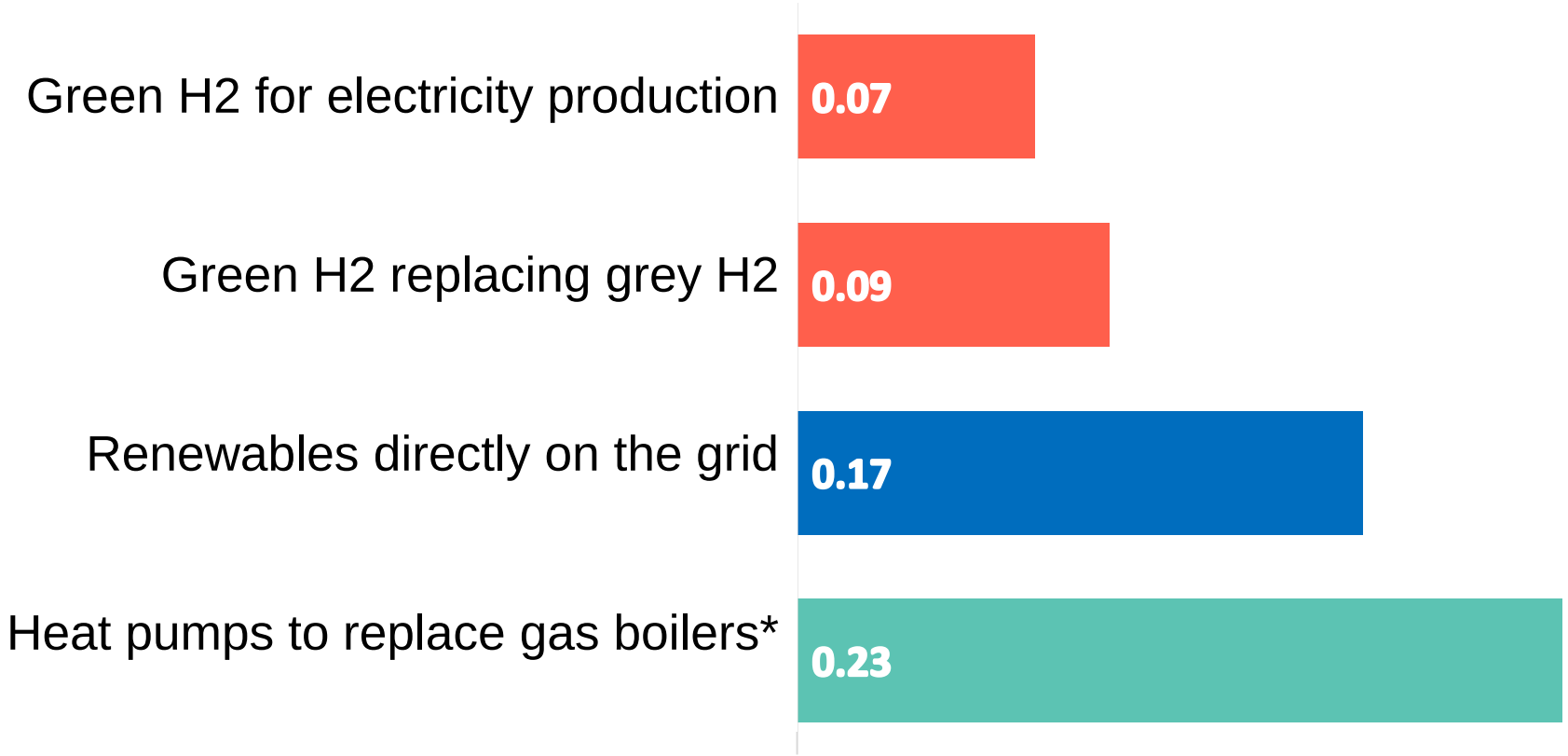
Using REPowerEU at its full potential:

