



A 100% Renewable Economy is Possible

Feasible pathways for 2035 & 2040

*Greens/EFA recommendations
to accelerate the European renewable energy transition
September 2022*

In December 2015, 196 Parties agreed to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels. This is and should remain our compass to strengthen our response to the threat of climate change. However, climate pledges by governments to date – even if fully achieved – fall well short of what is required. At the European Union level, the European Climate Law writes into law the commitment to become climate-neutral by 2050 while also setting intermediate target of reducing greenhouse gas emissions by at least 55% by 2030 (compared to 1990 levels). Our societal transition to achieve climate neutrality must be based on the latest independent scientific evidence and be socially just and inclusive, based on solidarity and collaborative effort at the Union level.

The war by Russia against Ukraine since 24th of February has been a wake-up call for the European Union to phase out of fossil fuel imports especially from Russia. With the war ongoing for months now, the European Union needs a strategy, not only to phase out imports of Russian fossil fuels but to get rid of its energy dependency overall and to **move to a highly efficient 100% renewable based economy.**

The Greens/EFA group in the European Parliament commissioned a study on “Accelerating the European renewable energy transition” with the aim of calculating the level of ambitions needed in the Fit for 55 legislative package to stay in line with the 1.5 degree commitment from the Paris Agreement¹. The overall aim of this research is to present the most viable and feasible techno-economic options by determining the least cost energy mixes. The study analysed three energy transition scenarios for the EU as a whole and for each of its Member States:

- A reference scenario, in line with the Commission’s Fit for 55 package, for a transition by 2050 which leads to a 98% renewable based economy;
- Two scenarios that lead to a 100% renewable based energy system by 2035 and by 2040.

The Greens/EFA group has been advocating for a European wide reduction of GHG emission of 65% by 2030 (compared to 1990) and reaching climate neutrality by 2040 to be in line with the 1.5C° Paris objective. This study and especially its energy transition pathways by 2035 and 2040 show that it is feasible and achievable with a transformation of our power, heat, industry and transport sectors while only limitedly affecting behavioural changes. **For this to become reality, we need strong political will, financial incentives for renewables and financial investments mainly done by the energy and industrial sectors. Public authorities need to scale up investments in our energy transition to lead the way.**

Europeans will be empowered with this transition, which creates new jobs, enables living in healthier environments and leading to financial benefits:

¹ The last IPCC WG III report of April 2022 assessed that ‘limiting warming to around 1.5°C requires global greenhouse gas emissions to peak before 2025 at the latest, and be reduced by 43% by 2030; at the same time, methane would also need to be reduced by about a third.’

- The installation of solar panels on our homes allows breaking free from high fossil energy bills. As costs for such technologies have come down, besides being subsidised or even coming for free in some regions, consuming one's own energy, sharing it with neighbours, or being part of an energy community is a right that becomes accessible to all.
- New services paying households to stabilise the electricity grid without fossil fuel or nuclear plants by turning on the washing machine or heating at a certain moment provide for extra remuneration rather than energy costs.
- Free renovations schemes tapping into government support, scale effects and performance contracting bring about quality and decent homes for all besides creating millions of jobs in the construction sector. A renovation wave is at our doors and we should embrace it.
- Dedicated funds and services must shield those living in vulnerable situations and in energy poverty, while empowering them to take part in the energy transition.

The study provides the following conclusions:

1. A highly-energy efficient and 100% renewable based economy by 2040 at the latest is possible

The study shows that a transition to a fully renewable energy system is possible and economically viable by 2040 at the latest while security of supply is ensured every hour of the year, throughout Europe for all end uses. This means no risk of energy shortage because:

- Renewable energy from biomass, but also hydropower, both within the limits of sustainable availability, can produce at all times and hence help to balance variable renewable energy;
- With additional electricity infrastructures we will be able to use wind power when the sun is not shining, and we will rely on an increased share of renewable energy produced on our buildings and integrated into the local grid.
- Electricity and thermal storage in buildings (for example through batteries, electric vehicles or heat storage tanks) as well as at the industrial level and at a larger scale will help to keep the lights on at all times. When taking a "system approach" rather than one based on single sectors, it becomes clear that unavoidable excess heat from industrial processes, but also from underground public transport or sewage plant treatments can be used in sustainably sourced district heating systems.
- Finally, demand response and other energy efficiency services enable the so-called "peak shaving", i.e. transferring the use of electricity to an earlier or later hour, than the highest demand hours of the day. Such services offer remuneration to households and industry that agree to consume less electricity between 18-21 hours in the evening for example (turning the dishwasher on during the day, charging electric vehicles in the middle of the night, adapting industrial production shifts).

