# THE EUROPEAN GREEN DEAL IMPACT ON THE GHG's EMISSION REDUCTION TARGET FOR 2030 AND ON THE EUA PRICES

## #SUMMARY


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# LIFEClimateCAKEPL


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# AUTHORS AND COPYRIGHT

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# Main conclusions:

- **Increase in European Union Allowances (EUA) prices** - adopting a higher target than the current 40% in the EU will result in a significant increase in the price of emission allowances in the EU ETS. If the new target is 50%, prices of allowances will rise up to **34 euro/EUA** and **52 euro/EUA** in 2025 and 2030 respectively. The consequence of raising the reduction target to 55% will be an increase in the price of allowances to **41 euro/EUA** and **76 euro/EUA.**

- **The cost of purchasing allowances -** total cost of purchasing allowances for installations covered by the EU ETS in 2030 will range from **EUR 10 billion to EUR 18 billion** for a 50% and 55% reduction target respectively.

- **Faster withdrawal of fossil fuels from electricity production in the EU** - the increase in the price of allowances will have the greatest impact on the energy sector in the EU, resulting in a decrease in the share of fossil fuels in electricity generation by **18%** and **30%** for the 50% and 55% reduction target. This results in a faster withdrawal of fossil fuels from electricity production. Fossil fuels will be replaced mainly by renewable energy sources.

- **Exhausting allowances in the EU ETS** – new reduction targets will also **reduce the number of allowances to zero around 2042-2045** (for a 50% and 55% reduction target respectively). This is the result of an increase in the linear reduction factor (LRF) from current 2.2% to 3.2% or 3.7%. This means that the system will not introduce any new allowances at primary auctions and they will not be allocated to industrial sectors.

- **Increasing reduction targets for non-ETS sectors in 2030** – current reduction target for Poland in the non-ETS sectors is -7% compared to 2005 emissions. This is a difficult goal to achieve, given that in the period 2013-2020 Poland has the right to increase emissions in non-ETS by +14% compared to 2005. Thus, achieving in 2030 even higher reduction targets, which for Poland are **-11%** and **-16%** can be a huge challenge.

- **Decrease of emission limits for the non-ETS sectors** - it will be necessary to set new reduction targets between Member States. This will translate into a reduction in AEA (Annual Emission Allocation) limits. In the period 2021-2030 average decrease of the limits will be 9% and 14% (for a 50% and 55% reduction target respectively).

# 1. EU ETS

## 1.1. Total number of allowances in the EU ETS

1. The new allocation of reduction efforts between the EU ETS and non-ETS sectors is assumed as proportional to the one adopted in the 2030 climate and energy framework. The scenarios used in the analysis are based on the Global Energy and Climate Outlook 2018 (Baseline GECO 11/2018), developed by the Joint Research Center of the European Commission in 2018. The analysis is made for three scenarios of climate policy implementation:

    - **Baseline scenario** - assuming that GHG[1] reduction target in the EU is 40% in 2030 vs. 1990, including the 43% of EU ETS in 2030 vs. 2005 (with LRF = 2.2%).
    - **GHG50 scenario** - assuming that GHG reduction target in the EU is 50% in 2030 vs. 1990, including the 52% of EU ETS in 2030 vs. 2005 (with LRF = 3.2%).
    - **GHG55 scenario** - assuming that GHG reduction target in the EU is 55% in 2030 vs. 1990, including the 57% of EU ETS in 2030 vs. 2005 (with LRF = 3.7%).

2. The total number of allowances in 2013–2020 is determined by allowances from 2013 reduced annually in a linear manner by a fixed value (approx. 38 million), representing 1.74% (linear reduction factor - LRF) of the amount from the middle of the period 2008-2012 including the adjustment for new gases and activities included in the EU ETS. From 2021, the LRF = 2.2% will be applied and the value which is submitted for an annual reduction of allowances will be 42.71 million EUA.
3. Assuming that new targets would be implemented from 2021, to meet the 52% reduction target in the EU ETS in 2030, the number of allowances should be reduced annually by LRF = 3.2%. An increase of the LRF from 2.2% to 3.2% will mean that the total pool of allowances in the EU ETS will be reduced annually (from 2021) not by 42.71 million EUA, but about 62.13 million EUA yearly.
4. Adopting the GHG reduction target for the EU at 55% may require increase in the EU ETS reduction target in 2030 to 57%. The consequence of these actions would be an increase in LRF from 2021 to the level of 3.7%, which will mean an annual reduction in the number of allowances by approx. 71,83 million EUA.
5. Table 1 summarizes the expected annual reductions in the number of allowances available in the EU ETS resulting from applying different LRF, assuming Brexit from the EU ETS (in the baseline scenario it is a decrease in the total number of allowances by 1817 million in the period 2021-2030).