the role of hydrogen and direct electrification in displacing fossil gas demand

15/03/2022

How to use renewable electricity to displace the most gas

Gas displaced in BCM per TWh of renewable electricity



*Based on German average household

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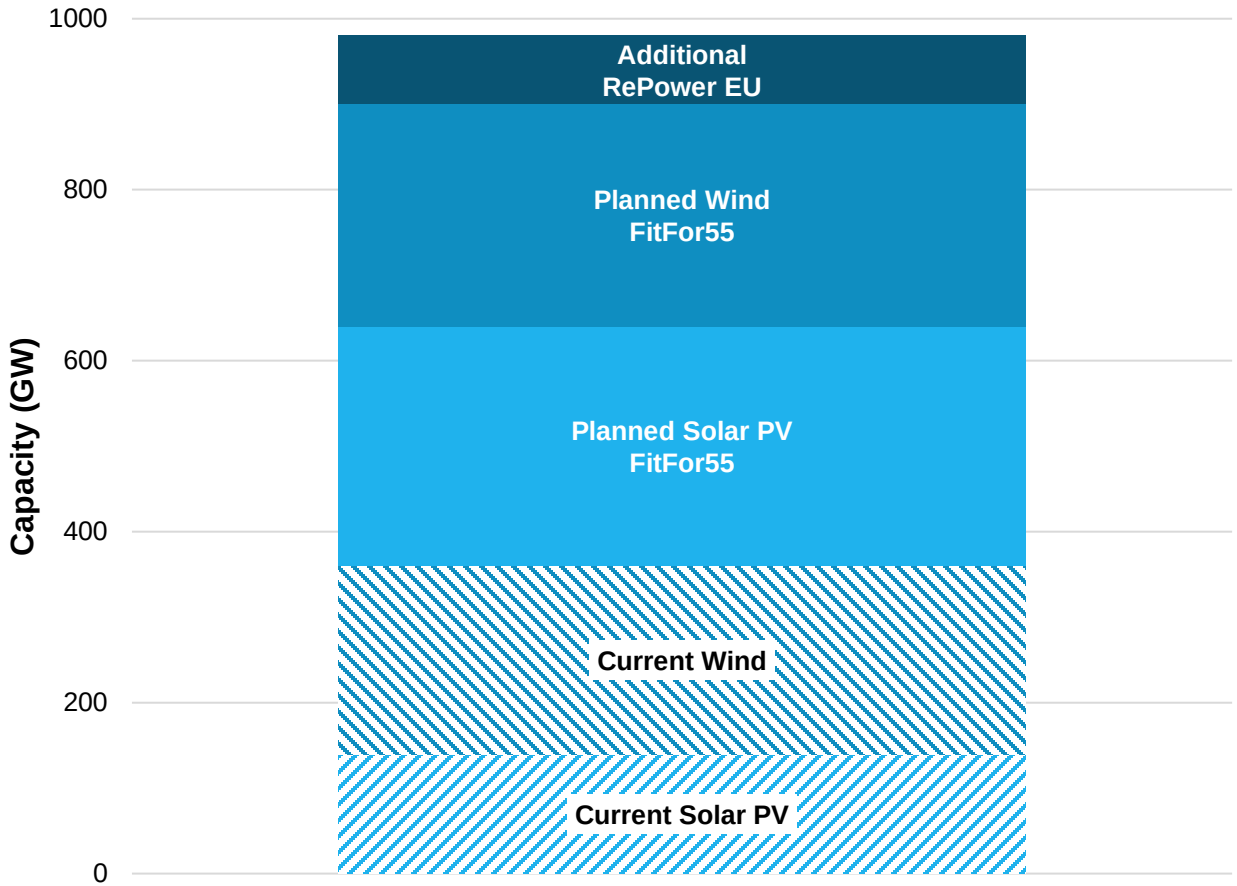
REPowerEU aims to nearly triple current renewable capacity in the next 8 years



All newly deployed Wind & PV combined in 2030 will be expected to produce a little over 1000 TWh of electricity per year.

That's the equivalent of the current French and German demand combined.

