

Building a 'first fuel' pipeline to regain Europe's energy sovereignty

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Recent Publications by Agora Energiewende



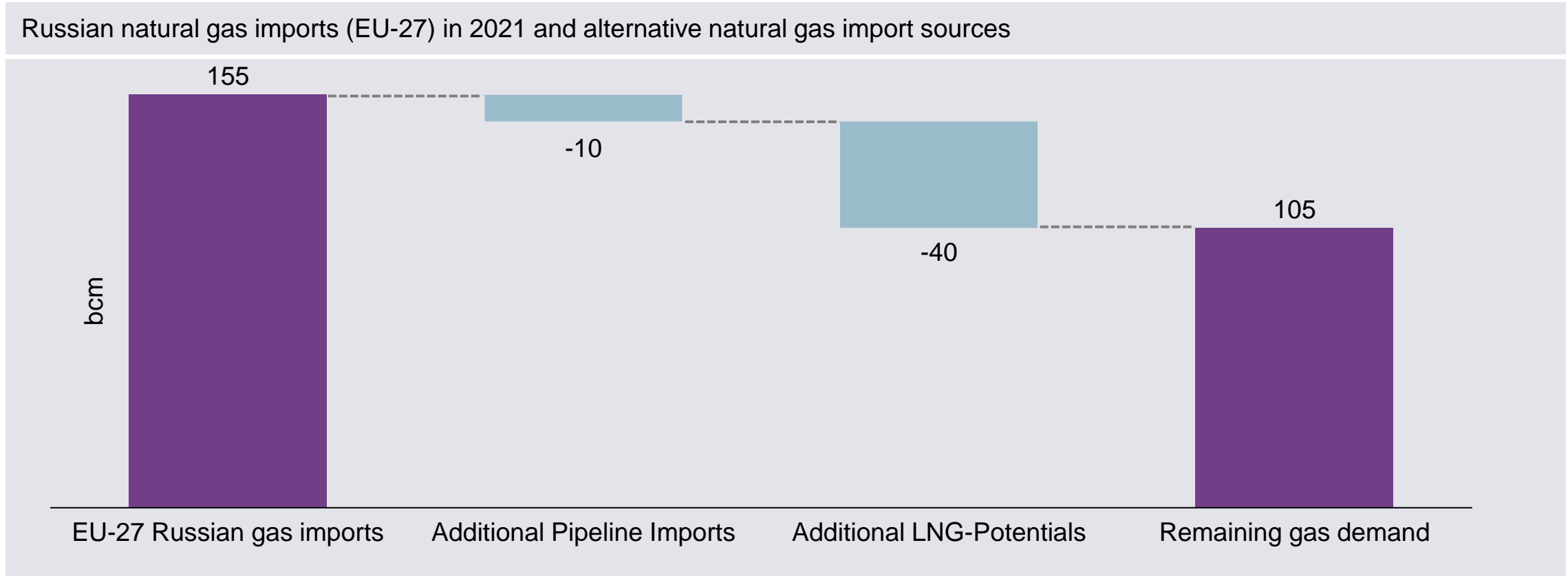
Uniting energy security and climate protection – Measures for exiting the fossil energy crisis (*only in German*) ([Link](#))

- Developed together with Prognos
- Looks at both the short- and medium term potential for Germany to reduce its dependence on Russian natural gas imports.

Regaining Europe's Energy Sovereignty: 15 Priority Actions for RePowerEU ([Link](#))

- Developed together with Artelys, Wuppertal Institute & TEP Energy
- Looks at the potential for the EU to reduce its structural dependence on natural gas by the end of 2027 (vs 2020 levels).

