

Agora
Energiewende



Phasing out fossil gas in Europe

*Feasibility, Regulation and Financing Options for CEE
and SEE EU Member States*



@andreasgraf



In an initial GEXIT project, we aimed to kick start the debate on the role of fossil gas with regard to our climate targets

→ Context:

- EU Climate neutrality target by latest 2050 and net domestic GHG emissions reduction by at least 55% by 2030 compared to 1990 levels.
- The European Climate Law obliges the EU Commission to propose an indicative GHG emission budget for 2030-2050 by mid-2024, while developing its proposal for the EU's 2040 climate target.

→ Objective:

- Help inform negotiations on the EU Fit for 55 package (Renewable Energy Directive, Energy Efficiency Directive, Energy Performance of Buildings Directive, Gas Directive, Gas Regulation) and related EU standards (e.g. Ecodesign rules for space and water heating appliances).
- Prepare for 2040 interim targets debate and national debates on role of fossil gas (NECPs, other regulation).

→ Expected outcomes:

- An estimate of the remaining GHG budget for the EU
- After coal, launching a debate on fossil gas phase-out
- A coherent narrative on how fossil gas dependent countries and sectors can deal with zero to little gas use by latest 2050
- A high-level cost analysis for the phase-out pathways
- Policy recommendations in buildings, power and industry sectors at EU level

Scenarios were modelled to provide solid evidence supporting policy recommendations

Modelling exercise

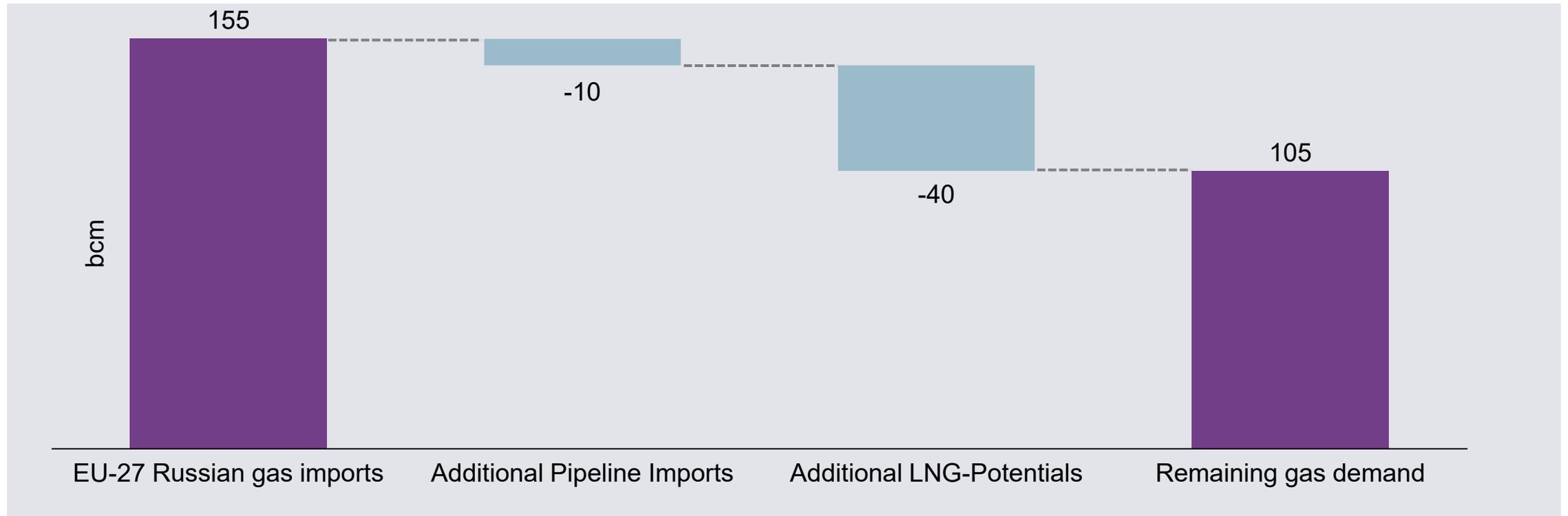
- Sectoral models for sectors with high gas use: power, buildings, industry
- Exogenous assumptions for transport and land use sectors
- Sectoral models with feedback-loops for overarching model
- One node per country, timeline focuses on 2027/2030 to 2050

Consortium

- **Artelys**: Leading consultant with special focus on power sector
- **Wuppertal Institute**: Model for the EU industry sector
- **TEP Energy**: Model for the EU buildings sector

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, thus shifting the focus of the project to the short- to medium-term.