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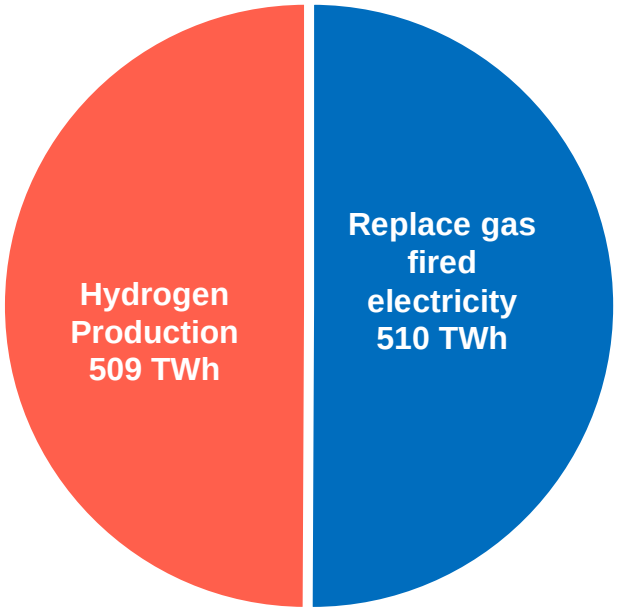
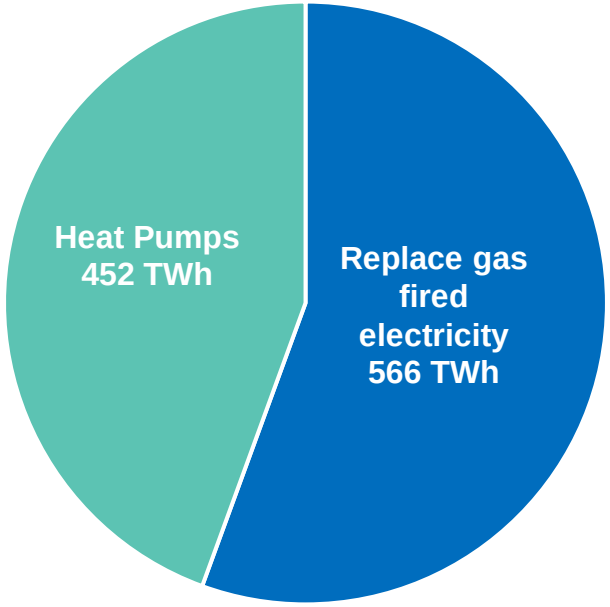
How will the EU choose to use its 1000TWh of renewable electricity?