[1] GHG - Greenhouse gases such as : $CO_2$, $N_2O$, $CH_4$, HFCs

**Tab. 1. Annual reductions of allowances in the EU ETS with various reduction targets for 2030**

| Scenario | Implementation year | Target in the EU ETS in 2030 vs. 2005 | Annual EUA reduction (2021-2030) in the EU ETS [in million] | LRF (2021-2030) |
|---|---|---|---|---|
| **Baseline** (40% reduction by 2030) | 2021 | -43% | 42,71 | 2,20% |
| **GHG50** (target -50%) | 2021 | -52% | 62,13 | 3,20% |
| **GHG55** (target -55%) | 2021 | -57% | 71,83 | 3,70% |

*Source: CAKE/KOBiZE own study*

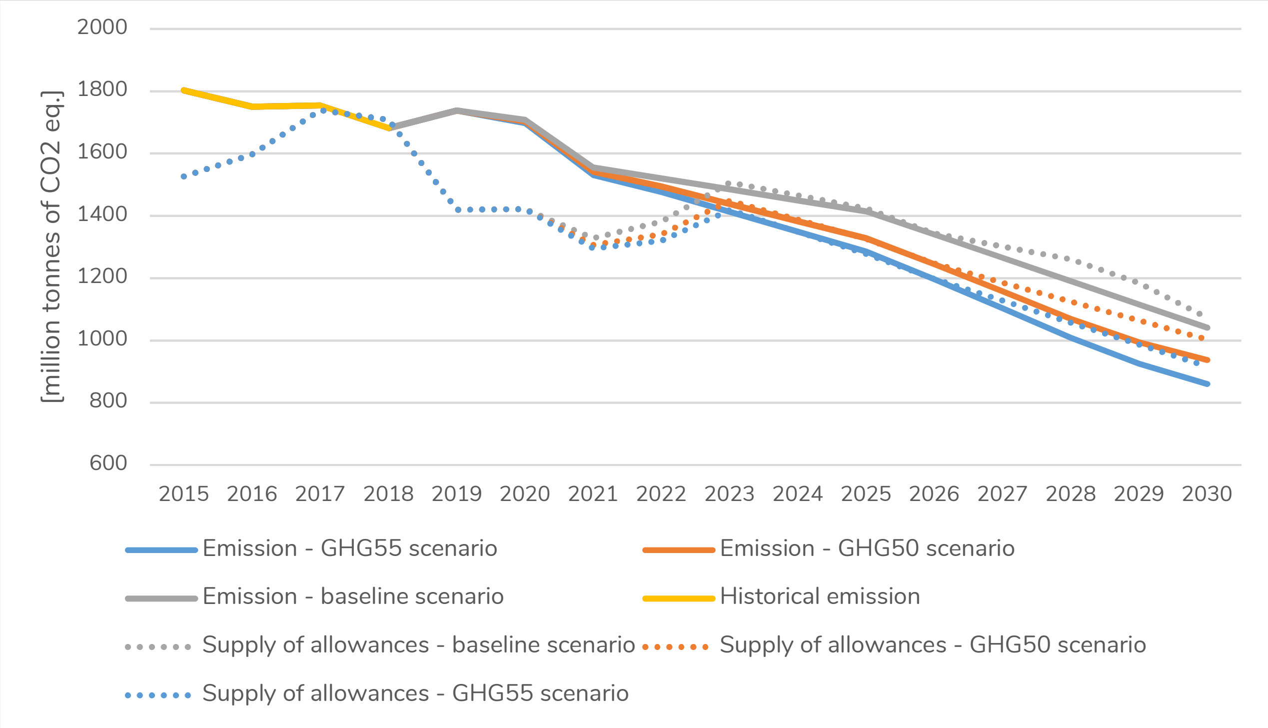
## 1.2. Estimated allowances supply and emissions in the EU ETS until 2030

6. The direct effect of new targets in the EU ETS is the reduction in the supply of allowances. It is expected to affect the volume of emissions in the EU ETS by increasing the prices of EUA, as well as the excess of allowances on the market and the number of allowances transferred to the MSR (Market Stability Reserve). The allowances supply and emission reduction projections in the EU ETS compared to the baseline scenario were made by using the *CarbonPIE*[2] simulation model. Figure 1 presents estimated supplies of allowances and emissions as a result of increased GHG reduction ambitions.

