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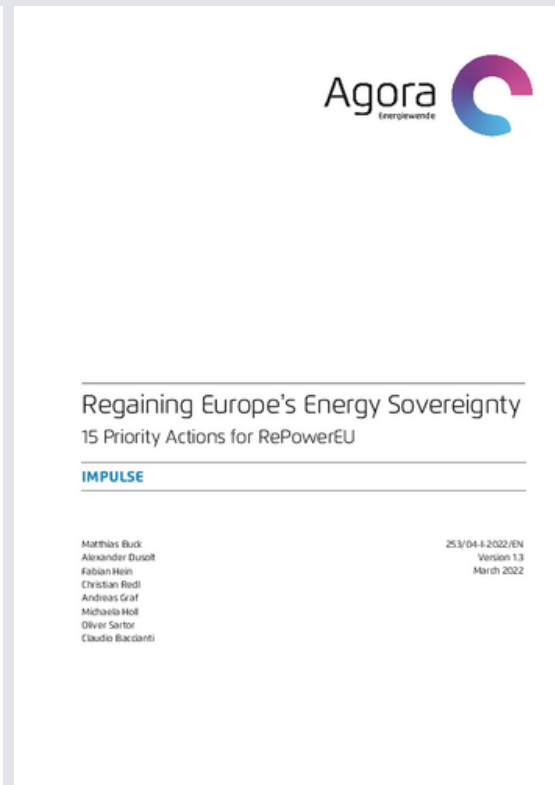
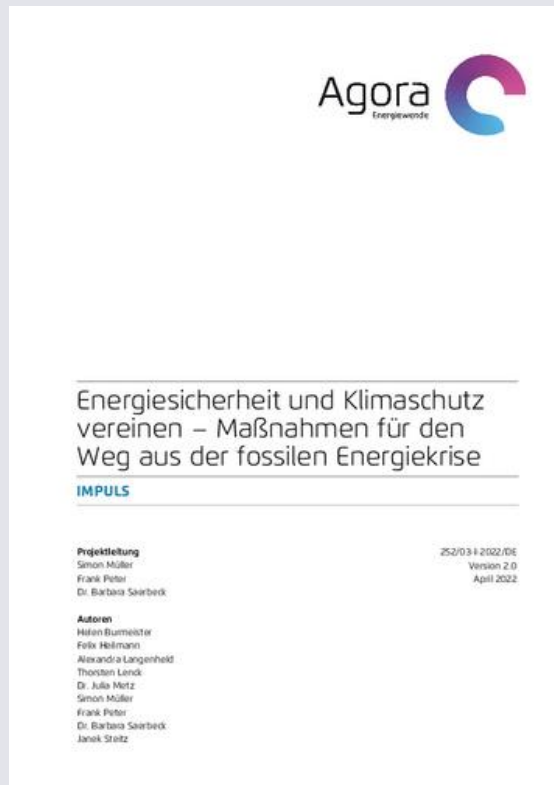
Regaining Europe's Energy Sovereignty

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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*) [\(Link\)](#)

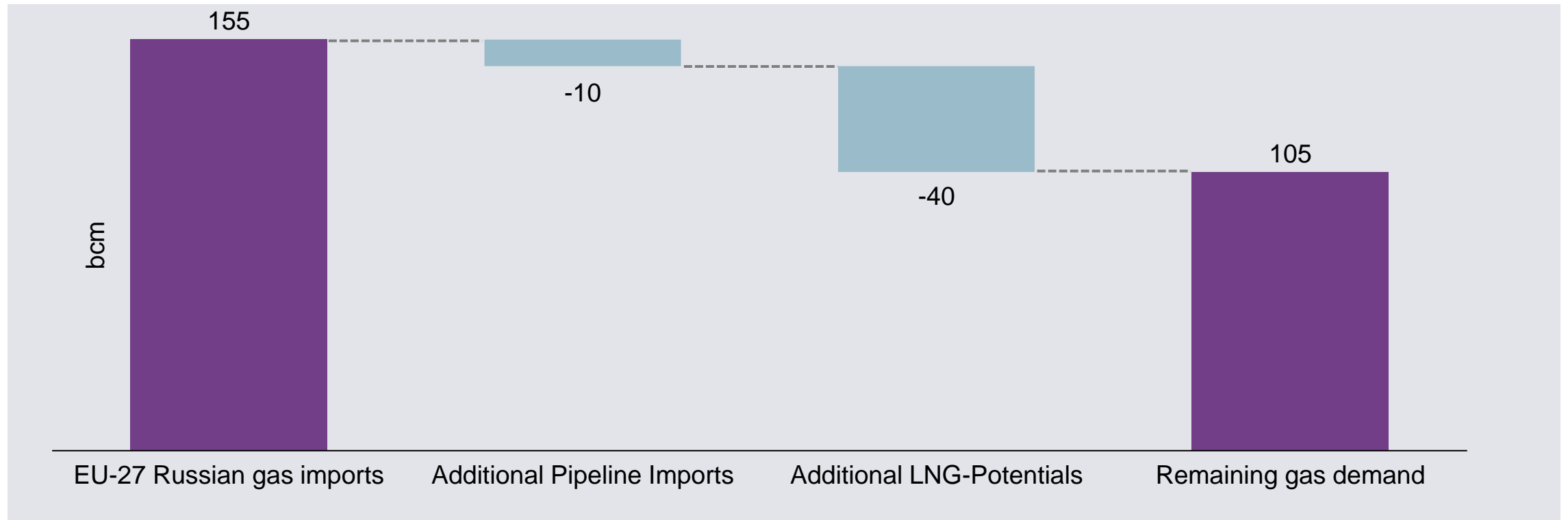
- Developed together with Prognos
- Looks at both the short- and medium term potential for Germany to reduce its dependence on Russian natural gas imports.

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.