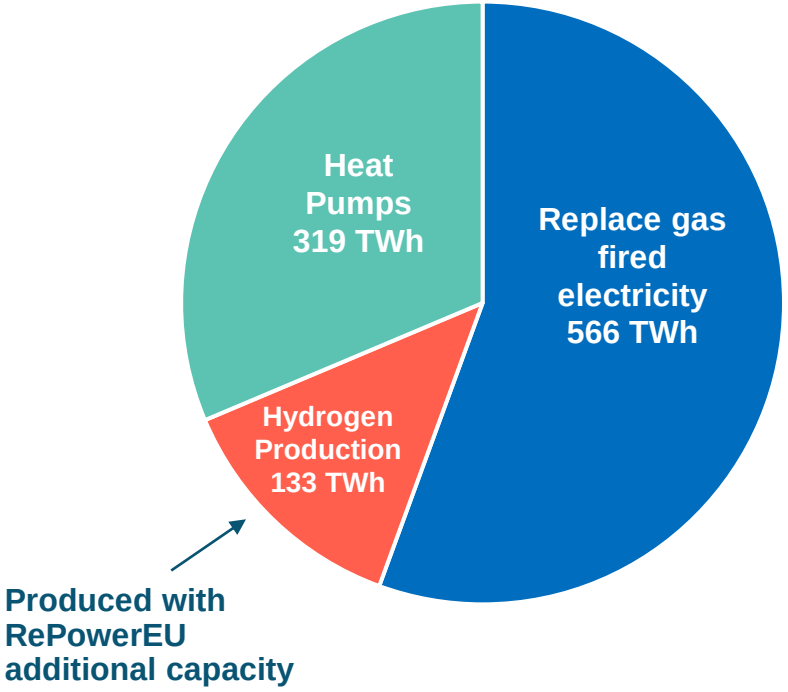
Current REPowerEU plans



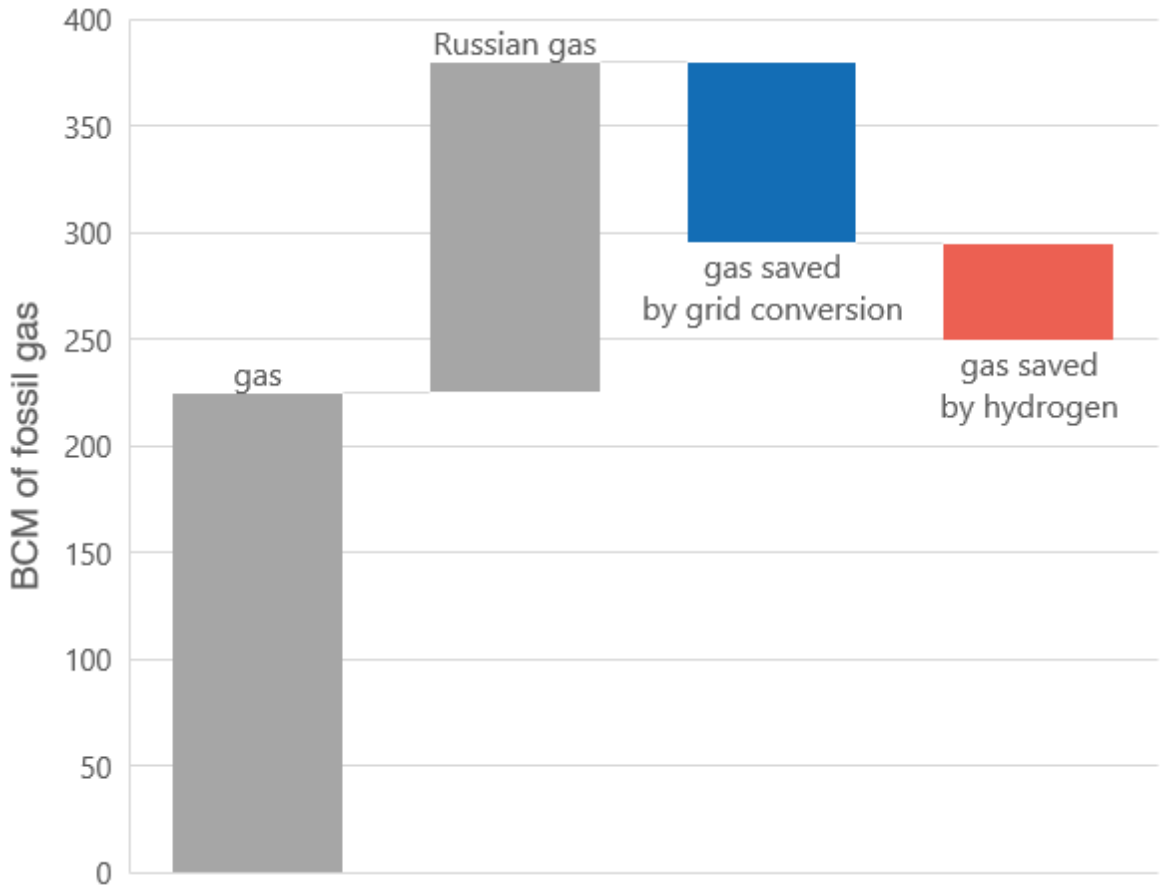
Maximising gas phase-out

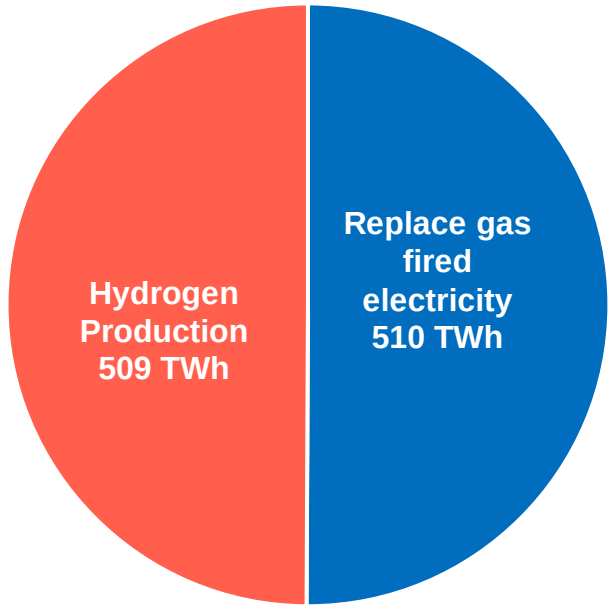


Maximise gas phase-out, while kick-starting H2 market