7. In the first period we can observe the effect of backloading. Backloading was a temporary withdrawal of allowances from the auction pool, while in 2015 and 2016 the auction pool was reduced by 300 and 200 million respectively, then from 2019 to 2022 the number of allowances available for installations in the EU ETS was reduced due to the MSR. It is worth noting that in none of the analyzed scenarios there is a transfer of allowances from MSR to the market.

[2] CarbonPIE - Carbon Policy Implementation Evaluation Tool – simulation model of the EU ETS system.

### Fig. 1. Projected emissions and supply of EUA by 2030




*Source: CAKE/KOBiZE own study*

8. In 2022 agregated surplus of allowances falls below 833 million and therefore transfer of allowances to MSR is stopped. The volume of allowances supply results mainly from the different values of the linear reduction factor. The differences between analyzed scenarios are most visible during this period. From 2028, the surplus increases and transfer of allowances to MSR starts again. Described effect results from a large emission reduction in the baseline scenario. A much smaller surplus occurs in the GHG50 and GHG55 scenarios.
9. The etimated emission level in 2025-2030 is presented in Table 2.

### Tab. 2. Change in GHG emissions in relation to the baseline scenario [in Mt eq. $CO_2$]

| | Emission in 2025 | Emission in 2025 vs. emission in the baseline scenario | Emission in 2030 | Emission in 2030 vs. emission in the baseline scenario |
|---|---|---|---|---|
| **Baseline scenario** | 1 415 | 100% | 1041 | 100% |
| **GHG50 scenario** | 1 329 | 94% | 937 | 90% |
| **GHG55 scenario** | 1 285 | 91% | 861 | 83% |

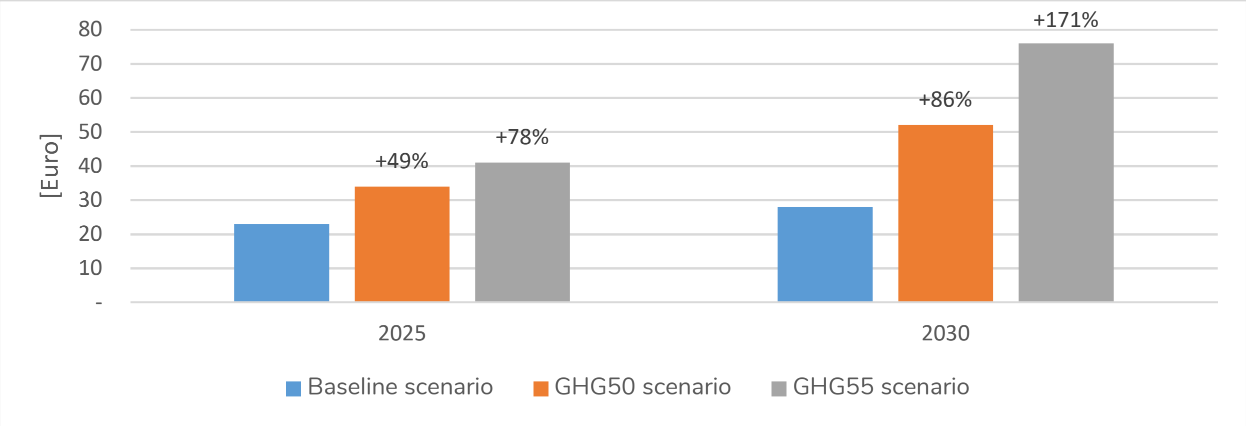
*Source: CAKE/KOBiZE own study*

## 1.3. Emission allowance prices in the 2030 perspective

10. Figure 2 shows percentage changes in EUA prices compared to the baseline scenario. In 2025 allowance prices may increase by 49% in the GHG50 scenario and by 78% in the GHG55 scenario. In 2030, allowance prices reach higher values than in the baseline scenario by 86% and 171%.

