



How Poland can reach higher GHG emission reduction targets by 2030

Forum Energii is a think-tank focused on the energy sector. Our mission is to create the foundations for an effective, safe, clean and innovative energy sector based on data and analyses.

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DATE OF PUBLICATION

December 2020

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Preface

Many European Union countries demand a significant increase in the targets for reducing CO₂ emissions. While the COVID-19 pandemic has knocked us off track, it has not diminished our commitment to environmental protection. On the contrary. After numerous discussions in the European Parliament and the European Council, the European Commission has been given the green light to present a more ambitious emission reduction strategy—from 40% by 2030 (which EU countries have already decided to do) to a 55% reduction in all EU CO₂ emissions. It is ambitious, however, if we take seriously the pace of climate change and its effects on society and the economy, at least for our children, then a significant proportion of Europeans believe it is not enough. The young, who consider climate change the greatest threat to their existence, has come to the fore. They are not concerned with the interests and beliefs of traditional business. Scientific data on the pace of climate change are very worrying and the effects can already be seen with the naked eye.

In Poland, we are afraid of the organisational effort related to the implementation of climate goals, and we are not sure whether we will manage. This makes it difficult for us to build a competitive advantage in an innovative and rapidly changing technological environment. Due to this resistance, the gap between Poland and the European Union in the field of energy transformation is starting to deepen.

In this study, we show that the 55% target is not as far away as some think. We will not run from modernisation of the energy sector—the available lignite deposits are running out, and in winter we have the most polluted air in the entire European Union. Poland can make a significant contribution to the achievement of the EU's CO₂ emission reduction target, and it can also benefit from it by modernising energy, heating, transport, industry, and agriculture—with the support of EU funds. How does this look in detail? We believe this report helps to answer that question.

I wish you a pleasant read.

Dr Joanna Maćkowiak-Pandera,
President of Forum Energii

1. Key conclusions

- In Poland, the discussion about the necessary reductions of emissions must be linked to the challenges the country is still facing, regardless of the European Union's climate ambitions—the end of coal is inevitable, Poland must ensure its energy security, the country requires new investments to rebuild the economy after the pandemic, and reducing CO₂ emissions is linked to improving air quality, which the government defines as a strategic challenge.

We propose that flagship projects should be adopted in Poland to implement strategic objectives and to fit in with EU climate policy. Flagship projects are measures that are strategic for Poland from the perspective of energy security, air quality, modernisation of the energy sector, and use of the new EU budget. In addition, their implementation will make it possible to reduce greenhouse gas (GHG) emissions by 42% compared to 1990.

- Taking into account the principle of a common target, but through different efforts, Poland's contribution to the increased targets should be a 44% to 51% reduction in GHG emissions compared to 1990. Additional emission reductions after the implementation of the flagship projects will be achieved by necessary changes in industry and agriculture.
- Social and political consensus should be built around the flagship projects in Poland. Thanks to this, the goal of reducing GHG emissions by 55% in the EU by 2030 compared to 1990 levels, although ambitious, will be achievable.

2. Introduction

2.1. Background of the study

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Poland is facing strategic challenges in the area of energy. The end of coal is inevitable, and the country must take care to build new low-carbon production capacity to ensure energy security. It is high time to improve air quality, and for this Poland needs clean heat and less carbon-intensive transport. Like in other countries, Poland faces a period of economic recession resulting from the coronavirus pandemic. To overcome the crisis more quickly and also to prepare Poland for future challenges, new investments are needed. They must be sustainable in order to help the economy and society emerge from the crisis and provide long-term benefits. The challenges arising from the modernisation of energy, heating, transport, and industry must be solved in a systemic way. Particularly as investments in these sectors are also linked to the need to reduce greenhouse gas emissions.

Meanwhile, EU climate policy is accelerating again. In September, the European Commission proposed raising the target to reduce GHG emissions by at least 55% by 2030 (compared to 1990 levels).¹ The current target is set at 40%. This is a consequence of the EU's ambition for climate neutrality by 2050, in line with the Paris Agreement. The discussion facing the Union will end not only with a political decision on the new target, but above all with legal and regulatory changes in the EU and the presentation of a European *nationally* determined contribution, NDC, at the global level. The European Council in October 2020 confirmed that the objective is to be raised and submitted before the end of the year to the United Nations Framework Convention on Climate Change (UNFCCC).²

¹ All greenhouse gases in terms of CO₂ equivalent are included in this analysis. Emissions other than CO₂—methane, nitrous oxide and fluorinated greenhouse gases—account for almost 20% of EU GHG. European Commission, *Stepping up Europe's 2030 climate ambition. Investing in a climate-neutral future for the benefit of our people*, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, COM(2020) 562 final, Brussels, 17.9.2020, https://ec.europa.eu/clima/sites/clima/files/eu-climate-action/docs/com_2030_ctp_en.pdf.

² "To meet the objective of a climate-neutral EU by 2050, in line with the objectives of the Paris Agreement, the EU needs increase its ambitions for the coming decade and update its climate and energy policy framework. (...) The European Council will return to this issue at its December meeting with a view to agreeing a new emission reduction target for 2030 and the submission of the EU's updated nationally determined contribution (NDC) to the UNFCCC before the end of the year." European Council Conclusions on COVID-19 and climate change, 15 October 2020, <https://www.consilium.europa.eu/en/press/press-releases/2020/10/16/european-council-conclusions-on-covid-19-and-climate-change-15-october-2020/>.

Poland has always opposed ambitious climate and energy targets, but now a breakthrough seems possible. In the perspective of the next dozen years or so, it must modernise the energy sector and initiate changes in other sectors because it is impossible to escape the challenges. Therefore, Forum Energii proposes that the strategy for the Polish transformation towards climate neutrality should be based on the implementation of flagship projects in sectors—particularly energy—in which changes are inevitable anyway. Cost-effective measures are necessary and will, at the same time, improve the quality of life, maintain jobs, and increase the competitiveness of the Polish economy. These are activities that the government considers strategic and is already partly implementing, and around which a social and political consensus can be built in Poland.

2.2. Objective of the study

The aim of this analysis is:

- Determining the reductions in GHG emissions that can be achieved by 2030 as a result of the implementation of the flagship projects—diversification of the energy mix, action towards clean heat, system changes in the transport sector, and industrial modernisation.
- Estimate Poland's participation in the EU 55% reductions target.
- Calculate the reduction gap, i.e., the difference between the reductions made possible by the flagship projects and the estimated contribution. The reduction gap must be filled by other projects in industry and in agriculture and forestry that have not yet been identified.

3. EU climate policy

3.1. Existing architecture

The EU's climate policy is defined by targets for the gradual reduction of GHG emissions in relation to 1990 levels. These targets apply from 2020, when the goal is 20%, to 2030, which is currently 40%. The first climate and energy package that set targets for 2020 was agreed in 2007. Apart from the reduction of emissions itself, it also concerned the implementation of renewable sources, whose share in 2020 is to be 20% of total energy consumption in the EU (15% for Poland), and energy efficiency, which is also to increase by 20%.

The Emissions Trading Scheme (ETS) is a key EU tool for reducing GHG emissions from large facilities in the energy and industrial sectors, as well as in aviation. It covers around 45% of EU³ greenhouse gas emissions. These sectors should reduce their emissions by 21% by 2020, with 2005 being the base year for the reduction in this segment. The ETS has the effect of reducing EU-wide emissions by pricing every tonne of CO₂ emitted, forcing a systematic change in the fuel mix as well as the modernisation of technologies used in energy production, both at the EU and national levels. The ETS system itself does not, by definition, impose national reduction targets for GHG emissions.