REPowerEU = Still 24 BCM of Russian gas needed





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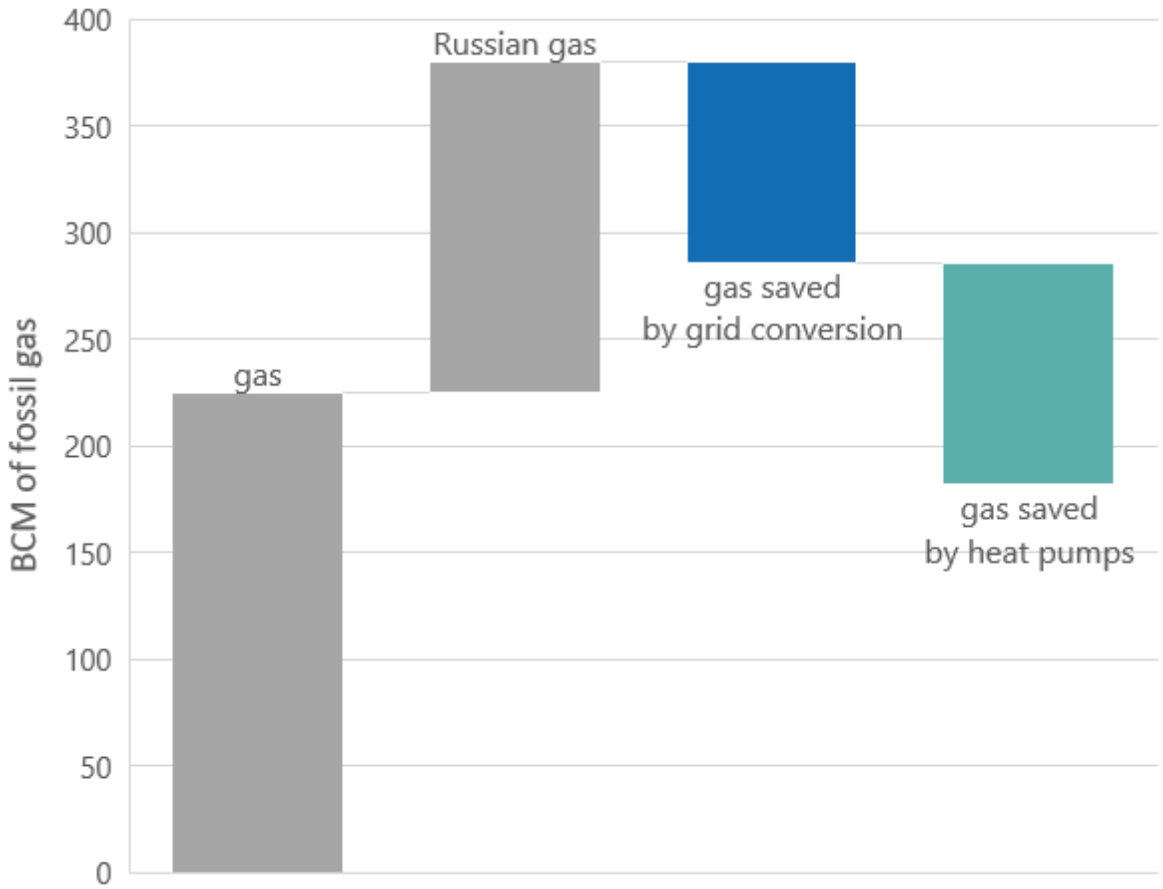
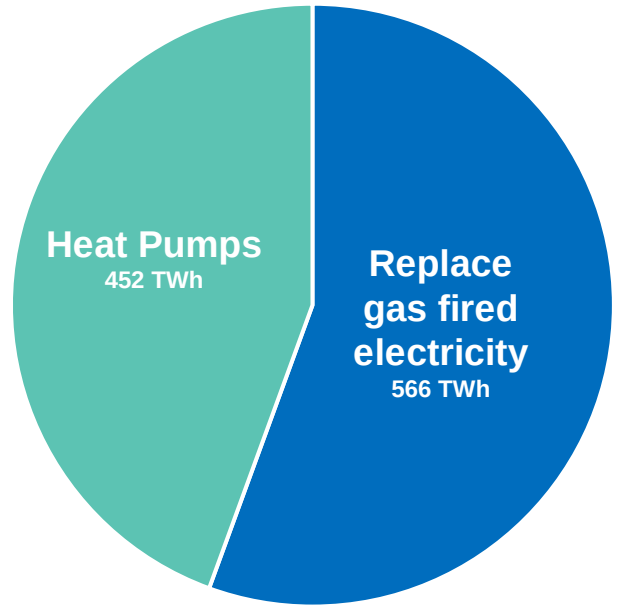
Maximising gas phase-out = No more RU gas + extra 43 BCM avoided