Russian natural gas imports (EU-27) in 2021 and alternative natural gas import sources



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

Agora published two first paper in March using the initial modelling work, adapted to include new constraints with Russia.



Energiesicherheit und Klimaschutz vereinen – Maßnahmen für den Weg aus der fossilen Energiekrise
IMPULS

Projektstellung
Simon Müller
Frank Peter
Dr. Barbara Saarbeck

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Autoren
Helen Baumelster
Felix Hellmann
Alexandra Langenheid
Thorsten Lenz
Dr. Julia Metz
Simon Müller
Frank Peter
Dr. Barbara Saarbeck
Janek Stötz

**Regaining Europe's Energy Sovereignty
15 Priority Actions for RePowerEU**
IMPULSE

Matthias Buck
Alexander Dussolt
Fabian Hein
Christian Riedl
Andreas Graf
Michaela Hoff
Oliver Sartor
Claudio Baccanti

25/04-1-2022/EN
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March 2022

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

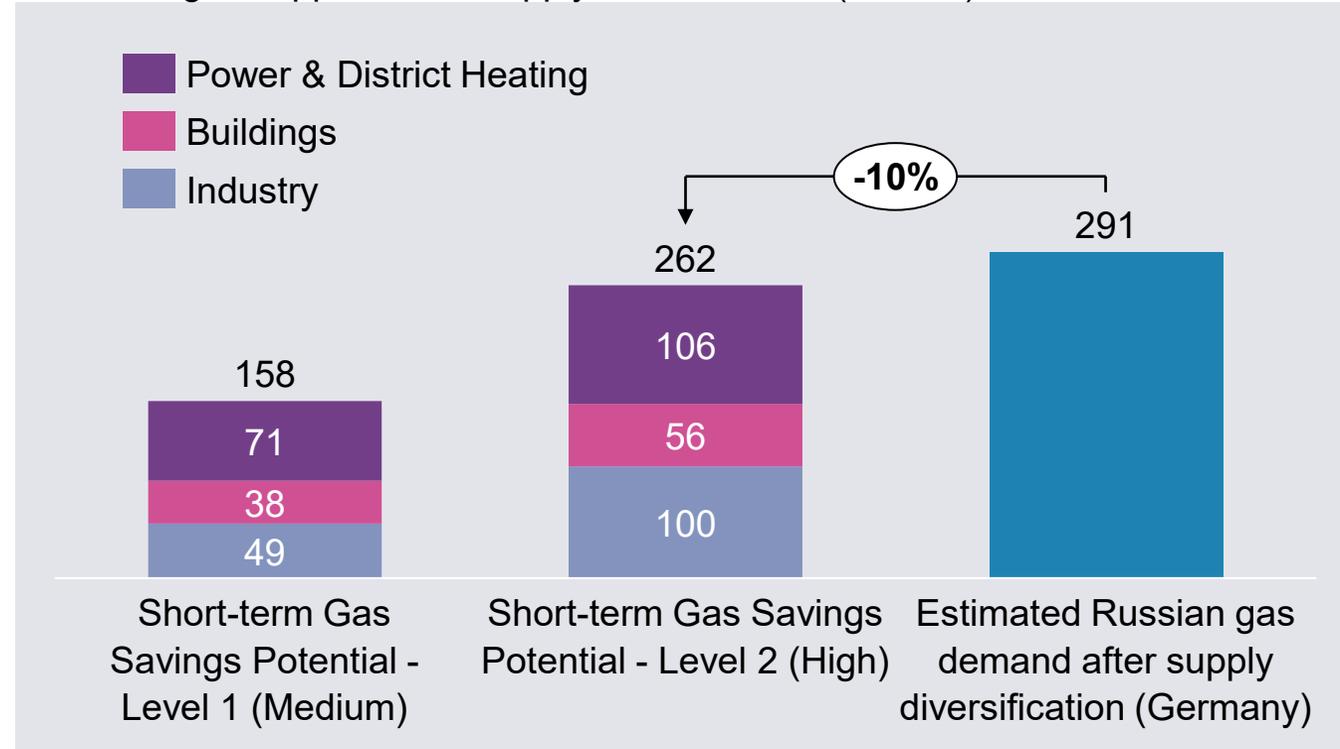
- Developed together with Prognos
- Looks at both the short- and medium term potential for Germany to reduce its dependence on Russian natural gas imports.

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).

