



Climate Of Cooperation

WHY COUNTRIES NEED TO COOPERATE TO
CUT ESR EMISSIONS COST-EFFECTIVELY

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Climate of Cooperation

Why countries need to cooperate to cut ESR emissions cost-effectively



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Executive summary & key findings

On the 22 December 2017, negotiators from the European Parliament and the Council reached a deal on the Effort Sharing Regulation, which will set out the reduction requirements for the non-ETS sectors (those sectors not covered by the EU Emissions Trading System) in the period 2021-2030. This report makes a final assessment of the negotiated outcome and what it means in terms of overall ambition for the EU. Secondly, the report assesses the impact for individual Member States, with a focus on the different challenges they are expected to face.

During the ESR negotiations, Sandbag has highlighted the need for a Project Based Mechanism to bridge the gap between differentiated national targets and a cost-effective achievement of the EU target¹. The final deal provides a framework for reduction projects in non-ETS sectors but leaves it up to the member states to decide if and how they want to use this possibility. This report follows up on this concept and examines both the need and potential for project-based cooperation between Member States to meet the challenges they face, while delivering additional emission reductions at lowest cost.

Up for the job? Assessing the overall ambition level of the ESR outcome

- Taking in to account all possible flexibilities, the EU28 would have to achieve 14 Mt CO_{2eq.} additional reductions per year beyond currently implemented and agreed measures. This represents about 0.5% of 2005 emissions.
- The carbon budget and flexibilities under the ESR would only require Member States to reduce their non-ETS emissions by 26.6% by 2030, compared to the agreed -30% target.
- The agreed -30% target fails to put non-ETS on track towards the upper range of the agreed 80 to 95% reduction targets for 2050. The 2030 target under the ESR would have to be tightened to at least -40% to be compatible with the objectives of the Paris Agreement.

Bridging the gap: why we need project-based cooperation between Member States

- The picture is more complex when looking at what the final deal means for the individual Member States. Because targets are highly differentiated, some higher-income member states face a challenge to meet their targets domestically. On the other hand, the targets and lack of dedicated funding mechanism don't provide sufficient incentives for lower-income member states to make full use of their cost-effective reduction potential.

¹ See our report "Bend it, don't break it", available here: <https://sandbag.org.uk/project/64/>

- The ESR does provide a framework for project-based cooperation, which allows member states to meet compliance with the ESR by implementing reduction projects in other member states. This provides a solution by allowing Member States with more stringent targets to achieve compliance by financing cost-effective reductions in other Member States with less stringent targets (cost-effective reductions which might have otherwise been left unused).
- **A first step to pave the way towards more ambition under the ESR would be for Member States to make use of the possibility to engage in joint reduction projects to ensure a cost-effective achievement of the agreed -30% target.** This will reduce the need for flexibilities that increase the overall carbon budget (with the EU ETS and LULUCF sectors) and will give Member States more confidence that more ambitious reductions are achievable and affordable, while also bringing forth a significant number of additional co-benefits.

What prospect for project-based transfers?

- Based on current emission projections and policy scenarios, demand could range between **75 million and 644 million AEAs**, depending on the use of other flexibilities and emission projections. Demand would be mainly coming from the smaller, higher income Member States.
- Without additional reductions, potential supply in 2021-2030 would only be 96 million AEAs. However, by ensuring the full implementation of agreed sectoral policies² and by unlocking further reductions through reduction projects, **a supply of up to 614 million AEAs could be generated**, primarily in lower-income countries.

Potential for reduction projects in Bulgaria, Romania and Hungary

- This report takes a closer look at Bulgaria, Romania and Hungary³ and identifies three non-ETS sectors where further emission reductions could be unlocked.
- In all three Member States, there is significant room for further energy efficiency improvements in the **building sector**. Reduced energy poverty and a shift away from

² One of the main differences between the Member States' WEM projections and the Commission's Reference Scenario is that the latter assumes the full implementation of EU sectoral policies that contribute to emission reductions, such as the current Energy Efficiency Directive, the Landfill Directive, the F-gas Regulation, etc. ... This would already increase the supply of AEAs to 434 million AEAs.

³ Bulgaria and Romania were chosen because they have the lowest reduction target under the ESR and the lowest GDP per capita. This implies they will have both limited incentives as limited means to pursue further emission reductions. Hungary was chosen as a third example because it expects the highest surplus (in relative terms) under a business-as-usual scenario and therefore also has little incentive to unlock further reduction potential.

biomass (wood burning) and electricity heating risks to increase ESR emissions in Bulgaria and Romania. Reduction projects could support these countries in combating energy poverty while at the same time limiting the overall energy use and a fossil fuel lock-in, by combining highly energy efficient dwellings with low-emission heating systems.

- Landfilling is the main **waste treatment** practice in all three countries, which gives rise to high methane emission. Reduction projects under the ESR could support these Member States to shift towards increased recycling. This would not only reduce greenhouse gas emissions but would also help them to achieve compliance with the objectives under the recently agreed Waste Package.
- **Fugitive emissions** – mainly methane emissions that are leaked into the atmosphere during oil and natural gas extraction - are the third biggest source of Romania's non-ETS emissions. Member States with better performance in natural gas extraction – such as The Netherlands – could support reduction projects with finance and knowhow to reduce the fugitive methane emissions in the Romanian gas sector.

Key recommendations

- ➔ **Member States who face a challenge in meeting their ESR targets domestically should make use of the possibility for project-based transfers for achieving compliance.** This is the only flexibility that guarantees additional reductions in the non-ETS sectors and helps to set these sectors on a cost-effective trajectory towards our long-term objectives under the Paris Agreement. By helping lower income Member States to reduce their emissions, this approach also reduces the need for differentiation in future Effort Sharing discussions.
- ➔ **Member States with a surplus of AEs should link the transfer of these AEs to reduction projects within their borders, or at least use the revenues to support further climate action.** This will help them prepare for more stringent reduction targets after 2030, and can bring several co-benefits in terms of job creation, technology transfers, reduced energy poverty, etc. ... It could also help them to achieve compliance with other, sectoral EU policies such as the Energy Efficiency Directive, the Energy Performance of Buildings Directive, the Renewable Energy Directive, the F-Gas Regulation, the Landfill Directive, etc.
- ➔ **Member States should not make use of the external flexibilities which are provided under the ESR,** as these do not guarantee additional reductions and delay the necessary transition in the non-ETS sectors.
- ➔ **Member States should start discussing the potential for project-based cooperation as soon as possible.** The sooner reduction projects are implemented, the more reductions they can achieve and the more AEs will be freed up in the period 2021-2030. With the negotiations on the ESR concluded and National Climate and Energy Plans currently in development, Member States can already at this stage get a clear view on the potential for additional reductions and the need for flexibilities.
- ➔ **The current targets under the Effort Sharing Regulation are insufficient in light of the EU's long-term objectives and will have to be increased.** A target of at least 40% reductions (compared to 2005 emissions) is a minimum to put the non-ETS sectors on a linear trajectory towards the upper end of the 80% to 95% reduction target. The invitation for parties to update their Nationally Determined Contributions (NDC's) by 2020 in response to the ongoing Talanoa Dialogue provides a first opportunity to do so. The Commission should come forth with its updated mid-century strategy as soon as possible and by Spring 2019 the latest.

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1. Introduction

On 21 December 2017, European co-legislators reached a provisional agreement on the ‘Effort Sharing Regulation’ (ESR, also referred to as the ‘Climate Action Regulation’), which sets out national reduction targets for the period 2021-2030 for sectors not covered by the EU ETS (the non-ETS sectors, primarily transport, buildings, agriculture and waste). The deal marked the end of lengthy negotiations on the distribution of reduction efforts that started as far back as January 2014, when the European Commission launched its Communication on the 2030 Climate and Energy Framework. Member States’ representatives have given their approval on the provision deal in January 2018, and the European Parliament is expected to do so in April.

The main aim of the ESR is to reduce emissions in the non-ETS sectors by 30% by 2030 (compared to 2005). The ESR target was set as a cost-effective contribution to the EU’s overall, at least -40% reduction target set for 2030 (compared to 1990)⁴. For this purpose, the ESR target is further translated into national targets, ranging from 0% to -40% based on relative wealth (GDP/capita), with some adjustments to account for cost-effectiveness. It is then the responsibility of the Member States to ensure they achieve the necessary reductions, with the support of specific EU policies on energy efficiency, renewable energy, etc.

With the negotiations concluded, this report makes a final assessment of the negotiated outcome and what it means in terms of overall ambition for the EU. It also looks at what the outcome means for the individual Member States, with a focus on the different challenges they are expected to face and the potential of project-based cooperation between Member States to meet those challenges, while delivering additional emission reductions at lowest cost.

⁴ In October 2014, the European Council agreed on the overall -40% reduction target as well as a cost-effective split of that target between the EU ETS and the non-ETS sectors. The sectors covered by the EU ETS are to reduce their emissions with 43% by 2030, compared to 2005. The sub-targets for the ESR (-30%) and the EU ETS (-43%) add up to the overall -40% target (compared to 1990) for the EU.

2. ESR outcome: a mountain bringing forth a mouse?

After almost one and half year of negotiations, the final outcome only marginally increased the overall ambition level and maintains the overall architecture of the ESR as proposed by the Commission in July 2016.

Emission budgets/annual emission allocations: Between 2021 and 2030, Member States will have to comply with annual emission limits (Annual Emission Allocations or AEAs), which will be set on a linear trajectory between a starting point and their target in 2030. Whereas the national targets for 2030 as proposed by the Commission have been accepted without much discussion, the starting point was without a doubt the most contested issue during the ESR negotiations. The final deal sets the starting point on either 1 June 2019 or 1 January 2020 (whichever results in the lowest allocation) based on average 2016-2018 emissions. Our analysis suggests that this approach would decrease the overall emission budget with just 121 Mt CO_{2eq.} (or 0.5%) compared to the Commission' proposal, bridging less than 25% of the difference between the Council position and the more ambitious position of the European Parliament (see also Annex 1 for a more detailed assessment).

Temporal flexibilities: As under the current Effort Sharing Decision (ESD), Member States will be allowed to both borrow and banking AEAs between different years. A limit on the banking possibility has been introduced under the ESR as an attempt to safeguard the achievement of the -30% reduction target. However, because the limit is set at 30% of **cumulative** AEAs and only applies as of 2022, it is very unlikely that the limitation would ever be triggered (see also Annex 1 for a more detailed assessment). Consequently, the introduced banking limitation is purely symbolical and does nothing to safeguard the 2030 target.

Flexibility between Member States: Member States can also transfer their AEAs between each other. The modalities for such transfers are at the Member States' discretion. Co-legislators did however include two specific possibilities in the ESR of how such transfers could be organized, namely through a Green Investment Scheme⁵-type approach (art. 5, paragraph 5a) and the realization of reduction projects (art. 5, paragraph 5b). During the negotiations, Sandbag has repeatedly highlighted the advantages of a Project Based Mechanism to allow Member States to achieve the required reductions cost-effectively⁶. An overview of these advantages is again included in section 3. Based on the framework provided by the ESR, it is now up to the Member States to make use of this possibility to reap these advantages.

Flexibility with the EU ETS: The final deal maintains the possibility for certain Member States to use up to 100 million ETS allowances (EUA's) for compliance under the ESR, to be decided before 2020. During the negotiations, Sandbag has warned that as long as the EU

⁵ The concept a Green Investment Scheme was introduced under article 17 of the Kyoto Protocol. The approach entails that the revenues from the sale of emission credits are re-invested in greenhouse gas reduction measures. The aim was to ensure that the use of emission credits effectively lead to additional reductions and is not just a mere transfer of excess AAUs (or 'hot air').

⁶ See here: <https://sandbag.org.uk/project/64/>

ETS remains oversupplied, it is unlikely that this mechanism would deliver any additional reductions under the EU ETS. Although mechanism was retained during trilogues, two further changes were made that (at least partially) limit its drawbacks. Firstly, Member States will be allowed to revise their decision downwards in 2024 and in 2027. This will allow Member States to make less use of this flexibility with the EU ETS in case other reduction opportunities become available. Secondly, the final outcome ensures that this flexibility will not result in less EUAs being withdrawn and cancelled by the Market Stability Reserve (MSR) under the EU ETS⁷.

Flexibility with the LULUCF: The end deal also maintains the possibility for Member States to use up to 280 million credits from the LULUCF sector to achieve compliance under the ESR. Like the flexibility with the EU ETS, Sandbag has argued against this external flexibility as it does not ensure additional, long-term reductions and it delays the required transition in the non-ETS sectors⁸. Although the overall limit of 280 million credits remained unchanged in the end deal, some other restrictions imply that only about half of the Member States could use their share of the LULUCF flexibility. Under the Commission's Reference Scenario, this would mean that in total 204 million LULUCF credits could be used throughout the phase 2021-2030 (see also Annex 1 for a more detailed assessment).

Safety Reserve: A final central element to broker a deal on the ESR was the introduction of a Safety Reserve that could be as high as 105 million AEAs⁹. Under certain conditions, lower income Member States could use this reserve to achieve compliance in 2026-2030. Our analysis shows that with the introduction of a second distribution round, there is a real risk that the total volume of the reserve will go to just a handful of lower-income Member States (Poland, Italy, Slovakia and Cyprus), undermining the incentive for these Member States to reduce their non-ETS emissions (see also Annex 1 for a more detailed assessment).

⁷ See here: <https://sandbag.org.uk/wp-content/uploads/2017/12/ESR-briefing-amendment-48.pdf>

⁸ See here: <https://sandbag.org.uk/wp-content/uploads/2017/11/ESR-Flexibility-repair-kit-briefing.pdf>

⁹ Subject to the achievement of the -30% reduction target in 2030. The maximum amount of 105 million AEAs would be reached if total EU non-ETS emissions would be reduced with 33.6% by 2030.