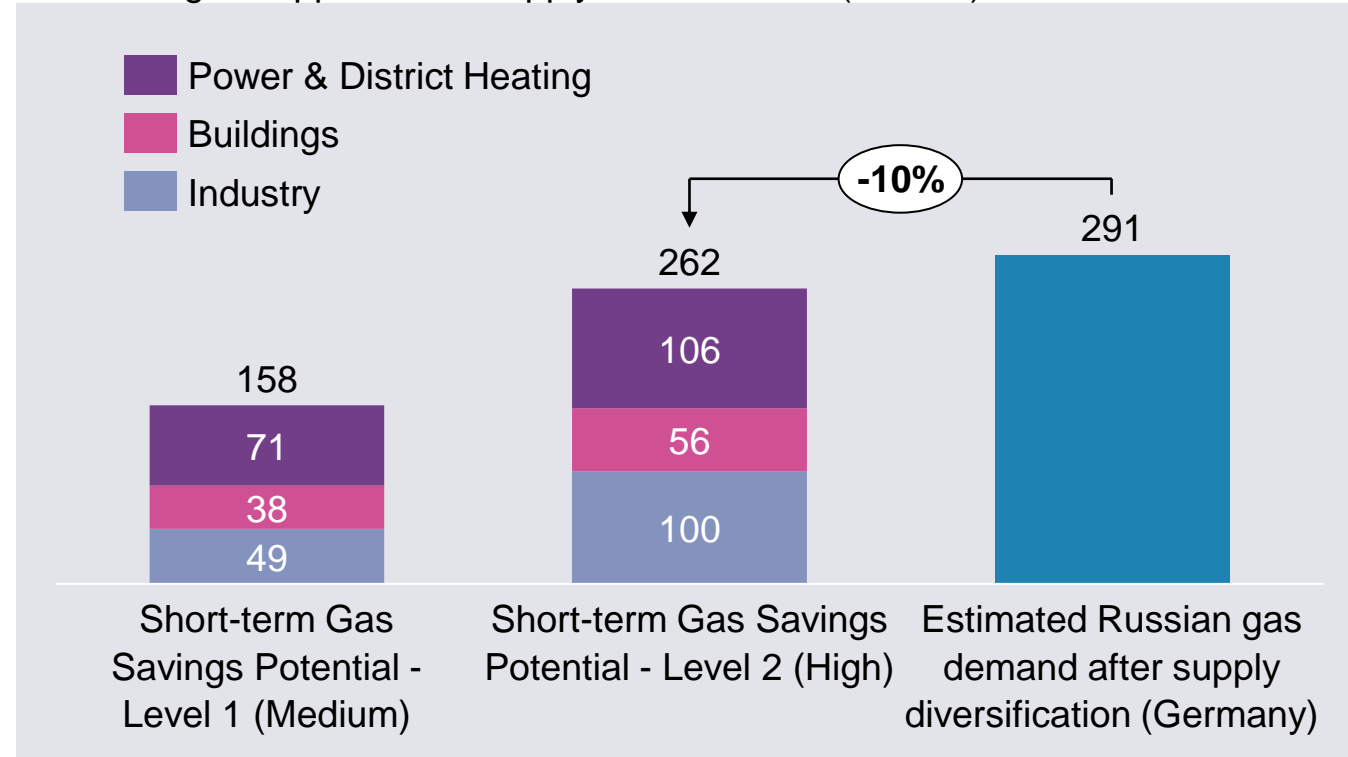
Russian natural gas imports (EU-27) in 2021 and alternative natural gas import sources



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

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

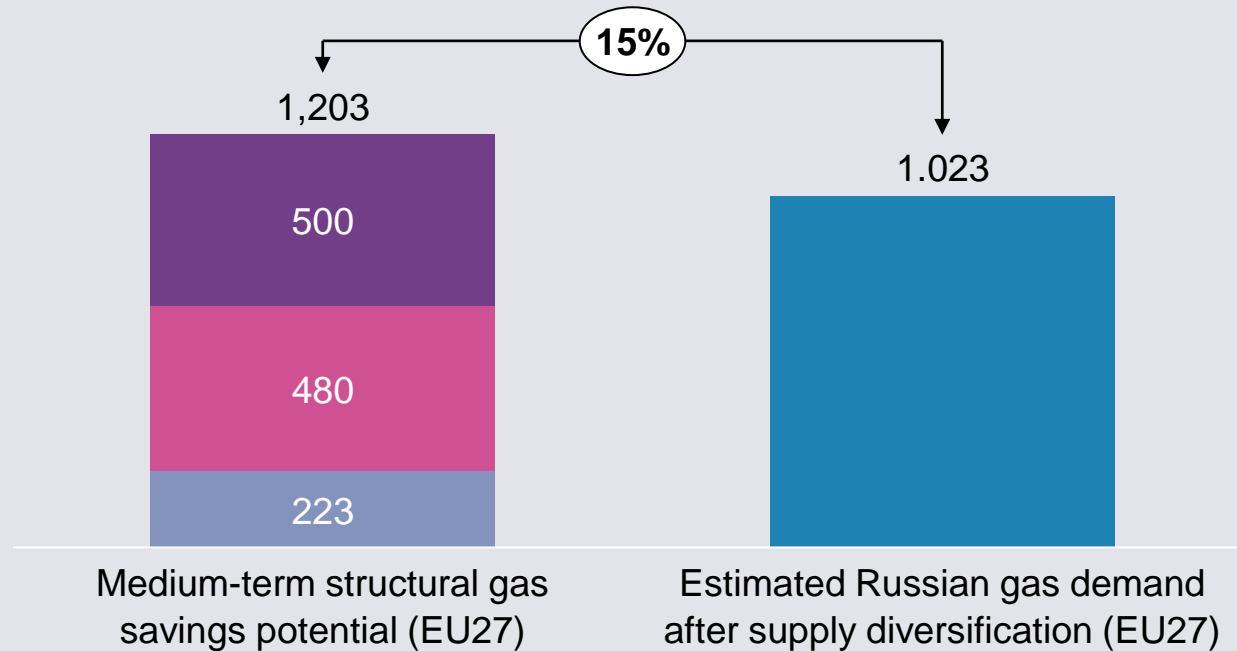
3

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)