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)

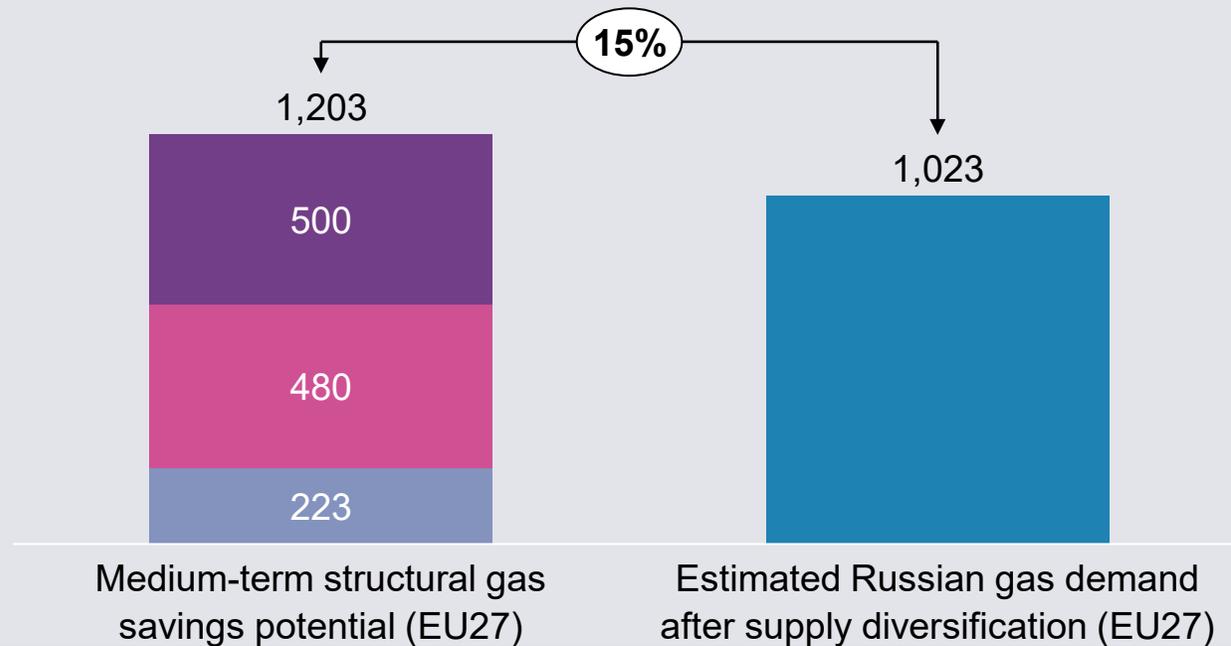
Measures assumed in level 2:

- 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

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)

- Power & District Heating
- Buildings
- Industry



Agora Energiewende (2022)

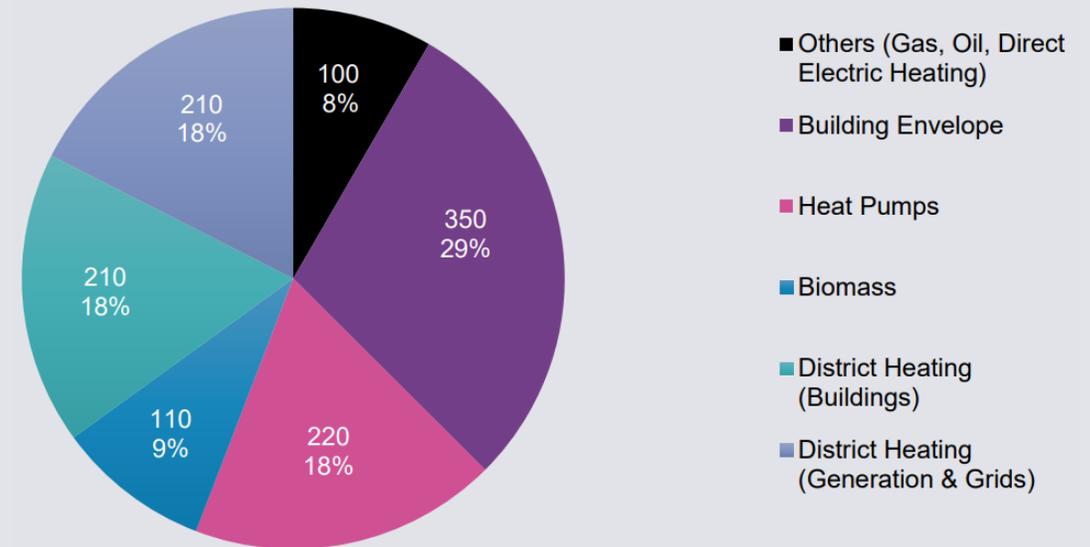
Roughly 480 TWh can be saved in buildings, but the investment needs are large and require a significant frontloading of investments, especially in district heating.