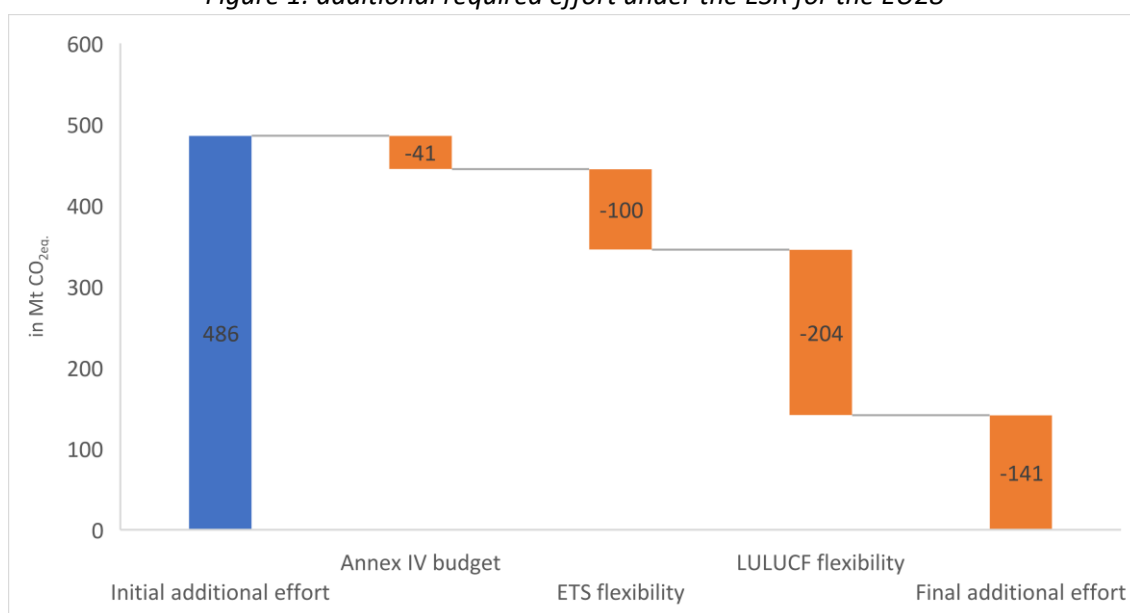
3. Up for the job? Assessing the overall ambition level of the ESR

Will the final ESR outcome be able to deliver the overall (EU-wide) emission reductions that are required the EU's climate target both in the medium and in the long term? In this section we explore the answer to this question by looking at three different aspects of the ambition level: to what extent will the ESR drive additional reductions in the non-ETS sectors; to what extent does it ensure the achievement of the -30% reduction target by 2030; and to what extent does it set the non-ETS sectors on a credible and cost-effective track towards the long-term reductions required under the Paris Agreement?

Will the ESR drive additional reduction efforts in the non-ETS sectors?

The ESR is an emission budget instrument, and therefore the additional required effort should be regarded over the whole phase 2021-2030. Our analysis shows that – assuming the Commission's Reference Scenario and full use of the different available flexibilities - the additional required reduction for the whole period 2021-2030 would be 141 Mt CO_{2eq.}, or on average 14 Mt CO_{2eq.} per year (see Annex I for more details). **This corresponds with an annual additional reduction of only -0.5% compared to the 2005 base year¹⁰.**

Figure 1: additional required effort under the ESR for the EU28



Based on current available data, we have calculated the total ESR budget for 2021-2030 to be at 22.220 million AEs (excluding the additional AEs under Annex IV), compared to 22.706 Mt CO_{2eq.} cumulative emissions under the Commission's Reference Scenario. This results in an initial additional reduction effort of 486 Mt CO_{2eq.}. After deducting 41 million Annex IV AEs, 100 million EU ETS allowances and 204 million LULUCF credits, the remaining additional effort would be only 141 Mt CO_{2eq.}

¹⁰ According to the latest EEA Trends and Projections report, the 2005 base year emissions for the EU28 are 2887.1 Mt CO_{2eq.}. The annual additional required reduction of 14 Mt CO_{2eq.} represents 0.5% of the 2005 base emissions.

Is the ESR ensuring at least 30% emission reductions in non-ETS sectors by 2030?

In line with the ‘at least’ character of the overall 40% reduction target, the 30% reduction target for non-ETS sectors should be considered as a minimum, and the ESR should not allow emission trajectories that could result in less than 30% emission reductions by 2030.

Figure 2: -26.6% reduction trajectory under the ESR budget

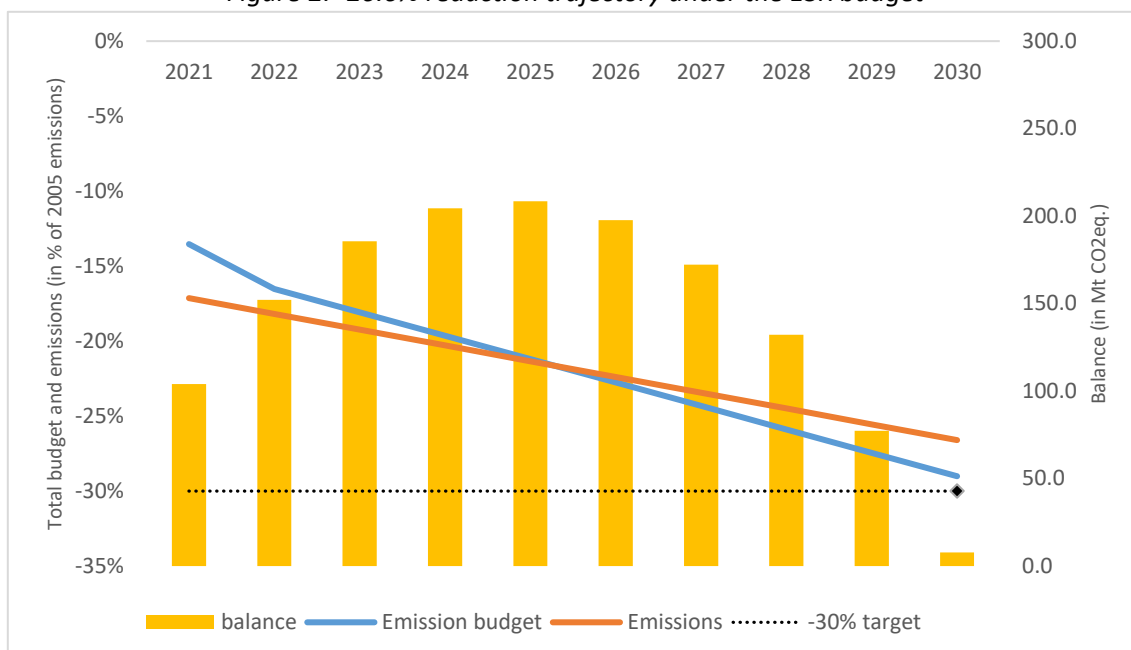


Figure 2 above shows the evolution of the emission budget and balance under a -26.6% reduction scenario. The total emission budget (incl. Annex IV and flexibility with the EU ETS and LULUCF) and the emissions are projected on the primary axis, as a % of 2005 emissions. The resulting balance is projected on the secondary axis in Mt CO_{2eq.}. It is assumed that non-ETS emissions will continue to evolve in line with the Member States’ most recent WEM projections until 2020. After that, emissions will decrease linearly towards a -26.6% reduction in 2030. It is assumed that 100 million EUAs and 204 million LULUCF credits are added to the total ESR budget, spread equally over the period 2021-2030 (30.4 million each year). The emission budget has a small dent in 2021-2022 due to the additional budget under Annex IV of the ESR (41 million AEAs).

The extent to which the ESR will ensure at least 30% emission reduction by 2030 will depend on several factors, such as the evolution of emission as of 2021 (and the resulting potential build-up of surplus AEAs) and the use of flexibilities. A commonly used approach to assess whether the ESR is in line with the -30% target is to look at what linear emission trajectory this budget-based approach would allow, taking into account the different available flexibilities¹¹.

¹¹ This approach was used by the Commission in its Impact Assessment accompanying the Effort Sharing Regulation proposal (see figure 13). It has also been used by Oeko Institut (see here: <https://www.oeko.de/fileadmin/oekodoc/WP-ESR-Surplus.pdf>). Sandbag has also used this approach during the ESR negotiations (see here: https://sandbag.org.uk/2017/11/16/lookingforaperfectfit_esr/)

Using this approach, our analysis points out that the ESR budget alone would allow an emission trajectory that only achieves 28.5% emission reductions by 2030. Taking into account the potential use of flexibilities with the EU ETS and LULUCF, non-ETS emissions would be allowed to decrease by just 26.6% by 2030, and the ESR would still provide just enough emission budget to cover all emissions. **Unless the ETS sectors overachieve their target, this would lead to the EU missing its overall -40% reduction target by 2030 as included in its NDC under the Paris Agreement.**

Is the ESR putting the non-ETS sectors on a credible track towards our long-term targets?

The purpose of the ESR is not only to achieve the -30% target by 2030, but also to contribute to achieving the objectives of the Paris Agreement¹². In this context it is important to assess whether the ESR will sufficiently drive down emissions in the coming decade to set the non-ETS sectors on a credible and cost-effective trajectory towards the long-term reductions needed in context of the Paris Agreement.

The EU needs to aim for the upper end of the agreed 80% to 95% reduction target for 2050.

The current EU climate targets for 2030 are set in line with a cost-effective trajectory towards 80% reductions by 2050 (compared to 1990). This is the low end of the 80 to 95% reduction range agreed by EU leaders, in context of the reductions needed according to the IPCC by developed countries to limit the global average increase in temperature to 2 degrees Celsius compared to pre-industrial levels. However, the Paris Agreement has since then raised the bar and aims to limit the global average increase **to well below 2 degrees Celsius**, and to even **pursue efforts to limit it to 1.5 degrees Celsius**. Consequently, the EU should step up its game and aim at the upper end of the 80 to 95% reduction range by 2050. This would also correspond with the net-zero emissions target for 2050 as recently adopted by the European Parliament¹³.

95% reduction target: who gets the remaining 5%?

A 95% reduction target would leave only a very small carbon budget left in 2050 to divide between the different sectors (286 Mt CO_{2eq}, based on most recent GHG inventories if international aviation remains included in the target). This implies that all sectors will have to pursue deep reductions, and those sectors with the technical potential to be completely emissions free by 2050 will have to do so. It has been acknowledged that the agricultural sector does not (yet) has the technical potential to completely reduce its emissions and will

¹² See article 1 of the final ESR text

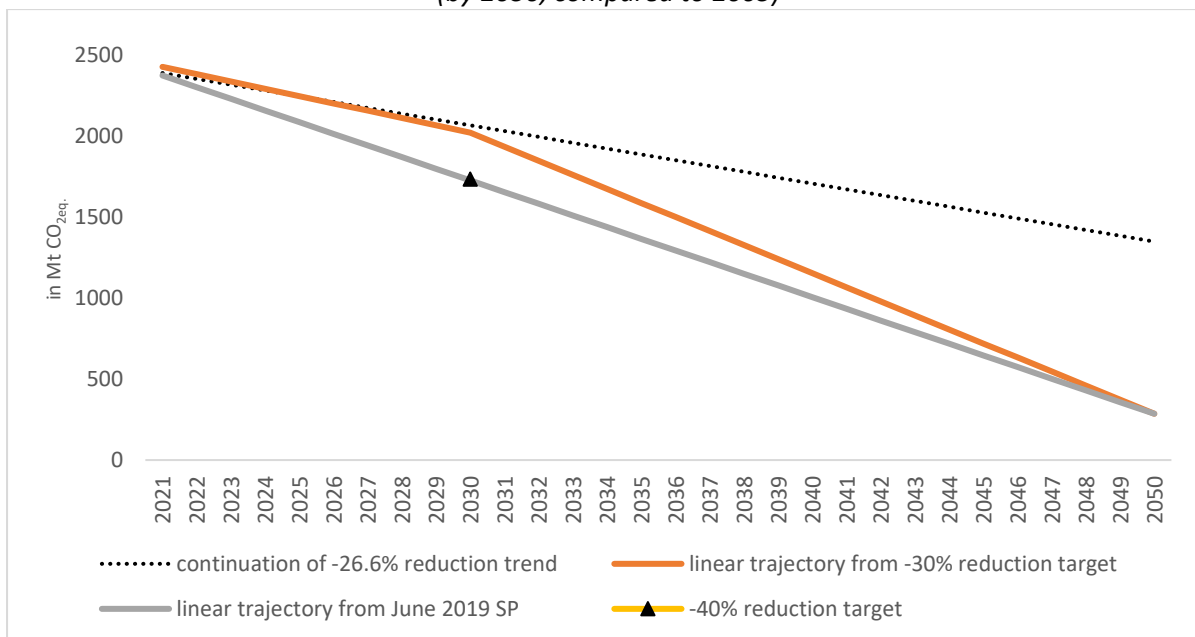
¹³ A 95% emission reduction would lead to a 2050 emission budget of about 286 Mt CO_{2eq}. This corresponds closely with the current removals by the LULUCF sector. According to the latest EU GHG inventories reported to the UNFCCC, the LULUCF sector achieved a net removal of about 305 Mt CO_{2eq}. We have therefore concluded that a 95% reduction in emissions is compatible with the net-zero emissions target as adopted by the European Parliament.

therefore have to rely on offsetting in the LULUCF sector to achieve net-zero emissions¹⁴. It could therefore be considered to allocate the remaining emission budget to the non-ETS sectors to cater for agricultural emissions. However, this would require the ETS sectors – including aviation – to achieve a 100% reduction by 2050, which is also challenging. We therefore assume a carbon budget of 286 Mt CO_{2eq.} for the non-ETS sectors by 2050 as a strict minimum. This would translate in a ESR reduction target of -90% compared to 2005 levels. In case it is deemed that the ETS sectors cannot fully eliminate their emissions by 2050, the targets for the ESR should be tightened in order to maintain the economy-wide 95% reduction target.

The ESR target for 2030 needs to be upgraded to at least -40% (compared to 2005)

Assuming the starting point as recently agreed under the ESR negotiations, it is clear from the chart below that the current -30% target under the ESR would require far steeper reductions beyond 2030 to achieve 90% reduction in non-ETS sectors by 2050¹⁵. This might prove to be very technically challenging and very costly. An ESR target of at least 40% reductions by 2030 (compared to 2005) would ensure a smoother, linear trajectory towards the end target in 2050, making the transition more manageable.

Figure 3: Possible trajectories towards 90% emission reductions in the ESR (by 2050, compared to 2005)



Parties to the Paris Agreement are currently engaged in the Talanoa Dialogue to assess to what extent the submitted NDC’s in aggregate achieve the objectives set out in that Agreement. This process is expected to conclude by the end of 2018. In a next step, parties

¹⁴ For example, the Commission’s Low Carbon Roadmap puts forward a 42% to 49% reduction for agricultural emissions by 2050 and makes the emission removals in the LULUCF sector as a further opportunity for the agricultural sector. Based on latest GHG inventories, an emission budget of 287 Mt CO_{2eq.} for agriculture in 2050 would imply a reduction of -48% compared to 1990 levels.