11. Adopting a higher target than the current 40% in the EU will result in a significant increase in the price of emission allowances in the EU ETS. If the target rises up to 50%, prices of allowances will rise up to 34 euro and 52 euro in 2025 and 2030 respectively. The consequence of increasing the reduction target to 55% will be an increase in the EUA price to 41 euro and 76 euro.

**Fig. 2. Changes in the prices of emission allowances (price level from 2013)**




*Source: CAKE/KOBiZE own study*

12. Price changes will require faster withdrawal of fossil fuels from EU electricity production. In 2025-2030 is forecast a decrease in electricity and heat production based on hard coal and lignite from 10% to 18% compared to the baseline scenario. There has also been a decline in electricity production based on natural gas. This production is being replaced by the growing use of renewable energy sources.

13. In the GHG55 scenario, change in the sources structure in the energy sector still remains the main source of emission reduction in 2030. Production of energy based on solid fossil fuels in the EU decreases in the years 2025-2030 by 15% to 30% compared to the baseline scenario.

# 2. Non-ETS

## 2.1. Reduction targets in non-ETS sectors in 2030

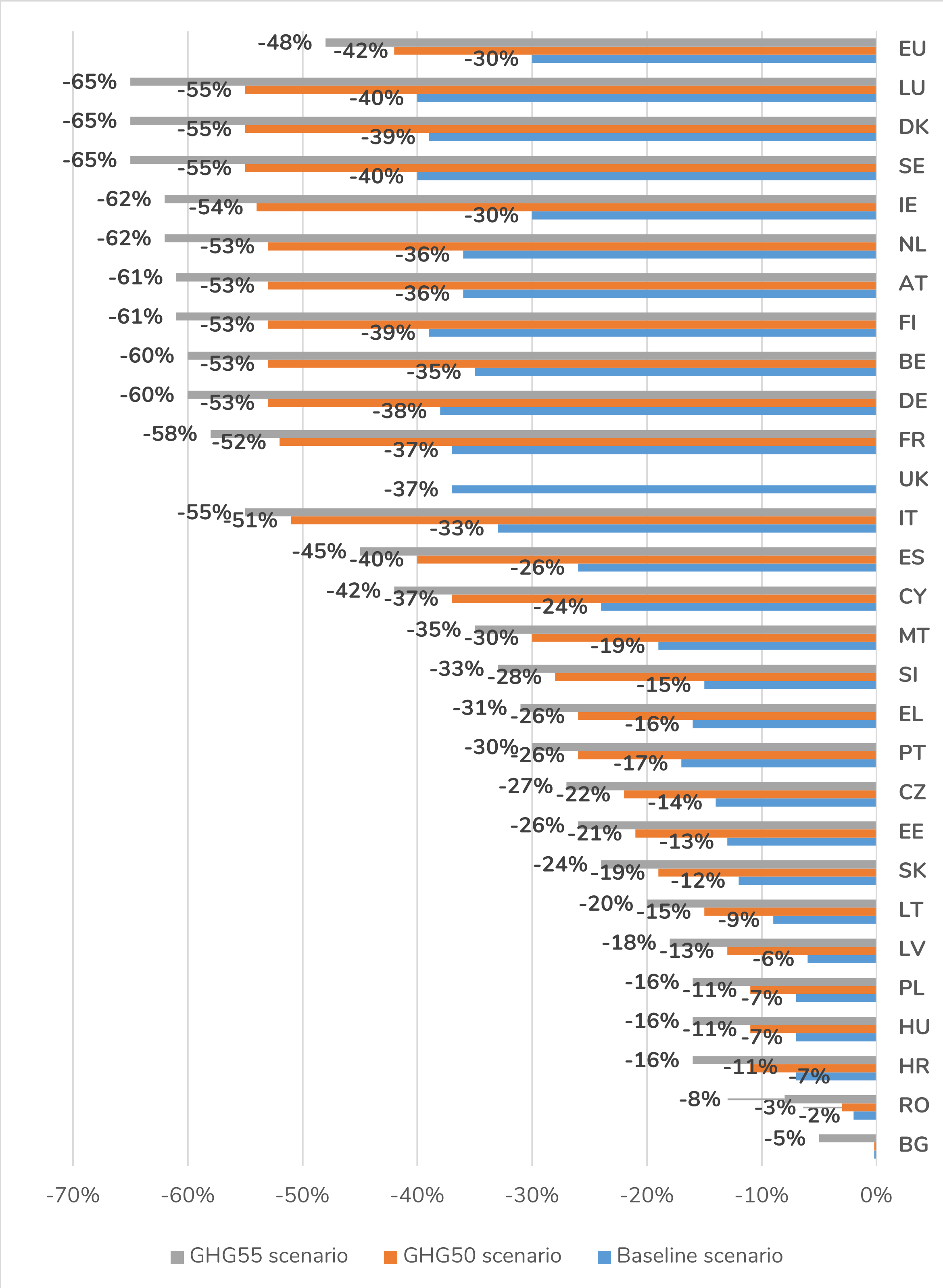
14. The EU total reduction target of 30% in non-ETS sectors in 2030 compared to 2005 emissions was allocated between Member States based on their 2013 GDP per capita[3]. The minimum and maximum reduction target did not exceed the range of 0% to 40%, which result from the European Council Conclusions of October 2014. Intervals for individual targets in 2030 for new reduction targets have been set:

- **from 0% to 55% - for the GHG50 scenario** assuming a GHG reduction target in the EU of 50% in 2030 compared to 1990, including 42% of non-ETS in 2030 compared to 2005,
- **from 5% to 65% - for the GHG55 scenario** assuming a GHG reduction target in the EU of 55% in 2030 compared to 1990, including 48% of non-ETS in 2030 compared to 2005.

15. Figure 3 presents reduction targets in non-ETS sectors in Meber States. It shows that new reduction targets may force a large average increase in the national reduction targets, range of 12 pp to 19 pp for 42% and 48% reduction scenario respectively. In the case of target 42%, countries with a GDP per capita above the EU average (i.e.: France, Germany, Belgium, Finalndia, Austria, the Netherlands, Sweden, Denmark, Luxembourg) may increase their national reduction targets from 14 pp up to 24 pp. While 48% reduction target increases national reduction target in the range of 21 pp to 32 pp.
16. For Poland, the national reduction target may rise by 6 pp to 9 pp for 42% and 48% reduction respectively. After Brexit, reduction tagerts for other Member States will increase by approximately 1 percent.

[3] GDP at market prices.

**Fig. 3. Comparison of reduction targets in the non-ETS sectors for 2030, according to GDP per capita**



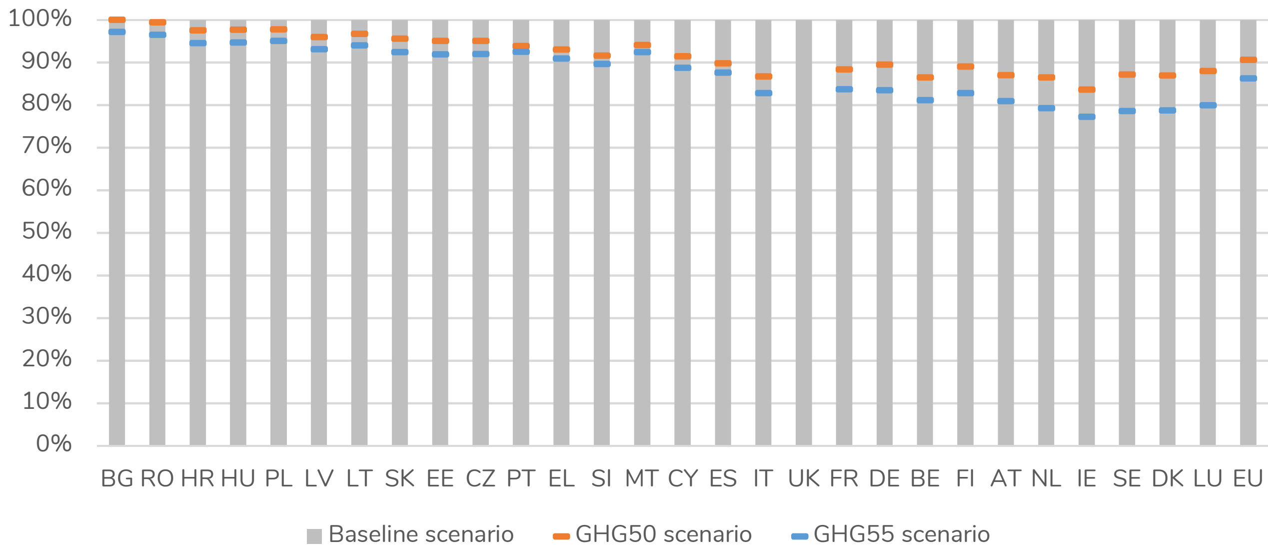

Source: CAKE/KOBiZE own study

## 2.2. Emission limits for Member States in non-ETS in 2021-2030

17. The paths to reaching the proposed reduction targets are defined by emission limits (AEA units), which are set individually for each Member State. Figure 4 presents emission limits in non-ETS sector in the period 2021-2030 for 42% and 48% reduction, compared to the baseline scenario (marked on the axis as 100%). For Poland, the decrease in emission limits in 2021-2030 may account for 1784 thousand tonnes to 1733 thousand tonnes for 42% and 48% scenarios respectively. While in the baseline scenario, the emission limit for Poland is 1825 thousand tonnes.

18. For Poland, the non-ETS reduction target in 2030 in the baseline scenario is -7% compared to 2005 emissions. It seems to be a very ambitious goal, since in the period 2013-2020 Poland has been allowed to increase emissions in non-ETS by 14% compared to 2005. Thus, achieving even higher reduction targets in 2030, which for Poland amount to -11% and -16% (for a 50% and 55% reduction target respectively) can become a huge challenge.