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

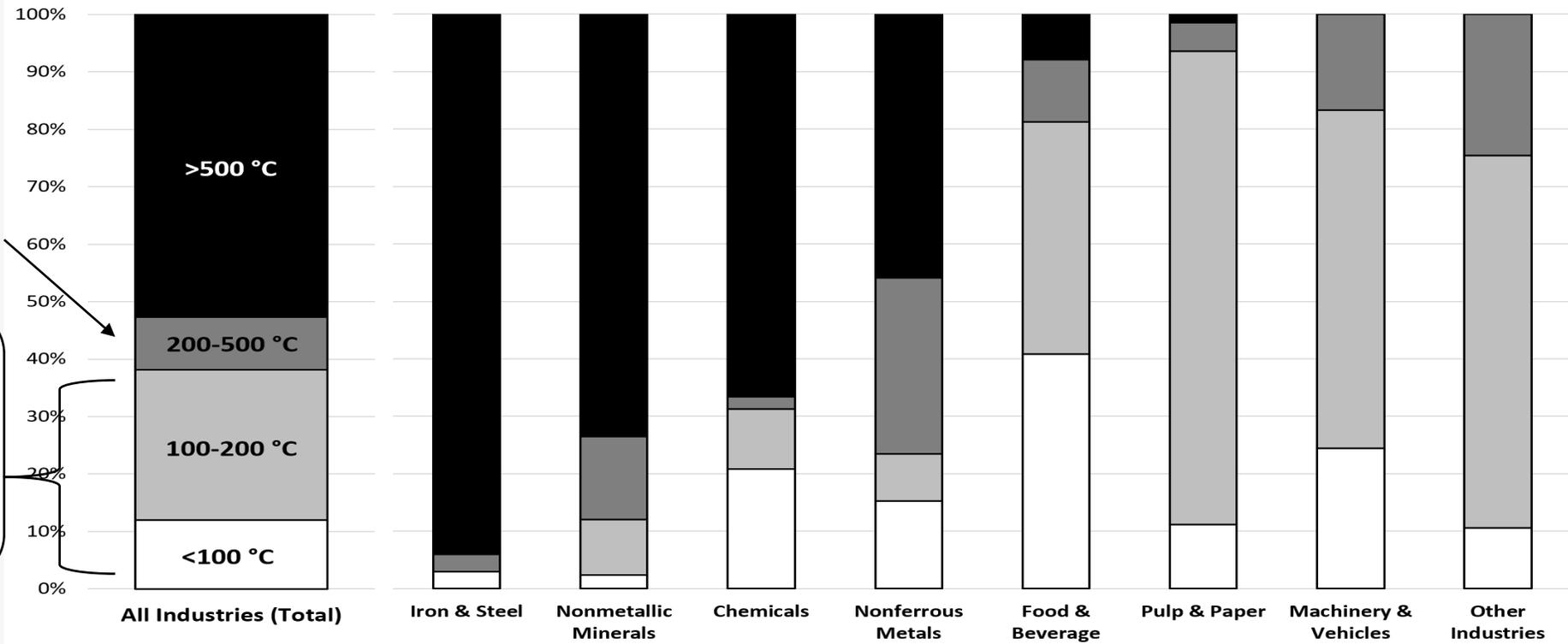
Investments between 2022-2027 in the EU27 buildings sector in billion Euros, including district heating.



Agora Energiewende 2022

Industry can save 223 TWh – $\frac{3}{4}$ of this is achieved by installing renewable heating technologies (especially heat pumps) for low temperature heat (<150°C)

Percentage Heat Demand by Temperature Range by Industry (EU28, 2012)