¹⁵ See also our initial report on the Effort Sharing Dinosaur here: <https://sandbag.org.uk/project/the-effort-sharing-dinosaur/>

are invited to update their NDC by the end of 2020 the latest, taking in to account the additional effort needed to keep the objectives of the Paris Agreement within reach. This provides a first opportunity for the EU to step up its game in both the EU ETS as in ETS sectors. In any case the ESR will have to be reviewed and the ambition level will have to be increased (with a view to the period after 2030) after the first global stocktake under the Paris Agreement, which will take place in 2023-2024.

To feed the public debate on updating the EU's long-term climate targets, the Commission is planning to bring forth an updated mid-term century strategy (as a successor to the 2011 Low Carbon Roadmap) to assess what the more ambitious temperature goals under the Paris Agreement mean for the EU's 2050 climate objectives, and what additional efforts are needed to keep the upper end of the agreed 80 to 95% reduction targets within reach. In order to allow sufficient time for debate before the end of 2020, the Commission should come forth with its updated mid-term strategy as soon as possible and by Spring 2019 the latest.

4. Bridging the gap: prospects for project-based cooperation between Member States

The previous section has shown that it would be both necessary and feasible to increase the ambition level under the ESR and that only minor additional reductions would be required to achieve compliance with the current ESR emission budget. However, this conclusion is based on the assumption that all reduction efforts will be distributed both between Member States as between sectors in a cost-effective way. This is not guaranteed under the ESR, as national targets are highly differentiated and do not reflect the cost-effective share of the different Member States in achieving the target at the EU level.

Recap: why the ESR needs a project-based mechanism

As we have already highlighted in a previous report¹⁶, the differentiated approach under the ESR leads to several drawbacks that risk undermining the achievement of the targets for both 2030 as for the longer term (2050). This is confirmed again when comparing the requirements for different Member States under the final ESR outcome with their indicative share under a cost-effective achievement of the overall EU target.

Note: For our analysis, we have used the EUCO30 scenario to assess what would be a cost-effective achievement of the overall EU target. This is one of the policy scenarios that were modelled by the Commission in preparation of the climate and energy framework for 2030, which formed the basis for i.a. the cost-effective split between the EU ETS and the ESR target. See Annex 2 for more info on the emission scenarios and projections used for this report.

Figure 4: ESR requirements versus cost-effective achievement of the -30% target

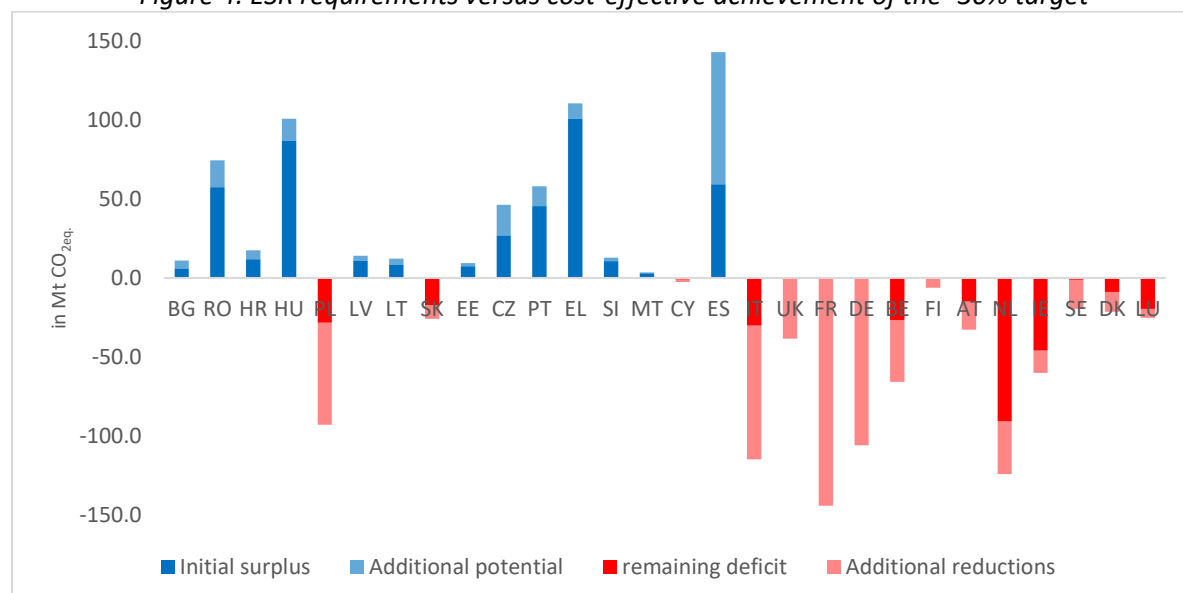


Figure 4 above shows the expected cumulative balance per Member State under the ESR for the whole period 2021-2030 under different emission scenarios. The initial balances are based on the Commission's Reference Scenario, the (potential for) additional reductions are based on the Commission's EUCO30 scenario.

¹⁶ See here: https://sandbag.org.uk/wp-content/uploads/2016/10/Bend_It_Dont_Break_It.pdf

Figure 4 shows that a number of (mostly higher-income) Member States are expecting a deficit under the ESR with current measures and will have to pursue additional reductions to achieve compliance (see sum of red bars). However, even if they would reduce their own emissions up to their cost-effective share of the EU effort (light red bars), several Member States would still have a remaining deficit (as indicated by the dark red bars). This means they would face higher costs if they have to achieve all reductions domestically, which could undermine their willingness to support more ambitious targets in the future.

On the other hand, the dark blue bars indicate that most lower-income Member States are expected to generate a surplus under the ESR without any additional measures. This means that the ESR targets alone do not provide any incentive for them to tap into their potential for additional, cost effective reductions (light blue bars). This would delay reductions, increase the risk of carbon lock-in and make future, more ambitious reductions harder to achieve.

Poland, Slovakia and Italy seem to be exceptions to the rule, as they are lower-income Member States which are also projected to expect a deficit over the period 2021-2030 under the selected scenarios. However, a closer look at the number shows that this is mainly due to an overestimation of non-ETS emissions for 2015 under the Commission’s Reference scenario when compared to verified emissions. Because the trend under the Reference Scenario starts from a too high value for 2015, the overestimation is extended on to at least 2025 when compared with the Member States’ own WEM projections.

As a result, under the Reference Scenario and the EUCO30 scenario, Italy, Poland and Slovakia would face a significant deficit already as of 2022. However, under their own WEM projections – which are be more in line with recent emission trends – the deficit up to 2025 would be significantly smaller, and Slovakia would even build up a surplus throughout the whole period 2021-2030.

Table 1: non-ETS emissions under the Reference Scenario compared to verified emissions (2015) and WEM projections (2020-2025-2030) (in Mt CO_{2eq}.)

		2015	2020	2025
Italy	verified	273		
	WEM projections		263	252
	RefScen	285	271	257
Poland	verified	187		
	WEM projections		190	186
	RefScen	199	194	188
Slovakia	verified	20		
	WEM projections		20	20
	RefScen	25	23	23

Why project-based transfers are the preferred flexibility under the ESR

As described in section 1, the ESR provides several flexibility options that Member States could use when facing a reduction deficit, such as the use of the external flexibilities (with the EU ETS and the LULUCF) and transfers of AEAs, possibly (but not necessarily) linked to the implementation of a reduction project. This last option can take different forms.

- A reduction project where the transfer of AEAs is directly linked to the implementation of that project and the (verified) emission reductions it is able to achieve. This approach seems most suitable for larger-scale projects.
- A reduction programme, where the transfer of AEAs is linked to the implementation of certain measures, such as a building renovation programme or strategy. This approach seems most suitable for pursuing reductions in a sector with many smaller sources of emissions (e.g. in the buildings sector).

There are many arguments why it would be beneficial for all parties to prioritize transfers of AEAs that are linked to reduction projects (or at least with the revenues least earmarked for further climate action).

- 1) **Additionality:** The use of external flexibilities does not sufficiently guarantee that less emission reductions in the ESR will be compensated with additional, permanent reductions in other sectors. As long as the EU ETS remains oversupplied, it is doubtful that the cancellation of 100 million EUAs would trigger a price increase that would drive further reductions. The measure that avoids this flexibility from undermining the functioning of the MSR is a welcome step but might be revoked in the 2021 review process. The permanence and additionality of reductions in the LULUCF sectors is also doubtful, especially now that it has been decided to allow credits from the Forest Management land category to be used under the ESR. Finally, the simple transfers of AEAs also doesn't guarantee additional reductions, as the carbon budget under the ESR will generate surpluses in certain Member States without requiring additional measures. Linking transfers to reduction projects or at least earmarking the revenues for further climate action is the only form of flexibility that guarantees additional reductions. This would also increase the public acceptability for transfers in the host Member States, as it will be publicly better acceptable to spend taxpayer's money on AEAs that represent actual, verified, additional reductions that are realized by reduction projects.
- 2) **Achievement of the 2030 target:** Section 2 has already illustrated how the use of the external flexibilities increase the risk that the EU will not achieve the agreed -30% target under the ESR. The same is true for simple transfers of AEAs as even without the external flexibilities, the carbon budget under the ESR is too large to guarantee the achievement of the -30% target. If higher-income Member States would only reduce up to their cost-effective share and then purchase excess AEAs that do not drive additional reductions in lower-income Member States, the overall -30% target will be missed even if the carbon budget under the ESR is respected.

- 3) **Putting the non-ETS sectors on a cost-effective trajectory towards the 2050 targets:** Another risk of using the two external flexibilities that are provided under the ESR is that they delay the much-needed transition in the non-ETS sectors. Section 3 of this report has shown how the -30% target fails to put these sectors on a linear trajectory towards the required reductions by 2050. The external flexibilities under the ESR amplify this problem by further softening the actual reduction requirements for non-ETS sectors up to 2030. This would result in a very steep (and costly) reduction trajectory after 2030. A similar argument can be made for simple transfers of AEAs. Due to the differentiated approach under the ESR, many lower-income Member States will not be incentivised by their targets alone to pursue further emission reductions, and several of them would even build up a surplus without any additional measures which they could then transfer. However, without additional reductions there's a risk that these Member States will lock themselves into carbon-intensive systems (e.g. heating systems for the building sector), which would make more stringent targets in the future more difficult to achieve. By linking transfers to reduction projects, higher income Member States can support lower income Member States to avoid a carbon lock-in. It also facilitates the transfer of technologies and knowhow which could unlock further reductions in the future.
- 4) **Co-benefits:** Reduction projects in lower income Member States can bring about several co-benefits in terms of investments, job creation, reduced energy poverty, improved air quality, etc... and can help them to comply with other obligations set out in EU law (for example in terms of energy efficiency, renewable energy, waste management, ...) This is also clearly illustrated in the examples identified in section 4 of this report. Reduction projects could also provide business opportunities for the buying Member State, e.g. if enterprises from the buying Member State are involved in the implementation of the project¹⁷.
- 5) **Increased supply/willingness to sell:** Even if Member States are expecting to generate a surplus, they might be reluctant to engage in transfers before the end of the period 2021-2030 when they have more certainty on their final verified emissions. By linking transfers to reduction projects, host Member States will have more confidence that they won't need to hold on to excess AEAs for compliance later in the phase and will be more willing to sell these to other Member States.
- 6) **Less need for differentiation in future effort sharing discussions:** If lower-income Member States lock themselves into a carbon intensive energy system in the coming decade, there is a considerable risk that they won't be able to support further ambition (either before or after 2030) without a continued, heavily differentiated effort sharing. This in turn could reduce the willingness of higher-income Member States to support further ambition. By avoiding a carbon lock-in and facilitating the transfer of low-carbon technologies to lower-income Member States through reduction projects, higher-income Member States can give them more confidence that more ambition in the future

¹⁷ For example, in 2010 Spain purchased a number of AAUs from Estonia, using the Green Investment Scheme approach under article 17 of the Kyoto Protocol. The revenues of the transfer were earmarked for promoting electric public transport in Tallinn. In a step to expand and modernize its infrastructure, the Tallinn public transport company Tallinna Linnatranspordi AS ordered 20 new, energy efficient trams from the Spanish constructor Construcciones Y Auxiliar de Ferrocarriles.

is feasible and affordable. This might reduce the need for differentiation in future Effort Sharing discussions.

Potential volumes and sources of demand

The expected demand for AEAs and potential supply (including from reduction projects) under the ESR will depend on several factors, such as how much additional efforts would be required from individual Member States, how much cost-effective potential each Member State would have for additional emission reductions, and to what extent the external flexibilities with the EU ETS and LULUCF sector would be used. Based on these different factors, we have calculated different scenarios for both supply and demand.

To determine the potential demand, we have looked at the cumulative deficit of Member States with a negative balance throughout the period 2021-2030 under three different scenarios¹⁸.

EUCO30 + external flexibilities: This scenario assumes that Member States will first reduce emissions in line with their cost-effective share of the EU effort (based on the EUCO30 scenario). They would then make full use of the possible flexibilities with the EU ETS and LULUCF. The remaining deficit would determine the demand for transfers and reduction projects under the ESR. Under this approach, the cumulative demand would be **75 million AEAs**.

EUCO30, no external flexibilities: This scenario also assumes that Member States will first reduce emissions in line with their cost-effective share of the EU effort (based on the EUCO30 scenario). However, instead of using the possible flexibilities with the EU ETS and LULUCF, Member States would turn to transfers within the ESR to cover any remaining deficit. **This scenario would be preferable**, as it maintains the overall reduction incentive for non-ETS sectors compared to the use of external flexibilities. The cumulative demand under this scenario would be **208 million AEAs**.

Reference Scenario: Finally, there is a possibility that not all Member States will reduce domestically up to the level of their cost-effective share. We have therefore also looked at the deficit under the Commission's Reference Scenario. This would result in a cumulative demand of **644 million AEAs**. As it is unlikely (and absolutely not recommendable) that Member States would turn to transfers before pursuing additional domestic reductions, this scenario is only included to indicate the maximum possible level of demand.

¹⁸ As mentioned previously, Italy, Poland and Slovakia are also expected to face a deficit under the Reference Scenario and the EUCO30 scenario. However, because the deficit is mainly caused by an overestimation of emissions up to 2025, these Member States were not included for assessing the expected demand.

