The Coalition for ENERGY SAVINGS

# 2040 CLIMATE TARGET: NO DECARBONISATION WITHOUT ENERGY SAVINGS

### Analysis of the Commission's communication & Impact Assessment on the 2040 climate target

On the 6th of February, the European Commission published the communication on the 2040 climate target [1] accompanied by an Impact Assessment (IA).[2] It recommends that the EU cuts its greenhouse gas (GHG) emissions by a net 90% by 2040. This briefing reviews how energy savings and energy efficiency contribute to reaching this climate objective according to the Commission's communication and underlying modelling.

***Key findings:***

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|---|---|
| **1** | There is a clear mismatch between the Commission's communication on the 2040 climate target and the IA regarding the role of energy efficiency and energy savings in reducing emissions. While the IA shows that reduction of energy use is a key driver to cut emissions, the communication does not sufficiently stress the contributions of energy efficiency in that respect. |
| **2** | Achieving the Fit for 55 package's objectives this decade is the prerequisite for a 90% cut in GHG emissions by 2040. This includes meeting the 2030 EU energy efficiency target and ensuring the full implementation of the 2023 Energy Efficiency Directive (EED).[3] |
| **3** | Progress in reducing energy consumption must continue in the next decade at a level of effort that is comparable to that of the 2020-2030 decade. |
| **4** | All sectors must significantly reduce their energy consumption, with the largest expected drops in the transport and residential sectors. |
| **5** | The importance of energy efficiency to cut emissions of Europe's industries is mentioned, but a clear recognition of the role of energy efficiency technologies as an enabler for industrial decarbonisation is still missing. |
| **6** | The adoption of more sustainable lifestyles in all sectors can enable additional energy savings while reducing the societal costs of achieving the 2040 climate goal. However, the additional energy savings that can be achieved with behavioural changes are relatively small, which may be the result of the modelling assumptions. |

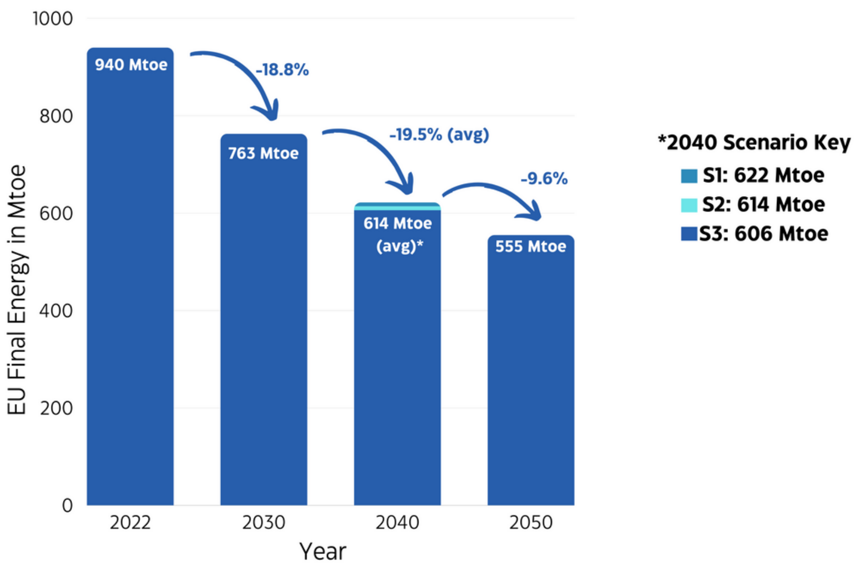
1 European Commission, Communication on 2040 climate target, COM(2024) 63 final.
2 European Commission, Impact Assessment on 2040 climate target, SWD(2024) 63 final;
3 Directive - 2023/1791 - EN - EUR-Lex (europa.eu)

### *Is there a mismatch between the Communication and the Impact Assessment for energy efficiency?*

Within the Commission's communication, the role of reducing energy use to cut emissions appears relatively minor with energy efficiency blended together with other "zero and low carbon energy solutions". The Energy Efficiency First principle is referred to as a "central policy principle" and it is recognised that achieving the 2030 energy efficiency objective will also have an impact in achieving the 2040 climate objective. However, the communication remains vague on the need to maintain a rate of energy efficiency progress in the next decade comparable to the one required for the current 2020-2030 decade (see below). Instead, it focuses on the importance of "*novel technologies*" such as hydrogen production by electrolysis, carbon capture and use, and industrial carbon removals to meet higher decarbonisation goals.