- Power & District Heating
- Buildings
- Industry



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

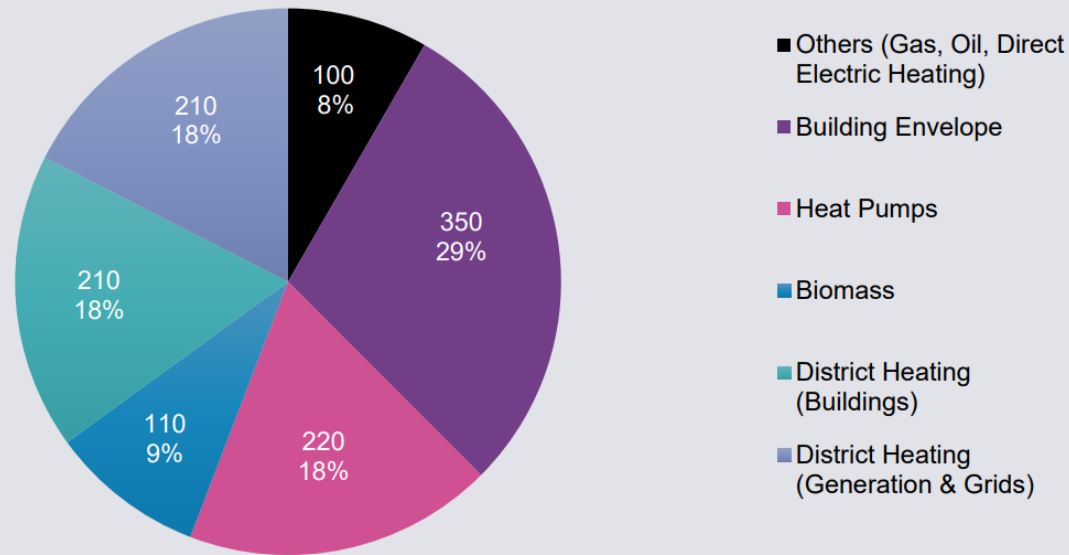
Agora based on modelling from Artelys, Wuppertal Institute and TEP Energy

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.

The investment needs in the building sector are huge and require a significant frontloading of investments, especially in district heating.

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



Agora Energiewende 2022

Estimated distribution of district heating investments to reach the Heat Roadmap Europe 2050 Scenario



Mathiesen et al (2019)

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 renewable heating technologies (especially 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

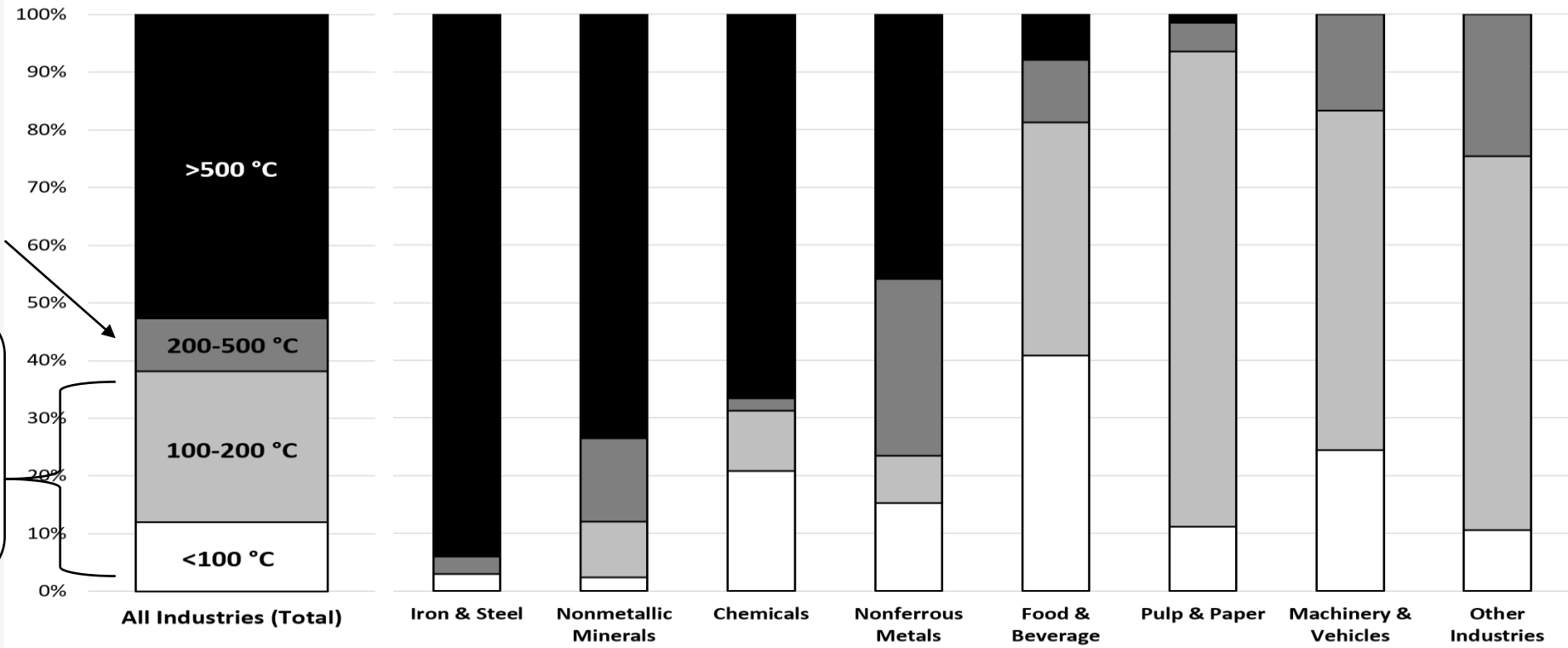
Agora based on modelling from Artelys, Wuppertal Institute and TEP Energy

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.

Replacing gas use in industry – 40% of EU industrial gas use for temperatures below 200C => quick solutions via heat pumps. E-boilers also possible for mid-temp range.