Figure 5: potential demand per Member State under different scenarios

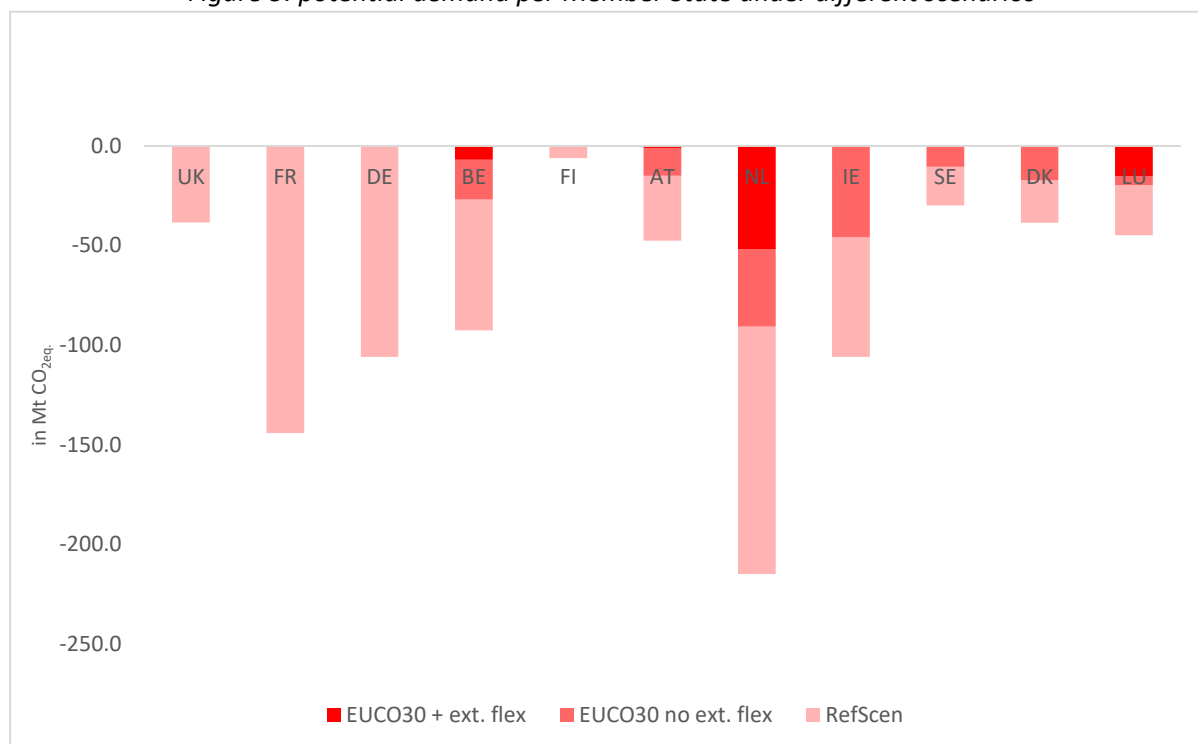


Figure 5 shows that most Member States can significantly reduce their initially expected deficit (under the Reference Scenario) by achieving additional emission reductions up to the level of their cost-effective share of the EU effort. However, based on the EUCO30 scenario it can be expected that a number of countries will be interested in purchasing additional AEAs, potentially linked to the implementation of reduction projects.

The **Benelux** countries are expected to have a remaining deficit under all selected scenarios and will either need to reduce emissions beyond their share of the EU effort under the EUCO30 scenario, or purchase AEAs from other Member States.

The other, smaller high-income Member States (**Denmark, Ireland, Austria**) would also need to make use of flexibilities to achieve compliance. In principle, they would have sufficient access to the external flexibilities to cover the remaining deficit after reducing up to their cost-effective share of the EU target (under the EUCO30 scenario). However, for the reasons described previously in this report, it would be recommended if they bridge any remaining deficit by financing reductions in other Member States. **Sweden** would also have a deficit under the EUCO30 scenario, but as it has a domestic reduction target for 2030 that is higher than its EU obligations, it is doubtful at this point in time that Sweden would be looking to purchase additional AEAs. **Finland** is not expected to face a deficit under the EUCO30 scenario and would thus be able to achieve its reduction target domestically under a cost-effective achievement of the EU target.

The large higher-income Member States (**Germany, France and the UK**) are also expected to achieve their required reductions domestically under the EUCO30 scenario. These Member

States also have domestic targets or carbon budgets¹⁹ that are more ambitious than their obligations under EU law. Assuming that these Member States will achieve their domestic targets, there wouldn't be any demand for AEAs from their side. However, if these Member States would fail to achieve their domestic targets, the demand for AEAs could increase significantly due to large share of these Member States in overall non-ETS emissions. In this regard, it is particularly relevant to keep track on developments in **Germany**, whose own WEM projections indicate that the country is off track to achieve its 2020 ESD target²⁰ and will have to achieve significant additional reductions to avoid a deficit under the ESR in 2021-2030.

Potential volumes and sources of supply

To determine the potential supply, we have looked at the cumulative surplus of Member States with a positive balance throughout the period 2021-2030 under three different emission scenarios.

WEM projections: This scenario assumes that emissions evolve in line with the Member States' own WEM ('With Existing Measures') projections²¹. Member States with a net positive balance under the ESR will not pursue any additional reductions as the ESR targets alone do not provide any incentive to do so. Under this scenario, the potential supply would be only **96 million AEAs**, which would be insufficient to meet the expected range of demand.

Reference Scenario: This scenario assumes that emissions evolve in line with the Commission's Reference Scenario²². Again, Member States with a net positive balance under the ESR will not pursue any additional reductions as the ESR targets alone do not provide any incentive to do so. Under this scenario, the potential supply would be only **434 million AEAs**.

EUCO30: This scenario starts from the Commission's Reference Scenario, but also takes into account the additional supply that could be generated if lower income Member States²³

¹⁹ See the carbon budgets under the UK Climate Change Act, the carbon budgets under the French *Stratégie Nationale Basse-carbone*, and the sectoral milestones for 2030 under the German *Klimaschutzplan 2050*.

²⁰ According to its latest WEM projections, Germany will decrease its non-ETS emissions with 11% by 2020 compared to a -14% target under the ESD, and with 22% by 2030 compared to a -38% target under the ESR. The cumulative expected deficit for 2021-2030 assuming WEM projections would be 370 Mt CO_{2eq}.

²¹ These projections are developed by Member States and look at how emissions will involve with current measures in place. See Annex 2 for more info on the emission scenarios and projections used in this report.

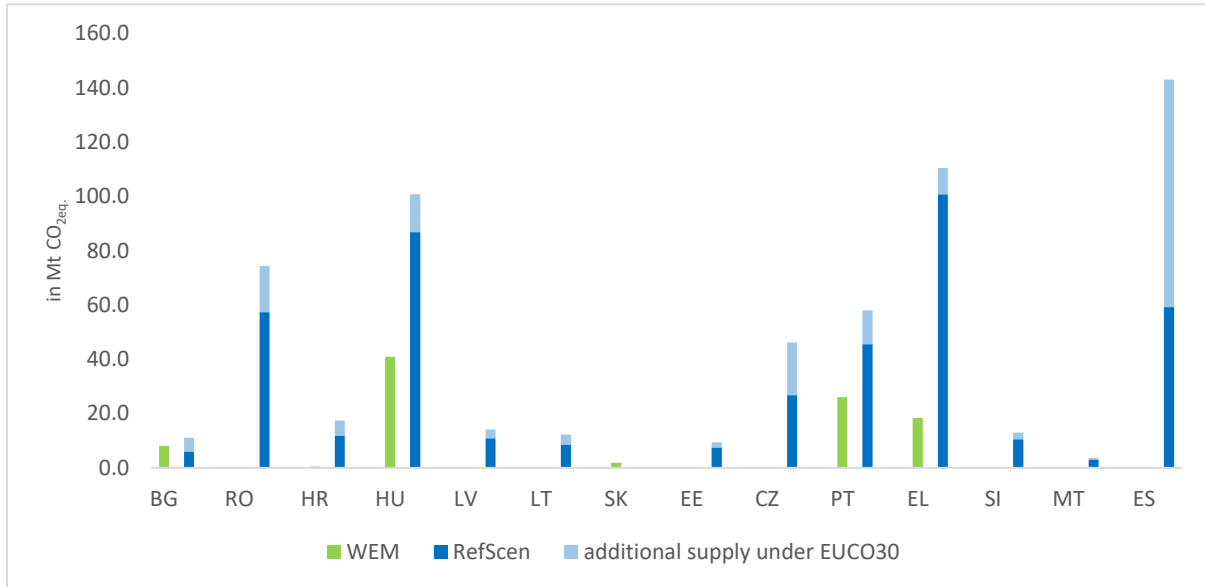
²² For many Member States this scenario is less conservative as the Member States own WEM projections. Main reasons are different assumptions on macro-economic developments and the implementation of agreed EU measures. For example, the Reference Scenario assumes a full implementation of sectoral policies such as the current Energy Efficiency Directive and Landfill Directive, even if Member States have not put the necessary instruments in place to achieve the targets as set out in those policies. See Annex 2 for more info on the emission scenarios and projections used in this report.

²³ a number of higher-income Member States would also be able to generate a surplus under the EUCO30 scenario, in particular the larger Member States (UK, FR, DE). We did not include these Member States in the potential supply as they might want to use their overachievement to increase the overall ambition level.

would pursue further emission reductions up to their cost-effective share of the overall EU. The additional supply that could be generated under the scenario would be 180 million AEAs, leading to a **total supply of 614 million AEAs**.

A further breakdown of the potential supply per Member States is provided in Figure 6 below.

Figure 6: potential supply per Member State under different emission scenarios



Bulgaria, Hungary, Portugal and Greece expect significant surpluses under both the Reference Scenario as their own WEM projections. It could therefore be expected that these Member States will be most confident to bring supply to the market. By linking transfers to reduction projects (or programmes) these Member States could unlock further reductions which could in turn generate additional supply.

Many other lower-income Member States would also be able to generate a net-surplus under the Reference Scenario and EUCO30 scenario, in particular (in terms of volume) **Spain, Romania** and the **Czech Republic**. However, their own WEM projections are more conservative and indicate that additional reductions beyond business as usual might be needed to ensure compliance. It can therefore be expected that these Member States will be more hesitant to bring supply to the market, unless they're confident that an AEA transfer would be matched by additional reductions.

5. Exploring the potential for reduction projects: taking a closer look at Bulgaria, Romania and Hungary

The previous section has identified which Member States could be potential candidates to host reduction projects or programmes under the ESR. This section of the report will explore a number of reduction opportunities in some of these Member States that could be tapped into by making use of reduction projects. It will thereby focus on Bulgaria, Romania and Hungary. Bulgaria and Romania were chosen because they have the lowest reduction target under the ESR. This target alone gives them little incentive to reduce emissions which implies a risk that the potential for additional reductions would remain unused.

Furthermore, these countries also have the lowest GDP per capita of the EU and might therefore be most in need for financial support to achieve further reductions. Hungary was chosen as a third example because it expects the highest surplus (in relative terms) under a business-as-usual scenario and therefore also has little incentive to unlock further reduction potential.

The assessment of the reduction potential in the different non-ETS sectors in these Member States is based on 1) the current emission profile of the selected countries, 2) the sectoral emission trends and underlying drivers under WEM projections, the Reference Scenario and the EUCO30 scenario, and 3) a comparison of specific energy or emission intensity indicators. Based on this approach, we have identified three non-ETS sectors where further emission reductions could be unlocked through reduction projects or programmes.

- Reductions in the building sector through energy efficiency improvements (all three Member States).
- Reductions in the waste sector by phasing out landfilling (all three Member States).
- Reductions in fugitive emissions from natural gas extraction and distribution (in Romania).

These three examples are far from an exhaustive overview, and undoubtedly there are other opportunities in other Member States and sectors as well.

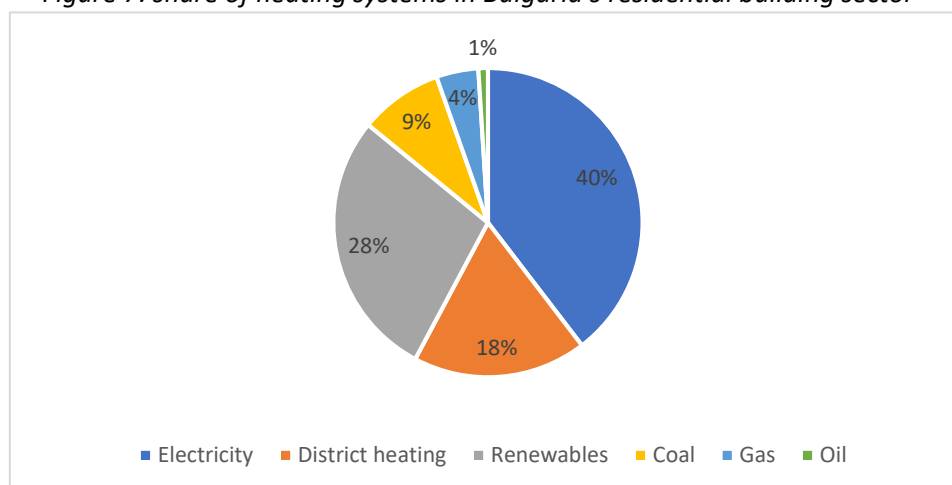
Building sector

Bulgaria

The building sector in Bulgaria only accounted for 5% of total non-ETS emissions in 2015, which is very low compared to the EU average (22%). The low share is attributable to the heating systems currently used in Bulgaria. The bulk of the energy use in residential buildings (58%) is provided by electricity and district heating, which emissions are accounted for under the EU ETS. Another 28% of total energy use comes from renewable sources (mainly wood burning), which is zero-rated under current reporting rules. Only the remaining 14% of used energy comes from direct fossil fuel combustion in buildings (of which 9% from coal use) and is thus accounted for under the ESR. A similar conclusion can

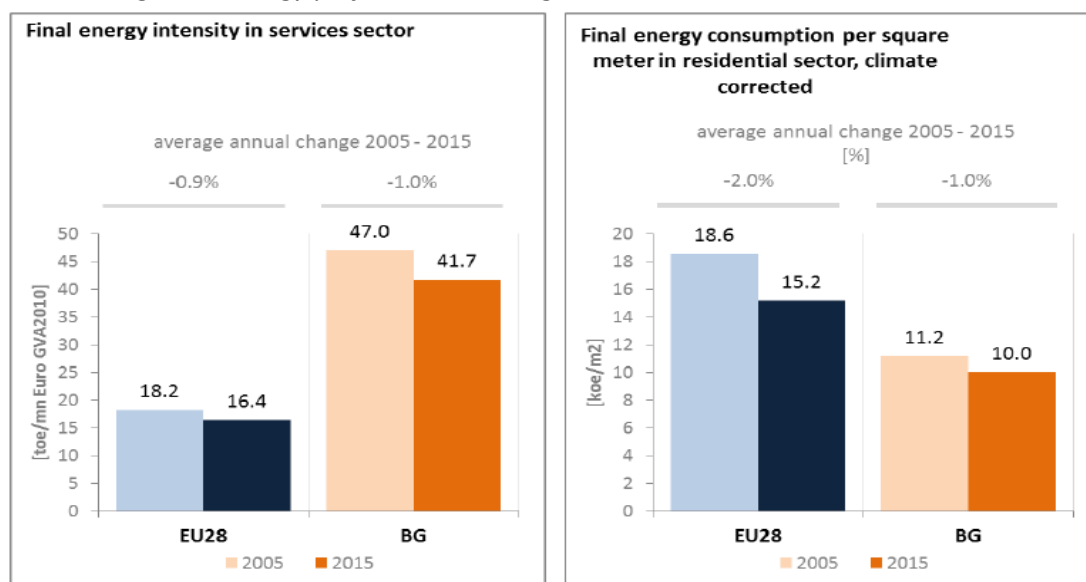
be made for commercial buildings, where electricity and district heating jointly account for 85% of total energy use.

