrument – NFOŚiGW programmes supporting adaptation to climate change.

The action includes improving the level of protection against the effects of climate change and natural hazards as well as major accidents, improving their recovery and strengthening selected environmental management elements, promoting modern, efficient and effective solutions in spa communities and increasing the amount of water retained, improving recognition and response efficiency in the event of natural hazards and major accidents.

Action 66. Measures concerning the provision of thermal water in Poland.

The activity involves carrying out geological works and works for the prospection and exploration of thermal water deposits with a view to making them available.

Action 67. Financial instrument – energy-intensive industries.

The measure concerns support to improve energy efficiency in energy-intensive industries covered by the EU Emissions Trading System (EU ETS) and decarbonisation by increasing the generation of electricity from RES.

Action 68. Financial instrument – Contract for Difference (CfD) for hydrogen production in industry.

The Contract for Difference is intended to provide public aid in the form of a pre-determined amount of surcharge on the price of 1 kg of hydrogen produced by the producer and used by the recipient in Poland. The subsidy aims to reduce the price gap between renewable and grey hydrogen (derived from fossil raw materials). By contrast, ensuring a price for renewable hydrogen at a level that allows it to compete with grey hydrogen on the market, i.e. removing the risks associated with the still early stage of development and production of renewable hydrogen, should reduce the risk of Polish hydrogen projects and contribute to the development of the renewable hydrogen market in Poland. The mechanism aims to facilitate the substitution, mainly in industry, of so-called grey hydrogen with renewable hydrogen.

Action 69. Support for the construction of renewable and low-carbon hydrogen generation capacity.

The measure aims to support financially the construction of low-carbon and renewable hydrogen generation capacity in Poland. The funding for the implementation of the measure will be provided from the Recovery and Resilience Facility.

Action 70. Analysis of the need for the construction of a maritime port terminal for the transhipment of ammonia.

In view of the growing demand for renewable hydrogen and green ammonia, the action aims to identify whether there is a need to build a maritime port terminal for the transhipment of imported hydrogen together with ammonia cracking infrastructure. The analysis is intended to answer the question whether the construction of such a terminal would be justified and would benefit the Polish economy.

Action 71. Financial instrument – NFOŚiGW 'Energy for Villages' programme.

The scheme supports investments in the construction of: hydropower plants, installations producing energy from agricultural biogas under high-efficiency cogeneration conditions, and energy storage facilities. The beneficiaries can be energy cooperatives and their business members, as well as farmers.

Action 72. Research and scientific, educational and commercial projects on CCS and CCUS.

This includes research, education and commercial projects to develop carbon capture and utilisation (CCU) technologies as well as the construction and operation of carbon capture and storage (CCS) facilities.

Action 73. Financial instrument – Modernisation Fund.

The Modernisation Fund may co-finance the implementation of a wide range of investments aimed at modernising the national energy system and improving energy efficiency within the priority and non-priority areas indicated in the ETS Directive. The FM will run until 2030 and will set up further priority programmes to support investments in these areas.

Other activities (e.g.: 18, 32, 34, 63, 67, 85, 90, 94, 95) were presented relevant for the National Action Plan financed by the Modernisation Fund.

Action 74. Development of clean and efficient district heating systems.

The aim of the action is to develop general solutions and support schemes for the heating sector. In addition, organisation of a system for obtaining information on the number, location and share of energy efficient systems in the number of district heating systems in Poland.

Action 75. Support for the development of hydrogen systems in heating.

The measure aims to prepare for the deployment of renewable hydrogen in the Polish heating sector by supporting R & D in this regard. In the near future, research and first deployment of technologies should allow for the development of more investment.

Action 76. Support for the construction of innovative hydrogen-powered transport units.

The measure aims to provide financial support for the development, construction and deployment of innovative hydrogen-powered transport units (work for the construction and subsequent commercialisation of vehicles/railway units/vessels). Funding for the implementation of the measure will be provided from the Recovery and Resilience Facility. *Recovery and Resilience Facility*) under the National Recovery Plan.

Action 77. Preparation of forest water management plans.