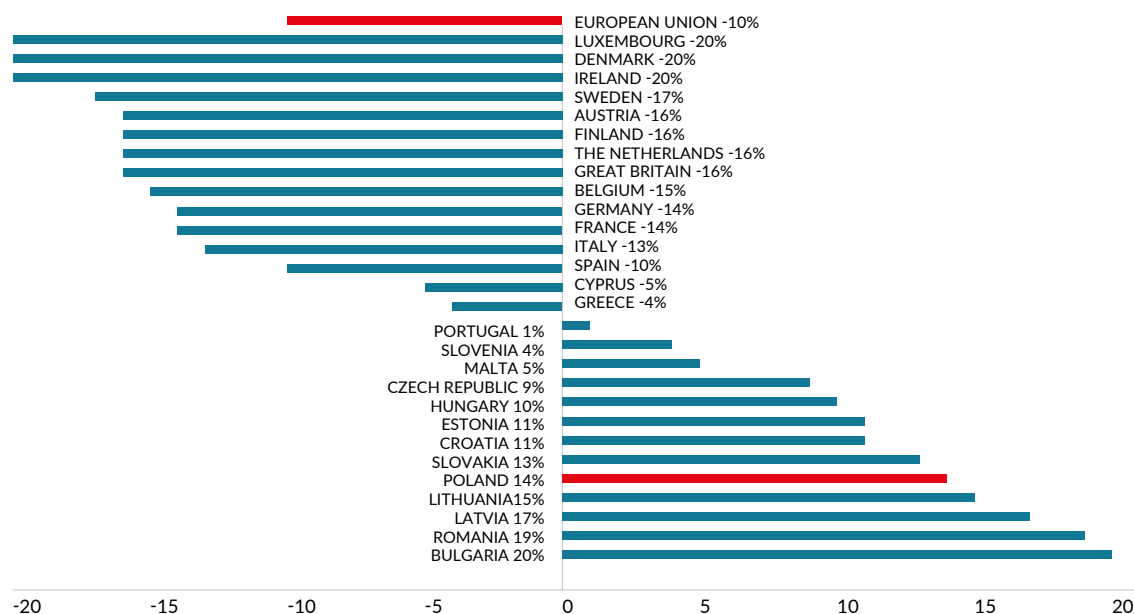
The remaining 55% of EU emissions are accounted for by sectors not covered by the emissions trading scheme (non-ETS). These are transport (except aviation), agriculture, waste management, and residential buildings. In terms of emission reductions, EU countries have adopted binding annual targets until 2020 (compared to 2005) under the ESD (*effort sharing decision*).⁴ The national targets are based on the relative prosperity of Member States, measured in terms of gross domestic product (GDP) per capita. Less prosperous countries are assigned less ambitious targets because of their lower investment capacity and higher economic growth with the risk of higher emissions.

As a result, national targets range from a 20% reduction for the richest countries to a maximum 20% increase for the least well-off. A detailed list of targets for individual EU countries is presented in Figure 1.

³ European Commission, 2020 climate & energy package, https://ec.europa.eu/clima/policies/strategies/2020_en.

⁴ Decision No 2009/406/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020, OJ L 140/136, 5.6.2009.

Figure 1: Non-ETS Reduction targets of individual Member States for 2020



Source: Own elaboration of Annex II to ESD Decision No 2009/406/EC.

Six years ago, in October 2014, the European Council took a directional step towards targets for 2030. It established that in the next decade the EU should reduce GHG emissions by 40% (compared to 1990), increase the share of RES to 27%, and improve energy efficiency by the same amount. These commitments make up the second climate and energy package. In the course of their implementation in EU law, the renewable energy and energy efficiency targets were revised upwards in 2018 to 32% and 32.5%, respectively.

In the ETS area, the system remains the main instrument for reducing emissions. However, the rate of reduction in the next decade will accelerate so that ETS emissions in 2030 will fall by 43% compared to 2005. Therefore, 2.2% of allowances (the so-called linear emission reduction factor, LRF) is to fall from the market every year, compared to 1.74% between 2013 and 2020. The *market stability reserve (MSR)*, which gives the European Commission powers to adjust the supply of allowances to changing market conditions,⁵ also became operational in the ETS on 1 January 2019. Even before the publication of the proposal to increase the reduction target to 55%, the Commission had already signalled the possibility of introducing a minimum price under the ETS, or even of extending the system.⁶

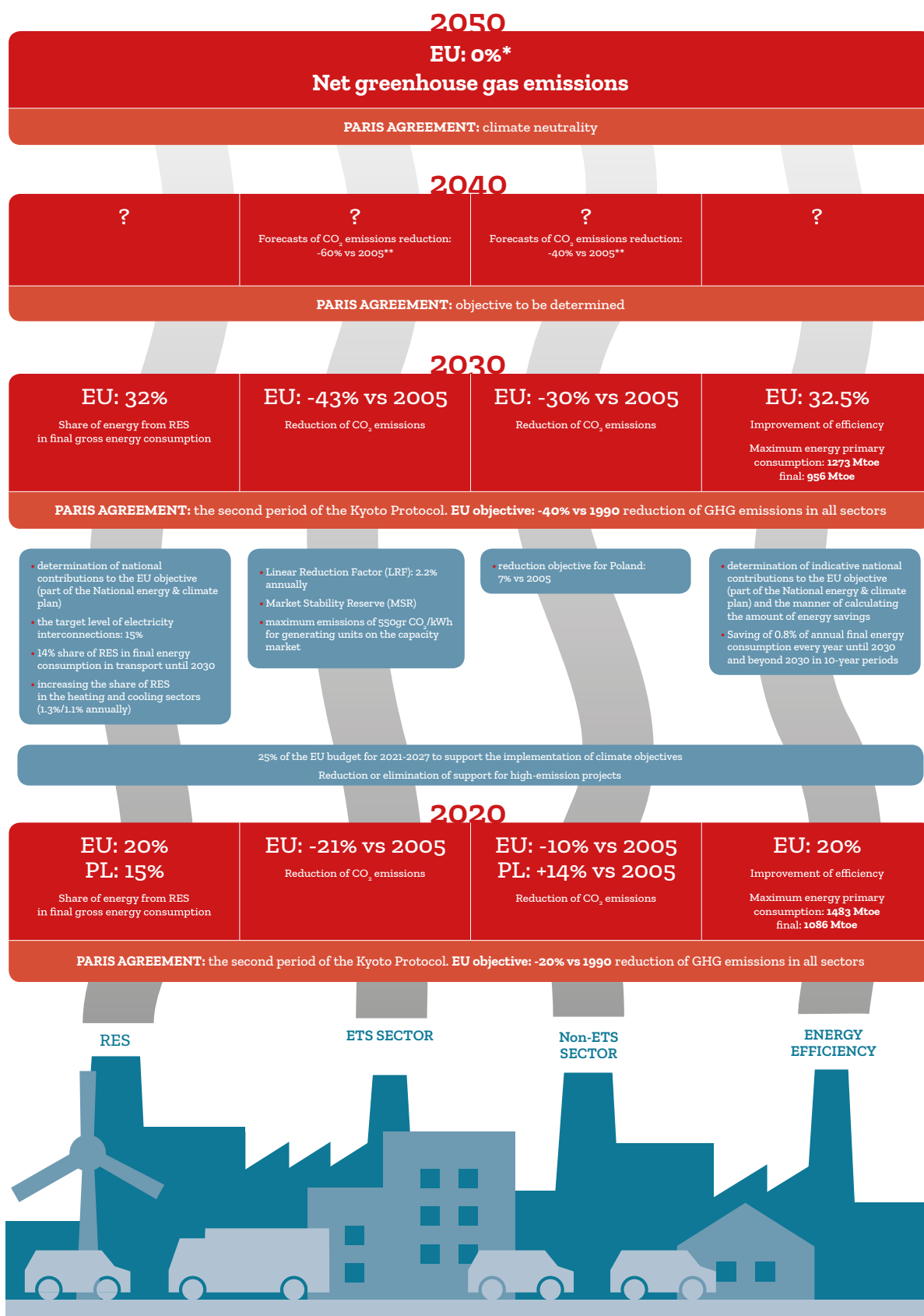
The post-2020 targets for non-ETS sectors are also changing. By 2030, all EU countries will already be obliged to at least not increase emissions, and the targets are in the range of 0% to minus 40% compared to 2005. The legal basis is the *effort sharing regulation (ESR)*. This is a much more ambitious task than that set for 2020, although the difference between the targets for the richest (Luxembourg, Ireland) and the poorest (Bulgaria) has been maintained at 40 percentage points.

