LIFE VIIEW 2050

The impact assessment of the EU Emission Trading System with the long-term vision for a climate neutral economy by 2050

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Centre for Climate and Energy Analyses

National Centre for Emissions Management
Institute of Environmental Protection
National Research Institute

CAKE – who we are?

The Centre for Climate and Energy Analysis (CAKE) is a specialized analytical unit established within the National Centre for Emissions Management (KOBiZE), wich is part of the Institute of Environmental Protection – National Research Institute (IOŚ-PIB).

One of the main tasks of the National Centre for Emissions Management (KOBiZE) is the continuous monitoring and analysis of EU climate policy. The responsibilities of KOBiZE include providing expert opinion on proposed policy measures and developing own proposals for new solutions, which then constitute Poland's contribution to the debate on climate policy.

Performing these tasks requires unique knowledge, skills and advanced analytical tools, the development of which would not be possible without support from the LIFE programme. Within this programme, we have implemented the project LIFE Climate CAKE PL – The system of providing and disseminating information in order to support the strategic implementation of climate policy (2017-2022).

The LIFE project mentioned above led to the establishment of the internationally recognised Centre for Climate and Energy Analysis (CAKE), which continues operation to this day. It is now a specialised analytical centre operating within KOBiZE and is definitely a lasting effect of the LIFE project. Today's CAKE is first and foremost a team of highly skilled experts who, through the use and further development of analytical tools, networks and communication channels, generate and deliver sustainable knowledge to support the support the climate policy decision making process.

Through generating and disseminating knowledge on the impacts of climate policy, our LIFE projects contribute to improving the quality of climate policy decision-making and thus to achieving climate policy goals more effectively.

LIFE VIIEW 2050 project (2020-2024)

The main objective of CAKE's LIFE VIIEW 2050 project is to assess the functioning of the European Union Emissions Trading System (EU ETS), its impact and interaction with other EU climate policy measures, other international emissions trading systems and its evolution towards a climate neutral EU economy by 2050. The research we conduct helps support and promote the functioning of the EU ETS and other policies that have an impact on carbon pricing, while the dissemination of the EU experience in this area contributes to the improvement of the climate and energy policy at the Community and international levels.

New sectors in the system:
- Agriculture
- Buildings
- Transport

Interaction of the system with other measures:
- Removals
- Hydrogen
- Transport

Interaction with other ETS and carbon pricing measures:
- China, Canada, USA, others
- Article 6 of the Paris Agreement

Analytical Tools in LIFE VIIEW 2050

The analytical work, which is the most important component of the LIFE VIIEW 2050 project, uses macroeconomic and sectoral models developed by CAKE experts. These models are continuously improved, refined and updated by the team in order to account for the changing economic, technological and social landscape. These advanced tools allow for comprehensive analyses of the functioning and future development of the EU ETS, with a view to a climate-neutral EU economy by 2050.

Analytical Toolkit:

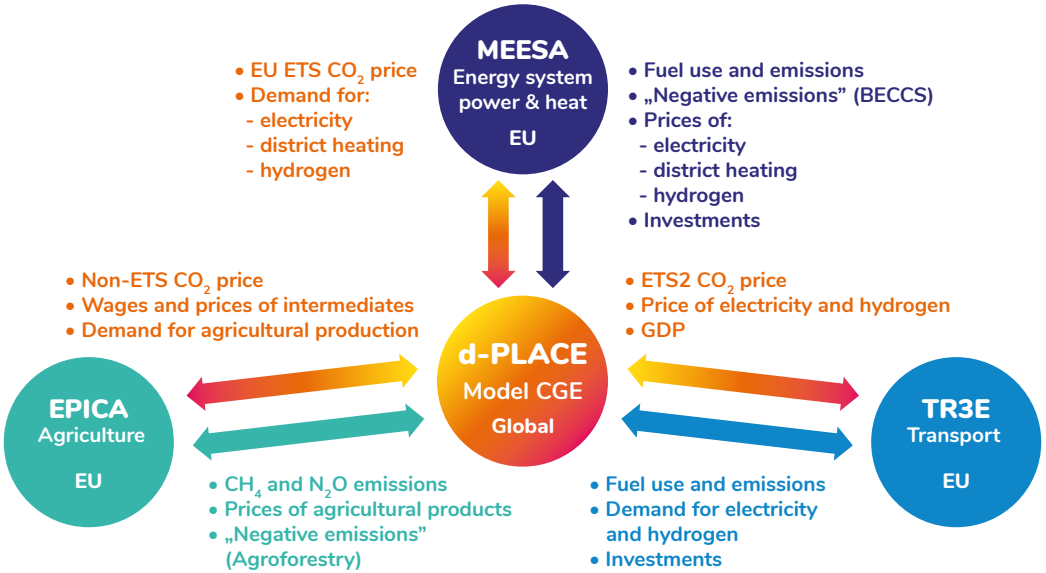
Model d-PLACE (CGE) - the global macroeconomic general equilibrium model (CGE) allows for an economy-wide, comprehensive assessment of the impacts of climate and energy policies.