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

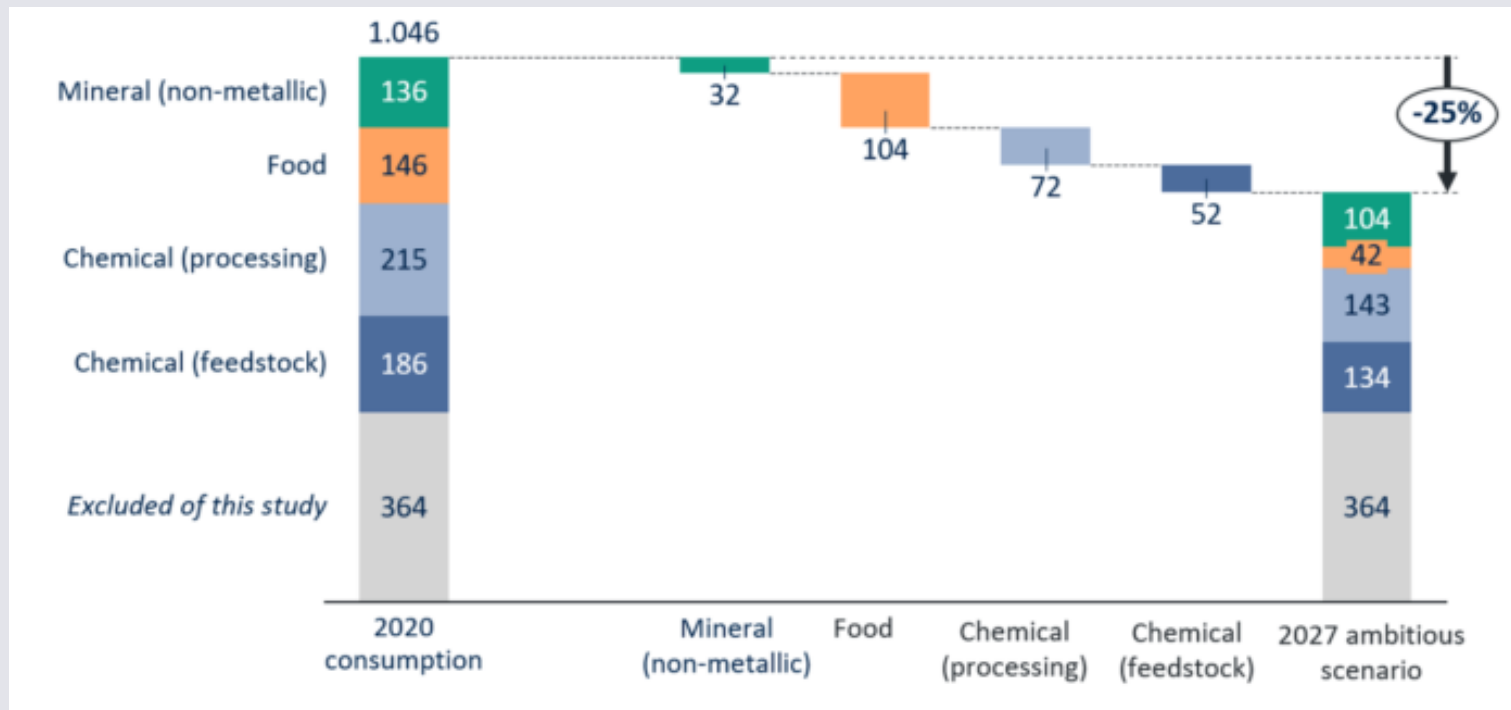


15-20%

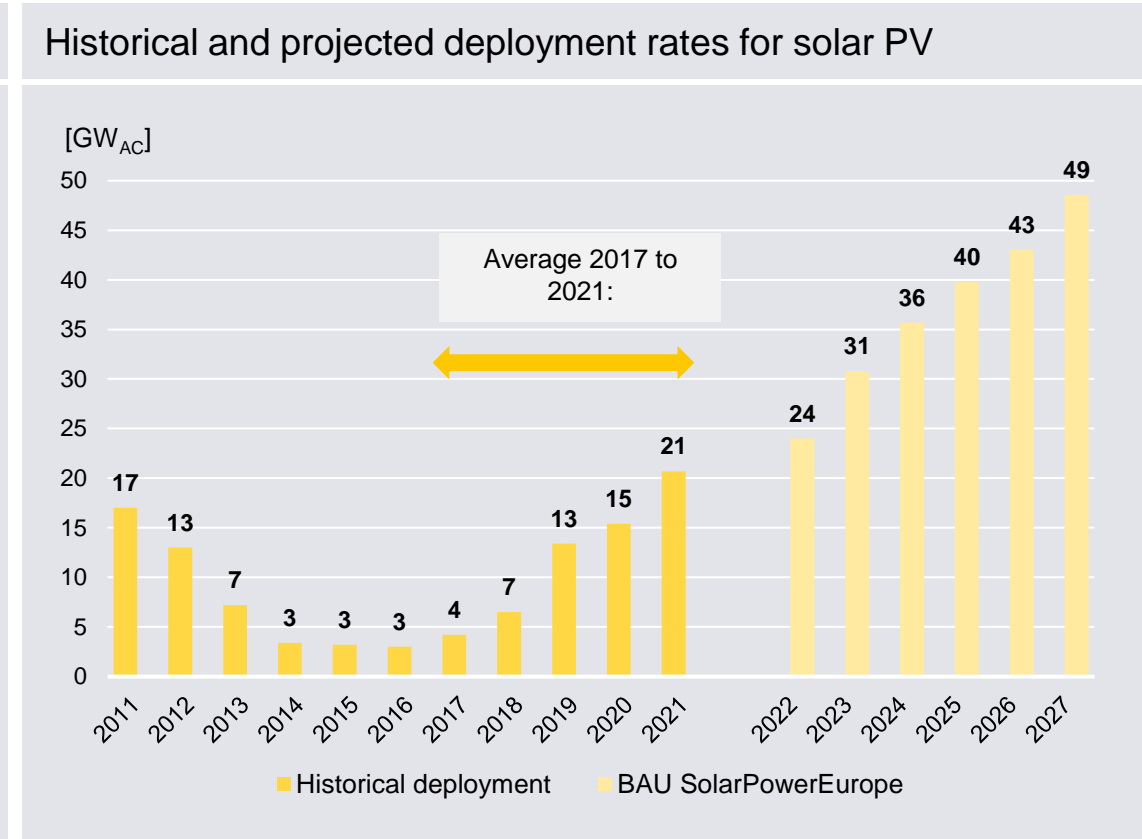
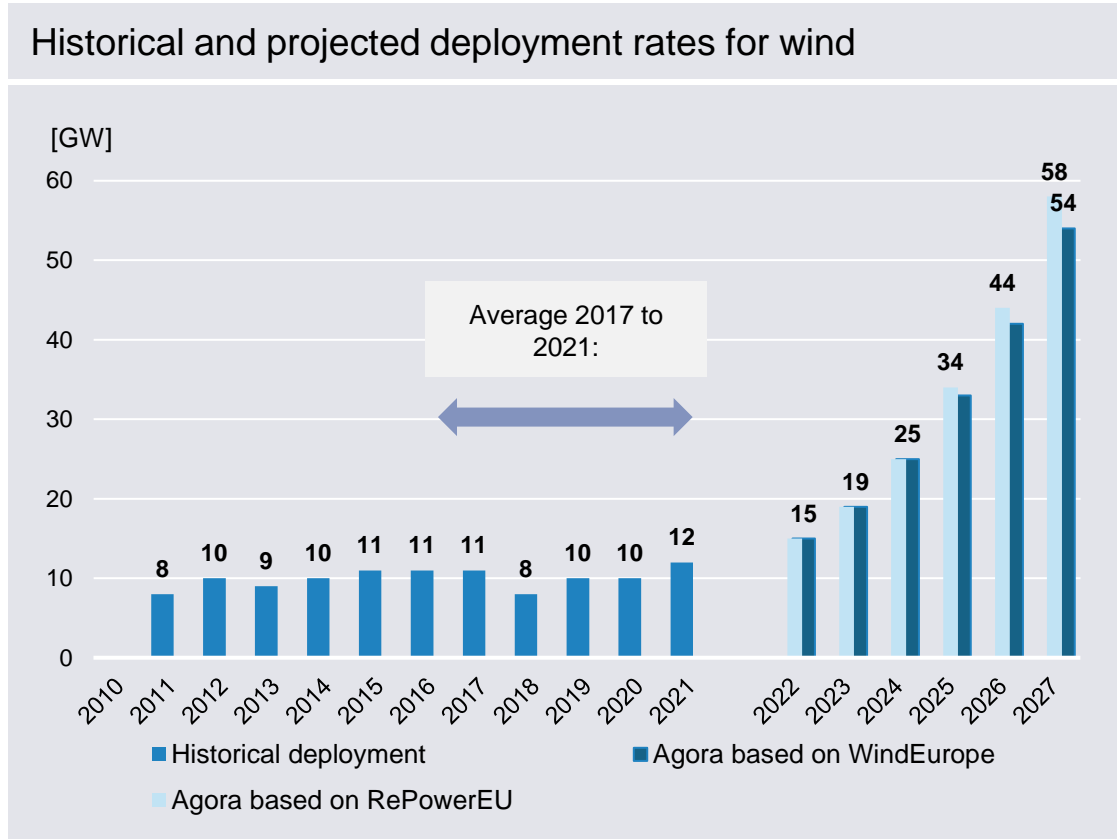
ca. 40%
industry
gas
demand

CLIMACT estimate large short to medium term natural gas savings potentials in glass, ceramics, food and chemicals.

Ambitious and short-term natural gas reduction potential [TWh] in EU27 industry, focusing on largest gas consumers.