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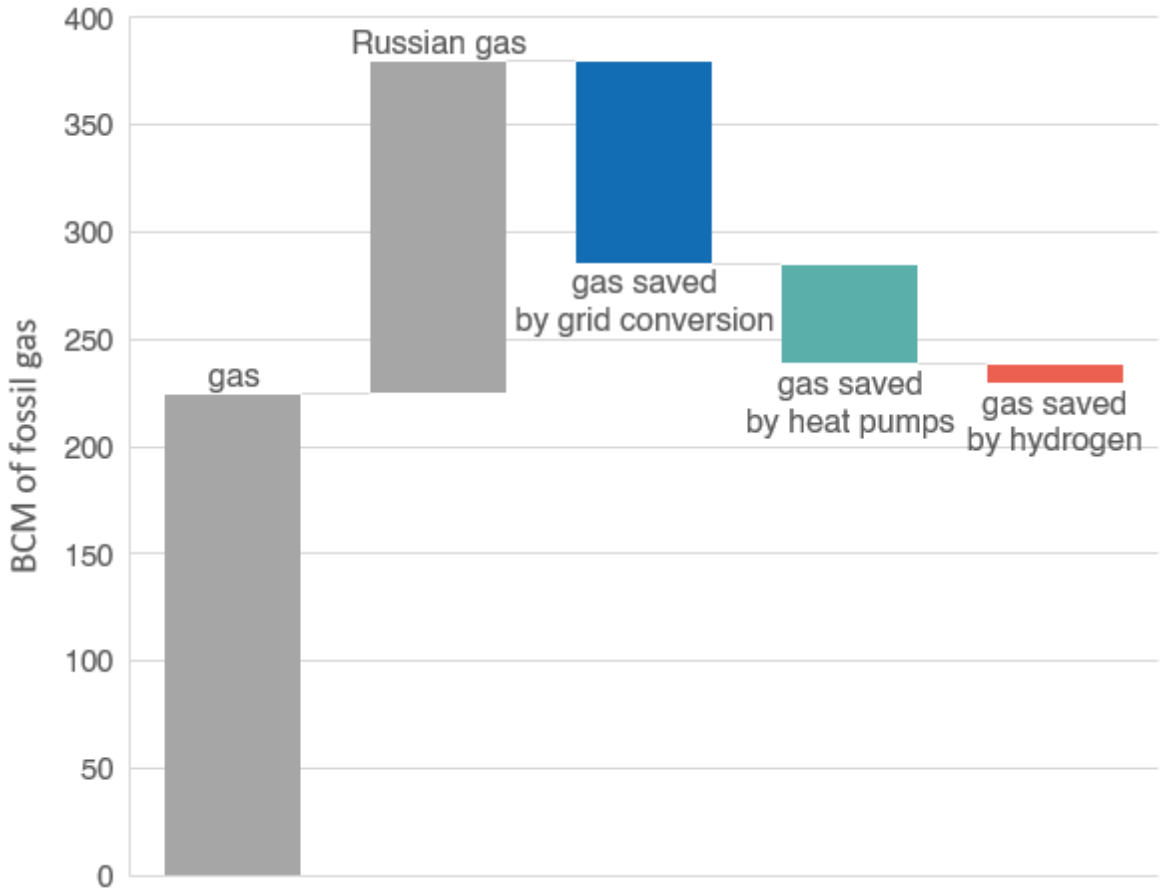
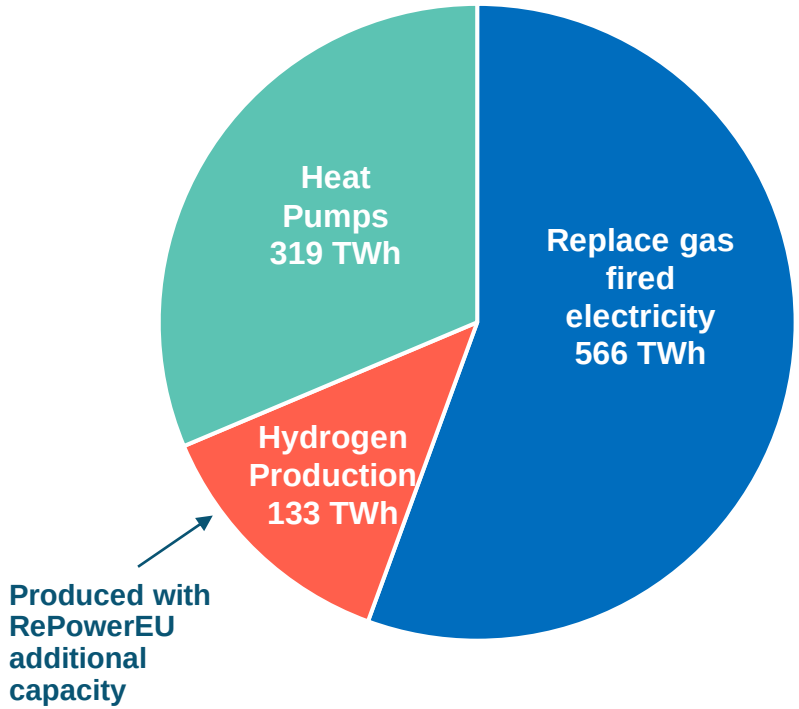
Mixed approach = total RU gas phase-out + deployment of H2 economy