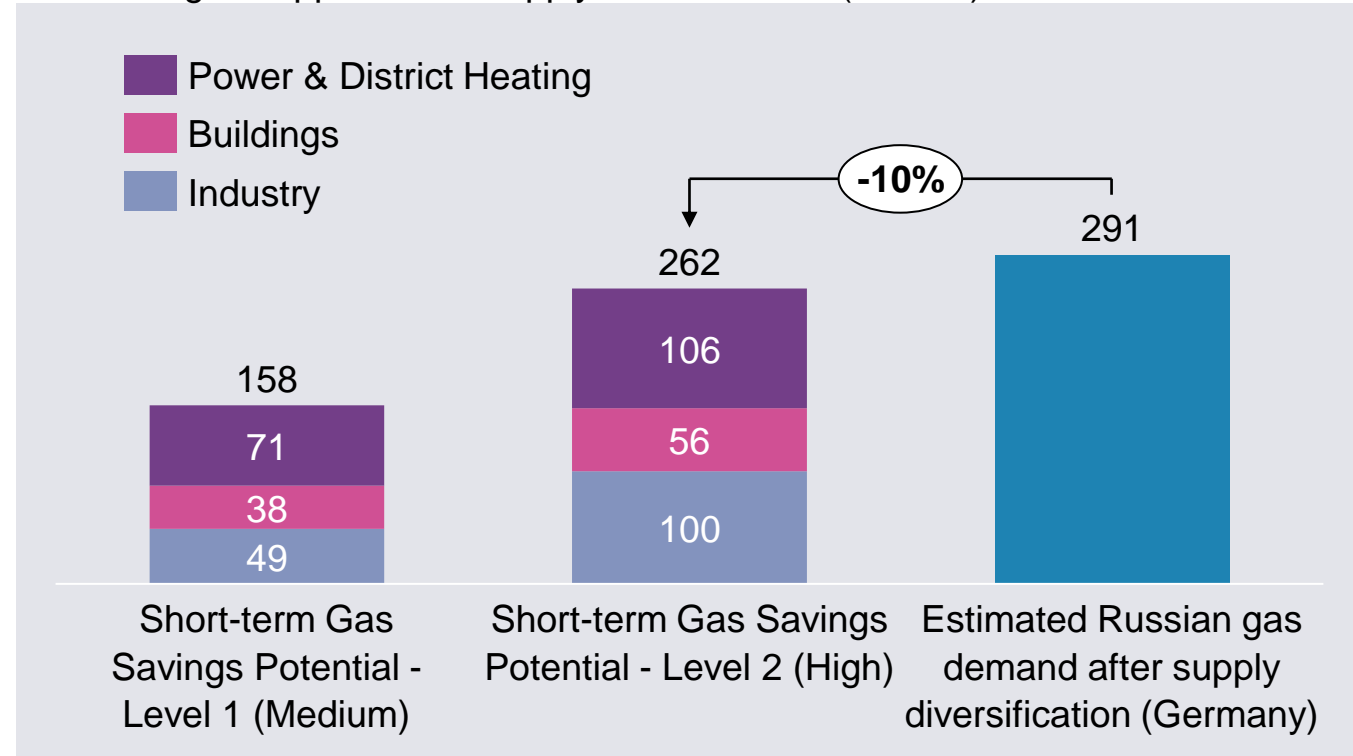
The escalation of Russia's war against Ukraine has created a fossil energy crisis and exposed the EU's structural dependency on fossil gas imports from Russia.



Agora Energiewende (2022) with data from Eurostat (2022), IEA (2022), EU-Commission (2022)

Short-term gas savings potentials in case of a disruption of gas supplies are significant, but will also need to rely on fuel switching to carbon intensive fuels, as well as difficult behavioural and demand rationing measures.

Short-term gas savings potential in Germany by sector vs residual demand for Russian gas supplies after supply diversification (in TWh)



Agora Energiewende (2022)

Measures assumed in level 2:

- Average reduction of room temperatures by 1-1,5 °C in across all buildings.
- Market and regulatory driven displacement of electricity and heat production from gas plants
- Fuel switch to other (largely fossil) fuel sources for one third of industry process heat installations
- Reduction of gas consumption in the basic chemicals sector to 25% of pre-crisis levels
- Significant deployment of short-term efficiency measures in buildings and industry

Short-term priority actions

1

An broad communications campaign to mobilize all available short-term energy savings