To ensure that the climate and energy targets are met, the EU has adopted integrated monitoring and reporting rules to ensure progress on its and international commitments under the Paris Agreement. Each country is required to adopt integrated national energy and climate plans for 2021-2030. Any national long-term strategies should be consistent with them. Member States must submit their draft plans by the end of 2018 and final plans by the end of 2019. A summary of the current EU targets is presented in Figure 2.

⁵ The reason for introducing the IAS was the structural oversupply of allowances on the market and the inability to respond to changing demand. The reserve has been in place since 2019. This year, the European Commission decided to reduce the number of allowances under the IAS by 110.84 million, which is more than 16% of the allowance pool for that year. Krajowy Ośrodek Bilansowania i Zarządzania Emisjami, *Raport z rynku CO₂*, No 99, June 2020, https://www.kobize.pl/uploads/materialy/materialy_do_pobrania/raport_co2/2020/KOBIZE_Analiza_rynku_CO2_czerwiec_2020.pdf.

⁶ *Ibidem*.

Figure 2: Current energy and climate targets for 2050



Source: Own study.

3.2. New objectives

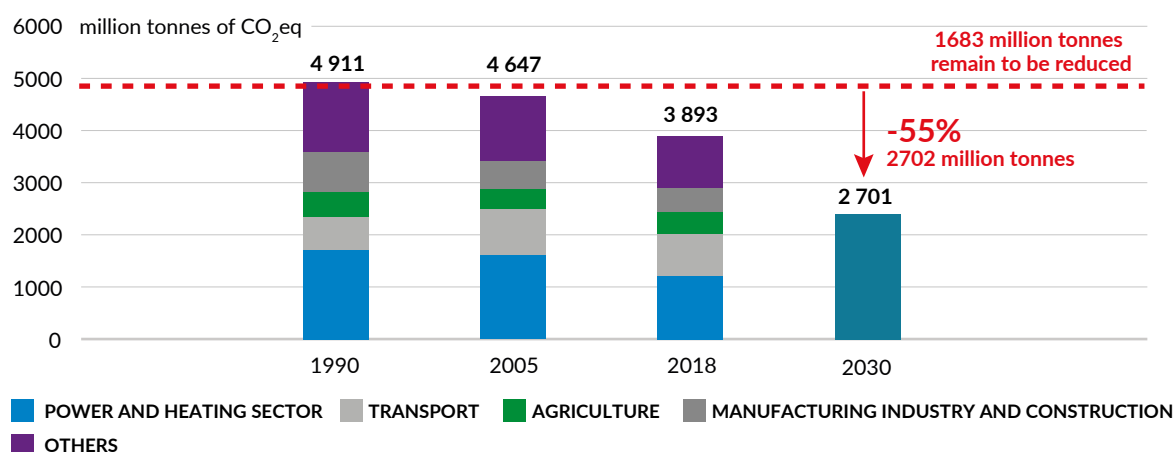
In December 2019, at the European Council, the Member States committed themselves to achieving climate neutrality by 2050, as set out in the Paris Agreement. This is an overarching objective that is beginning to combine the energy and climate objectives that have so far been scattered throughout many pieces of legislation. Its consequence is an attempt to set an even more ambitious path for reducing GHG emissions and, as a first step, a revision of the 2030 target. This is what the document published by the European Commission in September 2020 assessing the impact of increasing the target to 55% on EU economies concerns.

The Commission, as part of raising climate ambitions, has proposed⁷:

- an EU-wide target to reduce GHG emissions throughout the EU economy by at least 55% by 2030 compared to 1990, including emissions and removals;
- a series of actions required in all sectors of the economy and the launch of a review of the most important legal instruments; concrete new legislative proposals will be presented by the Commission by June 2021;
- to prepare the ground for a public debate aimed at increasing the EU contribution to the Paris Agreement (NDC) before the end of the year.

What does this mean for the entire European Union? A 55% reduction in GHG emissions at the EU level compared to 1990 requires a reduction in total emissions to 2701 million tonnes of CO₂ equivalent, of which 1683 million tonnes are still to be reduced⁸ (see Figure 3). To date (the latest verified data are available for 2018), the Union has reduced its emissions by 1018 million tonnes of CO₂ equivalent, i.e., by 20.7%, which means that it has already met its own reduction target for 2020.⁹ If the ambitions for 2030 had not changed, the EU would already be halfway to meeting its commitments. But higher targets mean that the EU is only one-third behind the necessary reductions. However, they need to be raised, because only then will it be possible to achieve climate neutrality by the middle of the century, in line with the Paris Agreement.

Figure 3: EU-27 annual GHG emissions in relation to the EU reduction target of 55%



Note: the category 'other' mainly includes combustion of fuels not included in other sectors.

Source: Own study based on Eurostat, EEA.

⁷ European Commission, *Stepping...*, op. cit.

⁸ <https://www.eea.europa.eu/data-and-maps/data/data-viewers/greenhouse-gases-viewer>.

⁹ The European Commission's estimates indicate that net greenhouse gas emissions in 2020 will fall by 30-35% below 1990 levels. This is due to the current crisis caused by the pandemic. However, the economic recovery will restore emissions to previous levels unless additional action is taken. European Commission, *Stepping...*, op. cit.

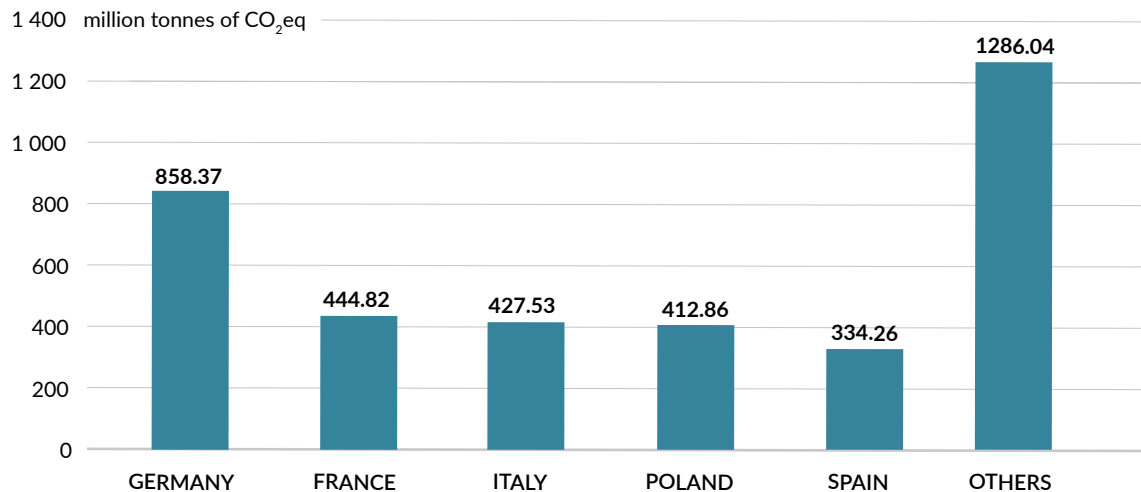
The scale of the effort is also illustrated by the fact that the EU should reduce emissions by a further 35 percentage points in just a decade, while the current 20% reduction has been achieved in 30 years. At the same time, the part to be reduced—1683 million tonnes—is more than the emissions of the entire EU ETS¹⁰ sector. Therefore, the decision to be more ambitious requires an intensification of reduction measures in all sectors.