This transition can hence be done:

- without new nuclear reactors and while phasing out existing nuclear power plants;
- while respecting biodiversity concerns related to bioenergy by using only true waste and residual biomass;
- without relying on carbon capture and storage.

This is why the Greens/EFA group has proposed amendments in line with or inspired by the -2040 scenario in several legislative proposals of the Fit for 55 package currently under negotiation: the Renewable Energy Directive (RED), the Energy Efficiency Directive (EED), the Energy Performance of Buildings Directive (EPBD), the FuelEU Maritime Regulation and the ReFuel EU Aviation Regulation. **The European Parliament and the Council need to step up their ambitions ahead of the adoptions of their position before trilogue negotiations.**

2. Accelerating the energy transition will require political will & legislative changes

A key takeaway from the study is that electrification will be key. This means the electrification of the transport sector: trams, busses, cars, trains, boats and scooters need to run on electricity instead of fossil fuels. Heating and cooling needs of our homes must be reduced and be met by

solar panels combined with heat pumps or renewable district heating. Low and mid-temperature industrial processes, like in food processing, need to switch from gas to renewable electricity.

Electrifying our transport, heating and industrial processes will allow matching the energy demand with domestic resources. Solar and wind energies are the driving forces in the renewable transition covering 93% of the electricity demand in 2050 (with a transition pathway by 2040). Electrification also increases energy efficiency, for example in the transport sector. Ramping up energy renovations plays a key part. Every investment in fossil fuels is damaging our energy independence, slowing down the transition and adding costs to it (cost of premature retirement, cost for the retrofitting of infrastructures, cost associated with fossil fuels use externalities etc.).

Inspired by this and other studies, the Greens/EFA group calls for:

- A minimum EU binding target of at least 56%–of renewable energy by 2030 in the RED, and binding national and sectoral sub-targets in line with this ambition;
- The phase-out of coal use by 2030, the phase-out of fossil gas by 2035 across the EU, with a total phase out of all non-renewable energy by 2040;
- A 20% EU efficiency target by 2030² in order to fully tap the potential of energy efficiency and savings to reach climate objectives as well as energy security and energy independence. The EU target should be supported by binding national contributions as well as by increased savings obligations for Member States to achieve at least 2.2% of annual energy savings among final consumers;
- The full implementation of the ‘energy efficiency first’ principle, in order to treat energy efficiency as a source of energy in its own right: this will allow reducing energy production and consumption by taking into account cost-efficient energy efficiency measures in shaping energy policy and making relevant investment decisions;
- A new zero emission standard allowing buildings to reduce their ecological footprint, being highly energy efficient and where any very low residual energy demand is met by renewable energy produced on-site (such as solar roofs) or nearby (for example through a renewable energy community) as well as the introduction of Minimum Energy Performance Standards that accelerate phasing out fossil fuel use in buildings;
- A highly efficient and fully renewable-based maritime sector by 2040;
- A modal shift in the transport sector to move away from aviation to more sustainable transport modes such as trains. The remaining fuels for planes should entirely be of renewable origin by 2035 or at the latest by 2040;
- Binding provisions in the Industrial Emissions Directive for the use of renewable energies for industries covered by this legislative proposal.

3. Financing climate action will bring high returns

Accelerating our energy transition to a fully renewable energy system is possible, already by 2035, if all financial flows are in line with our climate goals. We need to invest into energy efficiency measures, renewable energy and sustainable technologies in the next few years. The majority of the investments should come from the energy and the industry sectors, with the installation of new and cleaner devices and it will have to be a mix of public and private resources.