Energy model MEESA (Model for European Energy System Analysis) - the model allows for detailed simulations of various transformation options of the energy sector in the EU.

Transport model TR3E (Transport European Economic Model) - the model allows for the analysis of various options to reduce CO_2 emissions in the transport sector by switching to carbon free modes of transport.

Agriculture model EPICA (Evaluation of Policy Impacts – Climate and Agriculture) – the model enables analysing the impact of various climate policy measures on agriculture, including emissions, production volume and structure, and farmer's income in European Union.

Models used in scenario analysis



Evolution of the EU ETS

The European Union Emissions Trading System – the EU ETS is the principal policy measure for reducing greenhouse gas emissions in a cost-effective manner, which has been operational since 1 January 2005. The EU ETS operates on the „cap and trade" principle, which involves defining a pool of emission allowances and allowing them to be traded on the market.

The analyses carried out within the LIFE VIIEW 2050 project respond to the research needs of the ETS, and will help adapt the emission trading market to new and changing circumstances. The EU ETS is expected to change significantly – both in terms of structure and functions - after 2030 due to:

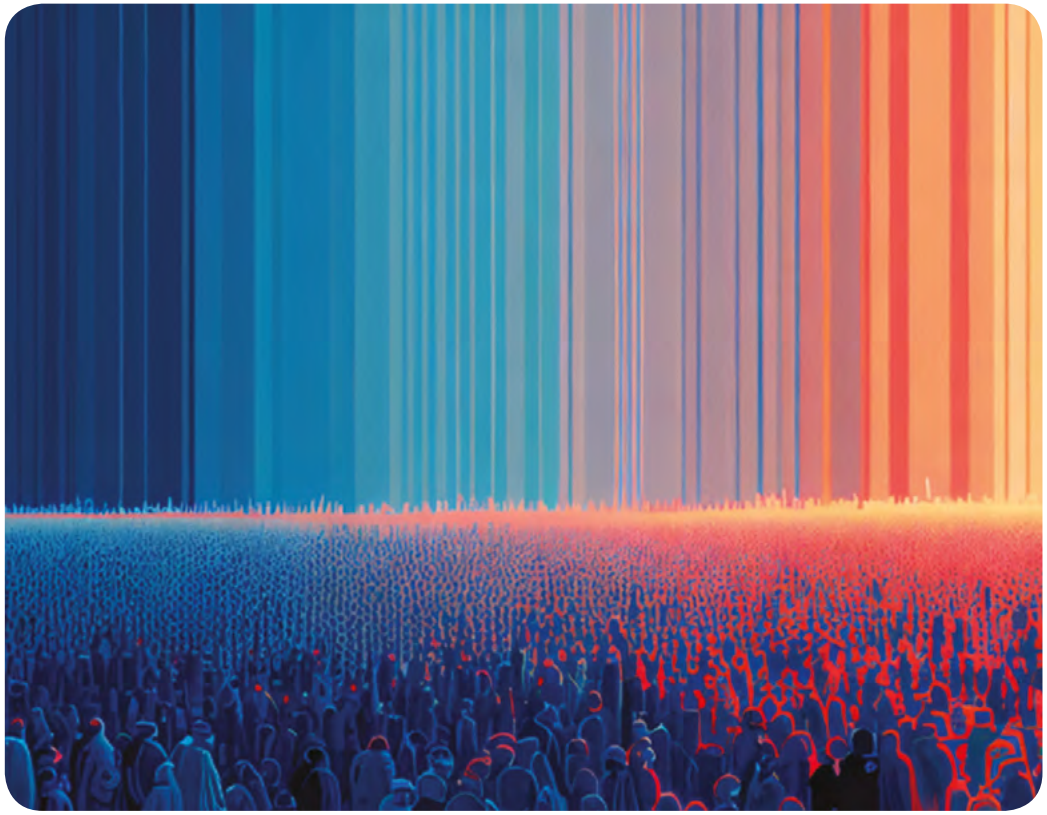
- the European Green Deal's 2050 climate neutrality target and the required energy transition,
- the ETS2, which will start in 2027, could perhaps form a single entity with the EU ETS after 2030,
- the primary market allowance pool in the EU ETS will be exhausted around 2040,
- in order to maintain liquidity in the market, it will be necessary to allow a certain number of carbon sequestration units (so-called removals).