The IA indeed shows a significant different picture compared to the communication: the three scenarios[4] modelled rely on a strong (and quite similar) reduction of final energy use. For final energy consumption, the scenarios assume as a basis the achievement of the EED target of 11.7% by 2030 (763 Million of tonnes equivalent (Mtoe)). In 2040, the three scenarios project a final energy consumption of 622 Mtoe in S1, 614 Mtoe in S2 and 606 Mtoe in S3 (an average of 614 Mtoe between the scenarios). This means that final energy must be reduced by 18.8% between 2022 and 2030 and then by about 19.5% between 2030 and 2040, which is a comparable level. The IA also provides data for the EU's 2050 final energy consumption, estimated at 555 Mtoe.

Figure 1: Expected decrease in final energy according to the 2040 climate target IA:

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[4] The Impact Assessment models three scenarios to set the EU's 2040 climate target, referred to as S1, S2 and S3. S1 models a net GHG reduction target of up to 80%, S2 a target of at least 85% and up to 90% and S3 of at least 90% and up to 95% (S3 being the level recommended by the European Scientific Advisory Board on Climate Change).

Figure 2: Comparison of 2040 scenarios' result with different baselines:

| | Final Energy Consumption (Mtoe) | Comparision with EU 2022 final energy consumption (940 Mtoe)[5] | Comparision with 2030 EU Energy Efficiency target (763 Mtoe) |
|---|---|---|---|
| 2040 consumption – S1 | 622 Mtoe | - 33.8% | - 18.5% |
| 2040 consumption - S2 | 614 Mtoe | - 34.7% | - 19.5% |
| 2040 consumption- S3 | 606 Mtoe | - 35.5% | - 20.6% |
| 2050 consumption | 555 Mtoe | - 41% | - 27.3% |

The IA also provides results in terms of the reduction of Gross Available Energy (GAE),[6] which follows a similar pattern to final energy until 2040. For the EU as a whole, the modelling expects that GAE will decrease from 1160 Mtoe in 2030 to about 1020 Mtoe in 2040. However, GAE slightly increases in 2050 compared to 2040, to 1032 Mtoe, while final energy keeps decreasing in the decade 2040-2050.

It is important to note that the modelling for energy efficiency policies is based on the adopted recast of the Energy Efficiency Directive (EED), but only considers the Commission's proposal for the recast of the Energy Performance of Buildings Directive (EPBD)[7] and the national measures planned in the integrated National Energy and Climate Plans (NECPs) of 2019. This means that the modelling outputs, notably for the building sector, do not reflect the latest agreed EU legislation and national plans, which could lead to diverging results.

***A continued reduction of energy consumption for all sectors:***

All sectors must contribute to reducing energy consumption, and therefore emissions, according to the IA[8] :

- **In the building sector**, final energy consumption is expected to decrease by 35-38%[9] by 2040 and by about 40% by 2050 compared to 2015 levels. In that effort, residential buildings would contribute more than buildings in the service sector. Residential buildings' consumption is expected to decrease by 29% in 2030 compared to 2015, by 39-41% in 2040 compared to 2015, and finally by 44% in 2050 compared to 2015 levels. Service buildings would see instead a decrease of their consumption by 23% in 2030 compared to 2015 consumption, 27-32% in 2040 compared to 2015, and stabilises at a 31% reduction in 2050 compared to 2015.

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[5] See the latest Eurostat data.

[6] Gross Available Energy is a more comprehensive statistic to quantify primary energy consumption, as it also includes final non-energy consumption and international maritime. See the EU energy in figures glossary.

[7] See page 164 of the IA for a full list of the main common legislative elements considered in all scenarios.

[8] All the numbers resulting from the modelling can be found in open access on the Commission's website.

[9] The range of results is taken from the Impact Assessment and likely represents the different results of S1, S2 and S3.