2

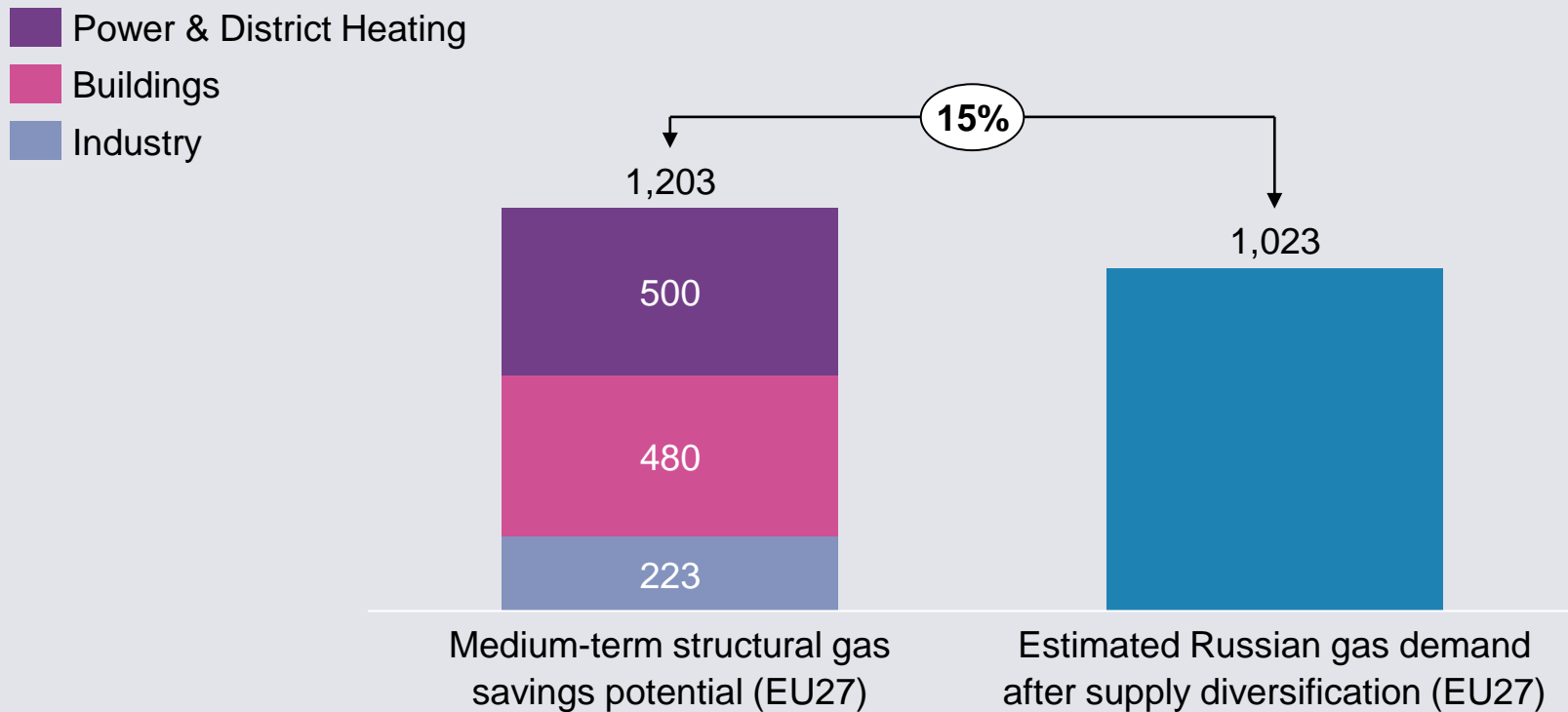
Targeted financial support for vulnerable and low-income households

3

Measures to safeguard industrial production in Germany and Europe

By contrast, if the EU fully mobilises all available means to structurally reduce gas demand, it can fully regain its energy sovereignty by 2027.

Medium-term gas savings potential for EU27 by sector vs residual demand for Russian gas supplies after supply diversification (in TWh)



Agora Energiewende (2022)

Roughly 480 TWh can be saved in buildings by improving boiler efficiency, renovating buildings, replacing gas boilers with renewable heating solutions and limited fossil switching

Estimated saving potentials in the buildings sector (TWh)

Sector	Minimum potential (TWh)
Improve energy efficiency of existing gas boilers	72
Renovate buildings	72
Replace gas boilers with heat pumps	140
Replace gas boilers with district heating	125
Replace gas boilers with biomass	47
Switch fuels for existing boilers	24

Agora based on modelling from Artelys, Wuppertal Institute and TEP Energy

7 Priority actions for the buildings sector:

1. Introduce an EU-wide Check & Act campaign and mobilize a Civilian Energy Corps.
2. Make the training of skilled professionals for the energy transition a key priority.
3. Stop installing new gas boilers.
4. Rapidly scale up the production and installation of heat pumps.
5. Rapidly scale up building renovation.
6. Connect more homes to district heating networks and make them greener and more efficient.