Figure 7: share of heating systems in Bulgaria’s residential building sector²⁴



The most recent Energy Union factsheet for Bulgaria suggests that energy consumption in the Bulgarian residential sector is considerably below the EU average. However, this is due to energy poverty rather than an efficient building stock, and energy use is expected to increase significantly as household incomes rise²⁵. The energy intensity of the service sector – which is mainly driven by energy use in commercial buildings – is significantly above the EU average, which indicates potential for further efficiency gains.

Figure 8: energy performance in Bulgaria’s service and residential sector²⁶



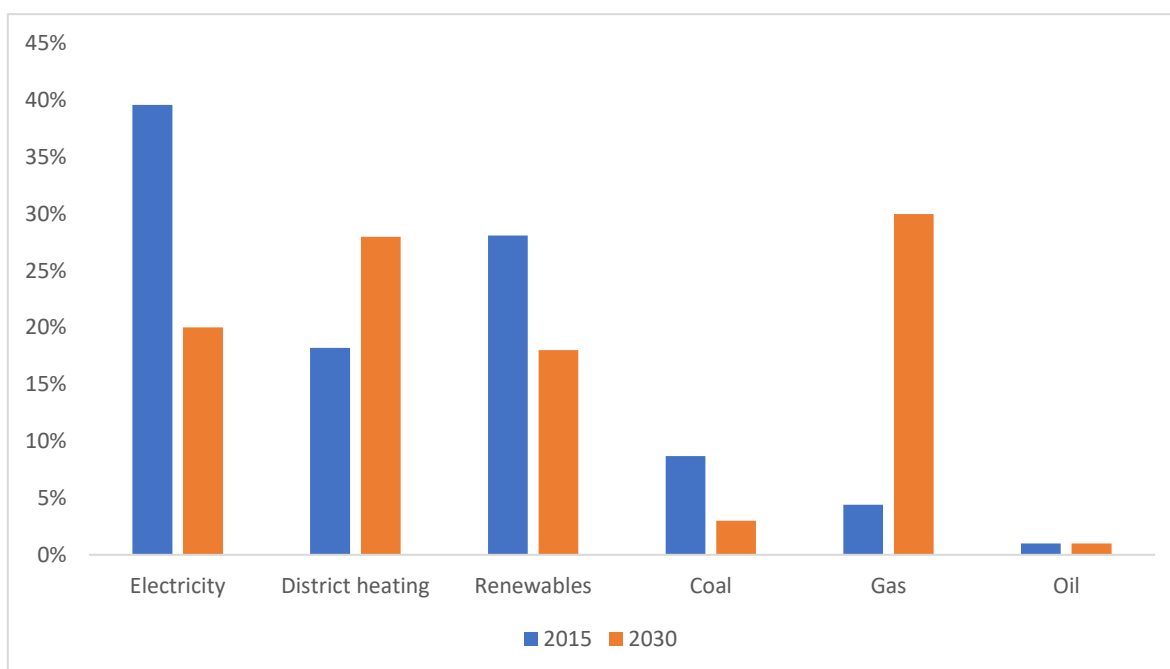
²⁴ See Bulgaria’s 2017 Report under art. 12, 13 and 14 of the Monitoring Mechanism Regulation (EU) No 525/2013, available here <http://cdr.eionet.europa.eu/>

²⁵ Ibid.

²⁶ Figure taken from the latest Energy Union factsheet for Bulgaria published by the European Commission, available here: https://ec.europa.eu/commission/publications/energy-union-factsheets-eu-countries_en

Up till 2030, Bulgaria is expecting to increase its emissions in the building sector due to reduced energy poverty and a switch from electricity (which is accounted for under the EU ETS) and biomass heating (which is zero-rated under current reporting rules) to natural gas (which is accounted under the ESR). The good news is that Bulgaria is planning/expected to further reduce the share of coal in residential heating systems. The shift away from electricity is also partially good news, as coal and lignite still account for a large share of Bulgaria's electricity mix. There is however a risk in Bulgaria's strategy to replace these systems primarily with natural gas. Although this is a cleaner fuel than coal or coal-fired electricity, there is a risk of carbon lock-in when considering that the building sector in the EU will have to decarbonise almost completely by 2050.

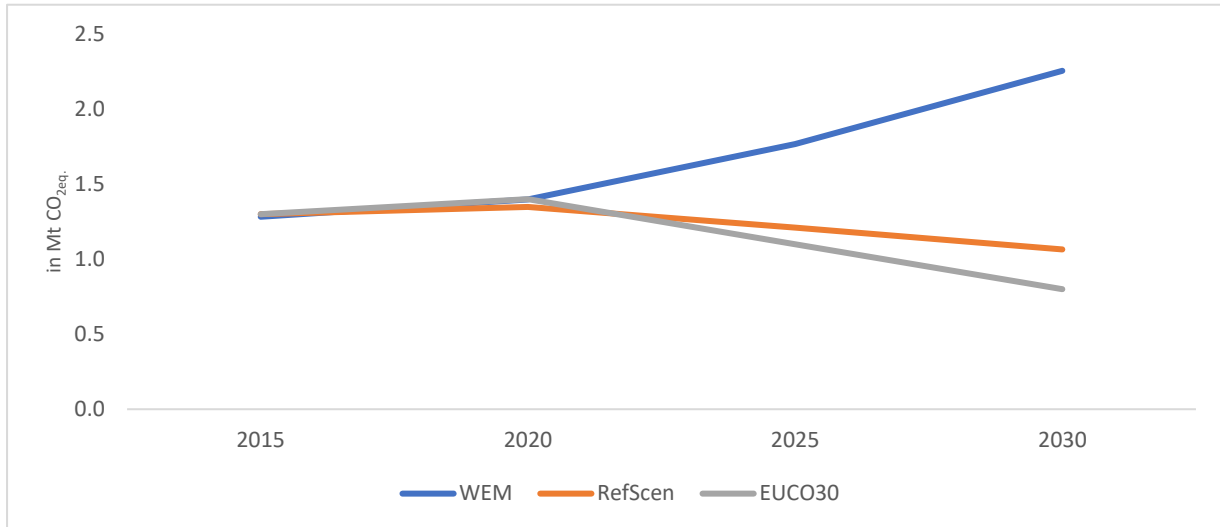
Figure 9: current and projected fuel mix in Bulgaria's residential buildings under WEM projections²⁷



Driven by reduced energy poverty and a switch to natural gas, emissions from the building sector are expected to increase 75% between 2015 and 2030 (from 1.3 to 2.3 Mt CO_{2eq.}) under WEM projections. Further efficiency improvements and low-carbon heating systems could avoid or at least limit this increase, as illustrated under the Reference Scenario and the EUCO30 scenario.

²⁷ See Bulgaria's 2017 Report under art. 12, 13 and 14 of the Monitoring Mechanism Regulation (EU) No 525/2013, available here <http://cdr.eionet.europa.eu/>

Figure 10: evolution of Bulgaria's building sector emissions under different scenarios



Under WEM projections, emissions are expected to increase due to increased energy demand and a switch away from electricity and biomass heating. Under the Reference Scenario, energy consumption per capita also increases, in line with efforts to combat energy poverty. However, the total increase in energy demand is limited due to energy efficiency improvements and a decreasing population. In combination with a decreased carbon intensity of the energy used, emissions will decrease slightly. Further energy efficiency improvements under the EUCO30 scenario could further bring down emissions.

The Reference Scenario and EUCO30 scenario illustrate that there is potential to avoid emission increases in Bulgaria's residential sector while combatting energy poverty, by combining extensive energy efficiency improvements with a decreased carbon intensity of the energy used. However, as Bulgaria is expecting to build up a surplus under the ESR even under its WEM projections, the targets alone provide no incentive to make use of this potential. Reduction projects and programmes should therefore be envisaged to support Bulgaria in combating energy poverty while at the same time limiting the overall energy use and a fossil fuel lock-in. Examples would be to combine energy efficiency improvements (either through deep renovations or demolish-and-rebuild) with renewable heat generation (e.g. heat pumps powered by renewable electricity).

Romania

The building sector in Romania accounted for 8% of total non-ETS emissions in 2015, which is very low compared to the EU average (22%). This is attributable to the large share of renewable energies (> 50%, mainly wood burning) and district heating (23%) in the residential sector²⁸. According to the latest GHG inventories reported to the UNFCCC, 53% of direct residential energy use (excluding district heating) in 2015 was generated with biomass, with another 40% coming from natural gas. Natural gas was also the predominant energy source (90%) for heating in commercial buildings.

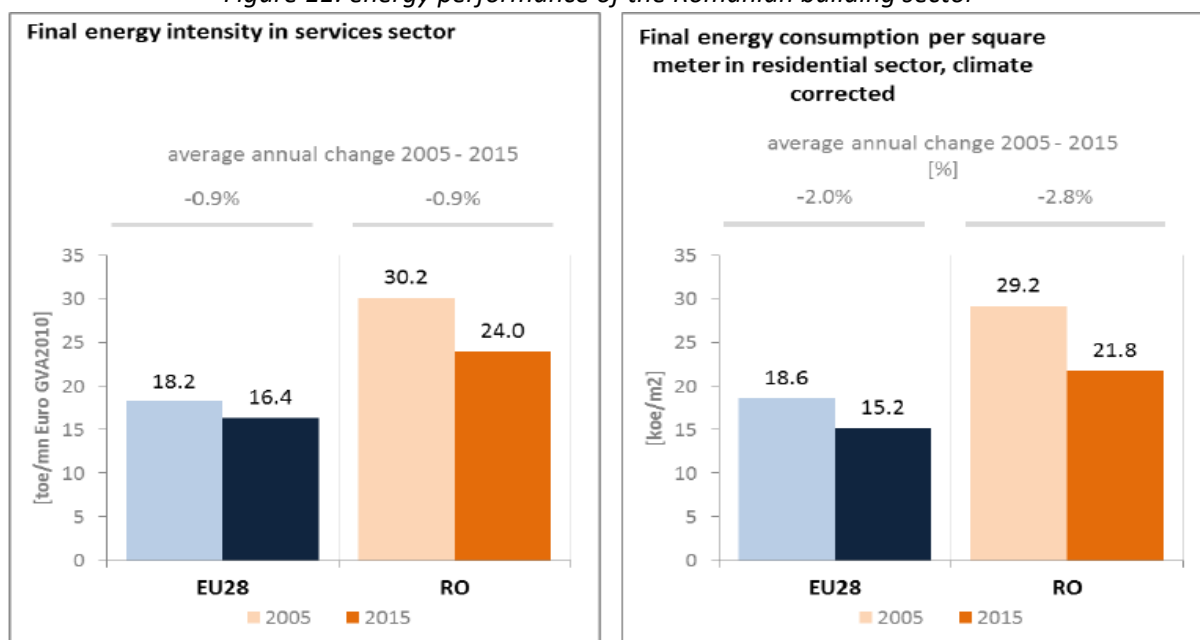
²⁸ See here: <https://www.euroheat.org/knowledge-centre/district-energy-romania/>

Table 2: share of different sources in residential and commercial energy use, based on latest GHG inventories reported to the UNFCCC

	Residential	Commercial
Liquid fuels	5%	10%
Solid fuels	1%	0%
Gaseous fuels	41%	90%
Biomass(6)	53%	

In terms of energy efficiency, the energy intensity in both the service sector as in residential dwellings is still significantly above the EU average despite a decreasing trend over the last decade. This indicates that there is considerable potential left for further improvements.

Figure 11: energy performance of the Romanian building sector²⁹



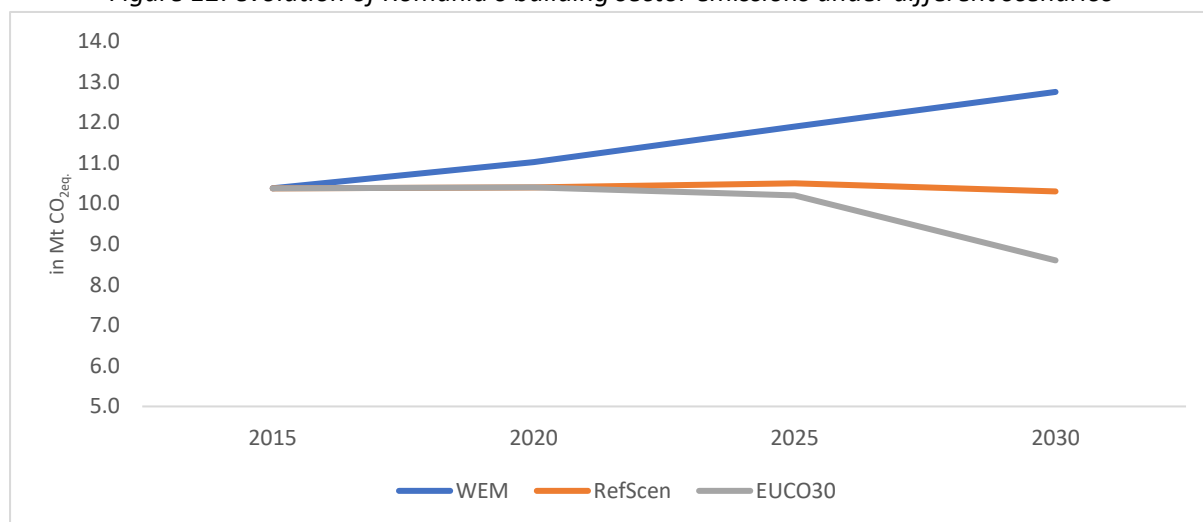
As the economy grows and household incomes increase, Romania is expecting that total energy use in both the residential (+29%) as commercial building sector (+21%) will increase continue to increase between 2015 and 2030. The increase is mainly due to a significant increase in heated surface, with only limited improvements in energy efficiency (-10% in residential buildings and -5% in the commercial buildings)³⁰. The higher energy use would increase building emissions with 23% between 2015 and 2030 (from 10.4 to 12.8 Mt CO_{2eq}.) under WEM projections. However, by making better use of the energy efficiency potential,

²⁹ Figure taken from the latest Energy Union factsheet for Romania published by the European Commission, available here: https://ec.europa.eu/commission/publications/energy-union-factsheets-eu-countries_en

³⁰ See the technical report accompanying Romania's WEM projections tables 2.30, 2.31, 2.36 and 2.37, available here: <http://cdr.eionet.europa.eu/>

building emissions could be stabilized or even turned into a reduction, as illustrated under the Commission’s Reference and EUCO30 scenario.