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



Adapted from the European Commission (2021)

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

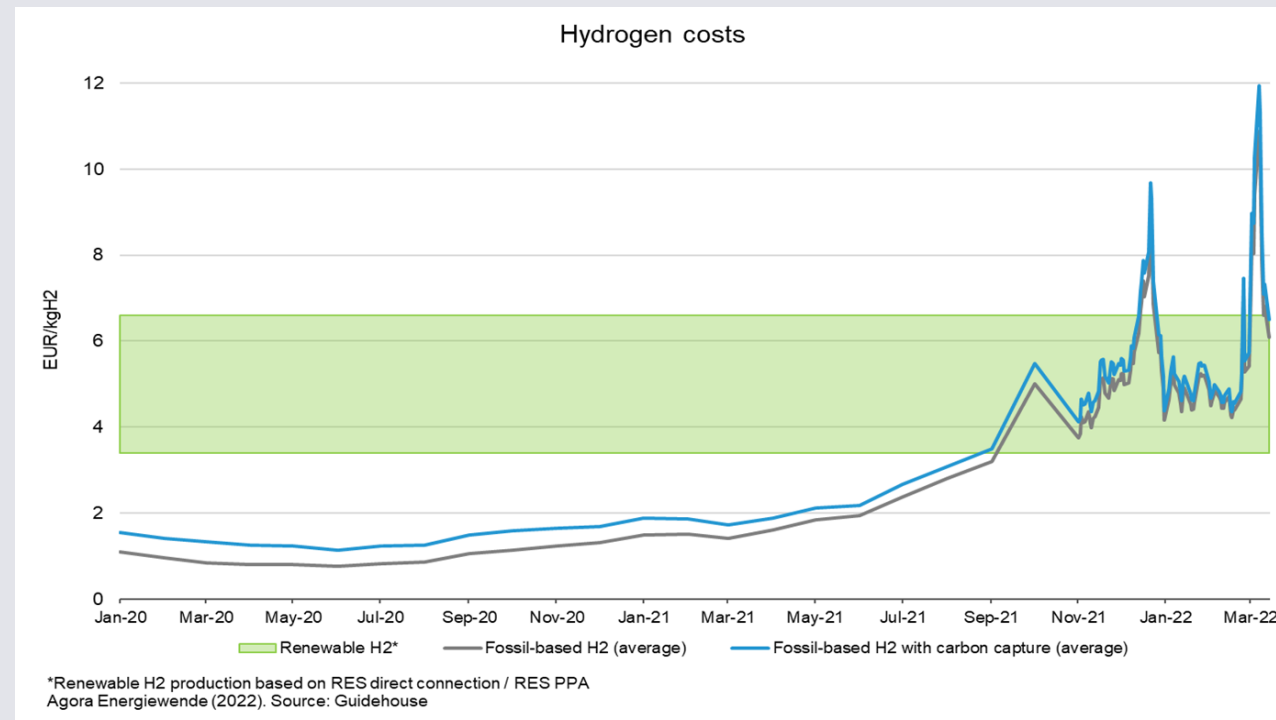
Pulling all stops to scaling renewables, investing into flexible assets and enhancing power system flexibility will displace around 500 TWh fossil gas in the power sector