Industry can save 223 TWh by installing heat pumps, switching fuels, and reducing & replacing gas as feed-stock

Estimated saving potentials in industry sector (TWh)

Sector	Minimum Potential (TWh)
Install heat pumps for low temperature heat (<150°C)	170
Install hybrid electricity/fuel systems for medium temperature heat (150-500°C)	30
Switch fuels for high temperature heat processes (>500°C)	3
Reduce and replace natural gas as feedstock in fertilisers and plastics	20

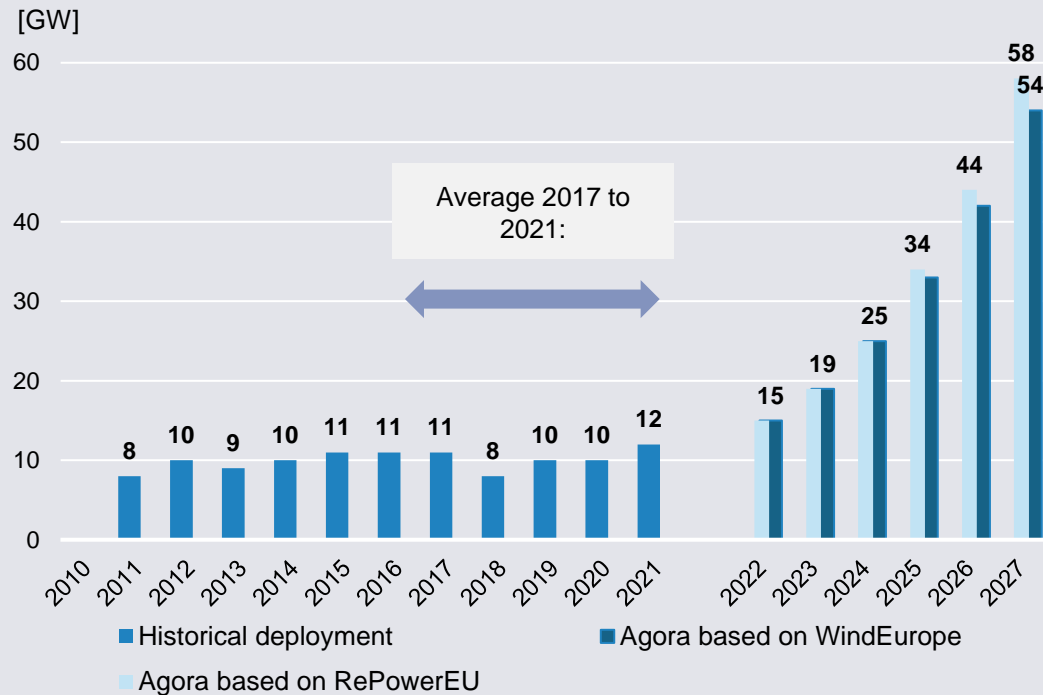
Agora based on modelling from Artelys, Wuppertal Institute and TEP Energy

5 Priority actions for the industry sector:

8. Don't regulate industrial gas and energy prices, let the demand signal work.
9. Take emergency measures to avoid irreversible reduction in EU industrial and agriculture production capacities.
10. Accelerate the uptake of heat pumps, direct electrification and hybrid RES-fossil fuel systems for low and medium-temperature industrial heat.
11. Regulate industry to ensure all cost-effective energy savings measures are taken.
12. Rapidly scale material efficiency and enhanced recycling of energy-intensive materials.