The measure involves shaping the ecological, productive and social functions of the forest at forest district level by: preserving the natural water conditions necessary for the development of a potential forestry body (water regulations), increasing water resources (retention projects and slowing water run-off from the catchment area), which significantly improves forest production conditions, biodiversity and helps the forest to adapt to projected climate change. It also helps to mitigate the impact of extreme weather events, i.e. droughts and floods on forests.

Action 78. Defining objectives and principles for sustainable forest management based on the criterion of conservation and appropriate enhancement of forest resources and their contribution to the global carbon stock.

This action implies the need for installation planning that ensures the desired quantity and quality of forest resources over the medium to long term (by balancing the yield/growth ratio), aims at maintaining or increasing the stock (to the level desired for economic, environmental and social reasons) and increasing forest cover whenever this can contribute to economic, ecological, social and/or cultural value.

Action 79. Support for the development of forest areas and improvement of the viability of forests.

The measure aims at increasing forest areas through afforestation and creation of woodland on agricultural and non-

agricultural land, as well as investments improving the resilience of forest ecosystems and their environmental value.

Action 80. Definition of directional forest protection tasks, including fire protection.

The action consists of establishing fire protection guidelines indicated on the basis of the legal provisions in force, an analysis of the state of fire emergency in the previous period and an analysis and assessment of the current fire protection status of districts (including an assessment of current and foreseeable risks under changing conditions of the link between the forest and the socio-economic environment). This allows forest fire prevention and subsequently combats CO_2 emissions$_{from}$ forests.

Action 81. Conducting seed management in forestry.

The action aims to expand the range of the best tree populations from regions of origin with a high capacity to adapt to changing environmental conditions and thereby increase the survival of trees in a changing climate.

Action 82. Forest carbon farms.

The measure includes afforestation of land, extension of the vertical structure of the forest, e.g. the introduction of a new generation under cover of old trees, the use of various ways of forest restoration and maintenance work to reduce carbon emissions from the soil, the use of species with a higher natural carbon sink capacity for this purpose.

Action 83. Restoration and conservation of wetlands, peatlands and wetlands in Natura 2000 and Green Infrastructure sites.

The aim of the action is to create opportunities for implementing the Priority Framework for Action for the Natura 2000 network in Poland in the field of marshes, peatlands and wetlands.

The aim of the measures is to reduce the negative effects of forest fires and to efficiently locate the source of danger and minimise losses and, in the longer term, to reduce the average size of fires and to extend the observation of forest areas, particularly in forest districts classified as fire risk category I.

Action 84. Adaptation of forests and forestry to climate change – small water retention.

The measure consists of carrying out water retention works, mainly consisting of the construction and restoration of small water bodies, the restoration of wetlands and floodplains (small retention in lowland and mountain areas). Actions taken should respond to the challenges of climate change adaptation. The creation of water storage conditions and the prevention, prevention and mitigation of the effects of forest fire risks are intended to reduce the negative effects of forest fires and to efficiently locate the source of danger and minimise losses and, in the longer term, to reduce the average size of fires and to extend the observation of forest areas, particularly in forest districts classified as fire risk category I.

Action 85. Combating forest dying.

The measure consists of combating forest dying in Poland and mitigation measures with a view to 2030, as well as preventing or minimising the negative effects of violent climate change, including, in particular, preventing large-scale forest collapse.

Dimension 2

Energy efficiency

Action 86. Financial instrument – Preferences for electricity generators in high-efficiency cogeneration.

The instrument consists of providing facilities for cogeneration units by facilitating access to the electricity grid. Its aim is both to stimulate the construction of new cogeneration units and to maintain the production of electricity from high-efficiency cogeneration in existing units. In view of the validity of the new guidelines on State aid for climate, environmental protection and energy issued by the European Commission (*Climate, Energy and Environmental Aid Guidelines*, CEEAG), which do not provide support for fossil fuels, and carbon fuels in particular, should be completely abandoned.

Action 87. Financial instrument – cogeneration premium.

The instrument consists of providing subsidies for energy produced from high-efficiency cogeneration, obtained through auctions. Its aim is both to stimulate the construction of new cogeneration units and to maintain the production of electricity from high-efficiency cogeneration in existing plants which, without support, could not function because of a funding gap in operating costs.

Action 88. Financial instrument – Other NFOŚiGW programmes supporting the development of cogeneration.

