

## OPINION

# Europe on the way to net zero: What challenges and opportunities?

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Driven by increasingly ambitious climate goals, Europe has been, and continues to be, a laboratory for experimenting with clean energy policies, many of which have been transferred and adopted by countries and regions across the world (e.g. [1]). Whilst certainly not perfect, Europe's energy and climate policy has led to significant technological and policy innovation from which countries also outside of Europe have benefited. Looking ahead, Europe now faces a triple-challenge:

First, the European Green Deal, the flagship climate policy initiative of the European Union (EU) announced in 2019, makes a commitment to reduce emissions by 55% based on 1990 levels and achieve climate neutrality i.e. net zero emissions by 2050 [2]. The commitments to reductions in carbon emissions agreed in the Green Deal are clearly achievable, but doing so will be challenging. Never in history before has the EU reduced carbon emissions at such a rate, which in turn needs faster and further deployment of clean energy technologies including energy efficiency, renewable energy (especially solar and wind), the electrification of large parts of the buildings and transport sectors, and the replacement of fossil fuels in hard-to-electrify sectors.

Second, energy prices are at unprecedented levels in Europe with wholesale gas prices around five times higher compared to pre-pandemic levels at the time of writing [3]. This has pushed millions of households into energy poverty meaning they struggle to heat their homes adequately. There is significant pressure on policy makers to alleviate the financial pressures household are facing driven by these price rises. Energy market reforms are under discussion and national governments have responded with a number of measures ranging from tax rebates and direct payments to households.

Finally, historically the EU has relied increasingly on fossil fuel imports from Russia. But the Russian invasion of Ukraine has led to a U-turn and the European Commission as well as Member States are now trying to reduce Russian gas, oil and coal imports as fast as possible. This is particularly challenging because the EU in 2021 received about 40% of its fossil gas from Russia, 27% of oil imports and 46% of coal imports [4]. Gas in particular is difficult to replace with alternative supplies but clean energy technologies can deliver significant reductions even in the short term of up to 2/3 by 2025 [5].

Delivering on all three of these challenges at the same time is by no means trivial and will require a broad suite of policies and regulations. This is why in May 2022 the European Commission [6] published an additional strategy called REPowerEU alongside the Green Deal following the invasion of Ukraine. The main aim of REPowerEU is to reduce Russian gas dependency in Europe whilst meeting climate commitments.

The main ingredients in a clean energy transition are energy efficiency and clean energy. The REPowerEU proposals provide for both: The proposal increases the energy efficiency target in the Energy Efficiency Directive from 9% of EU energy consumption to 13% by 2030 compared to the reference scenario. And the Commission expands the target for renewable

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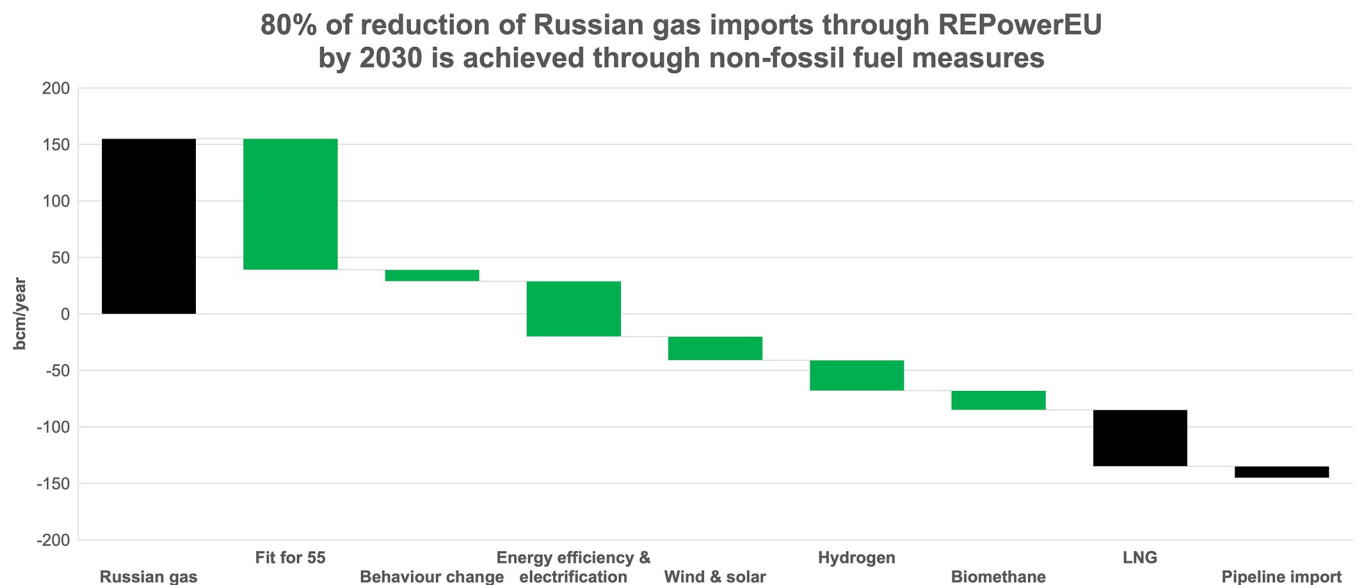
energy to 45% by 2030, up 5% from last year's proposal. This increase would result in 1,236 GW of renewable energy generation capacity, as compared to the previous expectation of 1,067 GW by 2030, with even more rapid increases for solar deployment [7].