The modelling also finds that the cut in energy use in the period 2030-2040 is smaller compared to the current decade for both residential and service buildings (see Figures 38 & 39 in IA Part III). This is also confirmed by the decrease of the annual renovation rate of residential and buildings in the service sector in the 2030-2040 decade compared to the renovation rate in the 2020-2030 decade: the renovation rate increases from 0.9% in 2020 to 2.2% up to 2030 and decreases to 1.6-1.9% up to 2040 for residential buildings; for service buildings, the annual renovation is expected to increase from 0.5% in 2020 to about 1.4% in 2030 and then either decrease to 0.6% (S1), 1% (S2) or stabilize at 1.3% (S3) in 2040. After 2030, the modelling also finds that electrification in buildings also needs to be intensified.

- **In the transport sector,** reduction in energy consumption is relatively slow until 2030 (-13% compared to 2015) but significantly accelerates between 2030 and 2040 (-42% compared to 2015, similar in all scenarios) to finally reach -53% in 2050. This steep decrease is due to the shift to electric vehicles for road transport (notably with the phasing out of the sale of Internal Combustion Engine vehicles in 2035) and energy efficiency improvements in maritime and air transport. This transformation does not entail the reduction of total transport passenger activity, which is projected to increase by 26-27% in 2040 compared to 2015.
- **The industrial sector** is expected to have a smaller reduction in final energy, with a reduction of 27% in 2040 and 39% in 2050 compared to 2015 levels. Despite an expected increase of economic activity in energy-intensive industries, circular economy, material, resource and energy efficiency, as well as electrification, allow to reduce industries' energy needs. In addition, the modelling finds that "a significant part of the mitigation potential allocated to efficiency improvement is attained already by 2040".
- **For services,** final energy is reduced by about 23% in 2030 and 31% in 2040 compared to 2015 levels. Little information is provided in terms of the uderlying assumptions and evolution of the sector's activities.
- Finally, **for agriculture**, final energy only marginally reduces, by 16% in 2030 and remains stable to 2040. There is little detail on the drivers for this reduction of final energy.

***Taking into account sustainable lifestyles – The LIFE variable***

In addition to the three scenarios that are technology driven, the IA also evaluates the impacts of behavioural changes on emissions, particularly shifts in consumption patterns and the adoption of more sustainable lifestyles, such as dietary changes, lower heating & cooling temperatures, or modal shifts towards more collaborative transport modes.[10] These demand-driven variables are grouped under the name of LIFE, which is not treated as a stand-alone scenario, but rather as a potential complement to the results of the modelling.

The integration of the LIFE variable in the scenarios allows a further decrease in energy consumption (12 Mtoe for final energy in 2040 at EU level).[11] However, when looking at the reduction of energy use to be achieved (where final energy needs to decline by about 330

[10] See Table 3 page 39 IA part II for a comprehensive description of the lifestyle changes assumed by the LIFE variable.
[11] The energy savings potential of LIFE is also disaggregated by sectors in the modelling's results.

Mtoe in 18 years), the addition of a LIFE variable would only marginally improve energy consumption. This may be explained by rather weak assumptions in terms of behavioural changes in the model, both in terms of actions taken or their scale.[12] For instance, in the building sector, LIFE assumes behavioural changes in the form of setting lower heating and hot water temperatures in winter and lower cooling in summer, supported by a larger deployment of smart energy management systems, that are weaker compared to other models' results (1.5°C from 2040 onwards compared to a possibility of 2°C immediately according to a 2022 IEA report[13]).

However, LIFE also provides a range of important benefits for the transition, namely reducing "the costs to society of reaching the 2040 target, lowering energy system costs, the need for investment in (novel) technologies, and environmental risks" according to the IA. LIFE substantially decreases investment needs in the modelling by about 59 billion euros per year, and, to a smaller extent, energy system costs for businesses (by about 20 billion) in the 2030-2040 decade. LIFE also marginally improves the energy system costs for households, with a greater effect on low-income households. Finally, LIFE provides further co-benefits to society such as improvement of air quality and public health.