An essential part of the Commission's proposal is a series of initiatives to rebuild the existing architecture of climate and energy policy. The implementation of the increased ambition is to build on all the existing legal and financial instruments in the EU—the ETS, the ESR regulation, which concerns the non-ETS sectors, and the regulations on land use, land use change and forestry (LULUCF). But, at the same time, all these areas are to be reformed, and the European Commission intends to present new proposals by June 2021. One of these is the extension of the ETS to buildings and transport, which would be the biggest change in the system since its introduction. This proposal has been presented as an option and it is not clear at this stage what shape it will eventually take. What is important, however, is that the higher ambitions will apply to all sectors and will go far beyond energy sector. At the same time, the Commission points out that the increased reduction target will mean increasing the targets for renewables to 38.5% and for energy efficiency to 36%.¹¹

3.3. Poland in comparison with the EU

In the European Union, Germany is ranked first in terms of total annual emissions (see Figure 4). In 2018, German emissions exceeded 850 million tonnes of CO₂—more than twice as high as in Poland. Poland is currently the fourth-largest GHG emitter in the European Union. However, it is worth noting that the differences between France, the second-largest emitter, and Italy (3rd) and Poland are small.

Figure 4: Total GHG emissions in Poland and selected EU-27 countries in 2018



Note: the category 'others' includes the other EU-27 countries.
Source: Own calculations based on Eurostat.

While, on average, emissions in the EU have fallen by one-fifth since 1990, the pace of decarbonisation has varied between countries. Over the last 30 years, Germany has managed to reduce its emissions by 30%, Hungary by 32%, the Czech Republic by 35%, and the Baltic States or Romania by more than half. There are also Member States where GHG emissions have increased over the three decades, including Cyprus (+54%), Spain (+20%), and Portugal (+19%). In Poland, emissions have decreased by 13% since 1990 (see Figure 5).

¹⁰ According to the EEA, the verified emissions of all EU installations covered by the ETS in 2019 were 1529 million tonnes of CO₂. <https://www.eea.europa.eu/data-and-maps/dashboards/emissions-trading-viewer-1>.

¹¹ European Commission, *Stepping...*, op. cit.

The classification in terms of *per capita* emissions is different. Among the five largest issuers listed above, Poland has the highest per capita emissions. In 2018, they amounted to 10.87 t. The EU average is nearly 8.5 t. Poland is ahead of five countries: The Netherlands (10.9 t), the Czech Republic (12 t), Ireland (12.4 t), Estonia (15.1 t), and Luxembourg, where emissions *per capita* are the highest in the EU at 17.2 t. In turn, the largest EU economies emit less per capita than Poland, as shown in Table 1.

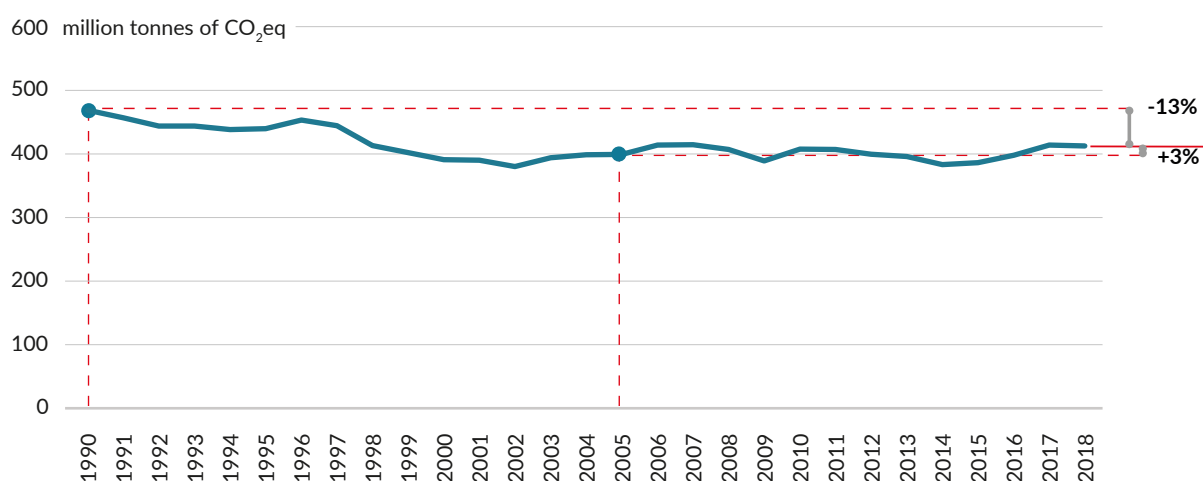
Table 1: Greenhouse gas emissions per capita in Poland and selected EU countries in 2018

GHG emissions per capita [t]	
Poland	10.87
Germany	10.34
Spain	7.12
Italy	7.08
France	6.64
EU average	8.42

Source: Own calculations based on Eurostat.

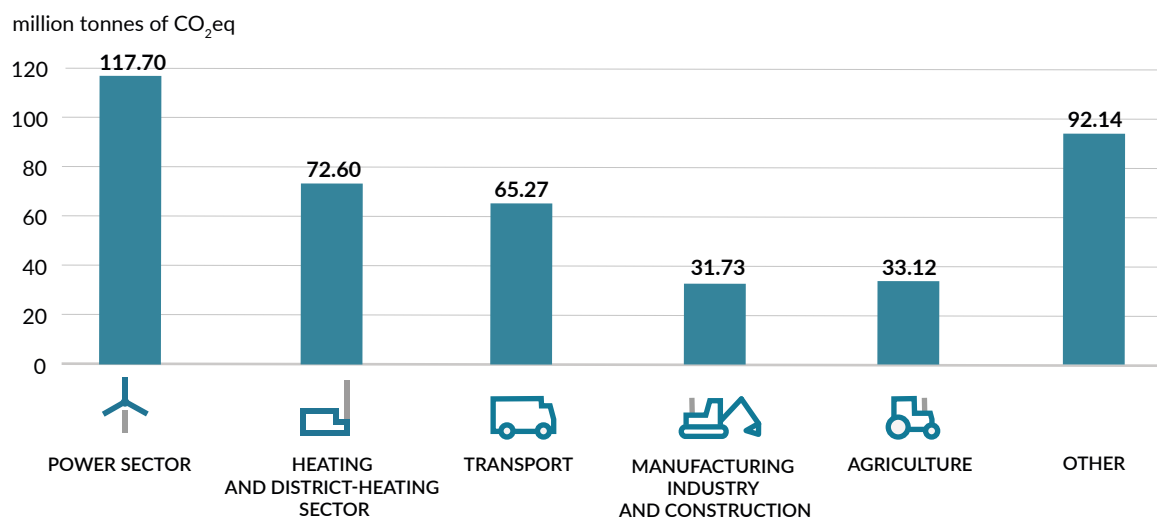
The political transformation and the collapse of entire branches of industry resulted in the reduction of Polish GHG emissions compared to before 1990. The country's emissions in 2018 were only 13% lower than in 1990. In 2018, Poland emitted 415.8 Mt CO₂ equivalent compared to 475.7 Mt in 1990¹²—data are already available for this area—and show an 8% decrease compared to 2018.

Figure 5: Changes in GHG emissions in Poland over the years



Source: R. Macuk, *Energy transformation in Poland. 2020 edition*, Forum Energii, 2020, <https://forum-energii.eu/en/analizy/transformacja-2020>.

Figure 6: Structure of greenhouse gas emissions in Poland in 2018



Note: the category 'other' mainly includes combustion of fuels not included in other sectors.

Source: Own study based on Eurostat, EEA.

What part of the emissions are the individual sectors responsible for? The GHG emission structure in Poland is presented in Figure 6. The sector responsible for the largest part of the emissions is the power industry—it is as much as a quarter of national emissions. This is due to the predominance of coal in the mix, which is also the reason for the high emissivity of district heating and individual heating. The combustion of fuels is also hidden in the category 'other'. Significant, but above all increasing, are emissions from transport. This sector is already responsible for 15% of national emissions and has more than tripled over the last 30 years. Industry and agriculture each account for around 8% of emissions.

4. What can be done?—flagship projects

The difficult discussion about emission reduction targets is causing resistance, because climate policy is being shown to be the cause of the problems of mining, energy, and the entire Polish economy. This approach leads to decision-making paralysis and puts Polish industry, which is not implementing an innovation strategy, at a disadvantage.

