EU climate targets aligned with the Paris agreement’s 1.5°C objective

ZERO emissions
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Intro

With climate impacts happening all around, governments are expected to increase action to limit greenhouse gas emissions and subsequent temperature rise. The longer we delay transformative action, the more substantial and challenging the necessary greenhouse gas emission cuts will need to be. This also applies to the EU. This paper aims to look at the implications of current EU policies and targets on the EU’s carbon budget, the processes to set or update the EU’s 2030, 2035 and 2040 targets, and highlights the need for much more ambition in target setting if the EU is to make a fair share to the global efforts to limit dangerous climate change.

Current EU climate policies and targets

In December 2019, the European Council (bringing together the Heads of State and Government of the 27 Member States) agreed for the bloc to achieve climate neutrality (“net zero domestic greenhouse gas emissions”) by 2050; and one year later in December 2020 they agreed to revise the EU’s 2030 climate target from a domestic reduction of gross greenhouse gas emissions by at least 40% (as agreed in October 2014) to a domestic reduction of net greenhouse gas emissions by at least 55%, compared to 1990 emission levels.

These targets formed the basis for the bloc’s December 2020 NDC (Nationally Determined Contribution) submission to the UNFCCC (UN Framework Convention on Climate Change), which replaced its earlier March 2015 NDC submission, as well as for a legislative package called Fit for 55 under the European Green Deal, and were confirmed in June 2021 through the EU Climate Law.

The Fit for 55 package consists of a broad range of policies and targets, including:

- the Emissions Trading Scheme Directive (ETS) through which emissions from industry and the power sector are to be reduced by ~62% by 2030 (as compared to 2005 emission levels);
- the Effort Sharing Regulation (ESR) through which emissions from agriculture, buildings, transport and waste sectors are to be reduced by ~40% by 2030 (as compared to 2005 emission levels);
- the Land Use, Land Use Change and Forestry Regulation (LULUCF) through which land-based removals must be increased to 310 MtCO$_2$-e by 2030 (of which a maximum of 225 Mt can be used to achieve the ~55% reduction target);
- the Renewable Energy Directive (RES) through which the share of renewable energy in total energy consumption must (originally) be increased to 40% by 2030;
- the Energy Efficiency Directive (EED) through which final energy demand must (originally) be reduced by 9% as compared to 2020 projections of final energy demand in 2030.

It is assumed that the full implementation of these policies would allow the EU to reduce its emissions by 57% (in particular through the overshoot enshrined in the LULUCF target), but EU Member States have explicitly rejected this number to be referenced in the third EU NDC submission of October 2023 (see below).
Through the May 2022 REPowerEU proposal\(^2\), the Commission suggested a further strengthening of the 2030 renewable energy (from 40% to 45%) and energy savings (from 9% to 13%) targets which could have led to a further reduction of greenhouse gas emissions by up to 3% (or more) on top of the existing -55% target. Final negotiations between Member States and the European Parliament have settled on a 42.5% renewable energy target and an 11.7% energy savings target.

New and updated Climate Targets

The EU just finalised one process to revise and strengthen its existing targets and is engaged in two more processes:

1. **2030 TARGET**: At COP26 in Glasgow (November 2021) and at COP27 in Sharm el-Sheikh (November 2022) the EU agreed to revisit and strengthen its 2030 NDC:

   **Decision 1/CMA.3 (COP26, November 2021)**\(^3\): “29. (..) requests Parties to revisit and strengthen the 2030 targets in their nationally determined contributions as necessary to align with the Paris Agreement temperature goal by the end of 2022 (..);” and

   **Decision 1/CMA.4 (COP27, November 2022)**\(^4\): “23. (..) requests Parties that have not yet done so to revisit and strengthen the 2030 targets in their nationally determined contributions as necessary to align with the Paris Agreement temperature goal by the end of 2023 (..);”

   At the EU Environment Council of October 2023\(^5\), Ministers agreed on a new (third) 2030 NDC submission to the UNFCCC\(^6\) which repeats the commitment of the EU27 to “a legally binding target of a domestic reduction of net greenhouse gas emissions by at least 55% compared to 1990 by 2030”. This is exactly the same commitment as in the EU’s previous NDC. The NDC however contains clear information on how the Fit for 55 legislation will ensure full implementation of the 2030 target, which the EU’s considers as fulfilling the “strengthening” requirements of the COP26 and COP27 commitments referred to above. Furthermore the NDC states: “According to the Commission’s estimates, the “Fit for 55” legislative framework, when fully implemented, could enable the EU and its Member States to overachieve the EU’s net domestic reduction of greenhouse gas emissions target of at least 55% compared to 1990 by 2030.” This text replaces previous references to Fit for 55 allowing the EU to achieve a reduction of 57%.