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Key Conclusions

- **Using renewable electricity can reduce gas use substantially if used effectively.**
- **Direct electrification offers the biggest reduction to gas**: heat pumps are particularly effective at displacing gas demand.
- **Natural gas cannot be replaced en mass by hydrogen**, given the large amount of renewables needed to displace small amounts of gas.
- **Relying on hydrogen will leave the EU with more fossil gas in the system.**
- A future-proof strategy needs to both drastically reduce our dependence on fossil fuels while also **deploying hydrogen in no-regret sectors** where other decarbonisation pathways don't exist.
- **Additional electricity deployed for hydrogen production must be dimensioned on the hydrogen targets**: RePowerEU foresees 80 GW of capacity for hydrogen production, only enough to produce 2.8 Mt of hydrogen per year, 20% of the proposed RED target.

Get in touch!

Marta Lovisolo

Policy Advisor Renewable Energy Systems

marta@bellona.org

+32 (0) 489 638 862

Thank You!

EuroStat 2020 – Energy Statistics
Wind average utilisation – 27%
Solar average utilisation – 11%
80GW of additional RePower EU – 50% Wind, 50% solar
Gas Power (CCGT) efficiency – 60%
H2 electrolysis efficiency - 70%
Grey Hydrogen – 4.5 Nm^3 of Natural Gas per kg of hydrogen
Heat Pumps – Assuming an average yearly heat pump consumption per household in Germany of 4993 kWh Schlemminger et al, 2022, Dataset on electrical single-family house and heat pump load profiles in Germany