The Commission's proposals in this regard are in line with its own conclusion that accelerating greater deployment of renewable energy will reduce electricity prices and reduce fossil fuel imports. Specific measures to reduce fossil gas use for heating include an early phase-out of subsidies for fossil fuel heating systems by 2025, more ambitious minimum energy performance standards, and a proposal to use the Ecodesign Directive which sets appliance standards to ban stand-alone fossil fuel heating systems by 2029 if co-legislators can agree on this intervention in the market. In short, REPowerEU includes sound proposals to facilitate accelerated a clean energy transition and increased energy independence.

In addition to more renewable energy and energy efficiency, REPowerEU also proposes to massively upscale green hydrogen and biomethane as key solutions to replace fossil fuels. The Commission proposes to accelerate renewable hydrogen deployment within Europe to 10 million tonnes and imports of additional 10 million tonnes per year. Current global green hydrogen production is less than 1 million tonnes per year [8]. Whilst expanded green hydrogen production is necessary to decarbonise part of sectors such as industry, transport and electricity generation, there are question marks as to whether such high targets can be achieved in such a short time. REPowerEU also establishes a 35 million bcm per year biomethane target, up from currently less than 5 bcm per year. A recent study by concluded that "there is a risk that large shares will have to be contributed via cultivated biomass (especially maize), this would translate to about 5% of the arable land in the European Union" [9].

REPowerEU also aims to diversify gas supply to Europe by expanding liquified natural gas (LNG) infrastructure and pipeline capacity to other countries. Whilst in the short-term supply diversification is clearly necessary if the EU wants to wean itself off Russian gas quickly, there are risks of potentially locking in new fossil fuel infrastructure as a result that will need to be carefully managed.

Overall, the expected impact of REPowerEU on Russian gas imports is significant: The reduction in fossil gas demand amounts to almost twice the current gas import volumes from Russia (Fig 1).



**Fig 1. Gas reduction options compared to Russian gas imports identified in REPowerEU.** Source: Based on [7].

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Of the cuts in gas demand foreseen 80% is achieved through non-fossil fuel measures consisting largely of renewable energy, energy efficiency and electrification. It is also notable that only 4% of the investments foreseen by REPowerEU are for new fossil fuel infrastructure such as LNG terminals. 30% of investments will be for renewable energy, 34% for energy efficiency and heat pumps, and another 10% for making the power grid ready for a faster transition to clean energy [10].

What all of this means is that the invasion of Ukraine and the subsequent efforts to reduce Russian gas imports have not stalled but accelerated the clean energy transition in Europe. Faster and further development of renewable energy projects and a more ambitious roll-out of energy efficiency and electrification are the key focus areas of the European Commission's proposals.

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