Achieving an energy efficient and fully renewables based economy by 2040 entails ramping up public and private investments in energy efficiency, renewables, and sustainable technologies across the EU by €1700 billion by 2030. This is almost equivalent to the EU’s multi-annual financial framework (2021-2027) coupled with Next Generation EU stimulus package adopted to rebuild a post-COVID-19 Europe³. In comparison, EU imports of natural gas and petroleum oils was estimated by the Commission to around €270 billion in 2021 alone⁴. EU countries also spent €56 billion on fossil fuel subsidies in 2019 according to the EU Court of Auditors⁵. To ensure solidarity

² compared to the level of efforts under the 2020 Reference Scenario

³ A total of €2.018 trillion in current prices (€1.8 trillion in 2018 prices) will help rebuild a post-COVID-19 Europe (comprised of NGEU and the 2021-2027 MFF).

⁴ https://ec.europa.eu/eurostat/statistics-explained/index.php?title=EU_imports_of_energy_products_-_recent_developments#Trend_in_extra_EU_imports_of_energy_products

⁵ <https://www.eca.europa.eu/en/Pages/DocItem.aspx?did=60760>

and invest together in the energy transition, the EU should adopt a new common EU borrowing mechanism as soon as possible.

It has to be pointed out that this number of €1700 billion investment was calculated with energy prices before the war in Ukraine and the current high fossil energy prices. With higher prices nowadays, investment in renewable energy and energy efficiency would be more expensive due to energy cost and inflation, but have a much more positive effect (as they replace costly fossil energy sources). And the energy transition is not only about the amount of direct investments but also about the per-unit-generation cost. Accelerating the energy transition towards a 100% renewable energy economy is economically attractive as the cost of used energy for both the 2035 and 2040 scenarios⁶ are competitive with the current cost of energy. Investing in a faster transition would bring us close to prices in 2020 in terms of energy costs.

Unambiguously, the cost of inaction will be far greater. According to a European Parliament study, the cost of “non-Europe” in EU energy-system transformation is estimated to be worth up to 5.6% of EU GDP in 2050 stemming from EU budgetary, regulatory and coordination actions, and including averted environmental costs and benefits from a fair transformation⁷. While the above-mentioned investments will bring high-returns and additional benefits:

- support for a green economic recovery from the effects of the COVID-19 pandemic and the war in Ukraine through creating local jobs;
- high levels of energy security with locally sourced renewable energy;
- the end of costly fossil fuels imports;
- the gain of energy independence from Russia and EU energy sovereignty globally;
- reduced greenhouse gas emissions, as well as associated pollution stabilising the climate;
- increased health and environmental benefits.

With skyrocketing fossil fuel prices, renewable investments become even more attainable. This is why the Greens/EFA group calls for:

- A €1 trillion EU Energy Transition Facility, running for at least 5 years focusing on projects aimed at boosting manufacturing of solar panels, wind turbines and heat pumps in the EU, domestic renewable energy generation capacity and energy efficiency;
- Member States to dedicate at least 1% of their GDP in energy efficiency measures and renewables;
- The Commission to rapidly present a multi-year investment strategy to plan the investment needs for the EU energy transition.
- Member States to ultimately implement active consumers’ rights as enshrined in the Clean Energy Package from 2018 into national law so that citizens can invest in and benefit from decentralised renewable energy production.

In conclusion, every investment using fossil fuels is an investment in a stranded asset. The sooner we have clear standards and dedicated financial investments, the sooner our citizens will be empowered to play an active part in the transition and the sooner our European companies will lead to way to have a competitive advantage on the international market. Technologies enabling a highly energy efficient and fully renewable energy system are already there and their prices decrease while current fossil based energy prices are increasing. **It is now more than ever time for the EU to implement legislation to guide our industries and citizens in the transition and to allocate the adequate funding to roll out its much-needed energy transition and independence.**

⁶ When looking at the levelised cost of energy (LCOEnergy) in the long-term, the REF scenario yields a LCOEnergy of 45 €/MWh in 2050, the RES-2040 scenario results in a LCOEnergy of 52 €/MWh in 2040 and the RES-2035 scenario has a LCOEnergy of 55 €/MWh in 2035⁶ (see Fig. ES7). These are rather competitive to current LCOEnergy of 48 €/MWh in 2020

⁷ €500 billion per year in 2020-2100 with 3 degrees warming due to economic losses of storms, drought and welfare loss:

[https://www.europarl.europa.eu/RegData/etudes/STUD/2021/694222/EPRS_STU\(2021\)694222_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2021/694222/EPRS_STU(2021)694222_EN.pdf)