CLIMATE ANALYTICS

Briefing

35 by 35 and clean electrification

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Key messages

The COP31 Presidency's "35 by 35" pledge aims to raise electricity's share of global final energy consumption to 35% by 2035.

- **Electrification can cut emissions now – even with today's electricity mix. But it only delivers emissions reductions at the pace and scale required when powered by clean electricity.**
- **Electrification rates must grow together with renewables to avoid potential fossil lock-in. This is feasible – expanding electrification does not require new fossil fuel generation.**
- **Meeting the 35 by 35 target without all the additional electricity being clean would add at least 0.1°C to global warming in mid-century, increasing climate impacts and the risk of passing tipping points.**
- **The IEA clearly shows the risks if electrification is not clean – emissions do not fall fast enough to limit the magnitude and duration of overshoot.**
- **Across the Global South, clean electrification can improve living standards by giving more households access to services such as refrigeration and clean cooking, because electric technologies use energy more efficiently.**
- **Expanding electrification allows more people to benefit from electrified end-use technologies.**
- **35 by 35 is a global target – it does not mean all regions or sectors should or will reach this at the same time (some are already above it).**
- **The global electrification rate was just above 22% in 2025, rising slowly mostly due to increased electricity use in industry, homes and services, alongside growing demand from electric vehicles and data centres.**
- **Clean electrification will be an essential lever for minimising overshoot and returning global warming well below 1.5°C by the end of the century. Any target must be clear that the expansion of electrification must be accompanied and powered by renewables.**

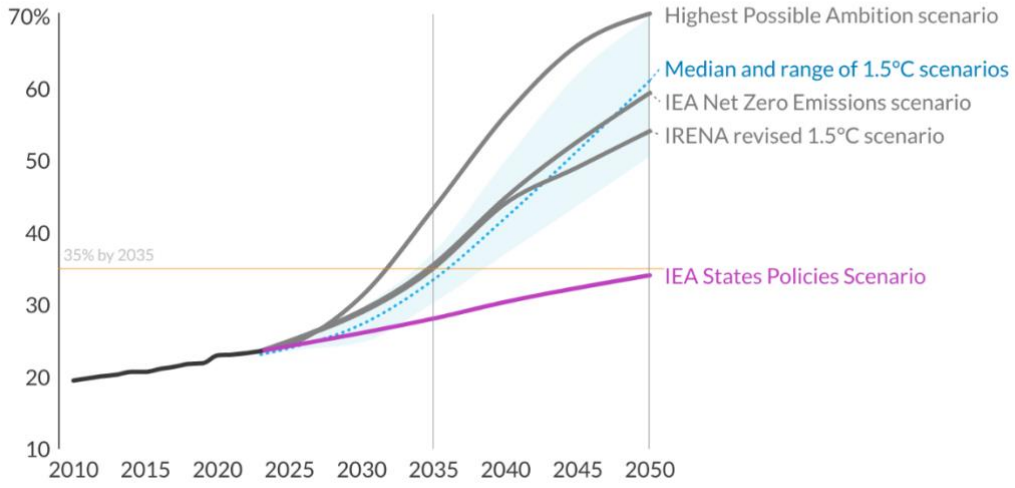
Is 35 by 35 1.5°C-aligned?

The electrification goal proposed by the COP31 presidency of 35% by 2035 is only fully consistent with pathways that minimise overshoot if electrification is powered by clean electricity.

- The 35 by 35 target should be seen as a floor, not a ceiling – higher electrification rates exist in some pathways, which can accelerate a fossil phase-out and reduce reliance on other options such as biomass.[1]
- Electrification will also need to increase beyond 2035, towards two-thirds of final energy by 2050, as shown in Climate Analytics' Highest Possible Ambition (HPA) scenario and others that minimise overshoot and return global warming below 1.5°C by 2100.[2] At the same time, the trajectory needed to achieve the GST-1 target of tripling renewables falls short compared with what is required to limit overshoot and align with the Paris Agreement; so we need to plan to go further.[3]

Projected global electrification share

Projections to 2050 by analysed scenarios of future share of electricity in total final energy consumption.



Source: Climate Action Tracker (2026). Unpacking electrification for a 1.5°C-aligned world.