The measure includes funding for projects aimed at the construction or modernisation of district heating systems and the construction or modernisation of units producing heat and electricity in high-efficiency cogeneration.

Action 89. Financial instrument – white certificates system.

Certificates confirming that a certain amount of energy has been saved as a result of investments aimed at improving the energy efficiency of the economy, increasing energy savings by final customers, reducing losses of electricity, heat or natural gas in transmission or distribution. They hold property rights and are traded on the Commodity Exchange.

Action 90. Development of energy audits and energy management systems.

The action consists of assessing the amount and structure of energy consumed and recommending specific solutions to determine their cost-effectiveness. In addition, it includes advice on the initiation and implementation of energy efficiency investments.

Action 91. Financial instrument – Termo Programme.

The measure consists of several forms of support for the renovation and modernisation of residential buildings. The aim is to provide financial assistance to investors for projects improving the technical condition of existing buildings and to compensate building owners for carrying out activities that significantly reduce energy consumption in buildings.

Action 92. Financial instrument – Tax credit for expenditure on thermomodernisation of single-family dwellings.

The measure consists of providing a tax credit (deduction from income/income) for expenditure incurred for the thermal renovation of single-family dwellings. The mechanism is aimed at private individuals and concerns only existing real estate and not yet under construction.

Action 93. Improving the energy efficiency of residential buildings.

[Description to be completed at a later stage].

Action 94. Energy efficient public sector.

[Description to be completed at a later stage]

Action 95. Increasing requirements – technical and construction regulations and requirements laying down standards for the design of buildings.

The action consists of adapting technical and construction regulations by increasing the requirements relating to the conditions to be met by construction works, in particular from the point of view of energy efficiency. In addition, they will include a broader analysis of the availability of resources used to implement the provisions of the new EPBD for the construction of zero-emission buildings.

Action 96. Support for ESCO enterprises.

The measure aims to take measures to support companies active in the field of energy efficiency and RES with preference for energy service providers.

Action 97. Digitisation of district heating networks.

The measure involves the construction and/or conversion of automation, telemetry and telemechanics systems consisting of the implementation of modern IT/OT tools and solutions for, inter alia, supervision, control, monitoring and analysis of qualitative and quantitative parameters of district heating and heat/cool transmission, construction of RES installations producing energy exclusively for telemetry and telemechanics equipment. An energy storage facility may be part of the RES installation, provided that it is integrated into the RES source.

Action 98. Financial instrument – NFOŚiGW programme 'Electro-Energy – Intelligent Energy Infrastructure'.

The action includes the development of infrastructure enabling all parties to the electricity distribution process to communicate by installing remotely readable meters at final customers, together with IT and management infrastructure, aimed at optimising grid operation, speeding up electricity market processes and enabling the implementation of DSR *(SDR)*mechanisms.

Dimension 3. Energy security

Action 99. Maintenance of efficient interconnections and LNG terminal in Świnoujście.

The action concerns comprehensive measures to ensure the full and continuous functionality and efficiency of all existing cross-border connections and the LNG regasification terminal in Świnoujście, which together ensure the security of natural gas supply to domestic customers and the possibility of exporting surplus natural gas, also strengthening security of supply on a regional basis. The action also consists of ensuring adequate cybersecurity physical protection.

Action 100. Periodic updating of the Preventive Action Plan and Emergency Plan and monitoring the implementation of the tasks included in the Preventive Action Plan.

Action consisting of monitoring progress in implementing key investments enhancing the security of natural gas

supply to domestic customers indicated in the preventive action plan.

Measure 101. Construction of the FSRU terminal in the Gulf of Gdańsk.

It includes activities relating to the implementation of the project for the construction of a floating LNG regasification terminal in the Gulf of Gdańsk.

Action 102. Increasing the capacity and reception capacity of the natural gas storage system

The measure consists of implementing infrastructure investments resulting in an increase in the operational capacity of the natural gas storage system and an increase in the maximum withdrawal capacity from storage facilities, which together will affect the stability of the system's operation in particular during the winter season and will provide the basis for the proper further development of the gas market and commercial activities in the sector.