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

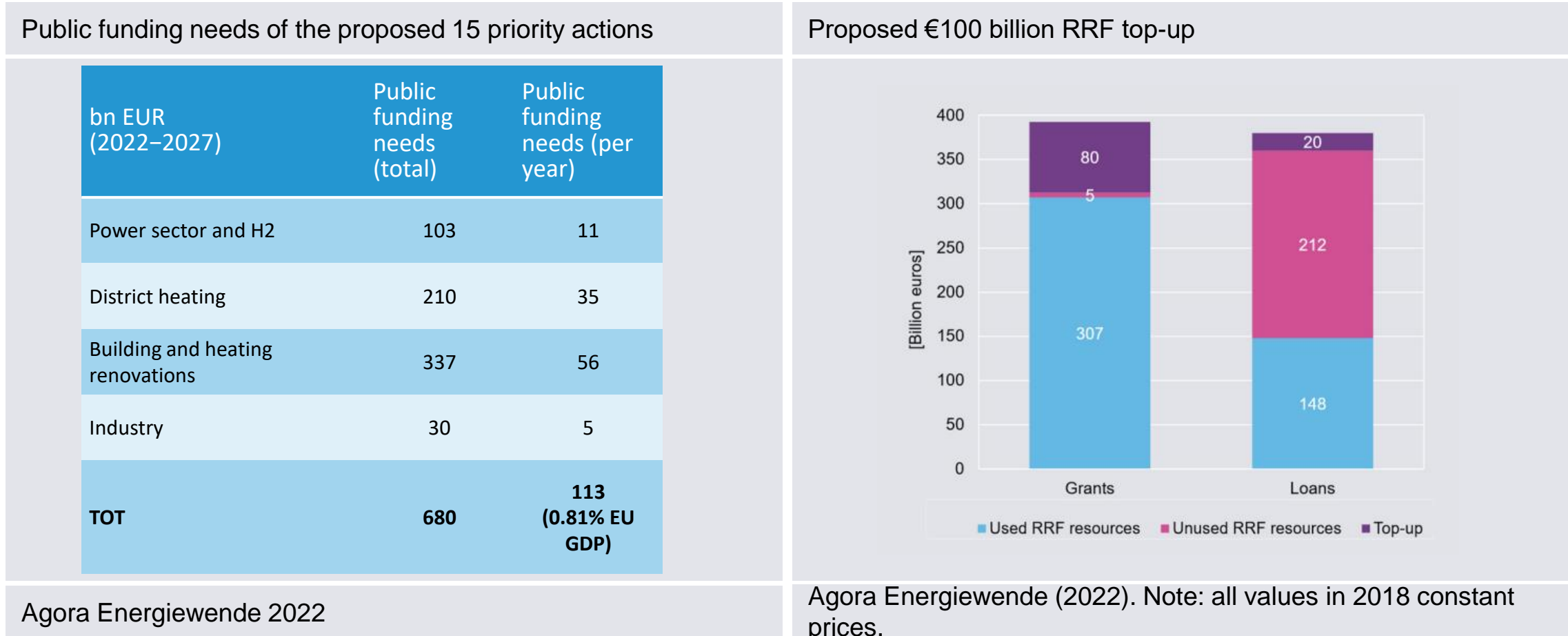
The changing economics and geopolitics of blue hydrogen put even higher pressure to accelerate the development of green hydrogen and prioritize its use.

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



Agora Energiewende and Guidehouse (2022)

Public investment needs for RePowerEU are large. European solidarity calls for enabling all EU countries, including those with limited fiscal capacity, to deliver the RePowerEU Plan.



Agora Energiewende (2022). Note: all values in 2018 constant prices.

Since the release of the initial REPowerEU communication we have seen 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 is aiming to switch the remaining 400,000 homes on natural gas to district heating and heat pumps by 2028.
- Italy is taking regulatory measures to reduce air conditioning in public buildings

→ Renewables:

- Denmark, Germany, Belgium and the Netherlands pledged to increase their offshore wind capacity from 15 GW today to 150 GW by 2050