What are the risks if electrification is not clean?

The IEA clearly shows the risks if electrification is not clean – emissions will not fall fast enough to minimise the magnitude and duration of overshoot. This would represent a missed opportunity in this critical decade.

- Electrification is already cutting emissions – even with today's electricity mix, in which fossil fuels still play a large role. This is because of the fundamental efficiency advantages of electrified end-use technologies, which are around 2-4x more efficient in general than fossil fuel alternatives.[4]
- The 35% electrification target would lead to electricity demand growing by around 50% by 2035.[4] Unless this growth is met with renewable electricity, it could lead to increased fossil fuel generation. This would undermine the pathway to clean power, which is a key pillar of climate action. In the HPA-2025 scenario, renewables account for 83% of the global power sector mix by 2035.
- If we electrify in line with the electrification trajectory in the IEA Net Zero Emissions by 2050 scenario – which achieves 35% penetration by 2035 –

without driving an accelerated renewables rollout, this could lead to growing gas generation and coal generation plateauing or only gently declining.

- While global energy-related emissions would still fall by around 20-25% by 2035 under such a scenario (due to electrification displacing fossil fuels in end-use sectors), this would result in emissions from unabated fossil fuel use in the power sector being considerably higher than if the additional electricity were all clean. These excess emissions would amount to 57-69 $GtCO_2$ between 2024-2035 and 177-248 $GtCO_2$ between 2036-2050 –a total of 234-317 Gt CO_2.
- This would result in global warming being 0.11-0.14°C higher in 2050 than if the 35% target was met with clean electricity.
- This would significantly undermine our collective chances of limiting the magnitude and duration of overshoot, leading to peak warming of 1.8-1.9°C instead of 1.7°C, bringing more climate impacts and a greater risk of passing tipping points.

Electrification must, and can, grow with renewables

Electrification rates must grow together with renewables to avoid potential fossil lock-in.

- A 35% target that is not underpinned by accelerated renewables rollout can undermine the emissions reductions needed for minimising overshoot and returning below 1.5°C this century.
- The latest modelling shows that it is possible to cut fossil fuel generation while also expanding electricity demand for electrification – with renewables ready to power the electrified energy system of the future.[2,4]
- In the Highest Possible Ambition scenario (HPA-2025), which limits the magnitude and duration of overshoot and brings warming back well below 1.5°C by 2100, we see:
    - 2035 power sector mix: 12% fossil, 5% nuclear, 83% renewables – Electrification rate: 41%
    - 2050 power sector mix: 0% fossil, 1% nuclear, 99% renewables – Electrification rate: 68%

- **The median across the 11 Very Low pathways developed for ScenarioMIP-CMIP7 shows a similar pattern.**
    - 2035 power sector mix: 15% fossil, 7% nuclear, 78% renewables – Electrification rate: 34%
    - 2050 power sector mix: 1% fossil, 3% nuclear, 96% renewables – Electrification rate: 61%

- **This is further confirmed by the IEA NZE 2025 scenario.**
    - 2035 power sector mix: 13% fossil, 10% nuclear, 76% renewables – Electrification rate: 35%
    - 2050 power sector mix: 1% fossil, 9% nuclear, 89% renewables – Electrification rate: 59%

- These scenarios show that we can expand electricity demand while still phasing out fossil fuels in the power sector. Across these scenarios, over 2024–2035:

- Coal generation falls 65% / 78% / 75% across the HPA-2025 / median of Very Low scenarios / IEA NZE scenario.
- Gas generation falls 64% / 53% / 59% across the same set of scenarios.

What does 35 by 35 mean for the Global South?

Across the Global South, clean electrification can expand access to heating, cooling, transport and other services because electric technologies waste less energy than burning fuels.[4]

- When fossil fuels are burned, up to 80% of the energy can be lost, depending on the technology.
- Some clean technologies, such as heat pumps, have an efficiency rate of above 100% because they transfer existing energy. On average, electrified technologies and renewables are two to four times more efficient than burning fossil fuels or traditional biomass.