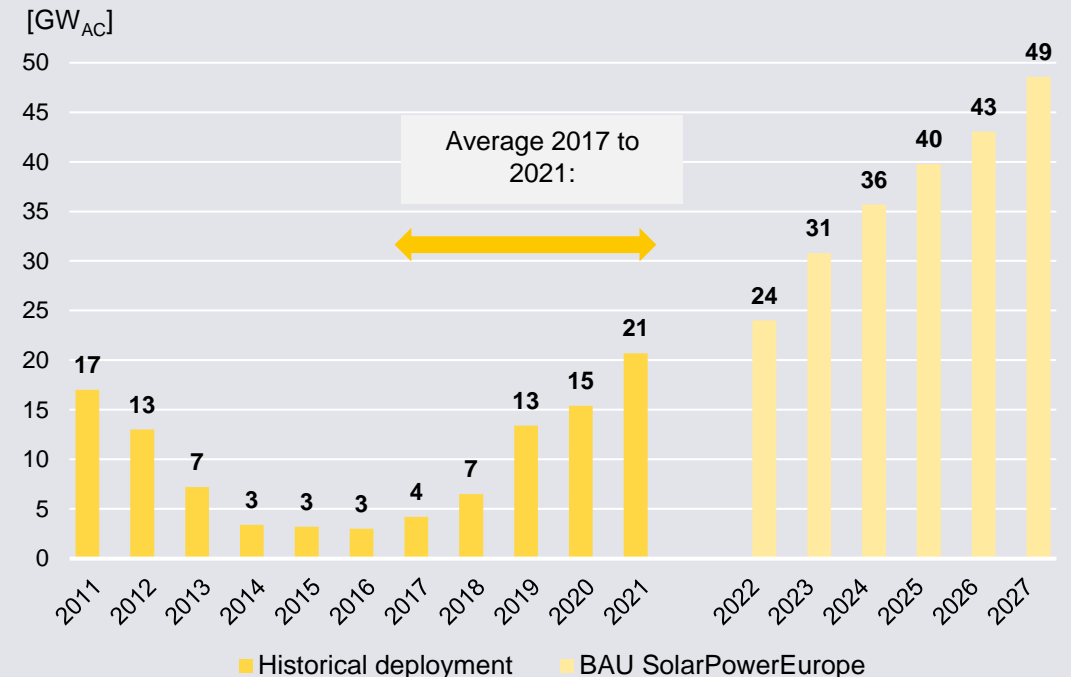
Pulling all stops to scaling renewables, investing into flexible assets and enhancing power system flexibility will displace around 500 TWh fossil gas in the power sector

Historical and projected deployment rates for wind



Adapted from the European Commission (2021)

Historical and projected deployment rates for solar PV



Solar Power Europe (2022); numbers in AC converted from DC numbers with a factor of 1.25

Pulling all stops to scaling renewables, investing into flexible assets and enhancing power system flexibility will displace around 500 TWh fossil gas in the power sector

Priority actions:

- 12. Pull all stops for renewables deployment and manufacturing in Europe
- 13. Mandate solar rooftops and maximize PV self-consumption
- 14. Fully and ambitiously implement existing electricity market rules to enhance power system flexibility
- 15. Strike a smart balance between direct electrification and green hydrogen production

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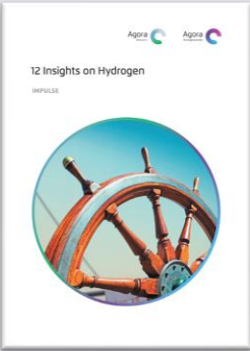




Thank you for your attention!

Questions or comments? Feel free to contact us:
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Publications on climate-neutrality, hydrogen and industry

12 Insights on Hydrogen	Making renewable hydrogen cost-competitive	No-regret hydrogen: Charting early steps for H ₂ infrastructure in Europe	Towards a climate-neutral Germany by 2045	Breakthrough Strategies for Climate-Neutral Industry in Europe
				
> <u>impulse</u>	> <u>main study</u> > <u>legal analysis</u>	> <u>full study</u>	> <u>summary (EN)</u> > <u>full study (DE)</u>	> <u>summary</u> > <u>full study</u>
	> <u>slide deck</u> > <u>webinar</u>	> <u>data appendix</u> > <u>webinar</u>	> <u>data appendix (DE)</u>	> <u>webinars</u>

Key findings

1

The escalation of Russia's war against Ukraine has created a fossil energy crisis and has exposed the EU's dependency on fossil gas imports. If the EU fully mobilises all available means to reduce energy demand and switch to renewable energy, Europe can regain its energy sovereignty by 2027. Energy efficiency in buildings and industry as well as a fast ramp up of wind and solar PV can permanently reduce fossil gas demand by 1200 terawatt hours in the next five years, allowing to avoid 80% of today's Russian gas imports and enabling a 100% displacement when combined with alternative supplies such as LNG.