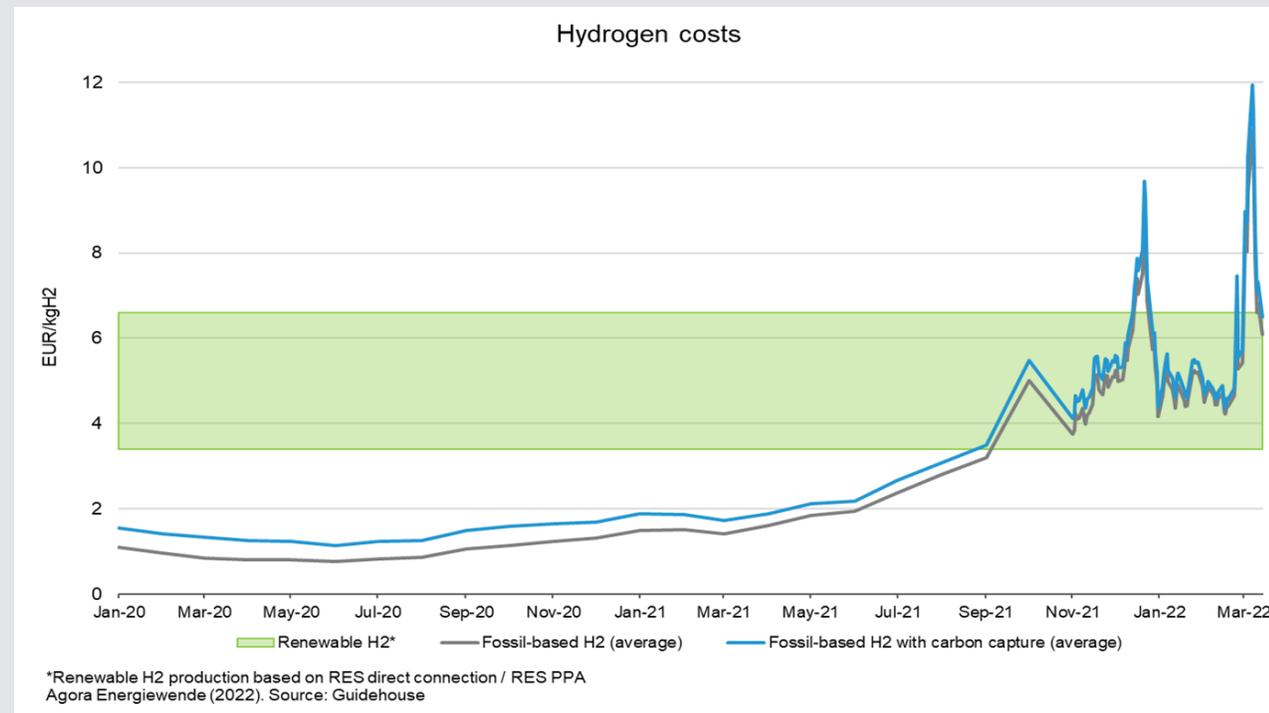


15-20%

ca. 40%
industry
gas
demand

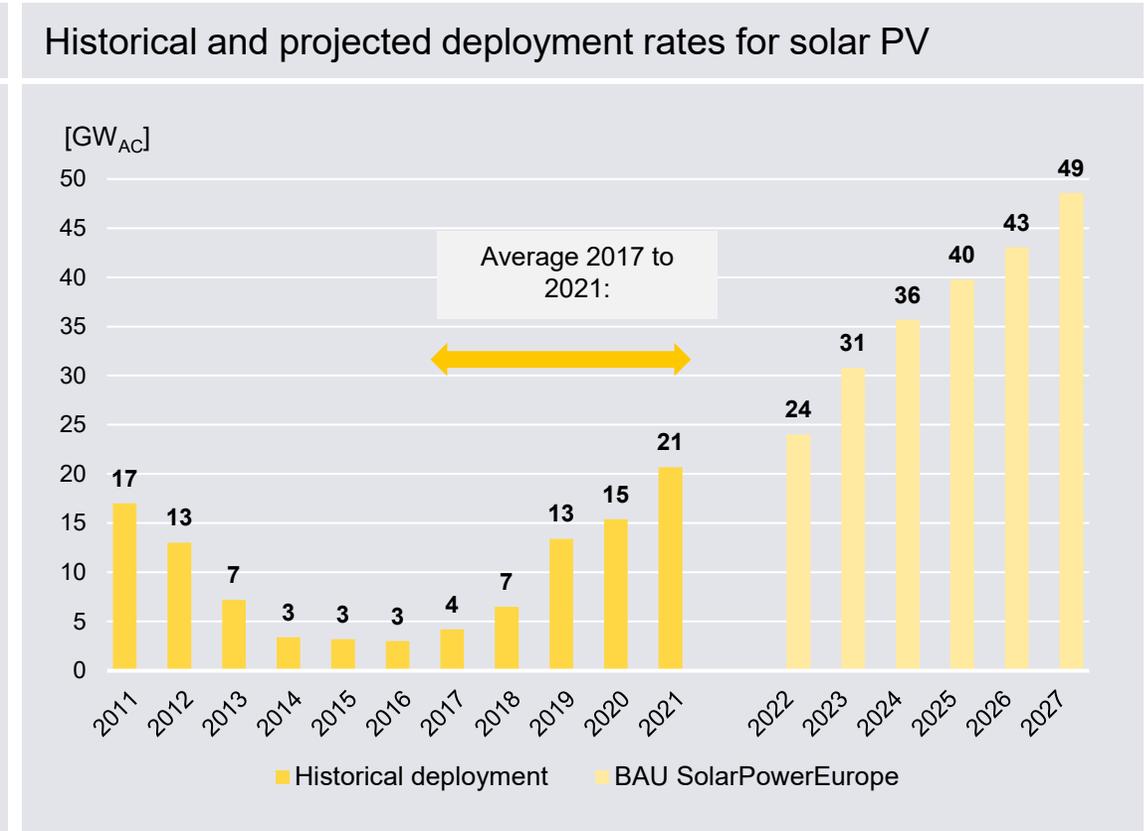
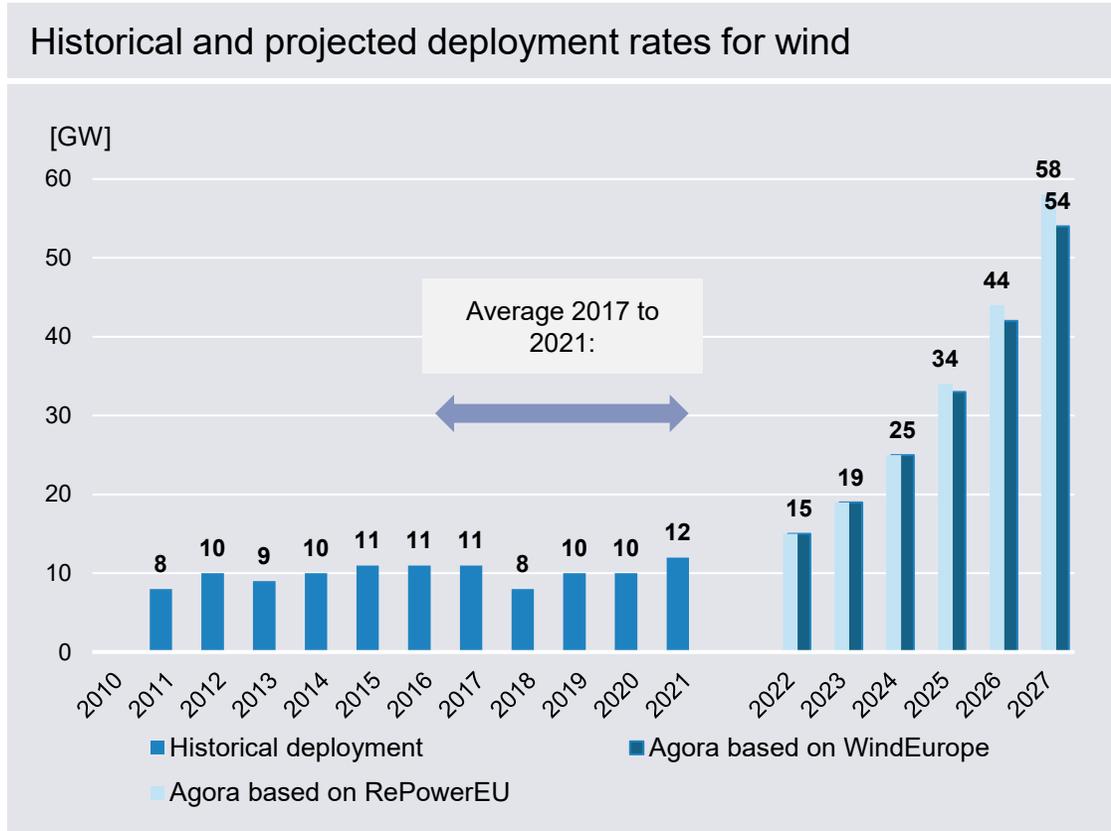
The changing economics and geopolitics of blue hydrogen put even higher pressure to accelerate the development of green hydrogen and prioritize its use.

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



Agora Energiewende and Guidehouse (2022)

Pulling all stops to deploy renewables, investing into flexible assets and enhancing power system flexibility can displace around 500 TWh fossil gas in the power sector, but requires a massive scaling of wind and solar.