Figure 12: evolution of Romania’s building sector emissions under different scenarios



Under WEM projections, an increase in total energy use results in increased emissions in Romania’s building sector. Under the Commission’s Reference scenario, efficiency improvements would limit the increase in energy use per capita. Combined with a decreasing population, energy use and emissions would stabilize around 2015 levels. Further efficiency improvements under the EUCO30 scenario would unlock a 17% reduction between 2015 and 2030.

Romania will have to reduce beyond its WEM projections to ensure compliance with its annual emission limits under the ESR. However, it might lack the financial means and/or technical knowhow to fully unlock the energy efficiency potential in its building sector. Reduction projects and programmes aimed at deep energy renovations (or demolish-and-rebuild programmes) could support Romania to achieve or even overachieve its ESR target, in which case excess AEAs could be transferred to financing Member States.

Hungary

Hungary’s building sector accounted for a quarter of total non-ETS emissions in 2015, slightly above the EU average (22%). However, this is relatively large when considering the energy mix. According to Euroheat, 12% of the energy use in 2015 came from district heating³¹, which is not accounted under non-ETS emissions. The direct energy use – excluding district heating – was supplied mainly by natural gas (66%) and renewables (30%)³², resulting in a low carbon intensity of the energy used.

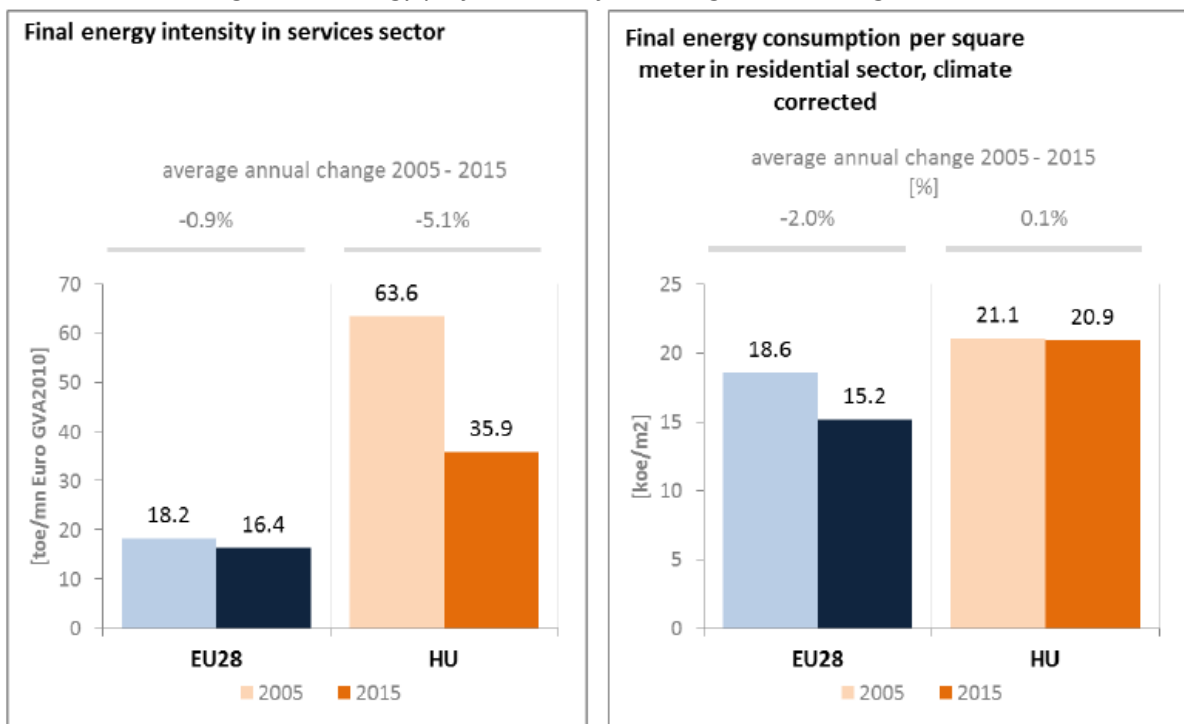
The relatively high share of buildings in total non-ETS can be explained by the poor energy performance of Hungary’s building stock. According to the latest Energy Union factsheet for, the energy performance of both the service as the residential sector are significantly above

³¹ See here: <https://www.euroheat.org/knowledge-centre/district-energy-hungary/>

³² Calculated based on energy data in the latest GHG inventories reported to the UNFCCC

the EU average. In the residential sector, the efficiency even seems to have stalled in the last 10 years.

Figure 13: energy performance of the Hungarian building sector³³

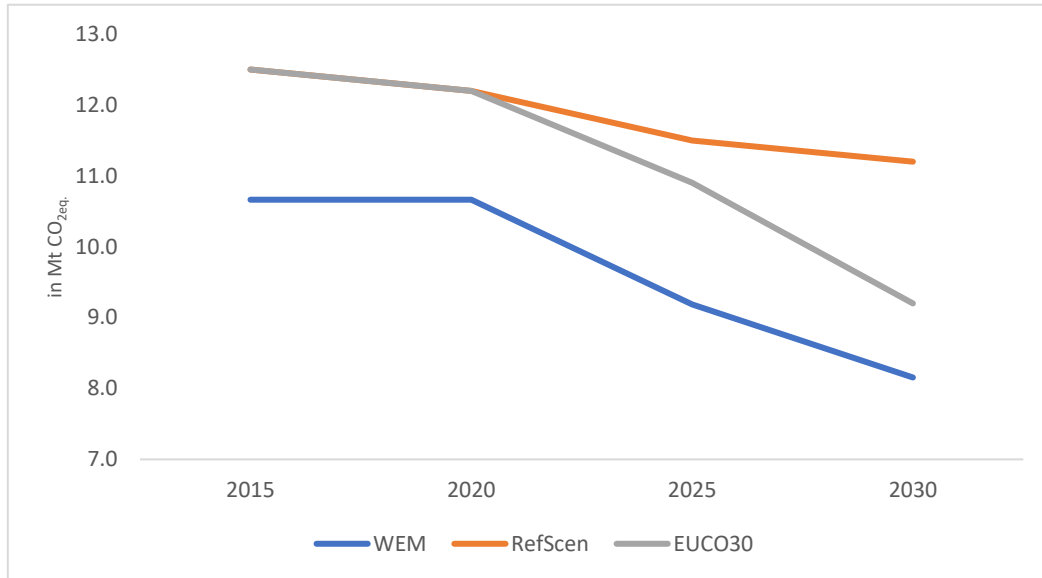


In 2015, Hungary put in place a National Building Energy Performance Strategy (NBEPS) with specific and relatively ambitious efficiency targets for 2030³⁴. If this strategy would be implemented, significant reductions in the building sector could be achieved as indicated by Hungary’s WEM projections.

³³ Figure taken from the latest Energy Union factsheet for Hungary published by the European Commission, available here: https://ec.europa.eu/commission/publications/energy-union-factsheets-eu-countries_en

³⁴ See here: https://ec.europa.eu/energy/sites/ener/files/documents/2014_article4_hungary_en%20translation.pdf

Figure 14: evolution of Romania's building sector emissions under different scenarios



The WEM scenario takes into account the energy saving targets set out in Hungary's NBEPS, resulting in a decreasing emission trend as of 2020. The decrease reductions is similar to that under the Commission's EUCO30 scenario, which suggests that the targets under the NBEPS are quite ambitious.

However, in the Commission's assessment³⁵, current and planned levels of support for residential building renovation do not seem to be sufficient to achieve the targets set out in the NBEPS, which means that Hungary would not succeed in making full use of its reduction potential. As Hungary is expected to comfortably overachieve its annual emission limits under the ESR³⁶, the non-ETS target also doesn't put any pressure on Hungary to increase the budget for support mechanisms under the NBEPS. However, additional finance could be leveraged by making use of reduction projects or programmes.

The Commission's Energy Union factsheet also indicates that there is significant energy saving potential in the modernization of district heating systems and in the broader deployment of combined heat and power generation. The emissions savings from this modernization would however be accounted under the EU ETS and this potential might therefore be more suitable for a Green Investment Scheme type approach rather than a direct emission reduction project.

Reduction opportunities in the waste sector

In all three countries considered in this report, landfilling is the main waste treatment practice, in particular for municipal waste. Landfilled waste is a major source of methane emissions, which have a global warming potential that is 25 time higher than carbon

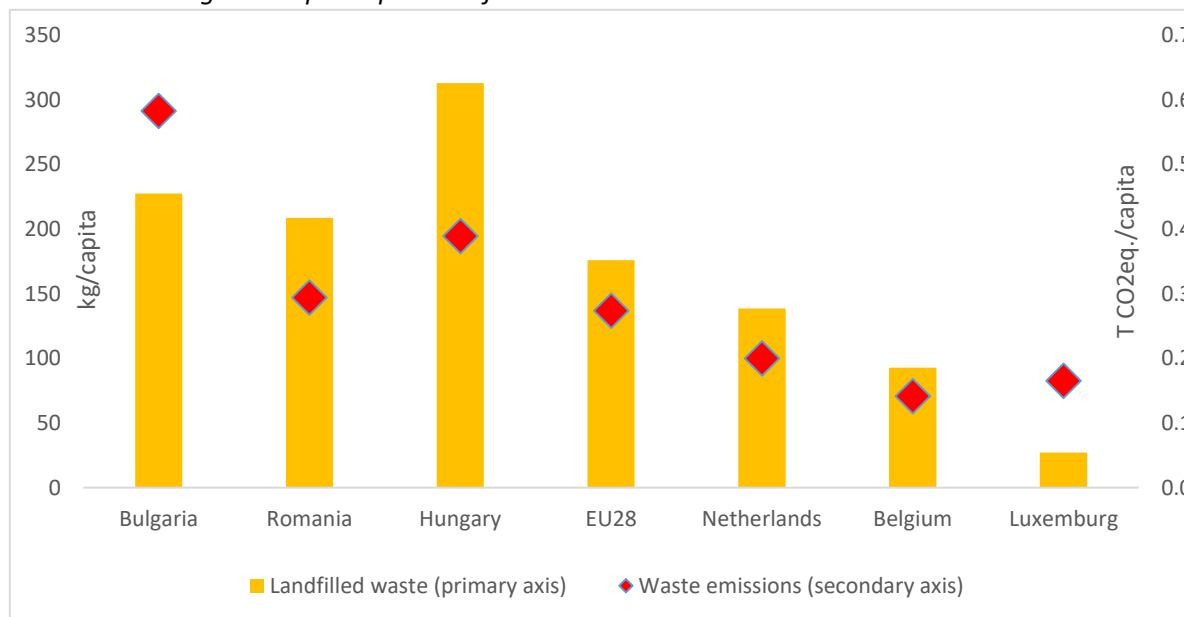
³⁵ See the latest Energy Union factsheet for Hungary published by the European Commission, available here: https://ec.europa.eu/commission/publications/energy-union-factsheets-eu-countries_en

³⁶ Non-ETS emissions in 2015 were already 14% below 2005 level, and below the -7% target set for 2030. This means that Hungary will have in fact an increase emission trajectory under the ESR.

dioxide. To a certain extent, these methane emissions can be captured and recovered for energy use.

The widespread use of landfilling in all three countries leads to relatively high emissions from the waste sector when compared to the EU average, and even more so when compared to higher income Member States (as an example, the Benelux countries were included in the figure below). This is particularly the case for Bulgaria, whose relative greenhouse gas emissions from waste (per capita) in 2015 were almost double that of the EU and triple that of the Benelux countries.

Figure 15: per capita landfilled waste and waste-related GHG emissions

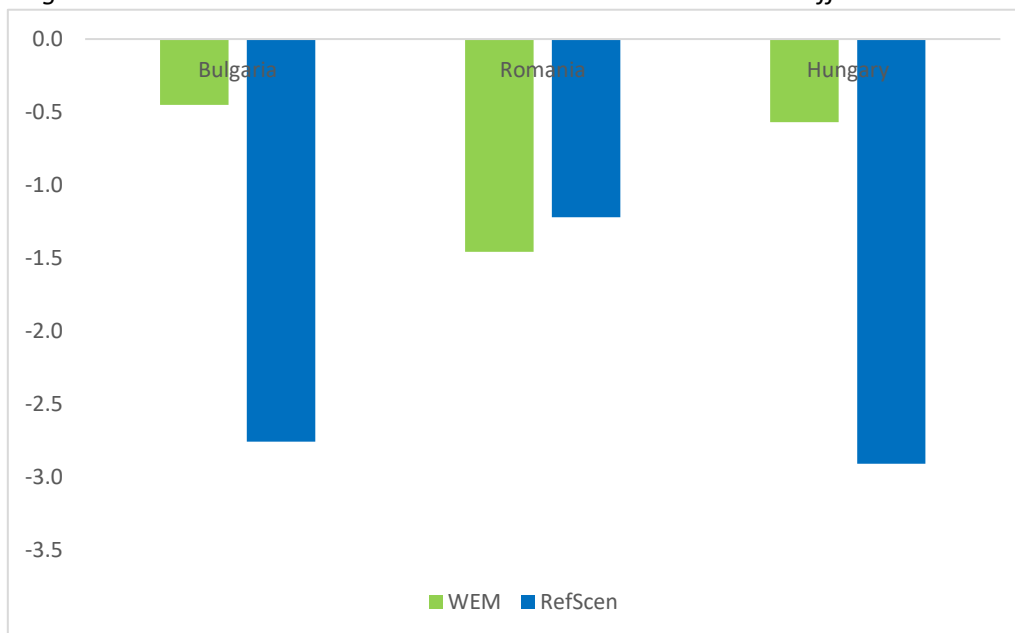


The amount of landfilled waste and waste-related GHG emissions are taken from latest available GHG inventories reported to the UNFCCC. Population data is taken from Eurostat.