### *Energy efficiency and the evolution of the EU energy system*

Energy efficiency and energy savings measures have an impact on the size and efficiency of the EU energy system; similarly, the deployment of new technologies also has an impact on total EU final energy consumption.

According to the IA, GAE in 2040 is similar across the three scenarios (1022 Mtoe in S1, 1021 Mtoe in S2 and 1018 Mtoe in S3). However, given the significant differences across scenarios for renewable energy penetration (65% in S1, 72% in S2 and 75% in S3) a sharper decrease in GAE in S2 and S3 would have been expected. The stabilisation is likely due to the higher hydrogen production (60 Mtoes in S1, 76 Mtoes in S2 and 100 Mtoes in S3, up from 9 Mtoe in 2030) and e-fuels production (15 Mtoes in S1, 27 Mtoes in S2 and 37 Mtoes in S3, up from 2 Mtoe in 2030). In the modelling, renewable energy penetration, which reduces primary energy consumption and GAE, seems to be counterbalanced by the increase of hydrogen and e-fuels, which are less energy efficient in primary energy terms.

Similarly, the different scenarios assume a relatively comparable level of final energy consumption. However, moving from S1 to S3 would entail a much more developed carbon capture in industry with "carbon capture covering all industrial process emissions" according to the IA. The fact that this would have a limited, almost non-existent, impact on final energy is surprising, given that final energy in the industry sector is lower in S3 (172 Mtoe) than in S1 (175 Mtoe).

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12 For instance, the CLEVER scenario that combines measures on efficiency and sufficiency finds that final energy consumption in the EU could be reduced to 532 Mtoe, lower than the IA's S3 scenario including the LIFE variable (594 Mtoe).

13 IEA (2022), Playing my part, IEA, https://www.iea.org/reports/playing-my-part

### *Decarbonising Europe’s industry – The role of energy efficiency*

The communication and the IA strongly emphasize that EU industries must be helped to decarbonize while remaining competitive. Despite the IA acknowledging that “energy efficiency contributed significantly to the decarbonisation of industry in the last years” and that the “remaining potential for energy efficiency is still large” in the industrial sector, the communication does not stress the key role of energy efficiency technologies in enabling all industries to help reduce emissions. Similarly, there is no mention of how energy efficiency can help reducing energy costs and prices for other industries, thereby ensuring their competitiveness.

The Commission’s IA underlines that research & innovation (R&I) “will be crucial to support the transition of the energy system with the aim to reduce the overall energy demand” but does not include energy efficiency technologies in the list of “key clean energy technologies” for which R&I is needed.

### *Investing in efficiency: Short term costs for long-term financial benefits*

The IA recalls that investing in energy efficiency solutions allows for avoiding an increase in energy prices that could result from higher international fossil fuel prices and carbon pricing.

For households and businesses, investing in energy efficiency leads to an increase in capital costs. However, the IA finds that this investment enables a decrease of energy-related costs for households in the 2030-2040 decade compared to the 2020-2030 decade. For businesses, the IA indicates that “higher levels of investment in energy-efficient equipment and to renovate buildings result in lower energy purchases under S3 than under both S2 and S1.”

In that perspective, the IA reconfirms past findings that investments in energy efficiency require an increase in upfront costs but result in a long-term reduction of energy expenditure for households and businesses.

### *Conclusion*

The analysis of the 2040 climate target IA clearly demonstrates that energy savings and energy efficiency will continue to play a key role to reduce GHG emissions beyond 2030.

First and foremost, meeting the 2030 EU energy efficiency target and ensuring the systematic application of the Energy Efficiency First principle is a pre-condition to achieving EU energy and climate goals for 2030 and beyond. Setting energy savings as a priority will allow the EU to reach climate neutrality in a cost-effective way, contributing to its energy security, the competitiveness of its industries and the wellbeing of its citizens, in particular the most vulnerable.

Looking ahead, several provisions in the recently revised EED and EPBD will remain in force after 2030 but, given the scale and number of additional actions that must be implemented in the next decade, it will be vital for the next European Commission to propose a post-2030 framework that continues promoting and fostering energy efficiency. This must include, among others, an EU energy efficiency target for 2040, complementary to the 2040 climate goal.