Action 103. Development and modernisation of the transmission and distribution system in accordance with the adopted development plans and their updates

The purpose of the action is to ensure the orderly development of the gas system, in a manner agreed with market participants and meeting their expectations. The implementation of the action will ensure a sense of functioning in a stable market characterised by predictability in the development of infrastructure for the transport of natural gas, which will facilitate decisions on the appropriateness of using natural gas as a transitional fuel among current and future customers of gaseous fuel.

Action 104. Define the legal framework for the development of infrastructure for the transport of hydrogen.

The action will consist of:

- the drafting and adoption of a draft act amending the Energy Law Act and certain other acts, consistent with the revision of the Third Gas Package in the field of hydrogen infrastructure,
- the adoption of a regulation implementing the Construction Law Act on the technical conditions and location of hydrogen refuelling stations,
- the adoption of a regulation implementing the Construction Law Act on technical conditions and siting for hydrogen networks, hydrogen storage facilities and associated facilities.

Action 105. Development of hydrogen infrastructure.

The actions aim to support investments in the development of hydrogen infrastructure for both transmission, storage and production, including but not limited to: electrolysers, fuel cells, dispensators.

Action 106. Support for the implementation of the Nordic Baltic Hydrogen Corridor and other infrastructure for the transport of hydrogen with a cross-border dimension.

Poland will support the project to build a hydrogen corridor across the Nordic countries and the Baltic Sea Basin at government level. The action will consist of the signing of letters of support and letters of recommendation expressing Poland's interest in implementing this and possible other projects, if they are judged legitimate for Poland.

Action 107. Support for the implementation of the "Programme for the development of hydrogen storage in salt caverns to strengthen Poland's critical infrastructure" to the GOSPOSTRATEG programme procured at the National Centre for Research and Development.

Action based on the GOSPOSTRATEG programme, procured from the National Centre for Research and Development, which provides funding for the initiative.

Action 108. Measures to ensure well-functioning fuel supply logistics, as well as support for investments in the development of transhipment, transmission and storage infrastructure in Poland,

support for measures aimed at extending the European Fuel Pipeline Network (CEPS) system to Poland.

Action to support investments under: maintain operational logistical facilities with neighbouring countries' systems (Germany, Czechia, Slovakia, Ukraine, Lithuania) and maritime fuel terminals; ensuring the operation and development of transhipment capacity of maritime fuel terminals (including LPG) in Szczecin, Świnoujście, Gdańsk and Gdynia, including the Dębogórz publishing base; extension of the capacity of fuel bases, i.e. construction of new fuel tanks in storage facilities, extension of the CEPS fuel pipeline system to Poland.

Action 109. Monitoring of oil and liquid fuel storage needs.

The action is implemented on the basis of a 10-year projection of national storage capacity requirements for emergency stocks of fuel and oil, prepared by the Government Strategic Reserves Agency, which is updated cyclically every two years. The objective of the action is to provide the right basis for investor decisions, which is crucial to ensure that the needs of the refining sector are properly forecasted.

Action 110. Support for investments aimed at diversifying and increasing oil supplies, including, inter alia, increasing the transhipment capacity of naphtoports, construction of the second strand of the 'Pomorskie' pipeline.

The action to ensure the uninterrupted supply of crude oil will be carried out by: ensure the functioning and development of transhipment capacity of the Gdańsk naphthoport and ensure well-developed and efficient transmission infrastructure within the country, including its expansion through the construction of the 2nd Pomorskie pipeline.

Action 111. Financial instrument – Capacity market.

Action to ensure the energy security of Poland and the continuity of supply of eclectic energy to all customers. It consists of ensuring that capacity providers can obtain, in competitive auctions, contracts in exchange for ensuring the availability of capacity and supplying electricity when the security of the energy system is compromised. It is a separate segment of the two-commodity electricity market (in addition to the energy market).

Measure 112. Deployment of large-scale nuclear energy.

The action consists of ensuring the conditions for the deployment of large-scale nuclear energy, including but not limited to: preparation of regulations, development of human resources, completion of the financing model, awareness-building carried out in accordance with the Polish Nuclear Energy Programme (PPEJ). It envisages the deployment of nuclear power units in Poland with a total net capacity of 6-9 GW in six units, located in two nuclear power plants, successively in 20332037 (EJ1) and 2039-2043 (EJ2). The measures taken will also ensure that private investment in large-scale nuclear energy is possible.