2. **2035 TARGET**: Also at COP26, the EU agreed to submit in 2025 a new 2035 emission reduction target:

   **Decision 6/CMA.3 (COP26, November 2021)**\(^7\): “2. Encourages Parties to communicate in 2025 a nationally determined contribution with an end date of 2035, in 2030 a nationally determined contribution with an end date of 2040, and so forth every five years thereafter.”

   Through this decision the EU has committed itself to develop a new NDC with a climate target for 2035. At the moment there seems to be no intention for the European Commission to develop such a target other than having this as a by-product from the 2040 target proposal described below. This could potentially be seen as conflicting to the spirit of the COP26 decision as the Decision explicitly refers to five-year timeframes that allow more flexibility than the ten-year timeframes the European Commission prefers. This potential conflict was recognised in the debate about the Climate Law (which was adopted before COP26) and a provision is included in Article 4.7 of the Law which states: “4.7. The provisions of this Article shall be kept under review in light of international
developments and efforts undertaken to achieve the long-term objectives of the Paris Agree-
ment, including with regard to the outcomes of international discussions on common time
frames for nationally determined contributions. “This review has not (yet) taken place as its
likely outcome would be that the European Commission would need to come up with a
proposal for a 2035 and not a 2040 climate target.

3. 2040 TARGET: In its Climate Law the EU agreed to discuss a 2040 climate target,
on the basis of a proposal that the European Commission needs to submit by mid-June
2024:

EU Climate Law: “4.3. With a view to achieving the climate-neutrality objective (..), a
Union-wide climate target for 2040 shall be set. To that end, at the latest within six months of
the first global stocktake referred to in Article 14 of the Paris Agreement, the Commission shall
make a legislative proposal, as appropriate, based on a detailed impact assessment, to amend
this Regulation to include the Union 2040 climate target, taking into account the conclusions of
the assessments referred to in Articles 6 and 7 of this Regulation and the outcomes of the global
stocktake.”

As the Global Stocktake will be finalised at the end of COP28, most likely on 12 De-
cember 2023, the deadline for the European Commission is to come up with a proposal
by 11 June 2024. A proposal is already expected to come out in the first quarter of 2024.
The European Commission can make use of the advice from the European Scientific
Advisory Board on Climate Change that proposed a 90%-95% net emission reduction
target for 2040.

Not enough

Multiple reviews have made it clear that current targets (including those of the EU) are
not sufficient to meet the target set in the Paris Agreement to limit temperature rise to
1.5°C. These include:

1. UN Framework Convention on Climate Change (UNFCCC). November
   2023: Nationally determined contributions under the Paris Agreement;
   Synthesis report by the secretariat; 18

2. UN Environment (UNEP). November 2023: Emissions Gap Report 2023; 19

   2023; 20

4. Forster et al. June 2023: Indicators of Global Climate Change 2022: annual
   update of large-scale indicators of the state of the climate system and hu-
   man influence. 21

While the numbers in these assessments differ slightly, they all come to the same
conclusion: countries are collectively failing to set (and implement) ambitious emis-
sion reduction targets in line with the 1.5°C objective of the Paris Agreement. Hence
all countries are being asked repeatedly to revise their 2030 targets (see above for the
relevant decisions made at COP26 and COP27) in order to contribute their fair share of
the collective commitment to limit temperature rise to 1.5°C. This is also recognised by
the EU, e.g. in its October 2023 Environment Council Conclusions: “UNDERLINES
that as reflected in the IPCC reports, collectively, NDCs and their updates and implementation
remain highly insufficient to keep the 1.5°C objective within reach and EMPHASIZES with serious concern that global ambition must substantially increase in line with the Paris Agreement. RECALLS that all Parties have been urged to revisit and strengthen the 2030 targets in their NDCs as well as to publish or update their long-term low GHG emission development strategies (LTS) as necessary to align them with the Paris Agreement temperature goal well in advance of COP28. These should include all GHG and sectors and be underpinned by concrete policies and measures to implement them.”

Assessing individual countries’ and regions’ contributions to the collective target of the Paris Agreement is challenging and depends on how to apply the concept of equity whereby countries’ contributions are assessed based on their (historical) responsibility and capacity to act. Still, many assess the EU’s contribution as insufficient, these include:

1. UN Secretary General. March 2023. Secretary-General Calls on States to Tackle Climate Change “Time Bomb” through New Solidarity Pact, Acceleration Agenda, at Launch of Intergovernmental Panel Report: “Specifically, leaders of developed countries must commit to reaching net-zero as close as possible to 2040, the limit they should all aim to respect.”