**Fig. 4. Emission limits for GHG50 and GHG55 scenarios in relation to baseline scenario in non-ETS sectors**




*Source: CAKE/KOBiZE own study*

# Annex

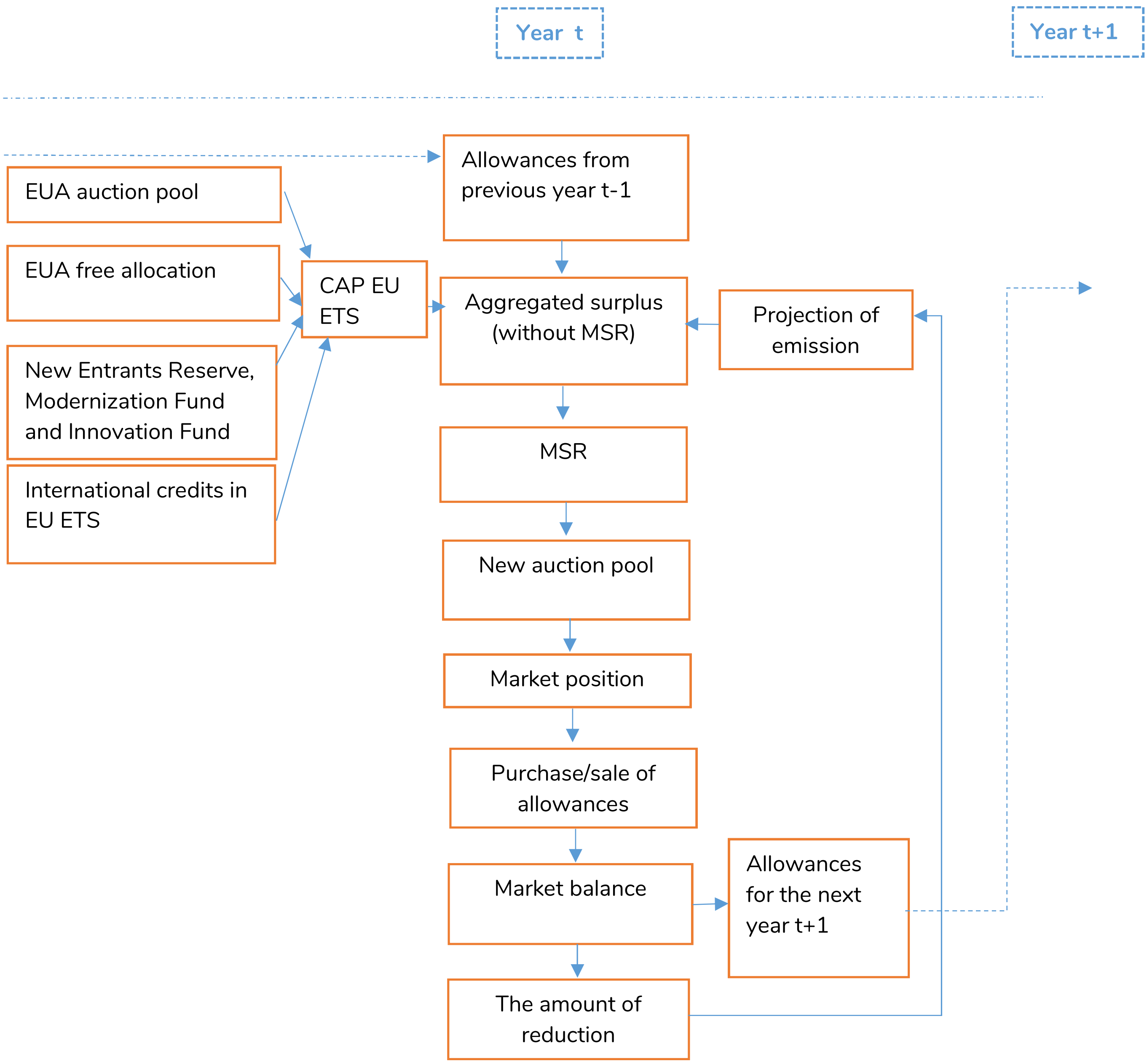
## Description of analytical tools

Key tool used in the analysis is the CarbonPIE simulation model with assumptions adopted from the Zephyr[4] model. Model scheme is presented in Figure 5. Its main task is mapping the functioning EU ETS system and reflecting the behaviour of market participants. Initially, the CarbonPIE model maps free allocation of emission allowances, auction volume, New Entrants Reserve (NER), Modernization Fund and Innovation Fund. In the next step, model simulation determines the size of the auction pool and number of available allowances. These calculations are made separately for each year, until a balance between the volume of supply and demand is achieved.

The price of emission allowances is equated with the marginal cost of reducing GHG emissions. Marginal cost of reduction is determined by using a CGE model CREAM (Carbon Regulation Emission Assesment Model). The model scheme is presented in Figure 6. The database in the CREAM model is built based on the Input-Output tables (IO), published by JRC EC (Joint Research Centre) in 2018. It contains data for 2025-2050 (with a 5-year step) with projections based on PRIMES and POLES-JRC models. Database provides global information on production processes and final demand including investment and consumption of households and government. Besides, it includes data on fuel consumption and GHG emissions in individual sectors and regions. The CREAM model distinguishes 13 regions (EU Member States as one separate region) and 31 sectors (including energy-intensive sectors), of which 10 belong to the EU ETS. The model generates 8 electricity production technologies, including 4 renewable energy technologies and based on nuclear fuels, and 3 electricity production technologies based on fossil fuels. Tables include also $CO_2$ emissions from fuel combustion: coal, petroleum products and gas, as well as process emissions, including $CO_2$, $N_2O$, $CH_4$ and F-gases.