Measure 113. Actions to ensure the flexibility of the energy system in order to adapt to the envisaged changes to the NES.

Promote the use of low- and zero-carbon forms of energy storage, implement demand and supply-side flexibility mechanisms, aggregation, tariffs and dynamic prices, increase the share of storage and DSR in the electricity market and increase the participation of other participants in the balancing market, as well as the continuation of the possibility for DSR and storage to participate in the capacity market.

Measure 114. Optimising the allocation of available cross-border capacity.

Actions related to increasing the availability of current cross-border connections by optimising the allocation of available cross-border capacities through flow-based approach

Action 115. Efficient management of the country's strategic raw materials.

The action includes, but is not limited to: ensuring access to strategic raw materials, exploring, identifying and

documenting strategic deposits, supporting the development of a circular economy.

Action 116. Strengthening cybersecurity in the energy sector.

This includes: awareness-raising and education, implementation of appropriate security protocols, monitoring and detection of threats, establishment of contingency and recovery plans, safeguard of systems control systems.

Action 117. Measures to increase the flexibility of the energy system with regard to renewable energy generation.

Provide appropriate legal solutions and develop the concept of market integration mechanisms for RES in view of the challenges of growing production and installed capacity in the NES, including market services provided by RES, taking into account the location of RES in the grid, cooperation between RES and storage, and services affecting the balancing of the electricity system and the conditions for the operation of the electricity grid.

Action 118. Prevention and congestion management.

The action consists of the development and updating of national legal acts or the application of EU acts relating to disruptions of electricity supply, through the preparation of legal provisions, documents, plans and procedures to prevent, silence or enable efficient management in the event of a situation resulting in a restriction of electricity supply to customers or an electricity crisis. In addition, this will be supported by the preparation of a report on the results of the monitoring of security of electricity supply.

Dimension 4.
Intra-EU energy market and social aspects of the transition

Measure 119. Optimising the way available cross-border capacity is allocated.

Actions related to increasing the availability of current cross-border connections by optimising the allocation of available cross-border capacities, including through the implementation of a flow-based approach – monitoring the application of the methodology in the day-ahead market and actions for intraday deployment.

Action 120. Modernisation and extension of transmission lines within the NES to allow for an increase in cross-border flows.

It includes actions to upgrade and expand the network supporting the increase of cross-border flows as part of the implementation of investments included in the Action Plan developed under Regulation (EU) 2019/943, as well as ongoing capacity increases by TSOE as part of the linear trajectories included in that plan. This includes the improvement of the current transmission infrastructure, the implementation of advanced monitoring and network management technologies and the creation of new international connections.

Measure 121. Regional Cooperation Activities (BEMIP) for the implementation of projects related to the synchronisation of Baltic States' systems with Continental Europe.

It involves active participation in the cooperation of BEMIP, at different levels, to prepare policy decisions on the synchronisation project and to monitor and support the investment process led by OSPE.

Measure 122. Market and transmission system integration activities of Ukraine.

It includes supporting the political dialogue process with Ukraine and support at administrative level and in particular the TSOs for the integration of Ukraine's energy system and energy market with the EU.

Measure 123. Monitoring the use by TSOEs of revenues resulting from the allocation of interconnections.

Actions involving the publication of data on how to use revenues from network congestion and capacity allocation, including the use of congestion rents. These revenues shall be used to finance the effective availability of allocated transmission capacities and network investments in maintaining or increasing interconnection capacity.

Action 124. Monitoring the implementation of PCI projects in the electricity area.

The action concerns the monitoring at national level of the implementation of projects on the PCI list.

Measure 125. Support investments financed by the Connecting Europe Facility (CEF) in the electricity sector.

The action includes support at national level to infrastructure projects applying for CEF funding.

Measure 126. Obtaining support for strategic projects by inserting them into the next PCI lists.

The action concerns support for candidate projects for the next PCI lists of strategic importance and in line with the country's policies.

Action 127. Measures to integrate and improve the functioning of the electricity market.

Activities related to the coordinated implementation by system operators of guidelines, principles and methodologies as acts of EU law on the technical aspects of energy system integration and their safe operation. Putting in place solutions at the level of national legislation to achieve these objectives.