LIFE VIIEW 2050 analyses

Several detailed analyses were conducted during the LIFE VIIEW 2050 project, the most important of which are presented below. The reports are available in English or in Polish at: **www.climatecake.pl** under the link: **Reports and Analysis**.

VIIEW on EU ETS 2050: Changing the scope of the EU ETS (2023)

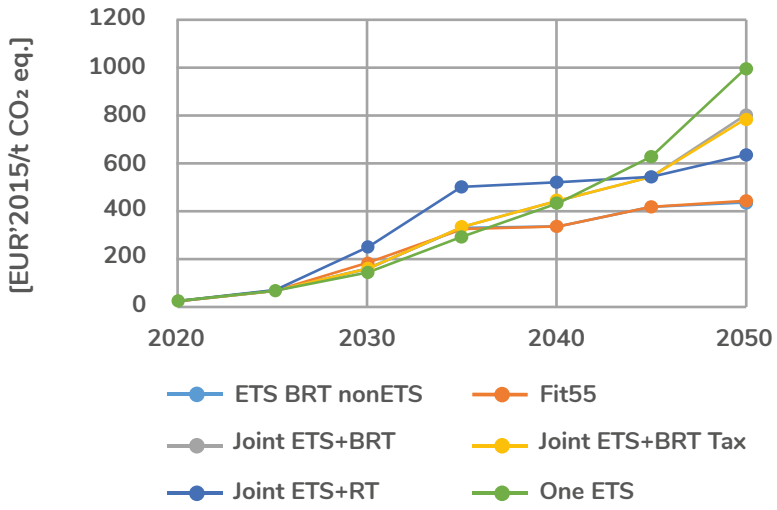
The study presents possible configurations of climate policy up to 2050, including different options for the extension of the ETS system to new sectors, and discusses the expected economic impacts of the proposed options. Six scenarios were analysed with possible options to extend the EU ETS to cover only the transport, both transport and buildings sector (ETS2), or to operate separate schemes in parallel (EU ETS and ETS2), or to create a single ETS covering all sectors of the economy.



Core conclusions:

- The extension of emissions trading to new sectors will lead to an increase in marginal abatement, in the system, mainly due to the more expensive abatement options available in sectors not currently covered by the emissions trading system (EU ETS).
- From a macroeconomic perspective, the inclusion of the newly created emission trading system for the buildings and road transport sectors (ETS2) has a negligible impact on average consumption in the EU, however significant differences between regions can be observed.
- The results of the analysis confirm the key role of the electricity sector in achieving the 2050 zero-carbon target, mainly due to its high emission reduction potential.
- The introduction of emissions trading for the transport sector will shift the cost of abatement to users of combustion vehicles.
- The introduction of an emission trading system in the agricultural sector could lead to a sharp fall in production, impacting farmers' incomes, and virtually eliminating food exports, as well as resulting in the need to import half of the food consumed in the EU.