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

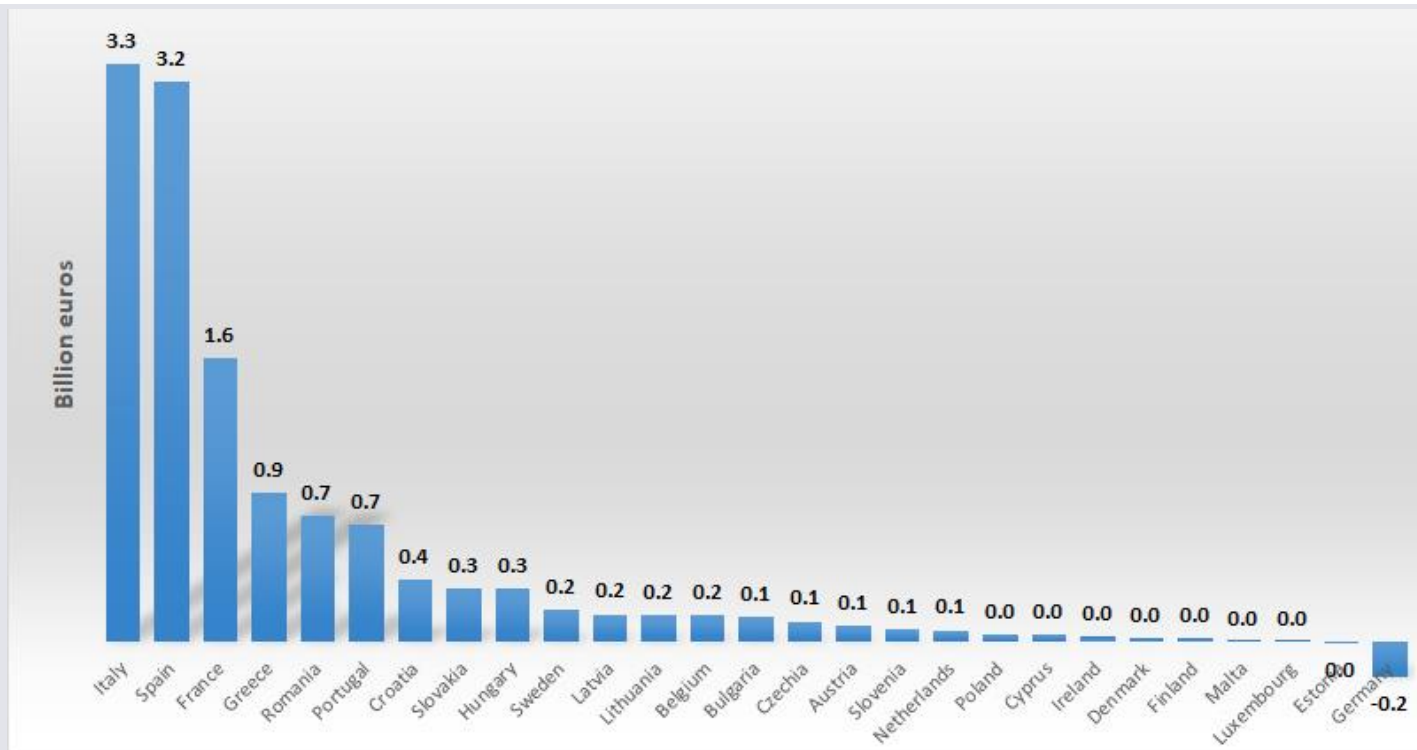
- Proposes new legislation and recommendations for faster permitting of renewables especially in dedicated 'go-to areas' with low environmental risk
- Proposes requiring solar rooftop PV for new public and commercial buildings by 2026, existing public and commercial buildings by 2027 and all new residential 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!

But REPowerEU also offers little additional financing

- In the short-term, RePowerEU will only make a difference where it is underpinned with additional public funding based on EU solidarity. The proposed shifting of already available funds is not enough. ***Rapidly reducing fossil fuel demand in Europe in line with the higher RePowerEU ambition, requires an additional 100 bn EUR of EU funds.***
- The Commission proposes to generate €20 billion in new revenues from the EU Emissions Trading System. Specifically, the suggestion is to auction ETS allowances currently kept outside the EU market that would likely have been invalidated in 2023. ***This proposal bears the danger of a lose-lose outcome for EU climate policy. If this proposal goes forward, it needs to be ensured that an equivalent amount of ETS allowances is taken out of the market again by the end of this decade and that all additional ETS revenues are invested into reducing fossil fuel demand.***

On a more positive note, the redistribution mechanism would likely benefit the most fiscally constrained countries the most.



Estimate grants received from the 20bn RRF top-up, net of the 5-years loss in national ETS revenues after MSR sales



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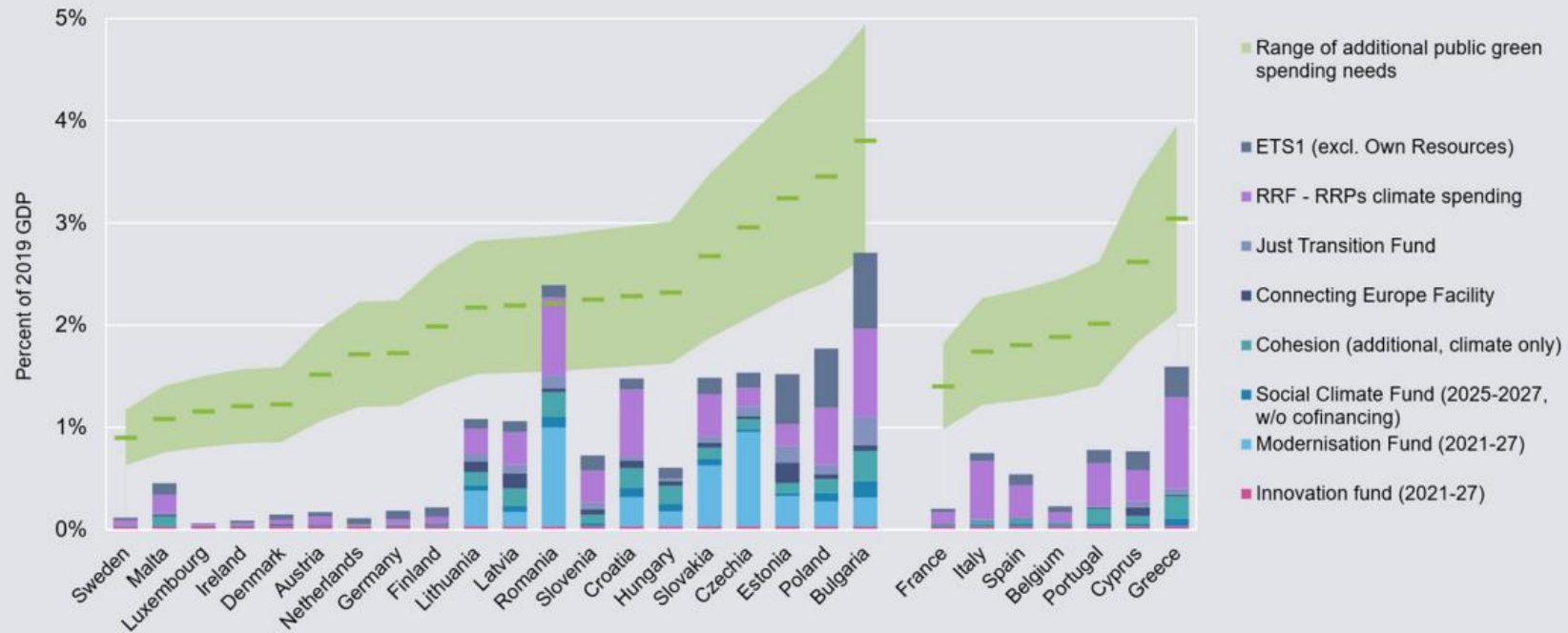
BACKUP