Action 128. Development and modernisation of transmission networks.

The actions concern support the preparation and implementation of investments for the expansion and modernisation of transmission and distribution networks. Network investments are supported both through financial support (e.g. cohesion policy, RRP, Modernisation Fund, CEF) and regulatory solutions

Action 129. Support scheme for energy clusters and energy cooperatives.

The action will consist of implementing transparent rules for cooperation within energy clusters, as provided for in the Renewable Energy Sources Act, including administrative and legal improvements and a special support scheme, as well as stimulating the development of energy cooperatives, which will increase the share of renewable energy sources in the national energy mix.

Action 130. Providing support for coal regions.

Actions concern support through, inter alia, training and retraining programmes, local development programmes, partnerships and cooperation.

Action 131. Reducing energy poverty and protecting vulnerable customers.

Actions relating to the modification or introduction of new forms of support, in the field of social policy, energy efficiency in buildings and in the field of education measures aimed at supporting the most deprived customers and reducing energy poverty

Dimension 5. Research, innovation and competitiveness

Measure 132. Gradual increase in R & D (R & D) budgets, including in areas conducive to the transition to a climate-neutral economy.

The measure aims to further increase state budget (R & D) spending, including areas related to the European Green

Deal (e.g. clean energy technologies, environmental technologies, next generation nuclear energy, materials and raw materials, hydrogen technologies, adaptation and resilience to climate change).

Measure 133. Implement strategic research and development agendas on topics conducive to the transition to a climate-neutral economy.

The action aims to support R & D work and projects in areas related to energy, environment and climate through strategic research programmes coordinated and funded by government R & D funding agencies (NCBR, NFOŚiGW).

Action 134. Update of State Scientific Policy.

As part of the evaluation of the country's scientific policy, the research priorities in the field of energy and climate will be updated taking into account the current objectives and needs of the transition to a climate-neutral economy as defined in both national documents (including Poland's energy policy) and European strategies.

Action 135. Conceptual design and High Temperature Gas cooled Reactor (HTGR) base design.

The project will result in a technical description of the HTGR as a basis for further implementation work, including the development of a technology demonstrator. The construction of the HTGR reactor is a huge opportunity for Polish science and the economy to bring additional, disproportionate benefits to the resources invested: developing the competences and international competitiveness of Polish research teams, developing Polish research specialities or contributing to the Polish energy mix in a significant way to reduce greenhouse gas emissions (nuclear energy is totally carbon-free).

Action 136. Reducing methane emissions from fuel production and distribution processes.

The action is based on ensuring regulation of containment, filling and emptying of petroleum products with the aim of reducing process methane emissions. It aims to limit annual losses of petroleum products in storage, filling and emptying processes below 0.01 % of their capacity.

Action 137. Research project – drainage using underground directional drilling technologies.

The project involves the development of a cost-effective and environmentally friendly drainage technology during coal-bed operations using directional wells in mines, replacing the very expensive drainage gallery built over hard coal beds, as well as other auxiliary drainage methods.

Action 138. Building competences and creating awareness – Zero-emission transport.

The action includes launching a course of education for "electromobility technologies" in industry schools, Ensuring back-up staff in the electro-mobility sector. It is also planned to develop professional qualifications in the field of zero-emission transport as part of the Integrated Qualification System. The automotive industry will also be included in training financed by the National Training Fund.

It is planned to take measures to raise awareness of the harmful effects of no change in the transport sector and to promote a shift towards alternative forms of transport, such as collective transport, cycling and walking. To this end, conferences, webinars, training courses, design contests or other promotional activities will be organised.

Measure 139. Scientific and educational research and projects on rational and low-carbon agricultural production.

This includes projects aimed, inter alia, at reducing fertiliser/manure application on cropland, supporting other activities beneficial to cropland management, pasture or grassland management and improving livestock management, improving animal waste management or improving the management of organic soils.

Action 140. Awareness-building – actions related to adaptation to climate change.

The action includes promoting social behavioural change and improving knowledge of climate change adaptation actions. It includes the organisation of conferences, webinars, training courses, projects, competitions or other promotional activities.

Action 141. Awareness-building – nuclear energy.

The action includes improving knowledge of nuclear and energy-related activities and shaping positive social behaviour towards nuclear energy. It includes the organisation of conferences, webinars, training courses, competitions and other educational and information activities.