Meanwhile, the challenges of modernising the energy, heating, transport, industry, and agriculture sectors are piling up year after year. At the same time, the new seven-year EU budget will contain unprecedented resources for climate action and support for the EU's recovering economies. Poland may be one of the countries that will benefit most from the distribution of funds—possibly more than PLN 140 billion¹³ for the energy transformation alone. However, the money will not be granted unconditionally. It is necessary to have a plan for the implementation of common EU objectives and to commit to climate neutrality and to join in the implementation of a 40%, or even 55%, reduction in emissions by 2030.

So let us look at the discussion about reduction targets from the perspective of what is still necessary to be done in Poland. There are flagship projects to be implemented—changing the energy mix, clean heat, electrifying transport, modernising industry, and developing environmentally friendly agriculture. Poland must carry them out not only because they will reduce CO₂ emissions but also because they will increase energy security, improve air quality, and give a new developmental impulse to the economy.

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J. Maćkowiak-Pandera et al., *The EU is ready to co-finance our energy transformation—what does the Polish government have to say?*, Forum Energii, 2020, <https://forum-energii.eu/en/blog/pieniadze-na-transformacje>.

What are flagship projects?

- Concrete actions that not only meet the emission reduction targets, but are necessary from the perspective of:
 - energy security (e.g. falling domestic coal production);
 - the need for investment in energy efficiency and new generation sources;
 - improving air quality.
- Partly the flagship projects have already been declared important and to be implemented by the government.

That is why Forum Energii proposes that the strategy of the Polish transformation towards climate neutrality should be based on the implementation of flagship projects in different sectors (with particular emphasis on energy) where changes are inevitable anyway, but which will be cost-effective while improving quality of life and maintaining jobs.

4.1. Power sector

Flagship project—change of mix in the power sector

- By 2030: replacement of coal, especially lignite by RES and partly natural gas;
- Emissions reduction in this sector—66.6%.

What does it mean?

- Nearly complete phase-out of lignite capacities, shutdown of the last units by 2032;
- Significant decrease of hard coal power;
- Filling the coal gap in Poland with renewable sources and partially with gas.

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The power industry is responsible for nearly a third of Polish emissions, and its transformation is irreversible. In the power industry, the end of lignite mining is already visible. There is a lack of money in utilities for new openings, and local communities do not agree to them. Domestic hard coal is uncompetitive, and mining is on the verge of collapse and is also dragging power generation down. At the same time, renewable sources are becoming the cheapest means of generating energy, and many countries are managing increasingly well with their variability. All this means that changes in the Polish energy sector are inevitable. That is why Forum Energii believes that the planned change of the mix by 2030, which means an almost complete abandonment of lignite, a significant reduction in hard coal power, and their replacement with RES and partly with gas, is key to reducing emissions. This transformation is already happening before our very eyes—companies want to get rid of their coal assets and they are beginning to make declarations about climate neutrality. Regions such as eastern Wielkopolska are planning to move away from lignite within a few years.

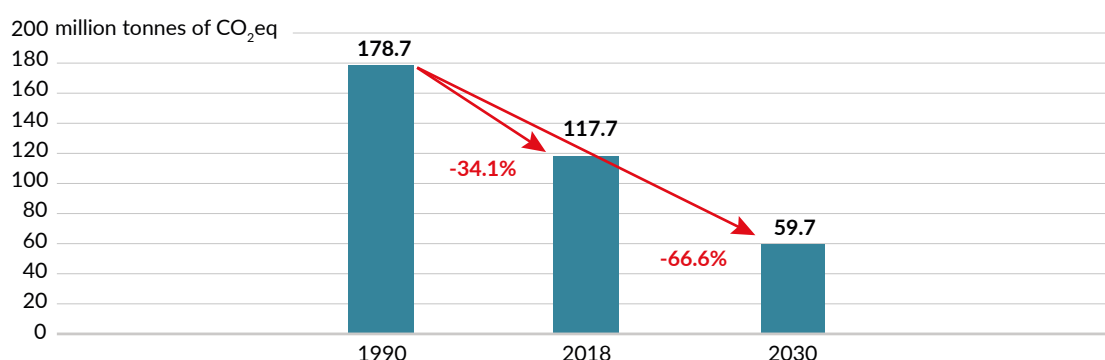
The first flagship project is the diversification and decarbonisation of the electricity mix, according to the most ambitious scenario of the analysis by Forum Energii, *Modernising the European lignite triangle*.¹⁴ This is a scenario for decommissioning lignite by 2032 and is in line with the objectives of the Paris Agreement, takes into account megatrends, and responds to the challenge of accelerating emission reductions in the European Union. The decline in the importance of lignite is due to the projected deteriorating economics of coal units and, in addition, to the decreasing reserves of this raw material, which can be exploited in an economically viable manner. In the meantime, the importance of hard coal will also decrease. Many of the existing units will not meet increasingly stringent

¹⁴ Forum Energii, *Modernising the European Lignite Triangle*, 2020, <https://forum-energii.eu/en/analizy/europejski-trojkat-wegla-brunatnego>.

environmental standards, capacity utilisation times will fall, and from 2025 onwards, high-emission units will not be able to receive payments under the capacity market (except for contracts concluded until the end of 2019). A prerequisite for an effective and significant reduction of CO₂ emissions is the replacement of the decommissioned high-carbon capacity by low or zero-carbon energy sources. To this end, coal phase-out plans must be included in the National Energy and Climate Plans. It is necessary to create a strategy for developing new sources, which will be reflected in the planned auctions and changes to the national energy market. The construction of new generation capacity must take into account the various options available to the system, not only new generation sources, mainly RES, but also gas, demand-side flexibility, storage, and availability of interconnection capacity.

The decarbonisation of the mix will allow for a reduction in emissions of up to two-thirds compared to 1990.

Figure 7: Possible greenhouse gas reductions in the power industry by 2030



Source: Own estimates and calculations based on EEA and Eurostat and the Forum Energii, *Modernisation...*, op. cit.; lignite exit scenario until 2032.

4.2. Clean heat

Flagship project-clean heat

- Moving away from coal in households to 2030 and partially in the heating system; improving the energy efficiency of buildings;
- Emissions reduction in the sector-48.5%.

What does it mean?

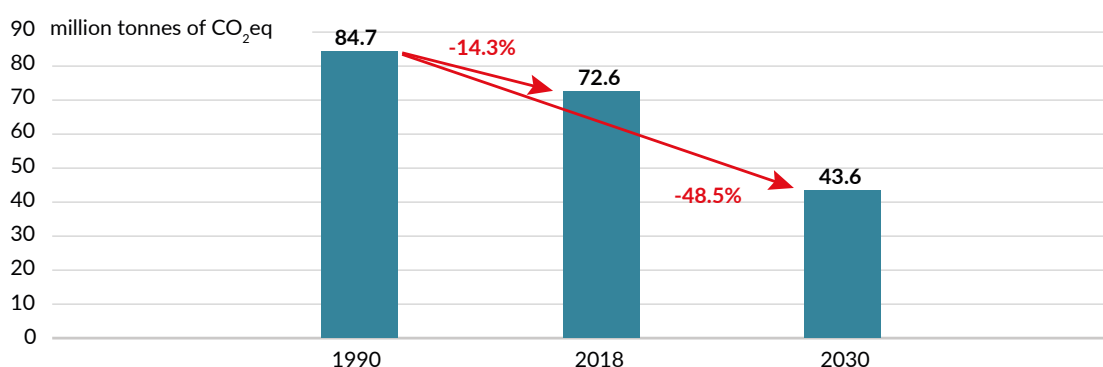
- End of hard coal in households by 2030;
- Limiting the share of coal in system heating; full abandonment of coal by 2035;
- Increase in the share of RES in the entire heat supply area to 39% in 2030;
- 24% reduction in final energy consumption by 2030 compared to 2015 levels.