Cost of emission reduction in EU ETS



VIIEW on EU ETS 2050: New sectors in the EU ETS in the context of EU climate neutrality in 2050 - Implications for Poland (2023) - analysis available in Polish

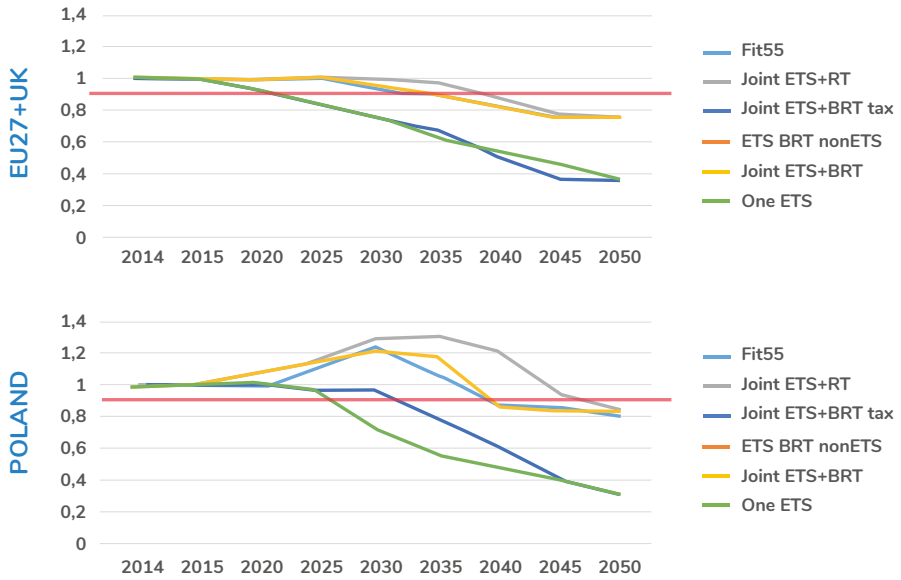
The report examines the challenges facing the Polish economy in the context of the EU's adoption of a climate neutrality target by 2050 and the possible extension of the EU ETS to new sectors. The key objective of the report is to show potential transformational challenges in specific sectors.

Key findings:

- Poland faces the challenge of going through an economic transformation, the cost of which will be significant - investment in new energy capacity alone will exceed EUR 370 billion by 2050.
- Funding can be acquired from existing resources and from the redistribution of revenues from the sale of emission allowances (e.g. under the new allocation of the auction pool in the EU ETS). Available funds are: Modernisation Fund (FM), Innovation Fund (IF), Social Climate Fund (SCF), or new funds from the inclusion of further sectors in the ETS. Funding should be appropriate to the scale of the projects required and support vulnerable consumers in countries such as Poland.
- Transforming the energy sector is the optimal development path for Poland in the short term. The alternative are more years of ever-increasing costs associated with the use of coal, leading to even higher costs for the economy as a whole.

- The best way to avoid rising emission charges is by pushing for an energy transformation based on available and developing low and zero emission technologies. The list of necessary investments in Poland includes RES (PV, offshore and onshore wind, biomass, biogas), nuclear (large scale and SMR), charging stations for electric and hydrogen cars, energy storage (battery, kinetic as well as storage in hydrogen).
- The introduction of emissions trading for the transport sector will shift the emission reduction costs to users of combustion vehicles in Poland. In the case of passenger cars, the average operating costs could increase by an average of 25% between 2030 and 2050, and for trucks costs could be higher by up to 80%. For Poland, a favourable market development process in the transport sector is the replacement of urban diesel buses with electric and hydrogen equivalents, of which Poland is a significant producer.
- The possible introduction of an emission trading scheme in the agricultural sector could lead to a serious decline in production in Poland, which is a major food producer. This will lead to a reduction in farmer's income, who are already dependent on support from public funds.