Measure 142. Awareness-building – circular economy.

The action includes improving social behaviour and knowledge of circular economy activities. It includes the organisation of conferences, webinars, training courses, projects, competitions or other promotional activities.

Measure 143. Awareness-building – renewable energy sources.

The action includes improving social behaviour and knowledge of renewable energy activities. It includes the organisation of conferences, webinars, training courses, projects, competitions or other promotional activities.

Action 144. Training and further training of human resources for the economy in the climate and energy transition.

The action consists of adapting the sectoral qualifications framework to include competences related to the achievement of the objectives of the European Green Deal (*Green Skills*). Sectoral qualifications frameworks may be included in the Integrated Qualifications System which takes into account the specificities of the sector or sector concerned and constitutes the development of the Polish Qualification Framework (PRK).

Action 145. Preliminary identification of the magnitude of potential uranium deposits.

The aim of the action is to support work on the possibility of obtaining uranium from unconventional deposits in Poland.

Action 146. Financial instrument – Horizon Europe.

The measure aims to increase the share of Polish projects in Horizon Europe funding. This programme includes funding for research and innovation in, among others, smart cities or clean hydrogen.

List of EU regulations (and common names)

EP and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste Office L 365, 31.12.1994, p. 10, as amended), link

Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste, link

EP and Council Directive (EU) 2000/53/EC of 18 September 2000 on end-of-life vehicles, link

water Framework Directive – Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy, link

Directive (EU) 2006/66/EU of the European Parliament and of the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators (OJ Office L 266, 26.9.2006, p. 1, as amended), which will expire on 18 August 2025 and will be replaced by Regulation (EU) 2023/1542 of the EP and of the Council of 12 July 2023 concerning batteries and waste batteries, amending Directive 2008/98/EC and Regulation (EU) 2019/1020 and repealing Directive 2006/66/EC, link

EP and Council Directive 2008/98/EC of 19 November 2008 on waste and repealing certain Directives, link

EPBD – Directive (EU) 2018/844 of the EP and of the Council of 30 May 2018 amending Directive 2010/31/EU on the energy performance of buildings and Directive 2012/27/EU on energy efficiency, link

EP and Council Directive (EU) 2012/19/EU of 4 July 2012 on waste electrical and electronic equipment (WEEE), link

NEC Directive – Directive (EU) 2016/2284 of the EP and of the Council of 14 December 2016 on the reduction of national emissions of certain atmospheric pollutants, amending Directive 2003/35/EC and repealing Directive 2001/81/EC, link

RED II – Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources, link

market Directive – Directive (EU) 2019/944 of the EP and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU, link

CVD – Directive (EU) 2019/1161 of the EP and of the Council of 20 June 2019 amending Directive 2009/33/EC on the promotion of clean and energy-efficient road transport vehicles, link

EU ETS Directive– Directive (EU) 2023/959 of the EP and of the Council of 10 May 2023 amending Directive 2003/87/EC establishing a system for greenhouse gas emission allowance trading within the Union and Decision (EU) 2015/1814 concerning the establishment and operation of a market stability reserve for the Union greenhouse gas emission trading system, link

EED – EP and Council Directive (EU) 2023/1791 of 13 September 2023 on energy efficiency and amending Regulation (EU) 2023/955, link

RED III – Directive (EU) 2023/2413 of the EP and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652, link

new EPBD – Directive (EU) 2024/... of the EP and of the Council [to be completed]

Directive 2008/98/EC on waste – Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives, link

Directive 1999/31/EC on the landfill of waste – Council Directive 1999/31/EC of 26 April 1999 on the landfill of waste, link

Directive 94/62/EC on packaging and packaging waste – EP and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste, link

Directive 2006/66/EU on batteries and accumulators and waste batteries – Directive 2006/66/EU of the EP and of

the Council of 6 September 2006 on batteries and accumulators and waste batteries and accumulators and repealing Directive 91/157/EEC, link

Directive 2012/19/EU on waste electrical and electronic equipment (WEEE) – Directive 2012/19/EU of the EP and of the Council of 4 July 2012 on waste electrical and electronic equipment, link