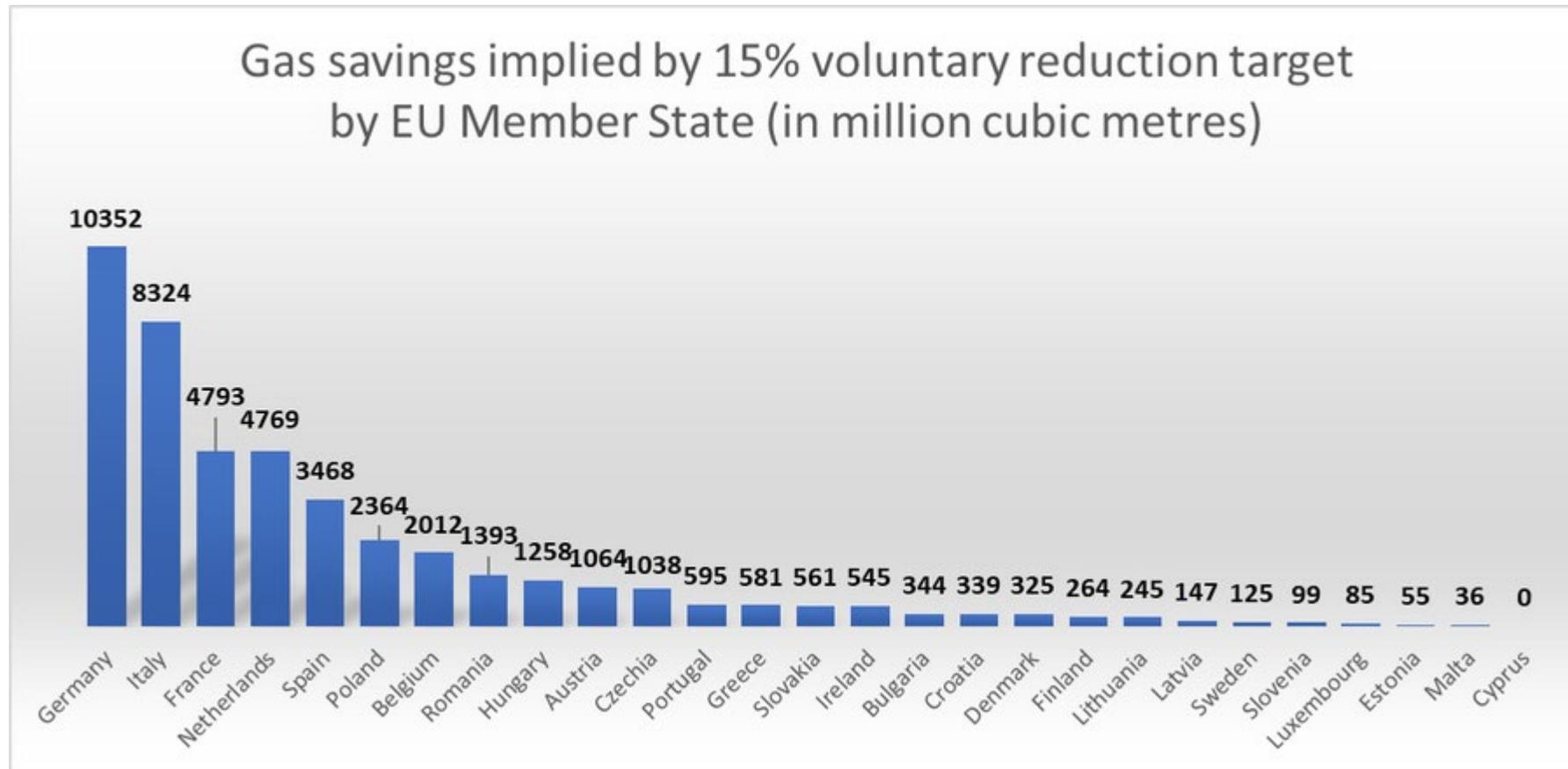
Adapted from the European Commission (2021)

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

The European Commission's REPowerEU package makes a number of important new proposals and recommendations.

- Proposes new legislation and recommendations for faster permitting of renewables especially in dedicated 'go-to areas' with low environmental risk
- Proposes requiring solar rooftop PV for new public and commercial buildings by 2026, existing public and commercial buildings by 2027 and all new residential buildings by 2029, as well as limiting permitting times to 3 months.
- Recommends:
 - Phasing out stand-alone fossil fuel boilers via Ecodesign standards by 2029 and introducing national bans on boilers based on fossil fuels
 - Phasing out fossil fuel subsidies for fossil-fuel boilers by 2025
 - Strengthening the target of minimum energy performance standards from "G" to "D"
 - Strengthening national energy requirements for new buildings before 2030
- Member States and regions must now embrace and implement them!

