



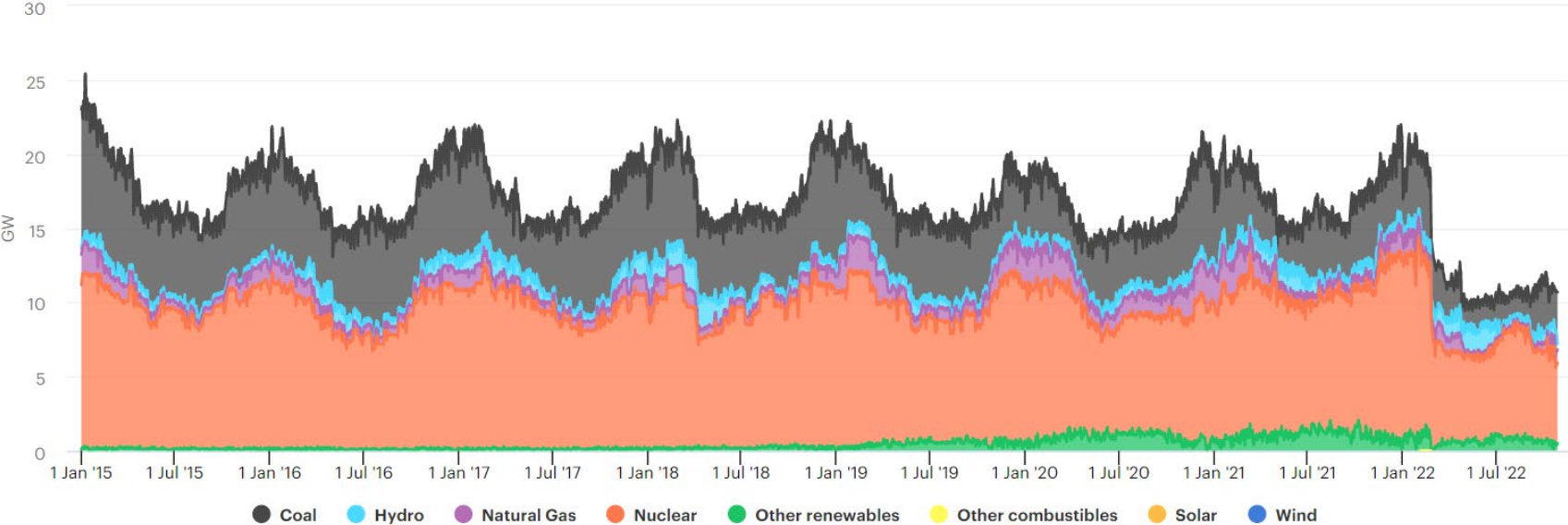
Energy security: key insights from the World Energy Outlook 2022