2. Climate Action Tracker. June 2023. EU: “When measured against a fair share emissions allocation, we rate the EU’s NDC target as “Insufficient”. The “Insufficient” rating indicates that the EU’s NDC target in 2030 needs substantial improvement to be consistent with limiting warming to 1.5°C. Some of these improvements should be made to the domestic emissions target itself (as discussed above), others could come in the form of additional support for emissions reductions achieved in developing countries. If all countries were to follow the EU’s approach, warming would reach up to 3°C.”

3. European Scientific Advisory Board on Climate Change. June 2023. Scientific advice for the determination of an EU-wide 2040 climate target and a greenhouse gas budget for 2030–2050: “Additional efforts to increase the ambition beyond 55% (up to 70% or more by 2030) would considerably decrease the EU’s cumulative emissions until 2050, and thus increase the fairness of the EU’s contribution to global mitigation.”

NGO position

The NGO community, represented by Climate Action network (CAN) Europe, adopted a more ambitious set of climate targets in September 2018 and calls for the EU to achieve:

- net zero greenhouse gas emissions by 2040 at the latest;
- (gross) domestic greenhouse gas emission reductions of at least -65% by 2030;
- emission removals through LULUCF of at least 600 MtCO2-e by 2030.

Further to this, in June 2023, CAN Europe agreed, based on the above targets, that the EU’s cumulative domestic greenhouse gas emissions budget should not exceed 27.5 GtCO2-e for the period 2020–2050. This budget represents a per capita fair share of the remaining carbon budget as it equals the (projected) EU’s share of the world population from 2020 to 2050. This position also set a new target of at least -92% gross emission reductions by 2040.
**Need for review**

Given the need to regularly assess progress in the implementation of targets as well as in scientific knowledge, NGOs have called for and supported the five-year global stocktake and five-year common timeframes within the UNFCCC; and mid-term reviews of all EU policies. As a logical consequence, it is worthwhile to review whether existing NGO positions are still in line with a science and equity based approach. This review then can help set and update preferred climate targets for 2030, 2035 and 2040.

As it is cumulative emissions that matter to the atmosphere rather than end-year target, it is good to assess whether the -65% by 2030 and net zero 2040 targets still align with the 27.5 Gt budget. The challenge is that even if the EU would exceptionally increase its 2030 target to -65%, this would at best only start to be implemented in a few years time. The consequence of this is that in the first half off this decade actual emissions will be much higher than what is foreseen in the carbon budget for this period. Under a pathway towards -65% by 2030, total greenhouse gas emissions from 2021 to 2025 would not exceed 15 GtCO\(_2\)-e. In reality EU Member States will be allowed to emit almost 16.5 GtCO\(_2\)-e over this five-year period and thus create an overshoot of almost 1.5 Gt (see graph 1 below). To remain within the 27.5 Gt budget, this overshoot would need to be compensated for by stronger reductions after 2025.

**Graph 1: adjustment needed to CAN Europe policy scenario due to “limited” action in 2021-2022**

The area in yellow represents the overshoot inherent in the implementation of EU policies even if the 2030 target would be strengthened, assuming implementation would only start from 2026. This ‘overshoot’ would need to be compensated by further reduction after 2025 in the red section.

It is important to understand that even if EU Member States in practice emit less than the allowed 16.3 GtCO\(_2\)-e, they will still be eligible to emit (most of) the remaining difference in the period 2026–2030 given the high level of carry-over that is allowed in EU legislation.

Without radical changes to current EU targets and policies (e.g. phasing down/out the concept of carry-over of unused yearly allowances) the domestic greenhouse gas emis-
sions budget envisaged by CAN Europe might be fully used by 2030, leaving no space for emissions after 2030 (both the European Scientific Advisory Board on Climate Change in its “Scientific advice for the determination of an EU-wide 2040 climate target and a greenhouse gas budget for 2030-2050” and AirClim’s “Counting the numbers: EU carbon budget not compatible with 1.5°C target” briefing indicate that current Fit for 55 policies will consume the proposed domestic greenhouse budget (of 27.5 GtCO$_2$-e) fully by 2030).

It is very clear that insufficient action by all actors is putting the 1.5°C target in jeopardy. The Indicators for Global Climate Change (IGCC) initiative has calculated that a large part of the identified remaining carbon budget in the last IPCC report (AR6) has been used in the last three years. In fact AR6 stated that the remaining carbon budget (from early 2020 to mid-century) for limiting temperature rise to 1.5°C with a 66% likelihood would be 400 GrCO$_2$, and with a 50% likelihood would be 500 Gr. The IGCC estimates the remaining budget from 2023 onwards to be respectively 150 and 250 Gr.