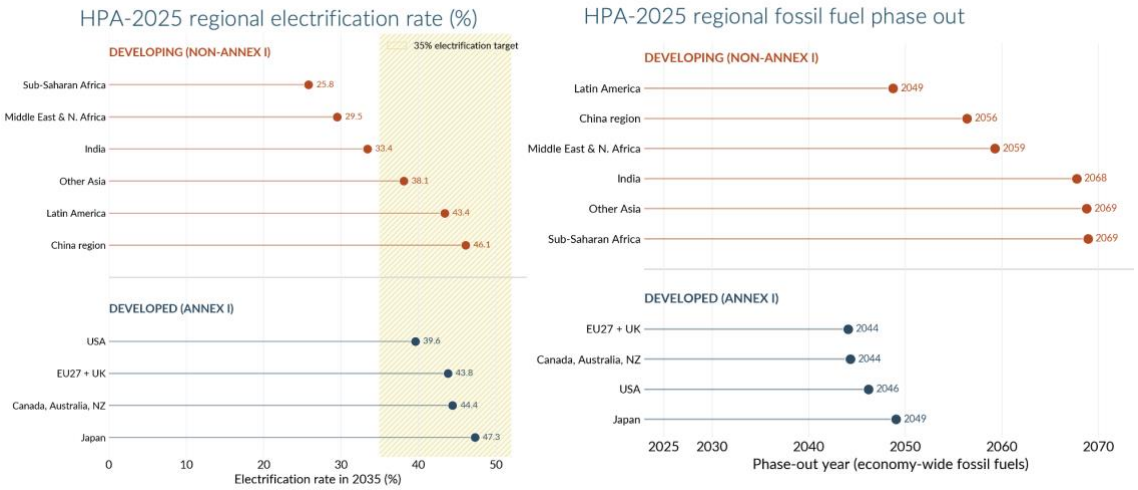
Expanding access to electricity can improve living standards by giving more households access to services such as refrigeration and clean cooking. Expanding electrification allows more people to benefit from electrified end-use technologies.

- Meeting global energy access for households under Sustainable Development Goal 7, aimed at ensuring access to affordable, reliable, sustainable and modern energy for all, adds very little electricity demand. A scenario that meets this goal by 2040 requires only around 160 TWh in 2035, or 0.6% of today's global electricity demand.
- The efficiency gains of electrification mean that final energy demand can fall while actual energy services delivered to the population grow. For example, in the IEA's energy ACCESS scenario, universal access to clean cooking is achieved around 2040, and the number of households cooking with electricity grows 50% over 2025-2035. But final energy demand falls ~50% over this time, due to the much higher efficiency of electric cooking compared to traditional biomass.
- Criticisms of electrification that are based on primary or final energy demand declining do not account for the efficiency advantage of electrified technologies.

35 by 35 is a global target. Not all regions will reach it at the same time.

- In one recent high electrification scenario, the HPA-2025, the electrification rate in sub-Saharan Africa rises from 10% in 2023 to 25% in 2035.[1] This helps provide access to modern, electrified energy services, but is below the global average. Meanwhile, major advanced economies such as EU 27 would reach above 40% in 2035 – above the global average.
- In this analysis, both Türkiye and Australia are able to move substantially above the global average, in journeys towards a highly electrified world. Both reach economy-wide electrification rates of 54% by 2035, driven particularly by buildings (which reach 60-90% electrification by 2035), industry (50-60% electrified by 2035) and transport (20-30% electrified).
- The EU 27 would similarly move faster than the global average, reaching 43% of final energy from electricity by 2035 in the same analysis.