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28 February 2023

Real-time electricity data shows the stark effects of Russia's invasion

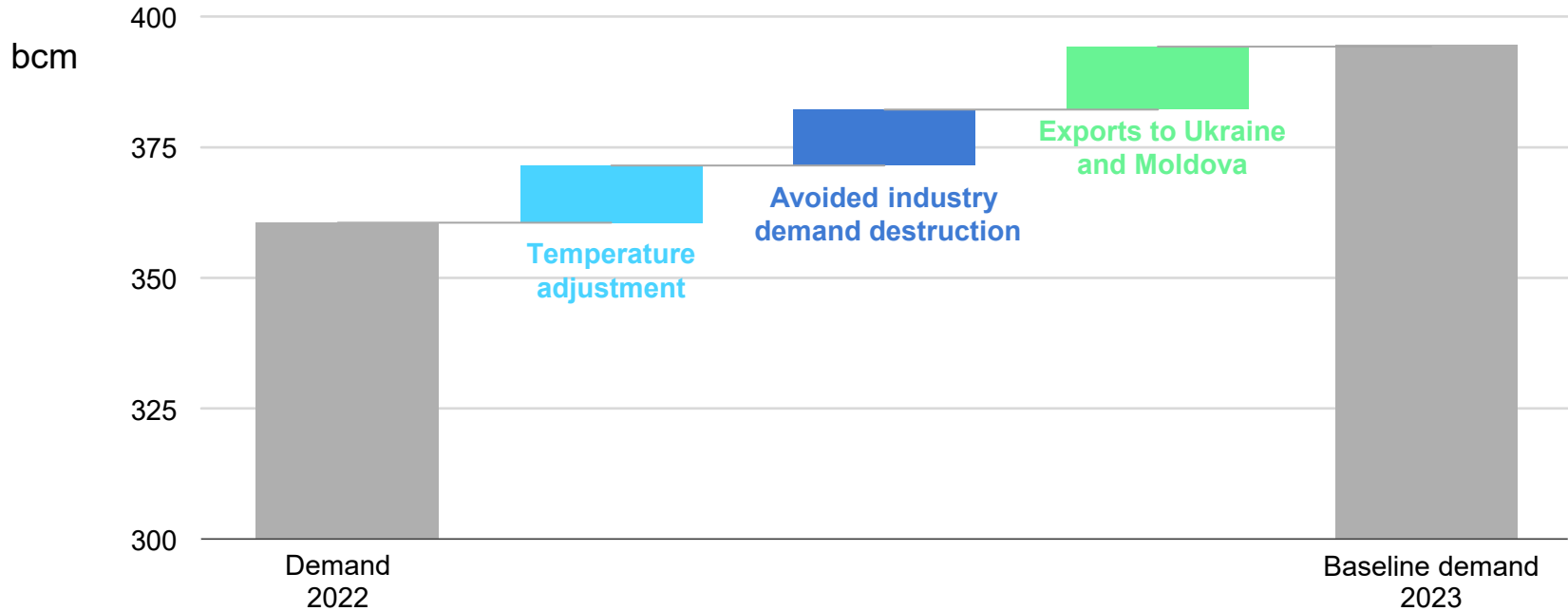
Ukraine daily power generation mix, 2015-2022



Ukraine's electricity demand has fallen by about 40% since Russia's invasion, driven primarily by declines in nuclear generation

2023 may prove to be a stern test for the EU gas balance

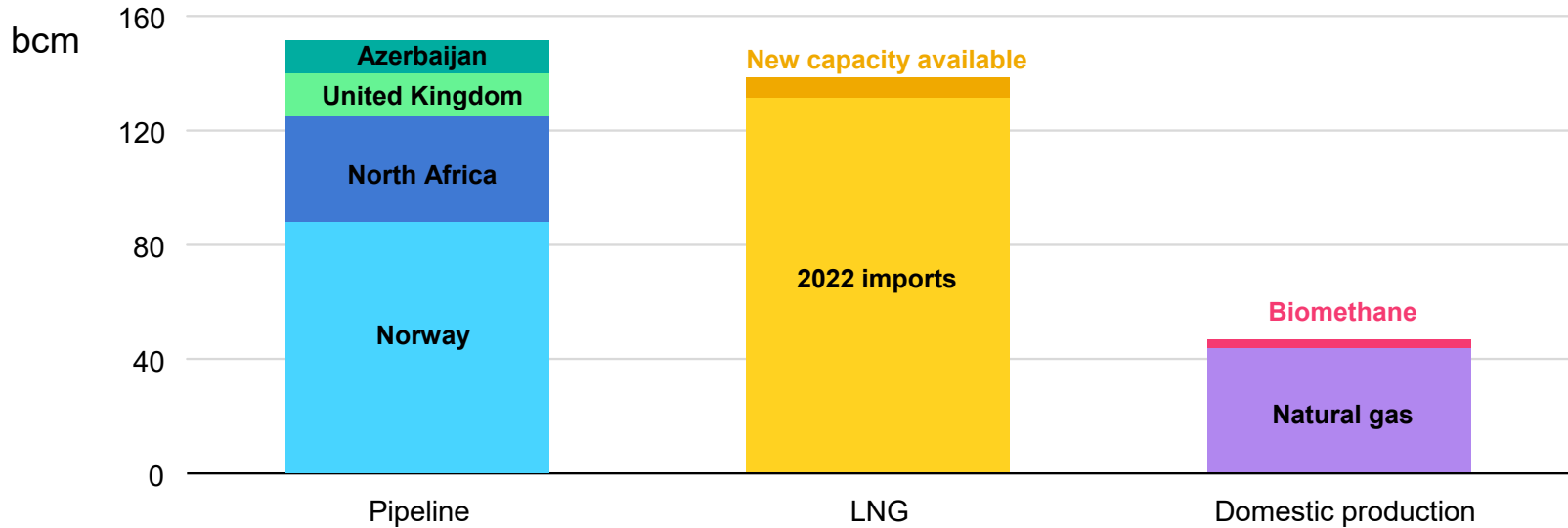
Additional levels of EU gas demand in 2023 above demand in 2022