**Scenarios**

In order to assess the current state of affairs and judge alternative approaches, a number of different scenarios were developed for this exercise. For each scenario, its impact on the EU’s domestic greenhouse gas emissions budget was calculated. All these scenarios start from the assumption that it will be close to impossible to impact existing emission allowances under the ETS and ESR policies up to 2025. Under this assumption, total cumulative emissions for the period 2020 to 2025 will be 19.55 GtCO$_2$-e (representing 71% of the per capita/1.5°C compatible EU budget for 2020 to 2050).

Five scenarios were identified: one reference scenario (based on Fit for 55/net zero 2050); Two scenarios based on the advice from the Scientific Advisory Board (representing low and high ambition); and two NGO scenarios (PAC+ based on CAN Europe’s positions and activities; and a scenario representing AirClim’s more ambitious approach). Below is a brief description of each scenario:

**1. Reference (FF55) scenario**

Based on existing EU policies as identified in the Fit for 55 legislation and the EU’s Long Term Strategy (Clean Planet for All). Basic pathways under these policies include:

- 2026–2030 gross emissions based on full implementation of the ETS/ESR legislation;
- 2026–2030 removals based on a linear pathway from actual 2021 levels to -310 Mt in 2030;
- 2031–2050 gross emissions based on a linear pathway to -92% in 2050 (as proposed in the EU’s Long Term Strategy);
- 2031–2050 removals based on a linear pathway to net zero emissions in 2050.
2. ESABCC (low ambition) (SAB) scenario

Based on the low end of the proposal made by the European Scientific Advisory Board on Climate Change which called for a 2040 net emissions target of 90% to 95%. Basic pathways under the low end of this proposal include:

- 2026–2030 gross emissions based on full implementation of the ETS/ESR legislation;
- 2026–2030 removals based on a linear pathway from actual 2021 levels to -310 Mt in 2030;
- 2031–2040 gross emissions based on a linear pathway to -90% net emission reductions in 2040 (taking into account the removals trajectory below);
- 2041–2050 gross emissions based on a linear pathway to -92% in 2050;
- 2031–2050 removals based on a linear pathway to net zero emissions in 2050.

3. ESABCC (high ambition) (SAB+) scenario

Based on the most ambitious elements mentioned in the advice of the European Scientific Advisory Board on Climate Change, including a reference to achieving a -70% net emission reduction by 2030 and setting a net emission reduction target of -95% by 2040. Basic pathways under these proposals include:

- 2026–2030 gross emissions based on a linear pathway from EUREF 2025 levels to -70% net emission reductions in 2030 (taking into account the 2030 removals target below);
- 2026–2030 removals based on a linear pathway from actual 2021 levels to -310 Mt in 2030;
- 2031–2040 gross emissions based on a linear pathway to -95% net emission reductions in 2040;
- 2041–2050 gross emissions based on a linear pathway to -92% in 2050;
- 2031–2050 removals based on a linear pathway to net zero emissions in 2050.

4. AirClim (AC) scenario

Based on the policy position of AirClim which are more ambitious than those of the CAN Europe network it belongs to. Basic pathways under these positions include:

- 2026–2035 gross emissions based on a linear pathway from EUREF 2025 levels to -75% in 2030;
- 2026–2030 removals based on a linear pathway to -600 MtCO2-e in 2030;
- 2031–2035 gross emissions based on a linear pathway to the level needed to achieve net zero emissions in 2035, based on the removals trajectory below;
- 2036–2040 gross emissions based on a linear pathway to -95% in 2040;
- 2041–2050 gross emissions to remain stable at -95% during this period;
- 2031–2050 removals to remain stable at -600 Mt during this period.
5. Paris Agreement Compatible (PAC+) scenario

Based on the 2nd iteration of the PAC scenario\(^a\) which is developed to show how CAN Europe’s positions regarding (gross) emission reductions (-65% by 2030 and net zero by 2040) can be achieved, in combination with CAN Europe’s position regarding land-based removal potentials. Basic pathways under these position include:

- 2026–2030 gross emissions based on a linear pathway from actual 2021 levels to -65% in 2030;
- 2026–2030 removals based on a linear pathway from 2021 actual levels to -600 Mt in 2030;
- 2031–2040 gross emissions based on a linear pathway to -92% in 2040;
- 2041–2050 gross emissions based on a linear pathway to -95% in 2050;
- 2031–2050 removals to remain stable at -600 Mt during this period.