Regional electrification rate and fossil fuel phase-out

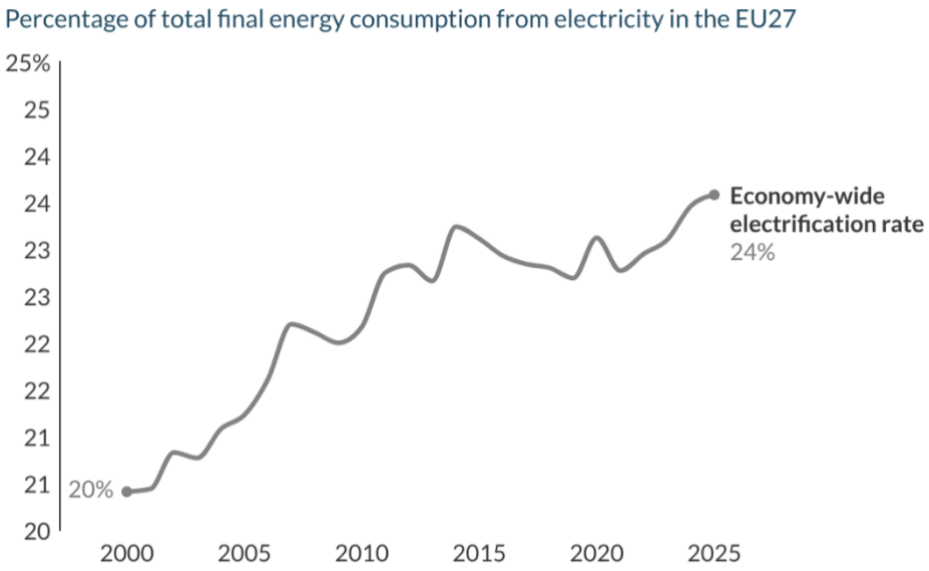


Where does electrification stand?

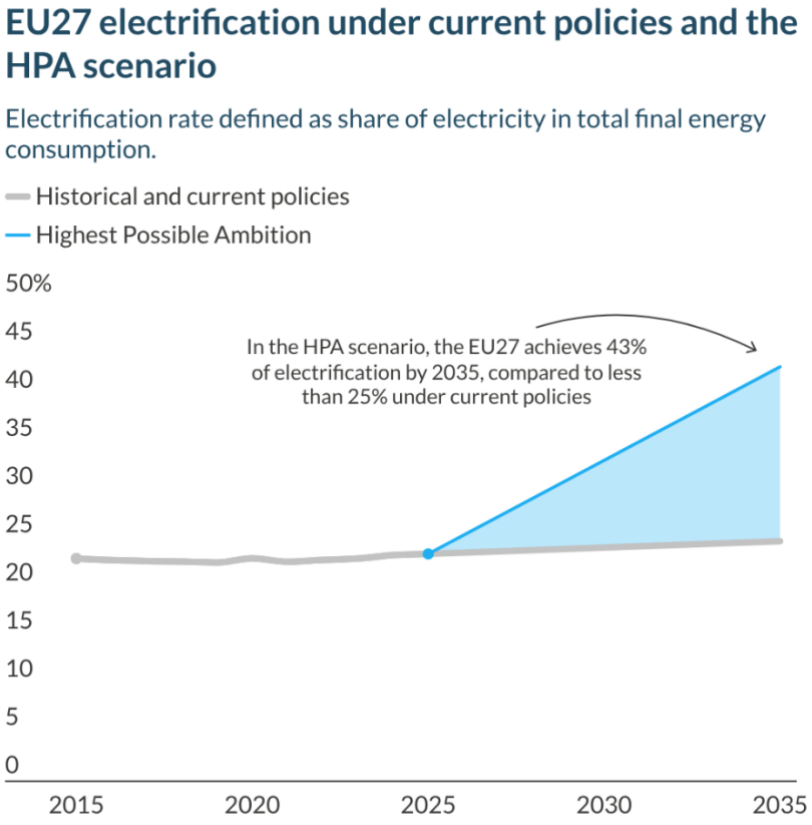
The global electrification rate has been rising, mostly due to increased electricity use in industry, homes and services, alongside growing demand from electric vehicles and data centres, reaching just above 22% in 2025.

- The global electrification rate has increased by only 4.3% since 2010 – an average increase of 0.3% per year.[5]
- Achieving the proposed 35% electrification target by 2035 therefore requires a major step-change in government policymaking to achieve a growth rate of approximately 1.4% annually, essentially more than quadrupling the current rate of progress.[3]
- For EU 27, the electrification rate currently stands roughly at 23.5%.[6]

EU 27 economy-wide electrification rate (% of Total Final Energy Consumption)



EU 27 economy-wide electrification: historic, current trajectory and required under the HPA-2025 scenario



Source: Climate Action Tracker (2026). Unpacking electrification for a 1.5°C-aligned world.