2

Climate protection and energy security go hand in hand, as actions to meet the EU climate targets also reduce fossil gas consumption. Until 2027, energy efficiency, district heating and a heat pump revolution can save 480 TWh in buildings; efficiency and electrification in low and medium temperature heat processes can provide for 223 TWh savings in industry, and a ramp up of wind & solar PV combined with more system flexibility will contribute 500 TWh in the power sector.

3

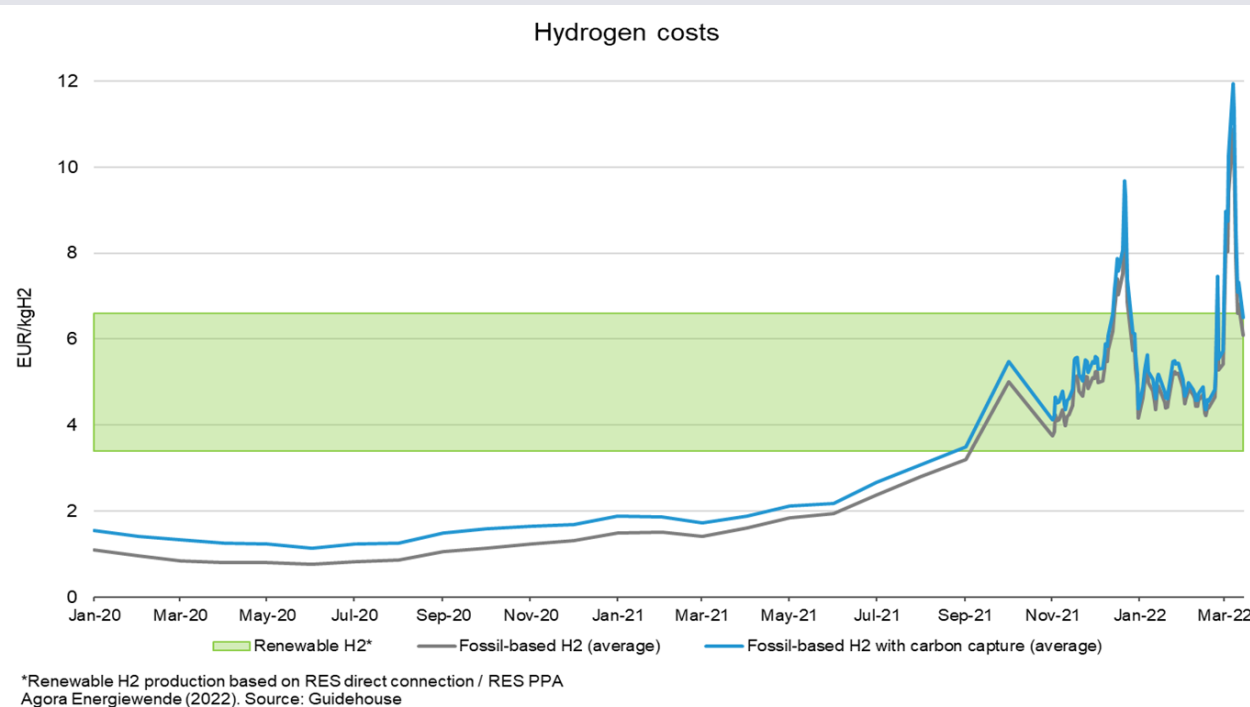
Regaining Europe's energy sovereignty by 2027 requires a collective European effort based on joint commitments and solidarity. The RePowerEU plan needs to mobilize the reductions identified in this study. Similar to the COVID recovery efforts, the plan must be embedded in a strong political framework overseen by the European Council to ensure its swift and full implementation. Helping Ukraine build back better after the war should be part of the efforts.