**Results**

The table below provides the results for each scenario for a number of indicators (all targets in percentages as compared to 1990 emissions and/or removals), total gross emissions include international shipping and aviation emissions:

<table>
<thead>
<tr>
<th></th>
<th>FF55</th>
<th>SAB</th>
<th>SAB+</th>
<th>AC</th>
<th>PAC+</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020–2050 GHG budget (Gt)</td>
<td>51.3</td>
<td>45.8</td>
<td>38.6</td>
<td>23.8</td>
<td>27.7</td>
</tr>
<tr>
<td>2030-2050 GHG budget (Gt)</td>
<td>21.5</td>
<td>16.1</td>
<td>10.4</td>
<td>-2.6</td>
<td>1.6</td>
</tr>
<tr>
<td>date of achieving net zero</td>
<td>2050</td>
<td>2050</td>
<td>2050</td>
<td>2035</td>
<td>2038</td>
</tr>
<tr>
<td>2030 net emissions (% of 1990)</td>
<td>-57%</td>
<td>-57%</td>
<td>-70%</td>
<td>-86%</td>
<td>-76%</td>
</tr>
<tr>
<td>2030 emissions/removals (% of 1990)</td>
<td>-53%</td>
<td>+48%</td>
<td>-53%</td>
<td>+48%</td>
<td>-65%</td>
</tr>
<tr>
<td>2035 net emissions (% of 1990)</td>
<td>-68%</td>
<td>-74%</td>
<td>-83%</td>
<td>-100%</td>
<td>-94%</td>
</tr>
<tr>
<td>2035 emissions/removals (% of 1990)</td>
<td>-63%</td>
<td>+59%</td>
<td>-68%</td>
<td>+59%</td>
<td>-77%</td>
</tr>
<tr>
<td>2040 net emissions (% of 1990)</td>
<td>-79%</td>
<td>-90%</td>
<td>-95%</td>
<td>-107%</td>
<td>-104%</td>
</tr>
<tr>
<td>2040 emissions/removals (% of 1990)</td>
<td>-73%</td>
<td>+70%</td>
<td>-83%</td>
<td>+70%</td>
<td>-83%</td>
</tr>
</tbody>
</table>
Observations and conclusions

1. Current EU targets and policies (the FF55 scenario) are not in line with the EU’s domestic fair share to limit temperature rise to 1.5°C as they would lead to cumulative 2020 to 2050 domestic greenhouse gas emissions that are almost double a per capita fair share greenhouse gas budget. Adapting current policies to the range of targets as proposed by the European Scientific Advisory Board on Climate Change (the SAB and SAB+ scenarios) would also be insufficient as they would still keep the budget well above the 27.5 Gt desired budget (respectively 45 and 38 Gt).

2. Only scenarios that foresee ambitious emission reductions and carbon removals well beyond current targets while achieving net zero emissions even before 2040 have any chance to fall within the per capita fair share budget.

3. It should thereby be clear that despite attention shifting towards the post-2030 targets debate, what happens between now and 2030 will be more decisive for the climate as current policies foresee that the per capita fair share budget will be fully consumed by 2030. Attention should thus remain on improving both the 2030 target as well as its implementing policies (by e.g. cancelling all carry-over of unused annual emissions allowances under both the ETS and ESR).

4. The role of carbon removals is thereby critical and often underrated. The biggest differences between the NGO scenarios and the others lies in the removals targets. This is not always visible in the public debate where the EU’s -55% target is often compared to the NGO’s -65% target but this is incorrect. A real comparison should be between gross emission reductions targets of -53% vs. -65% and net emission reduction targets of -55% vs -76%. The distance between the net targets is much greater than the distance between the gross targets. This should become more clear.

5. To have a reasonable chance to stay within the per capita fair share budget in line with the 1.5°C target, the EU will need to set a target for 2035 that is within the range of what the ESABCC is proposing for 2040. A target of -94% net emission reductions by 2035 seems most appropriate. This target needs to be complemented by a gross emission reduction target of at least -82%, which depending on the ambitious with regard to carbon removals may need to be substantially increased.

6. Given the likely overshoot that will happen up till 2025, achieving net zero emissions by 2040 might even be too late to have a decent chance to stay within the per capita fair share budget, and net zero might need to be reached in 2038 already.
Notes
13. https://unfccc.int/sites/default/files/resource/Overarching_decision_1-CMA-3_1.pdf
17. https://unfccc.int/documents/460952
20. https://www.iea.org/reports/world-energy-outlook-2023
22. https://climateactiontracker.org/countries/eu/
28. https://caneurope.org/content/uploads/2022/06/CAN_Europe_PAC_scenario_2_in_a_nutshell_FAQs_jun22.pdf