For Europe, clean electrification is not only a climate obligation but also an economic security imperative

- Fossil fuels supplied 69% of Europe's energy demand in 2024. 57% of these fuels are imported.[7,8]
- This makes the EU highly dependent and vulnerable to global fuel shocks. Before the Russian invasion of Ukraine, the EU typically spent EUR 57-62 bn annually on fossil fuel energy subsidies. After the invasion these subsidies spiked in 2022 to EUR 136 bn, increasing the price of electricity and cost of living for Europeans.[9]
- A new conflict starting in 2026, the US-Israel war on Iran, resulted in the EU's fossil fuel import bill for three months rising by EUR 27 bn, for the same volume of fuel. A month later, that added cost rose to EUR 35 bn.[10]
- Solar power has saved the European Union EUR 20 bn in gas imports since the start of the war in the Middle East.[11]

Methods

- Data from the Highest Possible Ambition scenario, the ScenarioMIP-CMIP7 Very Low scenarios and the IEA Net Zero 2050 scenario are taken from their respective sources. HPA-2025 and ScenarioMIP-CMIP7 scenarios are harmonised to historical data using Aneris.[12]
- To calculate the additional emissions and temperature outcomes if electrification is not paired with additional action on renewables, we use data from the IEA World Energy Outlook. We combine the gross electricity demand from the IEA NZE scenario, with the electricity generation mix from the IEA STEPS/CPS scenarios. We note that the CPS scenario should be seen as a worst-case outcome on the pace of the energy transition.
- Additional coal, oil and gas generation are converted into emissions using global average emissions factors for each fuel. This is then converted into a temperature outcome using a transient climate response to cumulative carbon emissions (TCRE) of 220 $GtCO_2$ per 0.1°C of warming.

References

1. Climate Analytics & PIK. *Rescuing 1.5°C: New Evidence on the Highest Possible Ambition to Deliver the Paris Agreement*. https://climateanalytics.org/publications/rescuing-1-5c (2025).
2. Climate Analytics. *Climate Overshoot: The Way Back below 1.5°C*. https://climateanalytics.org/publications/climate-overshoot-the-way-back-below-1-5-c (2026).
3. Climate Analytics. *From Setting Targets to Limiting Overshoot – Understanding the Challenge*. https://ca1-clm.edcdn.com/PolicyBrief_GST_Electrification_Final_clean_021126.pdf?v=1793729934 (2026).
4. IEA. *Electrification*. https://www.iea.org/reports/electrification (2026).
5. Enerdata. *World Energy & Climate Statistics – Yearbook 2026*. https://yearbook.enerdata.net/electricity/share-electricity-final-consumption.html (2026).
6. Ember. *Europe Electrification Data Explorer*. https://ember-energy.org/data/europe-electrification-data-explorer/ (2026).
7. Eurostat. Energy in Europe: imports dependency. https://ec.europa.eu/eurostat/web/products-eurostat-news/w/wdn-20260318-1 (2026).
8. Eurostat. Energy in Europe - 2026. *Shedding light on energy in the EU: Share of energy products in total energy available* https://ec.europa.eu/eurostat/cache/interactive-publications/energy/2026/01/index.html?lang=en&simple=true (2026).
9. *REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS 2024 Report on Energy Subsidies in the EU*. (2025).
10. Jorgensen, D. https://www.linkedin.com/posts/dan-j%C3%B8rgensen_energycrisis-cleanenergy-cleantransition-share-7460397200595099648-QsgP/?utm_source=social_share_send&utm_medium=member_desktop_web&rcm=ACoAACNSOxkBP8rRh1iA32YPj2Y-_aIeaiwipvg (2026).
11. SolarPower Europe, §. Europe's solar fleet saved €20 billion in gas imports since Middle East war began. https://www.solarpowereurope.org/press-releases/europe-s-solar-fleet-saved-20-billion-in-gas-imports-since-middle-east-war-began (2026).
12. Gidden et al, Global emissions pathways under different socioeconomic scenarios for use in CMIP6: a dataset of harmonized emissions trajectories through the end of the century https://gmd.copernicus.org/articles/12/1443/2019/