Volume index of agricultural products in 2050 [2015=1]



VIIEW on EU ETS 2050: Exploring synergies between the EU ETS and other EU climate policy measures - carbon removal, hydrogen, and sectoral transport policy (2024)

The study examines how complementary policies interact with the EU ETS and ETS2 (for transport and buildings). We considered policies such as the role of support for CO_2 removal/absorption (including BECCS and afforestation of arable land), strategies to decarbonise the transport sector (emission standards for heavy duty vehicles and accelerated scrapping of old fossil fuel passenger cars) and subsidising green hydrogen. The impacts of the above on allowance prices in the EU ETS, ETS2 and non-ETS sectors, macroeconomic performance (GDP and consumption), sectoral indicators (e.g. agricultural production, energy mix, transport emissions) were analysed.

Main conclusions:

- CO_2 sequestration (BECCS and afforestation) is key to achieving climate neutrality in the EU.
- Pricing of removals leads to a significant reduction in the price of CO_2 emissions across all EU sectors, increasing GDP and consumption in 2040 and 2050.
- Reducing GHG emissions in agriculture is difficult and costly. However, the appropriate use of subsidies can help reduce costs in this sector.
- Subsidies for green hydrogen production lead to lower prices in the EU ETS, but also lead to lower economic indicators (GDP, consumption).
- The development of green hydrogen production, especially between 2030 and 2035, is highly dependent on subsidies. Therefore, a sustainable and strategic plan for green hydrogen subsidies in these sensitive years is needed.
- 'Complementary measures' (especially emission standards) in transport have a major impact on reducing emissions in this sector.
- The creation of a 'European Carbon Central Bank' seems essential in order to properly manage the whole process (demand, supply and prices in the ETS) and to stabilise the market.

Impact vs. Fit55 scenario	EU ETS Prices	Non-ETS Prices	ETS2 Prices	GDP	Consumption
Removals	Significant decline in 2040 & 2050	Significant decline in 2040 in some regions (incl. PL)	Negligible	Medium positive in 2040 & 2050	Small in 2040, medium positive in 2050, large positive impact in some regions (incl. PL)
New ETSAgr	n/a	n/a	n/a	Negligible	Small in 2050
Hydrogen subsidies	Small impact in 2040 & 2050	Negligible	Negligible	Negligible	UE: small negative in 2030, negligible in 2040 & 2050; PL: negligible in 2030 & 2040, medium positive in 2050 r.
Transport Policies	Negligible	Significant decline in 2050	Significant decline in 2040 & 2050	Negligible	Positive in 2050

Events and promotion of the project

An essential part of the LIFE VIIEW 2050 project and CAKE's activities is the dissemination of the results of our analyses in order to share knowledge and to verify our work with climate and energy policy stakeholders in Poland, Europe and the rest of the world. Therefore, we constantly present the results of our analyses at various national and international conferences.

Throughout the LIFE VIIEW 2050 project, CAKE has organised several national conferences and workshops including: Workshop for public administrations on the vision for the development of the EU ETS in the 2050 perspective (April 2023), Conference entitled 'LIFE Projects Protect Climate and Environment: Sustainable Initiatives for a Better Future' (June 2023), Meeting for public administrations and advisory institutions on the overlap of mechanisms and policies on the functioning of the EU ETS (March 2024).

In addition, three international meetings of the LIFE VIIEW 2050 Expert Platform were organised, providing a unique opportunity to exchange ideas regarding model-based analysis of climate policy impacts with scientists from other EU research projects.

3rd LIFE VIIEW 2050 Advisory Board Meeting, 21.03.2023

LIFE VIIEW 2050 Conference, 28.06.2023

Meeting for public administrations and advisory institutions on the overlap of mechanisms and policies on the functioning of the EU ETS, 22.03.2024

The results of the LIFE VIIEW 2050 project are presented to a wide range of scientific organisations, local government organisations and other stakeholders in Poland. Below are highlights of our activities and work. We have participated in national conferences and workshops, e.g. Forum Green Region (2.03.2023), The Polish Chemistry Congress (13-14.06.2023 and 7.06.2024), Regional Forum of the Silesian Voivodeship, (16-17.11.2023), Meeting with the representatives of the “Green Deal Ukraine” project (22.02.2024), Carbon Capture and Storage Congress (23.04.2024).

