



Building a Paris Agreement Compatible (PAC) energy scenario

CAN Europe/EEB technical summary of key elements

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2.3 Phasing out fossil oil

Key assumptions

The absolute domination of fossil oil products in the transport sector is not compatible neither with the Paris Agreement's 1.5°C objective nor with the EU climate and energy targets,¹ therefore:

- Fossil oil disappears from the transport sector's energy supply by 2040 thanks to massive electrification combined with fuel-switching.²
- Ongoing modernisation of production processes and higher energy efficiency lead to a gradual phase out of oil in industry and agriculture. Circular economy principles accompany the phase out in the chemicals industry, also with regard to its role as a raw material.³
- Fossil oil will be phased out for space heating and hot water in buildings with the gradual replacement of old and inefficient heating oil boilers due to renovations.

Evolution of energy supply

Fossil oil products in 2015 were the most important source of primary energy supply. By 2030, fossil oil will remain by far the dominating energy supply in transport. In 2015, it covered 93% of final energy demand (3,385 TWh). Even after a steep market introduction of electric vehicles, 60% of final demand is still covered by fossil oil in 2030. With a further massive upscaling of renewable electricity, of renewable hydrogen and liquid synthetic fuels, its share decreases to 28% in 2035. Fossil oil products then are phased out by 2040.

In agriculture, fossil oil covered 50% of final energy demand in 2015 (162 TWh), falling to 47 TWh in 2035. It will be partly substituted by renewable electricity and by liquid biofuels for farming machinery, leading to an entire phase-out between 2035 and 2040. Fossil oil supply for heating in buildings has a less important role. Similar to the phase out of fossil gas boilers, the renovation of buildings leads to a fast switch to renewable heating such as heat pumps and renewable district heating. Fossil oil supply will reduce by 95% between 2015 and 2035 in the residential sector (-80% in tertiary).

Fossil oil supply in industry is often limited to processes that can be electrified or that can switch to biomass or non-fossil gases.⁴ In electricity generation, fossil oil loses its marginal role as reserve capacity and for islands.

Integration of members' and experts' feedback

Based on a comparison of cost factors and technology readiness, members and experts attending the PAC scenario workshops and providing feedback suggested a very quick ramping up of electric vehicles and thus an advanced phase-out of fossil oil in road transport.⁵

¹ Global Witness: Overexposed: How the IPCC's 1.5°C report demonstrates the risks of overinvestment in oil and gas, April 2019.

² Transport and Environment: How to decarbonise European transport by 2050, November 2018.

³ Material Economics.

⁴ In 2015, the non-energy use of fossil oil products in the chemicals industry (707 TWh) is 25 times higher than the direct use for energy supply. In contrast with the latter, fossil oil will remain in non-energy use for the production of raw materials. Circular economy approaches however allow for a phase-out by 2050. In energy statistics, the non-energy use of fossil fuels in the chemicals industry is not accounted with regards to emissions or shares of energy carriers.

⁵ CAN Europe/EEB: Summaries of PAC scenario workshops and General Assemblies workshops.

Sensitivities and limitations

The availability of alternatives to fossil oil in aviation is limited to second generation liquid biofuels and liquid synthetic fuels. Their competitiveness has not been assessed in detail. The analysis of economic and regulatory conditions for phasing out the fossil oil product kerosene by 2040 lies beyond the exercise of this first PAC scenario.

Key results

- Fossil oil quickly loses its dominating role in the transport sector by 2035, shrinking to 28% of final energy demand. This is followed by a full phase out by 2040, provided liquid synthetic fuels are scaled-up from the beginning of the 2030s to substitute kerosene in aviation.
- Like in the case of fossil gas, deep renovations quickly squeeze fossil oil out of the supply mix for heating and hot water in buildings. Final energy demand for fossil oil in the residential sector drops by 95% from 2015 to 2035 (-80% in tertiary).
- Phasing out fossil oil in industry is less challenging than leaving fossil gas. It slumps from a share of 8% in final energy demand in 2015 to 2% in 2035.