Directive 2000/53/EC on end-of-life vehicles – Directive 2000/53/EC of the European Parliament and of the Council of 18 September 2000 on end-of-life vehicles, link

LULUCF Regulation – Regulation (EU) 2018/841 of the EP and of the Council of 30 May 2018 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU, link

Regulation governance – Regulation (EU) 2018/1999 of the EP and of the Council of 11 December 2018 on the Governance of the Energy Union and Climate Action, amending Regulations (EC) No 663/2009 and (EC) No 715/2009 of the European Parliament and of the Council, Directives 94/22/EC, 98/70/EC, 2009/31/EC, 2009/73/EC, 2010/31/EU, 2012/27/EU and 2013/30/EU of the European Parliament and of the Council, Council Directives 2009/119/EC and (EU) 2015/652 and repealing Regulation (EU) No 525/2013 of the European Parliament and of the Council, link

European Climate Law – Regulation (EU) 2021/1119 of the EP and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999, link

LULUCF II Regulation – Regulation (EU) 2023/839 of the EP and of the Council of 19 April 2023 amending Regulation (EU) 2018/841 as regards the scope, simplifying the reporting and compliance rules, and setting out the targets of the Member States for 2030, and Regulation (EU) 2018/1999 as regards improvement in monitoring, reporting, tracking of progress and review, link

ESR – Effort Sharing Regulation – Regulation (EU) 2023/857 of the EP and of the Council of 19 April 2023 amending Regulation (EU) 2018/842 on binding annual greenhouse gas emission reductions by Member States from 2021 to 2030 contributing to climate action to meet commitments under the Paris Agreement, and Regulation (EU) 2018/1999, link

AFIR Regulation – Regulation (EU) 2023/1804 of the EP and of the Council of 13 September 2023 on the deployment of alternative fuels infrastructure, and repealing Directive 2014/94/EU, link

EU Regulation 2023/1542 concerning batteries and waste batteries – Regulation 2023/1542 of the EP and of the Council of 12 July 2023 concerning batteries and waste batteries, amending Directive 2008/98/EC and Regulation (EU) 2019/1020 and repealing Directive 2006/66/EC (Text with EEA relevance), link

ReFuelEU Aviation – Regulation (EU) 2023/2405 of the EP and of the Council of 18 October 2023 on ensuring a level playing field for sustainable air transport, link

FuelEU Maritime Regulation – Regulation (EU) 2023/1805 of the EP and of the Council of 13 September 2023 on the use of renewable and low-carbon fuels in maritime transport, and amending Directive 2009/16/EC, link

MRV Regulation – Regulation (EU) 2023/957 of the EP and of the Council of 10 May 2023, as amended, Regulation (EU) 2015/757 to include maritime transport in the EU Emissions Trading System and to monitor, report and verify emissions of additional greenhouse gases and emissions from additional ship types, link

Abbreviations and terminology

DSR — demand *side response*
EP — primary energy; used in the concept of 'EP-index' as a primary energy indicator
EU ETS — the European Emissions Trading System *European Union Emissions Trading System*
FSRU — *floating storage regasification unit*
GHG — *greenhouse gases*
GUS — Central Statistical Office
IPCC — Intergovernmental Panel on Climate change *Intergovernmental Panel on Climate Change)*
KSE — national electricity system
LNG — liquefied *natural gas*
LULUCF — land use, land *-use change, and forestry*
NCW — National Indicative Goal (concerns RES share in transport)
OSDe — electricity distribution system operators
OSDg — gas distribution system operators
OSMIUM — natural gas storage system operator
TSOE — electricity transmission system operator – Polskie Sieci ElektroEnergia S.A. (PSE S.A.)

TSOg — gas transmission system operator – Gas Transmission Operator GAZ-SYSTEM S.A.

RES — renewable energy sources
PPA —*power purchase agreements*
PMG — underground gas storage facilities
URE — Energy Regulatory Office
RFNBO — renewable *fuels of non-biological origin*
SMR — small *modular reactors*
EU — European Union
ZPO — waste prevention

[2] Regulation 2018/1999 uses the *words* 'measures'. The NECPs have been replaced by 'activities' because the term 'measures' is ambiguous and may cause confusion.

[38] Article 4 EED.
[40] Article 4 EED.