Heating in Poland urgently needs to be modernised. Heating systems are inefficient, and heat for consumers is, and will continue to be, increasingly expensive, not counting the external costs of smog, which is also detrimental to the quality of life and, above all, to the health of Poles. Today, this sector is responsible for almost one-fifth of national GHG emissions. Deep modernisation of heating and individual heating systems is therefore necessary and inevitable. By the way, it can support the reduction of GHG emissions. So far, this sector has reduced them by 14%, but potentially could reduce them by half. The change in district heating must be based on two pillars—improving the energy efficiency of buildings and abandoning the use of solid fuels in households by 2030 and by 2035 at the latest in district heating systems. Coal must be replaced by other sources of heat. This awareness is already there:

in the last draft of the Energy Policy, the government declared a gradual phasing out of coal. This is a key area for improving quality of life in Poland and will receive huge EU funding under the so-called 'renovation wave'—a strategy for thermal modernisation and change in the area of buildings.

As a flagship project, we propose the decarbonisation of heating, accompanied by a significant increase in the energy efficiency of buildings. This is in line with the fourth most ambitious scenario of the strategy for district heating developed by Forum Energii.¹⁵ This scenario assumes a reduction in current CO₂ emissions in 2030 and 2050 by 40% and 100%, respectively, and a share of RES in 2050 at 100%. Such actions are in line with the trends of EU climate policy, providing for the possibility of a complete abandonment of fossil fuels in district heating. District heating networks play a lesser role here, and decentralised systems are becoming more important. It is also very important to integrate district heating with the electricity sector. Decarbonisation of the heating sector also requires optimum thermal modernisation of buildings and the elimination of carbon fuels in non-system heating by 2030. Modernisation of the heat supply area will make it possible to reduce CO₂ emissions by almost half compared to 1990.

Figure 8: Possible greenhouse gas reductions in district heating and individual heating until 2030



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Source: Own estimates and calculations based on EEA and Eurostat and the Forum Energii, *Clean Heat...*, op. cit.; decarbonisation scenario IV.

4.3. Transport

Flagship project—electrification of transport

- Electrification of transport;
- Slowing and reducing emissions compared to current levels.

What does it mean?

- Electrification of passenger and public transport;
- Expansion of charging infrastructure;
- A paradigm shift in mobility;
- Reform of tax policy and charges;
- System changes in the sector—preparation of a roadmap for the decarbonisation of transport.

Transport in Poland is already responsible for over 15% of GHG emissions. Moreover, emissions from transport have more than tripled over the last 30 years. The same trend can be seen in other countries. Therefore, without a clearly defined strategy for this sector, it will not be possible to achieve EU objectives. To date, no roadmap for

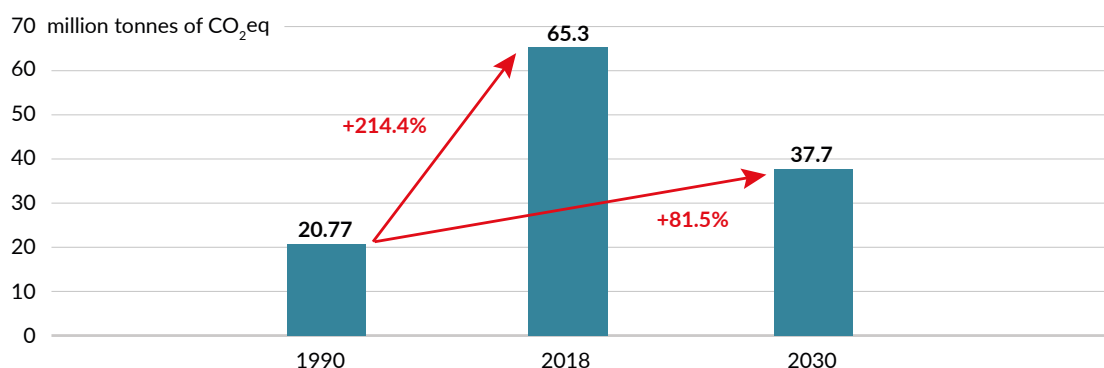
the decarbonisation of transport has appeared in Poland, but it is clear that a solution that can be applied on a large scale is electrification. At the same time, decarbonisation of the energy mix is the key to success in reducing emissions. Not only should we promote electric vehicles, but, above all, we should strive to electrify public transport in cities and expand the necessary charging infrastructure.¹⁶ This will bring about an improvement in air quality in urban areas, as well as the exploitation of the economic potential associated with the production of electric buses. It will also result in reductions in CO₂ emissions. These measures must, however, be accompanied by restrictions on imports of the most emitting vehicles from the secondary market.

However, the changes in the transport sector must result from a whole series of activities which, taken together, can only bring about a significant reduction in GHG emissions. Electrification alone is not enough, and a paradigm shift in mobility and systemic transformation in the sector are also needed. According to the estimates of the think-tank Transport & Environment, whose emission reduction forecasts we are using in this analysis, Poland has a chance to reduce transport emissions even by as much as 25-30 million tonnes of CO₂. Admittedly, these would still exceed 1990 levels, but at the same time it would mean a fall of as much as 46% over a decade from the current level of emissions from means of transport. The following measures are therefore necessary, among others:

- Implementation of specific emission standards for all vehicles;
- Appropriate taxation of fuels, closing any gaps in the current system;
- A well-designed toll system, varied according to emissions;
- Promotion of public transport (bus and rail), facilitation of walking and cycling, promotion of shared mobility;
- Promoting rail freight transport and restricting heavy goods traffic;
- Reduce emissions from aviation and shipping by developing alternative propulsion technologies.

Reducing CO₂ emissions in the transport sector is a difficult but necessary task, and one that can make a serious addition to Poland's contribution to the EU reduction target. The measures and assumptions presented above are very ambitious, but without these changes in this sector, Poland has very limited chances of achieving sufficient overall emission reductions by 2030. It is also certain that, depending on whether or not the transport sector remains in the non-ETS sector, the role and capacity of countries to initiate reduction measures in this sector will change.

Figure 9: Possible greenhouse gas reductions in transport by 2030



Source: Own estimations and calculations based on data of EEA, Eurostat and Transport & Environment, *Emission reduction strategies for the transport sector in Poland, 2018*, <https://www.transportenvironment.org/publications/emissions-reduction-strategies-transport-sector-poland>.

4.4. Industry

Flagship project–innovative industry

- Increasing the energy efficiency of processes, less energy-intensive materials, products that can be recycled;
- Emissions reduction in the sector–40%.

What does it mean?

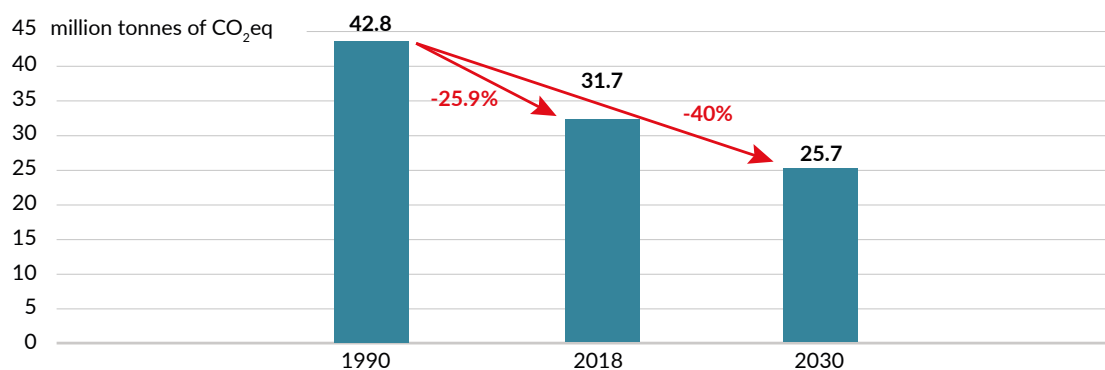
- Process energy efficiency improvements;
- Less energy-intensive materials;
- Recyclable products;
- The role of electrification and hydrogen;
- Industry decarbonisation strategy, taking into account the specificity of individual branches.