Forum Green Region, 2.03.2023

Green Deal Ukraine, 22.02.2024

Regional Forum of the Silesian Voivodeship, 16-17.11.2023

The Polish Chemistry Congress, 7.06.2024

Carbon Capture and Storage Congress (23.04.2024)

Throughout the development of the project, the CAKE team participated in a number of international conferences, meetings and workshops organised among others by the OECD, ERCST, World Bank, Energy Forum, Climate Coalition, Euractiv, European University Institute (EUI).

The LIFE VIIEW 2050 team also participated, among others, in the United Nations Framework Convention on Climate Change (UNFCCC) conferences - COP26 in Glasgow in 2021 and COP28 in Dubai in 2023 as well as in the international Conference Carbon Forward 2021, European Climate Summit IETA (2023) and European Climate Week (European University Institute, 2023 and 2024).

International recognition of CAKE

EUI Climate Week 2023 (State of the Union 2023)

Panel discussion „What next for EU Climate Policy?” organized by European University Institute, Florence School of Transnational Governance, May 3rd 2023.

EU ETS and Other Carbon Pricing Measures Towards Climate Neutrality (COP28 side event)

Side-event organised by CAKE, Estonian Pavilion at COP28, organized jointly, December 4th 2023

A Carbon Bank to manage the transition towards a low carbon economy (COP28 side event)

Side-event organised by the ERCST – European European Roundtable on Climate Change and Sustainable Transition, IETA Business Hub Pavilion, December 4th 2023.

Towards a Climate-Neutral Economy: The Role of Carbon Pricing in Moving the Industry Closer to Net-Zero by 2025 (COP28 side event)

Side-event at COP28 organized jointly by CAKE with DG Climate Action, International Carbon Action Partnership (ICAP) i Florence School of Regulation, European University Institute (LIFE COASE) – EU Pavilion, December 9th 2023.

Networking

Cooperation and networking with other LIFE programme beneficiaries is an essential element of the LIFE VIIEW 2050 project. Over the years we have been able to intensify our collaboration with the following projects: LIFE COASE, LIFE ETX, LIFE CLIVUT, LIFE After Coal PL, LIFE REMY.

We have also successfully participated in LIFE Information Days organised by the National Fund for Environmental Protection and Water Management, which are always an amazing opportunity not only to present our activities, but also to exchange experiences with other beneficiaries of the LIFE programme.

LIFE Information Day, 11.01.2024

LIFE Information Day, 16.05.2024

Networking with LIFE ETX, 29.06.2022

LIFE REMY Expert Meeting, 7.06.2023

The results of CAKE's work have been cited in foreign and Polish press, including Euractiv.com, Redshaw Advisors, Carbon Pulse, WNP, Wysokie Napięcie, Teraz Środowisko, Polish Chemistry, BiznesAlert, CIRE, Rzeczpospolita. Members of the CAKE team have also participated in podcasts and have given interviews for radio and television (e.g. PolskieRadio24.pl, Biznes24).

The results of the work of the LIFE VIIEW 2050 project are shared both in traditional media and on social media channels, i.e. 'X' and 'LinkedIn'. We encourage you to follow our profiles and find out more details about CAKE's ongoing activities.

The LIFE VIIEW 2050 project supports the implementation of the EU climate policy, contributes to its development and implementation in the period up to 2030 and in the context of achieving a climate-neutral EU economy by 2050.

We are pleased to share the results of our work on the website of the Centre for Climate and Energy Analyses: **www.climatecake.pl**.

We encourage you to follow our account on the platforms **'X': @climate_cake** and **'LinkedIn': CAKE**

You are welcome to cooperate with us and to contact us directly.

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Funded by
NATIONAL FUND
FOR ENVIRONMENTAL PROTECTION
AND WATER MANAGEMENT

Project entitled „The impact assessment of the EU Emission Trading System with the long-term vision for a climate neutral economy by 2050" (LIFE VIIEW 2050 – LIFE19 GIC/PL/001205) is co-funded by the Life Programme of the European Union and the National Fund for Environmental Protection and Water Management.