Already before the war in Ukraine, EU funds fell short of public spending needs to reduce greenhouse gas emissions in line with the EU's 2030 climate target

Public green spending needs, national ETS revenues and EU funding for clean energy, energy efficiency and public transport investment

Annual averages for 2021-2027



Agora Energiewende (2022). See Annex 1 for details.

Key findings

- 1 Regaining Europe's energy sovereignty requires the frontloading of investment in energy efficiency and the more rapid deployment of wind and solar PV. Speeding up the reduction in fossil gas consumption with investment in buildings and industrial plants, as well as in district heating, renewables and power grid expansion, will add €40 billion per year to the EU-wide public green spending needs in 2022–2027.
- 2 European solidarity calls for enabling all EU countries, including those with limited fiscal capacity, to deliver the RePowerEU Plan – which will require additional EU funding of €100 billion (€80 billion in grants, €20 billion in loans). Using the existing Recovery and Resilience Facility (RRF) for this purpose would make funds available in the 2022-2027 timeframe and allow – together with the unused RRF loans – to scale up investment quickly.
- 3 Member States should review current spending plans for EU funds and minimise grant support while maximising the use of alternative financing support instruments. However, the current EU budget (2021–2027) only allows for marginal adjustments and does not offer sufficient funding for all types of investment needed to deliver the RePowerEU plan.
- 4 The top-up to the Recovery and Resilience Facility can be financed with revenues from other climate instruments. One plausible option for financing the additional debt service of €2.9 billion per year in 2028–2058 is to use a share of revenues from carbon pricing, including the proposed ETS for transport and buildings.

Scaling demand for heat pumps and district heating – Things will not fall into place until we chart a clear course

- The RePower EU ambition on heat pumps and district heating needs underpinning through regulatory signals, attention on supply side and funding („*Heat Pump Accelerator*“). Price signals alone will not drive sufficient demand.
- Once industry is given a clear direction they will deliver. See Viessmann announcement!
- Now need to signal them a growing market – sunset clause for fossil boilers (support). EU legislation can play an important role in setting minimum performance criteria, but must be feasible for all MS.
- Start with explicit ban on the installation/support for fossil boilers in new built from 1 January 2023. There is simply no justification for these practices to continue.
- But the EU should also set minimum performance standards for newly installed heating appliances in existing buildings.

Viessmann pledges €1bn for heat pumps and green solutions

2 MAY 2022

There are four main competing ideas for regulating the uptake of fossil boilers in existing buildings. Ecodesign and Energy Labelling is the quickest and most straightforward route.

- An **outright ban** on installation – currently only planned or applied for oil boilers (DE, NO, AT, BE)
- A **RES obligation on building owners** – Germany is expected to propose a 65% renewables in heating requirement from 1 January 2024, effectively ruling out non-hybrid boilers.
- **EU Product (efficiency) Standards** – strengthening Ecodesign and Energy Labelling rules for space and water heating appliances to remove all heating appliances with an efficiency below 110% as of 1 January 2025 would effectively ban the sale and installation of direct electric and non-hybrid fossil boilers from the EU single market.
- A **manufacturer obligation** – The UK is discussing introduce a heat pump quota for heating appliance manufacturers, which could also be introduced as a **CO2 standard** modelled on CO2 standards for cars (max. CO2 emission per kWh of thermal heat provided) for which heat pumps would be given a zero rating. This policy would help to ensure that boiler manufacturers operating on the EU market sell a minimum share of heat pumps in line with needed deployment.

In parallel, regulations must ensure that building owners are preparing their homes to become ‚heat pump ready‘

- Quickly establish a **low-temperature ready building standard** for existing buildings that defines the measures and operational performance needed to enable the efficient and flexible operation of renewable heating systems such as heat pumps and low-temperature district heating.
- Quickly adopt **minimum energy performance requirements** for existing buildings and aim to renovate the lowest-performing 25% to the low-temperature readiness by 2027 / all buildings by 2030. Even good for buildings with gas condensing boilers operation.
- Require all building owners with a gas or oil boiler older than 15 years to develop a **building renovation roadmap** that includes steps to become low-temperature ready within five years.

RES deployment in industry for low-temperature heating will similarly require regulation and support, but also adequate price signals.

- We estimate significant gas savings potentials from switching to renewables in low-temperature (<200°C) industrial heating applications.
- Here a similarly clear regulatory signal will need to be coupled with financial support and pricing incentives to support companies in managing the transition and ensure it is proceeding at pace.
- We propose three key measures:
 - Sunset clauses : Require **full phase-out of fossil gas for industrial applications** using heat levels <200C within 3 years & uptake of hybrid systems for temp <500C w/in 5 years
 - Provide **aid for more capex intensive investments** (mid and higher temp processes) to accelerate payback periods in electrification in industry -> requires EU funding + guidance
 - **Allow for price signals to come through** and translate into speedy investment -> the EP's proposed inclusion in the ETS II + change future TCF rules on energy cost compensation...