Industry is one of the most difficult sectors to combat emissions. In Poland, it accounts for 8% of the total pool. The reductions to date have resulted from increased energy efficiency or gradual improvement of production processes. In order to enable industry to achieve real decarbonisation by a 2050 perspective, it will be necessary to develop and test—from a technical and business point of view—scalable carbon-free or very-low-carbon technologies already in this decade. It should be remembered that electrification is one way of reducing emissions.¹⁷ It is necessary to adopt a hydrogen strategy.

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The specific nature of individual branches and the lack of commercially available zero-emission technologies mean that it is currently difficult to propose a flagship project that could be a recipe for reducing emissions over the next 10 years. However, industry is necessary and must be included in the effort to reduce emissions. In this case, therefore, we have used the available calculations resulting from the National Energy and Climate Plan 2021-2030 (NECP),¹⁸ presented to the European Commission by the Polish government in December 2019.¹⁹ However, NECP does not contain a vision of system changes, and the emission reductions proposed therein are to result, among other things, from increased energy efficiency of processes. Taking into account the reduction path already outlined in NECP for the industry will allow for a 40% reduction in the sector's emissions compared to 1990. Such calculations have been included in the total contribution of the flagship projects in this analysis.

Figure 10: Possible greenhouse gas reductions in manufacturing industry by 2030



Source: Own estimates and calculations based on EEA, Eurostat and KPEiK.

¹⁷ European Commission, *Stepping...*, op. cit.

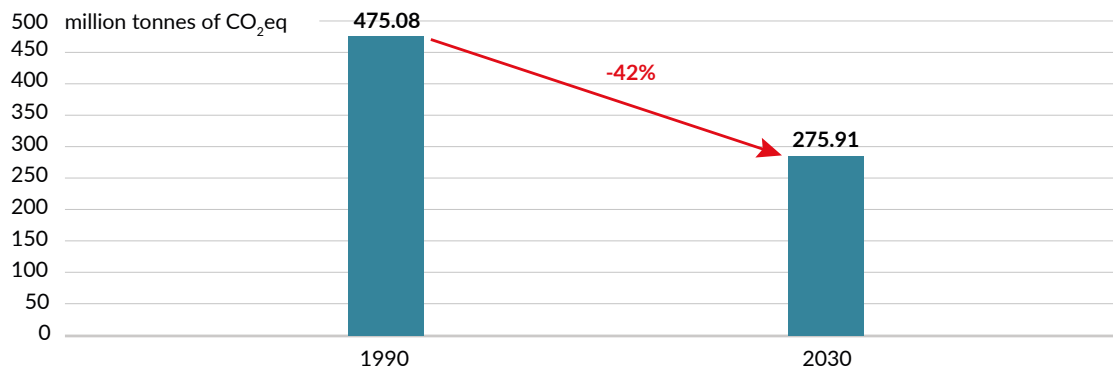
¹⁸ *National Energy and Climate Plan 2021-2030*, <https://www.gov.pl/web/aktywa-panstwowe/krajowy-plan-na-rzecz-energii-i-klimatu-na-lata-2021-2030-przekazany-do-ke>.

¹⁹ The emission reductions of 6 million tonnes of industry emissions in 2030 assumed in NECP were compared to actual emissions in 1990 and 2018, according to Eurostat. We did not relate them to NECP projections.

5. Is that enough?

The flagship projects we have proposed are actions that are already taking place and that are inevitable. They will make it possible to reduce total GHG emissions in 2030 by 41.9% in relation to 1990. This is three times more at a rate three times faster than actual reductions in Poland since 1990.

Figure 11: Possible greenhouse gas emission reductions by 2030 resulting from the implementation of flagship projects



Source: own calculations.

However, it should be remembered that the discussion on Poland's contribution to the new EU objective must take into account three important circumstances.

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- First, the idea of industrial and agricultural transformation is necessary.
- Second, the CO₂ absorption potential is important for the reduction targets.
- Third, Poland's contribution to the EU objective must be assessed.

Achieving the EU's new target for 2030, let alone climate neutrality by 2050, will mean a radical reduction in GHG emissions in all sectors. This also applies to industry and agriculture, whose share in domestic emissions is similar, at around 8%. A conscious climate policy is needed in both areas, which is currently lacking. We therefore propose that flagship projects—innovative industry and environmentally neutral agriculture—be included in the climate transformation. It is time for a strategy for these sectors.

If, in calculating the Polish contribution, we take into account the reduction path for industry outlined in the National Energy and Climate Plan, the reductions will only reach 6 million tonnes. In agriculture, however, according to NECP, we plan to increase emissions over the next decade. The increase in emissions in agriculture, or at best a very slow reduction by 2030, concerns the entire European Union. And these emissions cannot be completely eliminated using existing technologies. However, they can be significantly reduced by using, among other things, existing technologies such as the efficient use of fertilisers, the introduction of precision farming, and the spread of anaerobic digestion. Sustainable use of agricultural land can make a huge contribution to decarbonising the whole economy.²⁰ Undoubtedly, the most comprehensive analysis on the decarbonisation of Polish agriculture has been developed as part of the WWF project 'Zero-Emission Poland 2050'.²¹

The CO₂ sink potential and the LULUCF sector are important for emission targets. In Poland, the priority in this area should be to slow down the trend of decreasing carbon absorption and storage by national forests. Let us recall that as recently as 2015, the agricultural and LULUCF sectors were climate neutral.²²

Due to its economic and population potential, as well as the amount of emissions produced each year, Poland can and should be one of the main actors when it comes to reducing CO₂ emissions in Europe. However, given that the national targets are based on the relative wealth of the Member States, measured in terms of gross domestic product (GDP) per

²⁰ European Commission, *Stepping...*, op. cit.

²¹ WWF, *Zeroemisjyjna Polska 2050*, 2020, https://www.wwf.pl/sites/default/files/inline-files/Zeroemisjyjna%20Polska%202050_0.pdf.

²² *Ibidem*.

capita, Poland has been given a kind of reduced tariff. The target for non-ETS sectors by 2020 allows emissions to rise by 14% compared to 2005, which has already been exceeded.²³ By 2030, Poland should reduce emissions by 7%—the absolute difference compared with 2005 is therefore 21%. This will be difficult to achieve, bearing in mind that emissions from the transport sector alone have almost doubled in the meantime.

Although the EU target may be raised to 55%, due to the principle of a common target, but with different efforts, we estimate that Poland should reduce its emissions between approximately 44% and 51% by 2030. Our calculations are based on the estimated range of reductions in the ETS and non-ETS sectors to be achieved at that time compared to 2005. The ETS has an EU-wide emission limit (volume of allowances). Poland's share of ETS emissions is based on its share in the ETS limit. The ceiling is based on all emission allowances (allocated free of charge, sold by governments, use of international units) in the period 2008-2012. A linear reduction factor was applied to the estimated emissions. For the non-ETS, where new national targets for 2030 are still to be set, we have adopted two different options, which represent a scenario of a smaller or larger increase in the target for Poland (the current one is -7%), i.e.:

- according to KOBIZE: -16%,²⁴
- according to Agora Energiewende -32%.²⁵

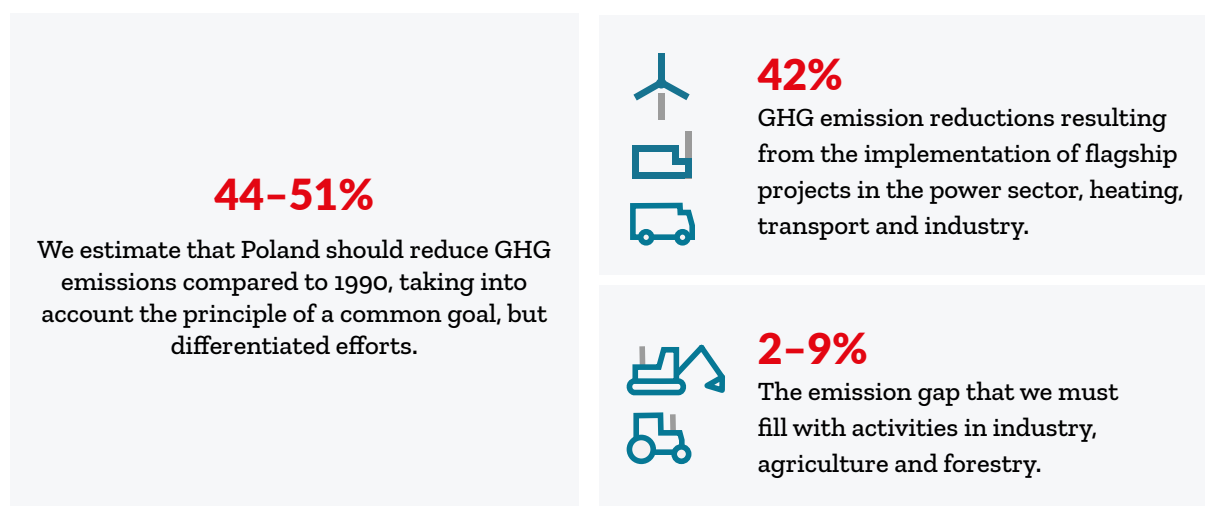
The resulting emission values in ETS and non-ETS in 2030 have been compared to the base emissions in 1990. Consequently, depending on how the reduction efforts are distributed among these sectors, Poland's contribution should be between 44% and 51%. These are not definitive estimates, as decisions on increasing and possibly extending the ETS and changing national targets in the remaining area will only be the subject of negotiations between the EU institutions.

Therefore, despite the adoption of the flagship projects presented in this study, there will still be an emission gap of 2-9%, which needs to be filled by measures in industry, agriculture, and forestry.

In this analysis, we do not take into account all the feedback between sectors and emission reductions going beyond the flagship initiatives. But such potential exists, for example, in diffuse methane emissions from coal production and transport. In transport alone, it will reduce the need for rail transport, where coal represents as much as 41% of all goods transported by rail.²⁶

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Figure 12. Emission gap in industry, agriculture, and forestry



Source: Own study.

²³ According to preliminary Eurostat data, in 2018, emissions from the non-ETS sector in Poland exceeded the 2005 level by as much as 21%. Eurostat, https://ec.europa.eu/eurostat/databrowser/view/t2020_35/default/table?lang=en.

²⁴ M. Pyrka et al., *Zmiana celów redukcyjnych oraz cen uprawnień do emisji wynikająca z komunikatu "Europejski Zielony Ład"*, Instytut Ochrony Środowiska - Państwowy Instytut Badawczy, 2020, http://climatecake.pl/wp-content/uploads/2020/03/CAKE_Zmiana-cel%C3%B3w-redukcyjnych-i-cen-uprawnień%C5%84-do-emisji-wynikaj%C4%85ca-z-komunikatu-Europejski-Zielony-%C5%81ad-1.pdf.

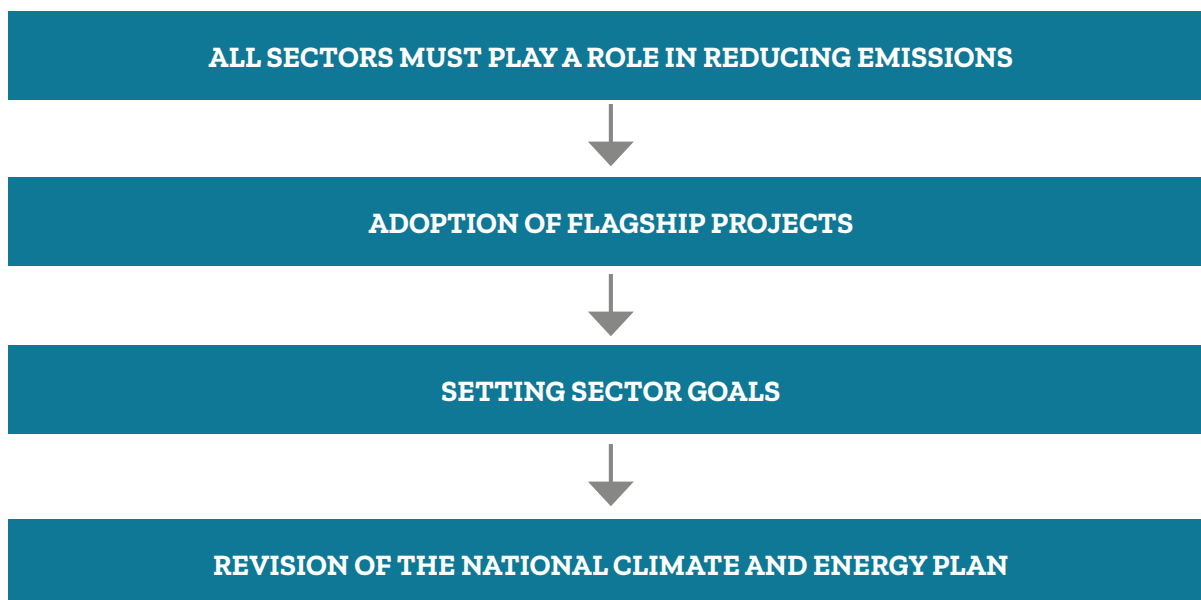
²⁵ Agora Energiewende, *How to Raise Europe's Climate Ambitions for 2030. Implementing a -55% Target in EU Policy Architecture*, 2020, https://static.agora-energiewende.de/fileadmin2/Projekte/2020/2020_07_Raising-EU-Ambition/185_A-AW-EU_Ambition_WEB.pdf.

²⁶ WWF, op. cit.

6. Conclusions

- The next 10 years will be crucial for entering the path of emission reductions so that the European Union becomes climate neutral by 2050. That is why the European Commission has proposed raising ambitions for 2030 and increasing the reduction target from the current 40% to at least 55% compared to 1990.
- Our analysis indicates that this is also achievable in Poland. By implementing the necessary measures in energy and transport, and partly in industry, it will be able to reduce emissions by 42%. Further measures may lead to greater reductions, which are necessary to fit in with EU policies and objectives. However, Poland should look at the discussion on higher commitments from the perspective of the tasks and changes that are inevitable in the country anyway, from the perspective of flagship projects. These measures, such as diversification of the production mix, abandonment of coal in the power and heating sectors, the fight to improve air quality, and electrification of transport, have already been declared in Poland. However, they need to be speeded up, and in a systemic way, and a broad political and social consensus built around them.
- All sectors will have to participate in the effort to reduce GHG emissions. The adoption of flagship projects and the setting of specific targets must also be reflected in national strategies—energy policy and, above all, the national energy and climate plan. We believe that Poland can and should radically decarbonise its economy over the next decade and declare its contribution to achieving the increased EU target of 55%. Such a declaration must also be accompanied by consent to climate neutrality. Immediately afterwards, these tasks must begin to be implemented.

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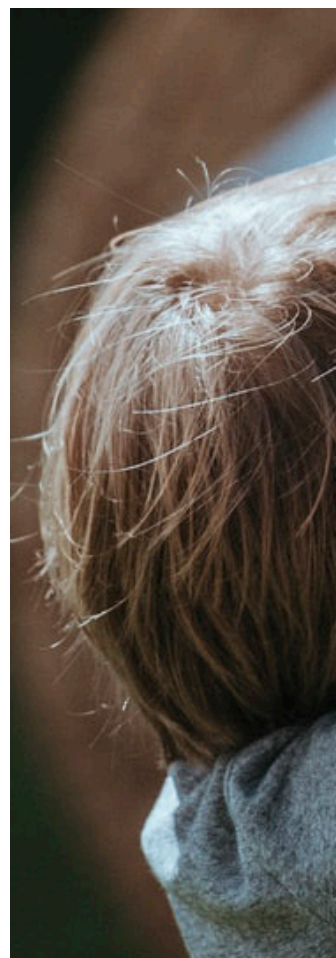
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How Poland can reach higher GHG emission reduction targets by 2030



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