Significant reductions could be achieved by phasing out landfilling and the recuperation of methane emissions from existing landfills. The EU has put in place legislation (the Landfill Directive³⁷, which is currently being revised under the Waste Package) that would – if fully implemented – achieve significant emission reductions in the Member States concerned. However, under Member States’ own WEM projections, only Romania seems to have policies in place that would result in comparable reductions by 2030.

³⁷ Directive 1999/31/EC

Figure 16: reductions in waste sector emissions 2015-2030 under different scenarios



The Commission's Reference Scenario assumes full implementation of the Landfill Directive, which leads to significant reductions in waste sector emissions. However, based on WEM projections only Romania seems to have in place policies that would result in similar reductions.

From the Commission's Reference scenario, it is clear that a full implementation of the Landfill Directive would result in steep reductions in the waste sector. The revision of that Directive and the broader Waste Package which was recently agreed could bring down emissions even further. However, from Member States own projections it seems that current measures in both Bulgaria and Hungary wouldn't be able to achieve similar reductions. This could be due to a range of factors, including a lack of financial means or know-how to put in place alternative waste treatment technologies. Reduction projects under the ESR could support these Member States in achieving compliance with the Landfill Directive, and thus contribute to both greenhouse gas reductions as a transition towards a more circular economy³⁸.

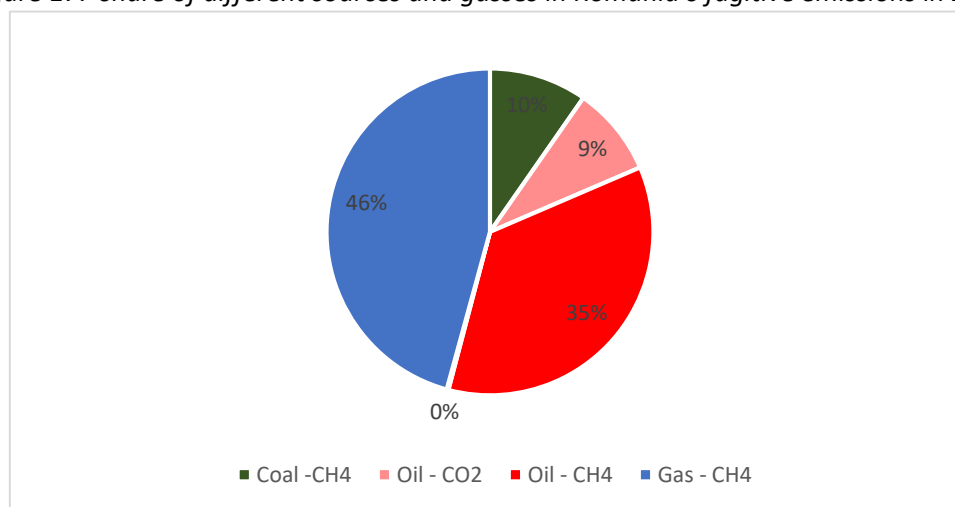
Reduction opportunities in the Romanian gas industry (fugitive methane emissions)

In 2015, fugitive emissions in Romania amounted to 11.4 Mt CO_{2eq}, which made it the third biggest sources of non-ETS emissions (after agriculture and transport, and before buildings).

³⁸ It could be argued that these reductions would not be fully additional, as Member States would already be required to take reduction measures under the Landfill Directive. On the other hand, supporting lower-income Member States in achieving compliance with sectoral policies such as the Landfill Directive could make them more supportive of increased ambition under these policies. The best approach would be to assess on a case to case basis whether measures in the waste sectors would be required under the Waste Package anyway, and whether there are sufficient other funding sources in place to finance their implementation.

Oil and natural gas production both accounted for 45% of total fugitive emissions (in terms of CO_{2eq.}), with coal responsible for the remaining 10%. Over 90% of fugitive emissions (in terms of CO_{2eq.}) come from methane leakage and venting.

Figure 17: share of different sources and gasses in Romania's fugitive emissions in 2015

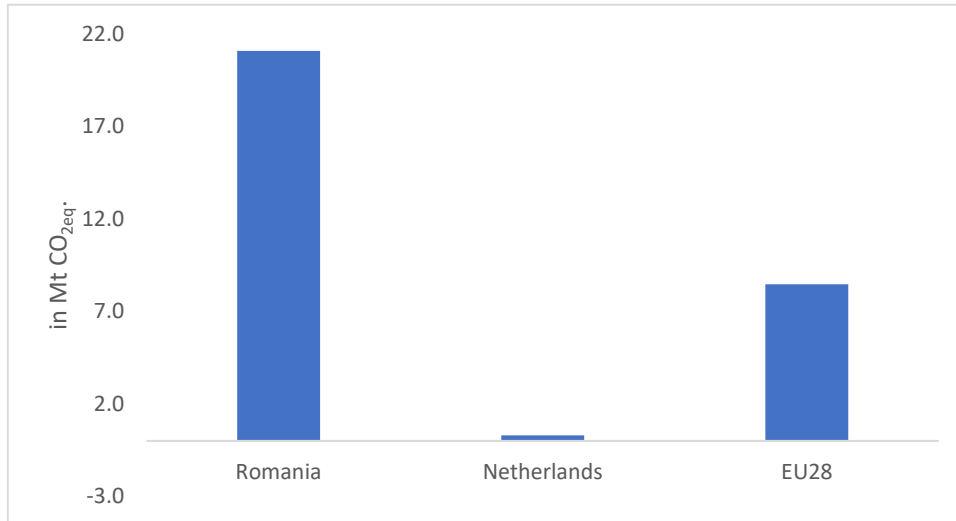


Both Romania's own projections as the Commission's scenarios only expect minor reductions in fugitive emissions (primarily methane from natural gas extraction and distribution) until 2030. However, a recent study by the Oxford Institute for Energy Studies suggests that the methane emission rate – that is the amount of methane emissions compared to the level of natural gas production or consumption – in Romania (1.2%) is significantly higher than in other EU Member States (0.2%). The Netherlands on the other hand seems to be the world leader when it comes avoiding fugitive emissions³⁹.

This is confirmed when comparing the methane emission rate from natural gas production based on the latest GHG inventories and primary energy production data available on Eurostat. As shown in figure 18 below, the methane emissions per unit of produced natural gas in Romania is three times higher than the EU average, and almost 70 times higher than in The Netherlands!

³⁹ Oxford Institute for Energy Studies (2017), "Methane emissions: from blind spot to spotlight", see table 4, available here: <https://www.oxfordenergy.org/wpcms/wp-content/uploads/2017/07/Methane-Emissions-from-blind-spot-to-spotlight-NG-122.pdf>

Figure 18: methane emissions per tonne of natural gas production in 2015 (in tonnes CH₄)⁴⁰



If interested in financing reduction projects, Member States with better performance in natural gas extraction – such as The Netherlands – could look into supporting reduction projects (both in terms of finance as knowledge and technology sharing) to reduce the fugitive methane emissions in the Romanian gas sector.

⁴⁰ Methane emissions based on CRF category 1.B.2.b in the latest GHG inventories (excluding venting, flaring, as this data was not available specifically for natural gas in the Dutch GHG inventories). Primary production of natural gas taken from Eurostat database NRG_109a.

6. Off to a flying start: the way forward

Previous sections of this report have argued that there are both strong arguments as potential for project-based cooperation between Member States under the Effort Sharing Regulation. When looking at the way forward, there are good reasons not to waste time and for all relevant stakeholders (both Member States as the private sector) to actively start exploring possibilities and engaging with each already in the coming months (and years).

Early start to maximize benefits: The most obvious reason for proceeding quickly with the implementation of reduction projects under the ESR is to maximize cumulative emission reductions over the years, and to avoid investments in carbon-intensive infrastructure as soon as possible. Furthermore, as there is no clarity yet on what will happen after 2030, it is probable that host Member States will only credit reduction projects with AEAs until that year. This means that the sooner in 2021-2030 a reduction project is completed the more reductions could be achieved, the longer the crediting period and the more AEAs could be freed up and transferred to the buying Member State.

Pave the way for a ratchet in 2024-2025: this report has already argued that the current -30% target for 2030 should be increased and steeper reductions are needed to keep the upper end of the EU long term commitment of 80% to 95% emission reductions by 2050 within reach. A good opportunity to increase the target for 2030 and to establish a framework for post-2030 will come in 2024-2025, when the Commission is to submit a report and appropriate legislative proposals to reflect the outcome of the first global stocktake under the Paris Agreement and the updated EU long term climate strategy. By implementing the first reduction projects already early in the period 2021-2030, this flexibility option will gain credibility and give both higher- as lower-income Member States more confidence that steeper reductions can be achieved cost-effectively.

Provide a credible alternative to the flexibility with the EU ETS: one of the key recommendations in this report for Member States is to prioritize the option of reduction projects within the non-ETS sectors before turning to the flexibilities with the EU ETS and the LULUCF sector. However, the first decision on the use of the flexibility with the EU ETS will have to be made before 2020 and the revision possibilities in 2024 and 2027 only provide a partial solution⁴¹. It is therefore important to create sufficient certainty on the potential for reduction projects before 2020. By exploring the potential for reduction projections with candidate host Member States before 2020, Member States that have access to the flexibility

⁴¹ Member States will have to make an initial decision on how many EUAs they wish to cancel under this flexibility mechanism before 2020. As of 2021, one-tenth of the total volume in the initial decision will be cancelled annually. If a Member State decides before the end of 2024 to cancel less EUAs, this would only have an impact on the cancellations as of 2026 (due to the time required to update the auctioning calendars). By then, 50% of the total amount of EUAs in the initial decision will already have been cancelled (10% in each year from 2021 to 2025) and can be used for compliance under the ESR.

with the EU ETS will have more confidence that they will not need this because there will be a better alternative available in 2021-2030.

We therefore recommend both the private sector as Member States to start exploring and discussing the potential for reduction projects in the non-ETS sectors as soon as possible, and before 2020. Member States are currently preparing their National Climate and Energy Plans (NCEPs) under the Governance Regulation (negotiations ongoing), which will have to be finalized in 2019 (according to the latest text version). These plans will give valuable information on the policies and measures which are planned in the different Member States and what to expect in terms of non-ETS emission for the period 2021-2030. This could be used a basis for further assessment of which Member State might need to make use of the flexibility mechanisms provided under the ESR (and how much), and in which Member States there could be potential for further cost-effective reductions through reduction projects.

Annex 1: detailed assessment of the ESR outcome

Starting point

Several options for the starting point have been put on the table during the negotiations on the ESR. The main options were:

- The original Commission proposal (which the Council adopted in its position): the starting point is set in 2020 based on the average 2016-2018 emissions;
- European Parliament position: the starting point is set in 2018 either based on the average 2016-2018 emissions or the 2020 target, whichever is the lowest;
- The final outcome: the starting point is set either in June 2019⁴² or in 2020 (whichever results in the lowest AEA budget⁴³) based on the average 2016-2018 emissions.

The table below shows the estimated impact of these different options on the AEA budgets for the different Member States (excluding the additional AEA allocations under Annex IV of the ESR). It shows that the position of the European Parliament would have tightened the overall AEA budget under the ESR with 537 Mt CO_{2eq.}; The final outcome would the overall budget with only 121 Mt CO_{2eq.}, which means that only 25% of the difference between the Council position and the European Parliament position was bridged in the end deal.

⁴² "at five twelfth of the distance between 2019 and 2020"

⁴³ De facto this means that the starting point for Member States whose 2016-2018 emissions were already below their 2030 target and which thus have an increasing trajectory under the ESR, will be set in 2020.

Table A.1: cumulative 2021-2030 AEA's under the different negotiation positions, excluding Annex IV allocations (in Mt CO_{2eq.})

	Council (=Commission)	European Parliament		Final outcome		
		Total	Difference	starting date	Total	Difference
AT	424	406	-17	Jun-19	421	-3
BE	614	582	-32	Jun-19	609	-5
BG	226	225	-1	Jun-19	226	0
HR	156	157	1	Jan-20	156	0
CY	35	34	0	Jun-19	35	0
CZ	558	553	-5	Jun-19	557	-2
DK	279	273	-6	Jun-19	277	-2
EE	53	52	-1	Jun-19	52	0
FI	250	236	-13	Jun-19	247	-2
FR	2,922	2,852	-70	Jun-19	2899	-23
DE	3,622	3,392	-229	Jun-19	3585	-36
EL	502	506	4	Jan-20	502	0
HU	430	433	3	Jan-20	430	0
IE	382	347	-35	Jun-19	379	-3
IT	2,455	2,419	-36	Jun-19	2443	-12
LV	85	84	-1	Jun-19	85	0
LI	127	126	-1	Jun-19	126	0
LU	72	68	-3	Jun-19	71	-1
MT	11	10	-1	Jun-19	11	0
NL	897	884	-13	Jun-19	892	-4
PL	1,778	1,761	-17	Jun-19	1772	-6
PT	407	407	-1	Jun-19	407	0
RO	742	741	0	Jun-19	742	0
SK	201	201	0	Jan-20	201	0
SI	104	103	-1	Jun-19	104	0
ES	1,831	1,817	-14	Jun-19	1826	-5
SE	289	285	-5	Jun-19	288	-2
UK	2,891	2,848	-43	Jun-19	2876	-14
EU28	22,341	21,804	-537		22220	-121

For the 2016-2018 non-ETS emissions that determine the starting point, we have taken the following values:

- 2016: emissions are taken from the latest proxy inventories⁴⁴
- 2017-2018: emissions are taken from the latest WEM projections reported by the different Member States. We opted for WEM projections as these are more recent and closer in line with observed emission trends in 2014-2016, compared to the Commission's Reference Scenario.