In July, Member States also agreed to a natural gas reduction plan that requires each Member State to aim for a 15% reduction in natural gas (with some caveats and exceptions).



Since the release of the initial REPowerEU communication we have seen also some very positive signals from Member States

→ Heating & Cooling

- Germany plans to strengthen new-build standards from 1 January 2023 and require 65% renewable heating systems for new installations in all homes from 1 January 2024.
- The Netherlands has announced that it plans to require hybrid heat pumps for new installations for all homes that are not connected to a heat network from 2026.
- Denmark aims to switch 400,000 homes remaining on natural gas to district heating and heat pumps by 2028, transition to green gases by 2030 and phase out gas in heating by 2035.

→ Renewables:

- Denmark, Germany, Belgium and the Netherlands pledged to increase their offshore wind capacity from 15 GW today to 150 GW by 2050.
- Germany plans to require PV in new commercial buildings

The 2nd phase of the project aims to analyse gas phase-out pathways for the countries most dependant on Russian gas imports and develop a robust EU scenario with adjusted assumptions taking into account recent events.

→ **Project objectives:**

- Develop pathways for the EU and 9 Member States most relying on Russia gas to phase out as quickly as possible (latest by 2027), in line with REPowerEU. The main focus remains on structural measures, as opposed to short-term behavioural changes.
- Develop policy recommendations in buildings, power and industry sectors at national and EU levels to structurally reduce consumption and ensure security of supply for remaining demand.
- Spell out the remaining GHG budget for the EU.
- Deliver first cost analyses on the phase-out pathways & investment needs.

Scope

- EU27 + “deep dives” in focus countries with 1 partner per country:
 - **Bulgaria:** Center for the Study of Democracy (CSD)
 - **Czechia:** Nano Energies
 - **Greece:** FACETS S.A.
 - **Croatia:** University of Zagreb – Faculty of Mechanical Engineering and Navel Architecture)
 - **Hungary:** Regional Centre for Energy Policy Research (REKK)
 - **Italy:** ECCO Climate
 - **Poland:** Forum Energii
 - **Romania:** Energy Policy Group (EPG)
 - **Slovenia:** University of Ljubjana – Laboratory of Energy Policy (LEST)
- Modelled sectors: power, buildings, industry (transport and agriculture sectors covered by existing studies)
- TBC: Additional modelling on national gas and power infrastructure

Deliverables until Q1 2023

- EU-27 scenario focusing on Russian gas phase-out → report and slide deck
- National sectoral pathways for buildings, power supply and infrastructure for all countries + industry for IT, CZ, HU, PL & RO only
 - National Buildings Action Plans → dynamic website with a deep dive on 10-12 thematic issue areas and policy recommendations for the 9 deep dive countries.
 - National modelling results, including power sector, in slide decks
 - National Industry Action Plans → brochure-like publication (short) for the 5 focus countries

Agora Energiewende
Rue du Commerce 31
1000 Brussels

www.agora-energiewende.de
info-brussels@agora-energiewende.de

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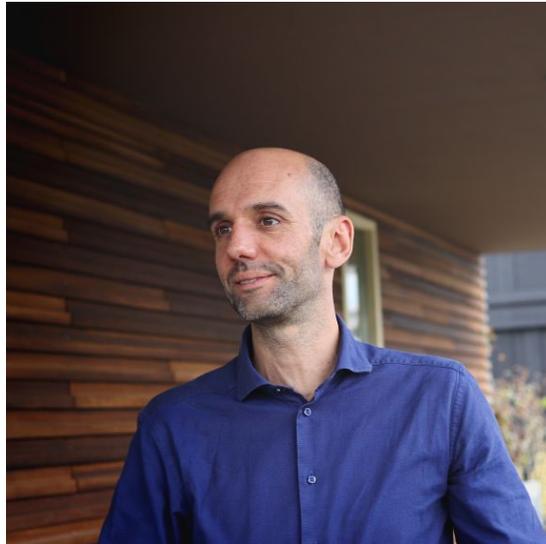


Thank you for your attention!

Questions or comments? Feel free to contact us:
Andreas.Graf@agora-energiewende.de



Panel Discussion



Jure Vetrsek

Researcher & Project Manager
UL – Institute for Innovation
and Development



Prof. Marko Topic

Professor, Faculty of Electrical
Engineering, University of
Ljubljana



Janez Ramsak

Technical Manager, KPV
(Utility Company Velenje)