4

A new EU Energy Sovereignty Fund, modelled on NextGenEU and equipped with 100 bn EUR until 2027, should be set up as part of a dedicated investment framework to deliver RePowerEU. The framework also needs to ensure that existing EU funds are re-purposed wherever possible and governments smartly combine price signals and protection for poor households and industry.

The changing economics and geopolitics of blue hydrogen put even higher pressure to accelerate the development of green hydrogen and prioritize its use.

Costs of renewable H2 and fossil based H2 with carbon capture 2020-2021

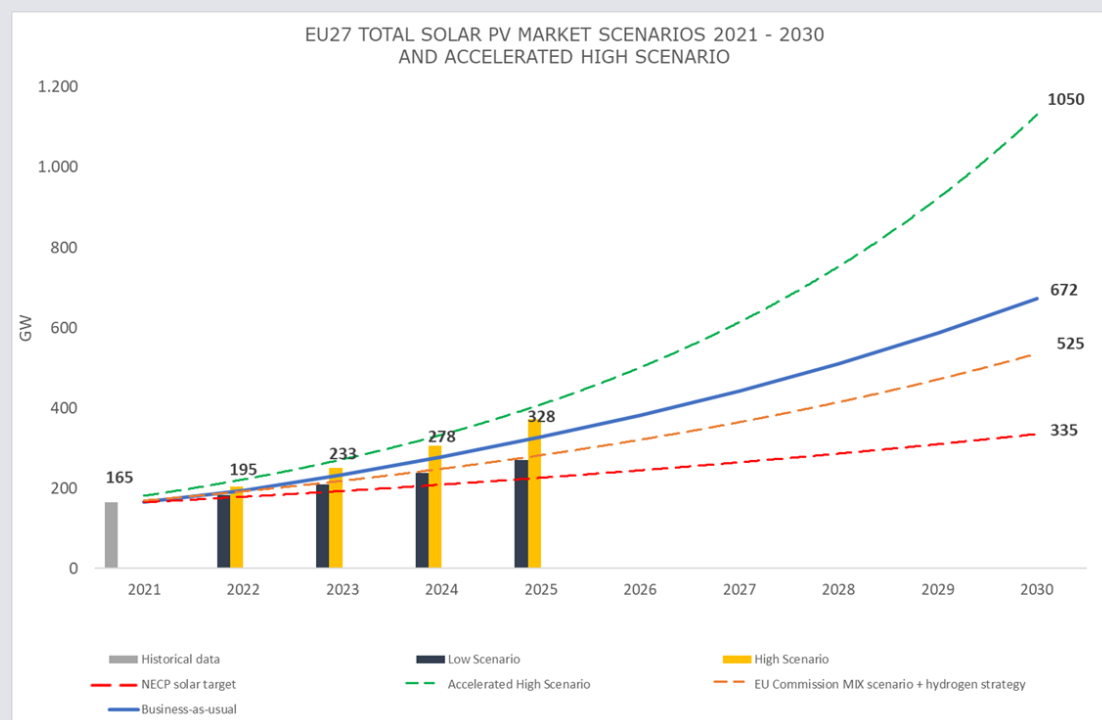


- Fossil-gas based blue hydrogen plays a prominent role in net-zero scenarios in a transition phase.
- Due to the fossil energy crisis, blue hydrogen can no longer be considered part of the solution.
- Current gas prices have undermined the business case compared to green hydrogen.
- Renewable hydrogen and additional renewable electricity generation must be accelerated.
- Renewable hydrogen needs to be prioritized for no regret applications.
- No regret applications are steelmaking, basic chemicals, long haul aviation, maritime shipping and back-up power plants.

Agora Energiewende and Guidehouse (2022)

The current EU ambitions are lower than BAU market expectations and need immediate adjustment.

EU27 Solar PV Market scenarios until 2030



SolarPower Europe (2022). Numbers are in DC

- Recent market outlooks show that the currently envisaged 525 GW_{DC} by the Commission do not reflect market developments.
- The BAU scenario shows around 150 GW more than current EU targets.
- Accelerated deployment is possible. More than 200 GW are in the pipeline in just four countries (France, Italy, Spain, UK).
- Solar PV deployment is taking off. To keep the momentum going the whole process chain needs investments now.