⁴⁴ Taken from table 7 in the Commission's 2017 Progress Report, available here: https://ec.europa.eu/clima/sites/clima/files/strategies/progress/docs/swd_2017_xxx_en.pdf

Banking limitation

To illustrate why the banking limitation that was introduced under the ESR is purely symbolical, the figure below shows the expected cumulative surplus and banking limit for Hungary in the period 2021-2030. Hungary was taken as an example because it is the Member States that is expected to generate the largest cumulative surplus in relative terms (% of its AEA budget in 2021-2030).

Figure A.1: Expected cumulative surplus and banking limit for Hungary

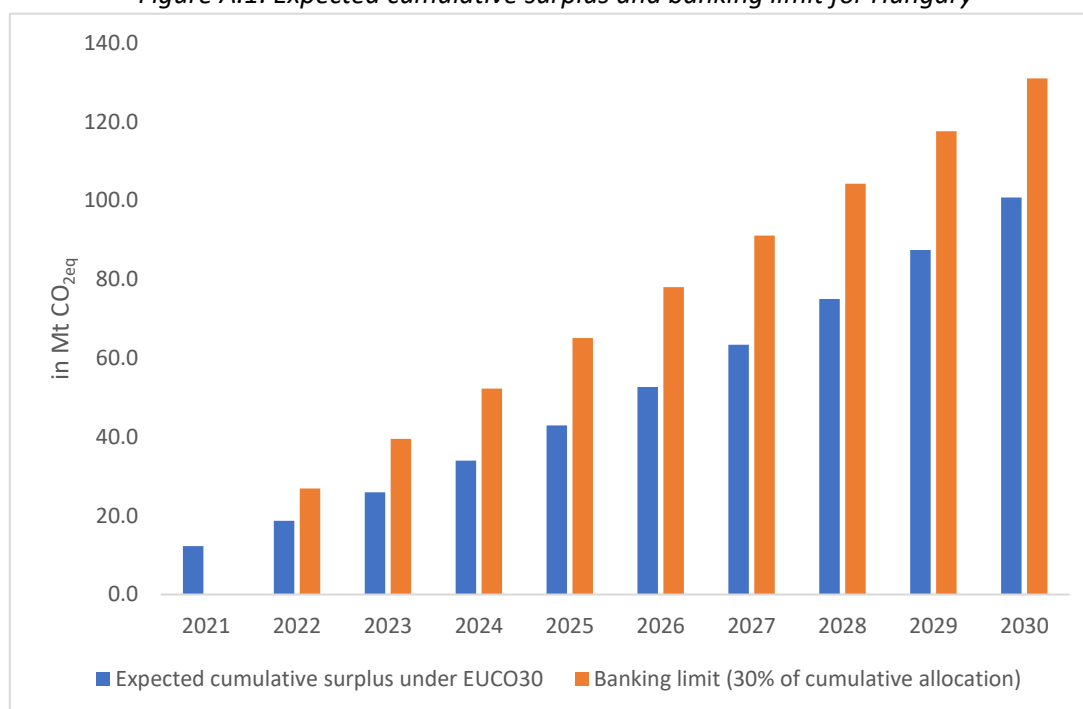


Figure A.1 above shows that the expected cumulative surplus under the EU030 scenario – which assumes additional emission reductions beyond current measures – in Hungary would remain comfortably below the banking limit. The reason is that the banking limit increases annually as it is set at 30% of the cumulative AEA budget up to each year. E.g. the banking limit for 2025 is calculated as 30% * the cumulative AEA budget for 2021-2025.

It is therefore very unlikely that the limitation would ever be triggered. Consequently, the introduced banking limitation is purely symbolical and does nothing to safeguard the 2030 target.

LULUCF flexibility

The overall limit for the use of LULUCF credits under the ESR is set at 280 million. However, the ESR contains further restrictions that will limit the actual use of LULUCF credit:

- Member States can only use them for compliance purposes, in case they have insufficient AEAs themselves (including any banked excess AEAs) to cover their emissions.
- Member States can only use LULUCF credits to the extent that they have been a net-generator of such credits;

To estimate the amount of LULUCF credits that could be used in practice, our analysis is based on the following assumptions:

- Emissions in 2021-2030 will evolve in line with the Commission’s Reference Scenario
- Member States will make maximum use of the possibility to bank surplus AEs
- As the use of Forest Management credits under the ESR will be permitted as soon as the Forest Management Reference Levels are set, all Member States will be able to generate sufficient credits to make full use of the LULUCF flexibility under the ESR

The table below shows which Member States could actually make use of the LULUCF flexibility based on these assumptions. Overall, up to 204 million LULUCF credits could be used. A sensitivity analysis was carried out to see how many less credits could be used under a lower emission scenario (the EUCO30 scenario). This would result in a potential use of up to 153 million LULUCF credits.

Table A.2: Maximum limit and potential use of LULUCF credits under different scenarios

Member State	LULUCF limit	Potential use - Reference Scenario	Potential use - EUCO30
Austria	2.5	2.5	2.5
Belgium	3.8	3.8	3.8
Bulgaria	4.1	0.0	0.0
Croatia	0.9	0.0	0.0
Cyprus	0.6	0.6	0.6
Czech Republic	2.6	0.0	0.0
Denmark	14.6	14.6	9.2
Estonia	0.9	0.0	0.0
Finland	4.5	4.5	2.4
France	58.2	58.2	35.6
Germany	22.3	22.3	22.3
Greece	6.7	0.0	0.0
Hungary	2.1	0.0	0.0
Ireland	26.8	26.8	26.8
Italy	11.5	11.5	11.5
Latvia	3.1	0.0	0.0
Lithuania	6.5	0.0	0.0
Luxemburg	0.3	0.3	0.3
Malta	0.0	0.0	0.0
Netherlands	13.4	13.4	13.4
Poland	21.7	21.7	21.7
Portugal	5.2	0.0	0.0
Romania	13.2	0.0	0.0
Slovakia	1.2	1.2	1.2
Slovenia	1.3	0.0	0.0
Spain	29.1	0.0	0.0
Sweden	4.9	4.9	1.7
United Kingdom	17.8	17.8	0.0
EU28	280	204	153

Safety reserve

The overall limit of the Safety Reserve is set at 105 million AEs. However, the actual size will depend on the extent to which the EU overachieves its -30% reduction target for non-ETS sectors by 2030. Per percentage point overachievement, about 29 million AEs would be generated by the Safety Reserve. The maximum level of 105 million AEs would be reached if the EU reduces its non-ETS emissions with -33.6% by 2030 (compared to 2005).

The AEs in the Safety Reserve could be used by lower-income Member States for compliance in 2026-2030, certain to subject to certain conditions:

- The Member State had a GDP/capita in 2013 below the EU average
- The Member State has built up a cumulative surplus of AEs under the current ESD (period 2013-2020)
- The Member State has not made any net-transfers of AEs to another Member State in 2021-2030, has exhausted the possibility to bank and borrow AEs and the possibility to use LULUCF credits, and yet still faces a deficit for the period 2026-2030

The share of each eligible Member State in this Safety Reserve will be calculated based on the cumulative surplus it has built up under the current ESD⁴⁵. Furthermore, decision-makers have included a second distribution round in the Safety Reserve that poses a significant risk to the incentive for lower-income Member States to reduce their emissions. This second distribution round allocates any leftover AEs in the Safety Reserve to those Member States that still face a reduction gap after the first round.

Assuming emissions will evolve in line with the Commission's Reference Scenario, the table below show that this second distribution round will imply that all of the AEs in the Safety Reserve will go to just four Member States: Italy, Poland, Slovakia and Cyprus. In case the Safety Reserve would reach its maximum amount (105 million AEs), these Member States would receive sufficient access to cover around half of their expected deficit.

⁴⁵ The provisional share will be calculated as 20% of the cumulative surplus in 2013-2020. If necessary, the provisional shares will be reduced on a pro rata basis to ensure the overall limit (maximum 105 million AEs) is maintained.

Table A.3: potential distribution of the Safety Reserve (in Mt CO_{2eq})

	surplus 13-20	Provisional access (20%)	Final Access Round 1	Balance 21-30	Use round 1	Remaining deficit	Use round 2	Total use
Bulgaria	30	6	3	5.9	0	n.a.	n.a.	0
Croatia	35	7	4	11.8	0	n.a.	n.a.	0
Cyprus	9	2	1	-1.9	1	-0.9	0.4	1.3
Czech Republic	38	8	4	26.7	0	n.a.	n.a.	0
Estonia	1	0	0	7.4	0	n.a.	n.a.	0
Greece	102	20	10	100.7	0	n.a.	n.a.	0
Hungary	94	19	9	86.8	0	n.a.	n.a.	0
Italy	245	49	25	-103.3	25	-78.7	32.3	56.9
Latvia	5	1	0	10.9	0	n.a.	n.a.	0
Lithuania	7	1	1	8.5	0	n.a.	n.a.	0
Malta	-1	0	0	3.2	0	n.a.	n.a.	0
Poland	87	17	9	-71.2	9	-62.5	25.6	34.3
Portugal	70	14	7	45.6	0	n.a.	n.a.	0
Romania	65	13	7	57.3	0	n.a.	n.a.	0
Slovakia	39	8	4	-24.6	4	-20.7	8.5	12.4
Slovenia	12	2	1	10.5	0	n.a.	n.a.	0
Spain	204	41	20	59.2	0	n.a.	n.a.	0
Total	1044	209	105		38		67	105

- The surplus for 2013-2020 is calculated based on the verified emissions for 2013-2015, proxy emissions for 2016 and WEM projections for 2017-2020.
- The provisional access is calculated as 20% of the surplus in 2013-2020. A uniform factor is then applied to limit the total access to 105 million, in order to determine each Member State's access for round 1.
- To the extent that a Member States has a deficit in 2021-2030 (after making full use of the LULUCF flexibility), it receives AEAs based on its access for round 1. This leads to a total use of 38 million AEAs.
- The remaining 67 million AEAs are then distributed in a second round to the remaining Member States with a deficit proportionally to their remaining shortfall.

Annex 2: emission projections and scenarios used

The analysis underpinning this report is based on three different emission scenarios.

WEM projections:

Under the Monitoring Mechanism Regulation⁴⁶, Member States are required to develop and report emission projections every two years, with a split between ETS and non-ETS emissions. Member States are required to project how emissions would evolve ‘with existing measures’ (= WEM projections), which includes the effect of all the policies that are already adopted and implemented. It can therefore be considered as a ‘business as usual’ scenario. Member States may also provide projections on how emissions would evolve ‘with additional measures’ (= WAM projections), which also takes into account policies and measures that are being planned but which are not yet adopted or implemented.

This report takes into account the most recent WEM projections that were reported in 2017, and which provide emission projections until 2035. As not all Member States have reported WAM projections, these have not been taken into account for the analysis underpinning this report.

The WEM projections have mainly been used for this report to determine the expected emission levels between now and 2020. The reason for this is that these projections are more recent and more in line with recently observed emission trends under the current Effort Sharing Decision compared to the Commission’s Reference Scenario (see below). WEM projections were therefore used to determine the starting point under the ESR (which is based on 2016-2018 emissions) and the expected surplus for 2013-2020 (which determines the access of Member States to the Safety Reserve). For specific Member States where there is a large difference between the WEM projections and the Reference Scenario (see below), the WEM projections were also used to provide a sensitivity analysis.

Commission’s Reference Scenario:

In 2016, the Commission developed an updated Reference Scenario (the previous version dated from 2013) to prepare for the upcoming proposals on climate (the Effort Sharing Regulation), energy (the Clean Energy Package) and transport (e.g. new standards for vehicles). The scenario models how emissions could evolve based expected socio-economic developments (population and economic growth, fuel prices) and existing and agreed measures and objectives. It is mainly based on the PRIMES model (for CO₂ emissions) and the GAINS model (for non-CO₂ emissions).

Although both the WEM projections as the Reference Scenario take into account existing measures, there are some main differences. The WEM projections only take into account the effect of policy measures in place, even if those measures are insufficient to achieve already agreed targets and objectives. The Reference scenario on the other hand assumes sufficient measures will be put in place to achieve already agreed objectives. For example, based on the targets set out in the Landfill Directive, the Reference Scenario assumes that significant reductions will happen by 2030 in the waste sector in lower-income Member States. However, these Member States have so far not yet put in place sufficient policy measures in the national level to in fact achieve these objectives, and

⁴⁶ See article 14 of Regulation (EU) 525/2013

consequently the WEM projections do not assume similar reductions in the waste sector of those countries.

For this report, the Reference Scenario was used as the default scenario for emissions in the period 2021-2030.

Further information on the 2016 Reference Scenario is available here:

<https://ec.europa.eu/energy/en/data-analysis/energy-modelling>

Commission's EUCO30 scenario:

The EUCO30 scenario which is part of a set of scenarios that have been developed for the European Commission in preparation of the 2030 Climate and Energy Framework and the different legislative proposals thereunder, including the Effort Sharing Regulation. These scenarios build on the Commission's Reference Scenario and look at what happens under a certain carbon value and specific measures related to renewable energy and energy efficiency. Under the EUCO30 scenario, greenhouse gas emissions are reduced by 40% by 2030 compared to 1990 (split between 43% reductions in the ETS sectors and 30% reductions in the ESR sectors, both compared to 2005), renewable sources account for 27% of the total energy supply in 2030, and the energy efficiency is improved by 30% by 2030. The scenario therefore corresponds with the climate and energy targets as put forward by the Commission.

Because these scenarios apply a harmonized carbon value over the different sectors and Member States, they can be considered to give a cost-effective distribution of greenhouse gas reductions. To date, these are the only available scenarios that include a cost-effective distribution between sectors and Member States for the achievement of the EU 2030 climate and energy targets. They formed the basis of the cost-effective split of the -40% reduction target between the EU ETS (-43% compared to 2005) and the non-ETS sectors (-30% compared to 2005), as well as the adjustments to the ESR targets for some higher-income Member States to reflect cost-effectiveness.

It is important to note that these policy scenarios only trigger additional reductions in CO₂ emissions (based on the PRIMES model) compared to the Reference Scenario. The results for non-CO₂ emissions (based on the GAINS model) remain largely unchanged between the Reference Scenario and the different policy scenarios.

Further information on the EUCO30 scenario (and other policy scenarios) is available here:

[https://ec.europa.eu/energy/sites/ener/files/documents/20170125 -
_technical_report_on_euco_scenarios_primes_corrected.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/20170125_-_technical_report_on_euco_scenarios_primes_corrected.pdf)