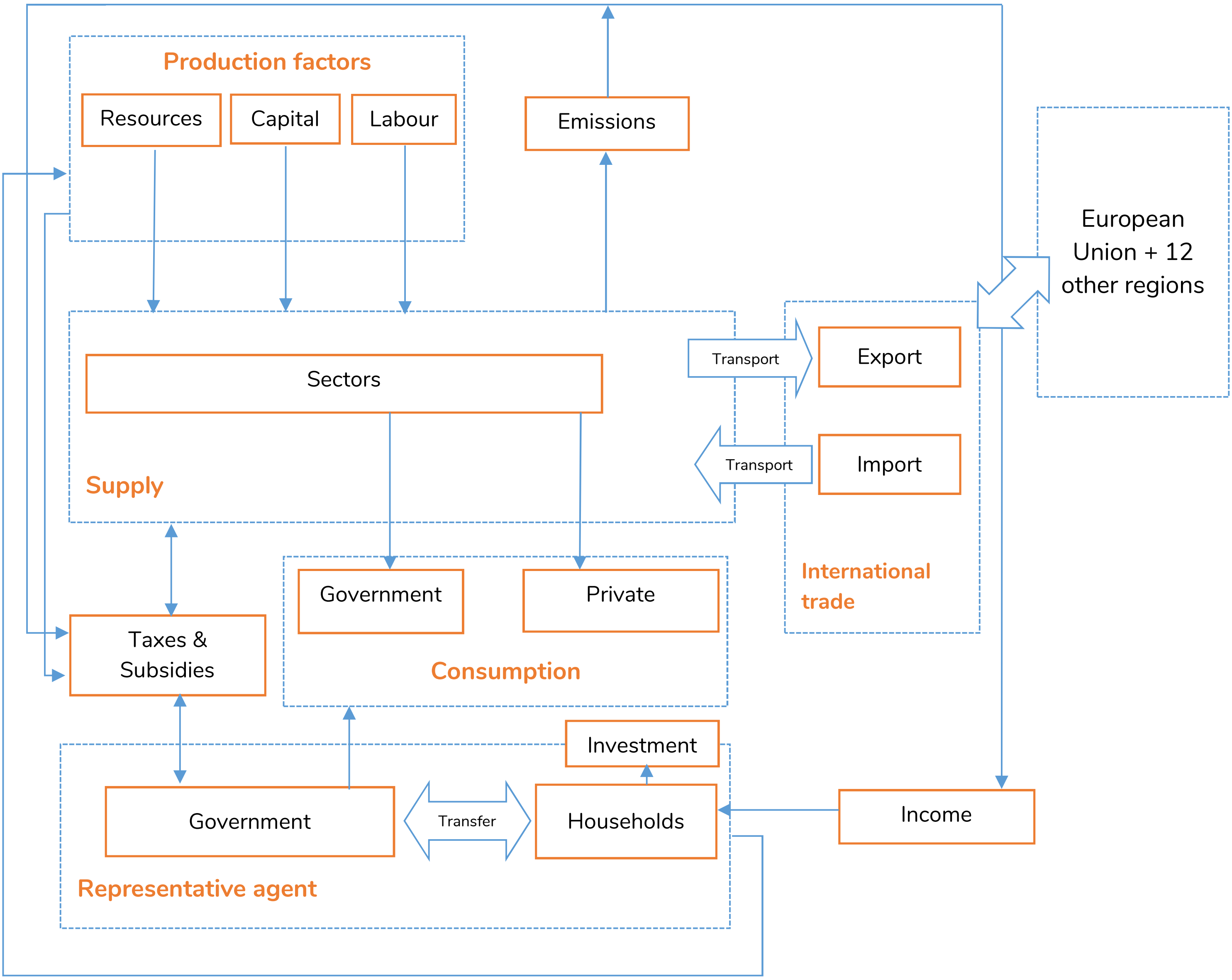
[4] *Lessons on the Impact of a Market Stability Reserve using the Zephyr Model*, WP no. 2015-11, October 2015, authors: Raphaël Trotignon, Pierre-André Jouvet, Boris Solier, Simon Quemin i Jérémy Elbeze, Chaire Economie du Climat, Universitte Paris-Dauphine CDC Climat.

**Fig. 5 CarbonPIE scheme**




*Source: CAKE/KOBiZE own study*

## Fig. 6. CREAM model scheme




*Source: CAKE/KOBiZE own study*

### Tab. 3. Countries with their abbrevations

| | Country | Abbreviation |
|---|---|---|
| 1 | Bulgaria | BG |
| 2 | Romania | RO |
| 3 | Croatia | HR |
| 4 | Hungary | HU |
| 5 | Poland | PL |
| 6 | Latvia | LV |
| 7 | Lithuania | LT |
| 8 | Slovakia | SK |
| 9 | Estonia | EE |
| 10 | Czech Republic | CZ |
| 11 | Portugal | PT |
| 12 | Greece | EL |
| 13 | Slovenia | SI |
| 14 | Malta | MT |
| 15 | Cyprus | CY |
| 16 | Spain | ES |
| 17 | Italy | IT |
| 18 | United Kingdom | UK |
| 19 | France | FR |
| 20 | Germany | DE |
| 21 | Belgium | BE |
| 22 | Finland | FI |
| 23 | Austria | AT |
| 24 | Netherlands | NL |
| 25 | Ireland | IE |
| 26 | Sweden | SE |
| 27 | Denmark | DK |
| 28 | Luxembourg | LU |
| 29 | European Union | EU |