The starting point for our stress test considers gas demand in the European Union in 2022, adjusted for weather, the drop in gas use in industry caused by production curtailments, and imports required by Ukraine and Moldova

Supplies will be tight in 2023...

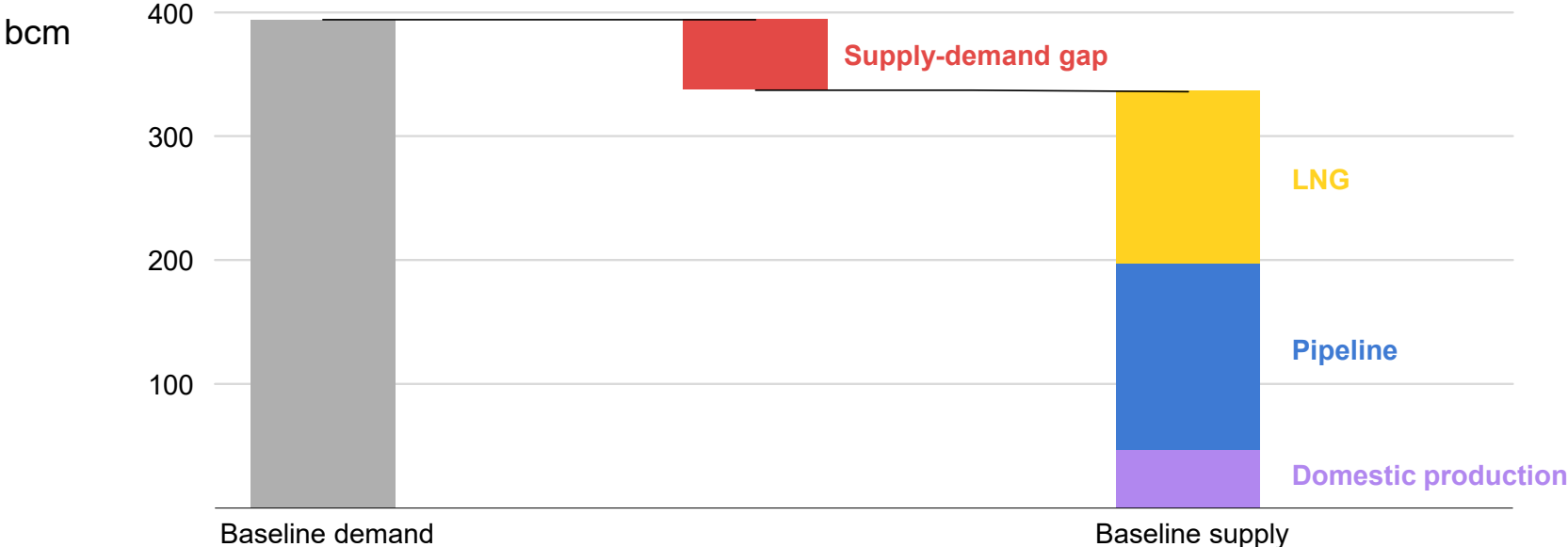
Baseline level of gas supply available to the European Union in 2023 in case of total cut-off of Russian pipeline flows and limited LNG availability



LNG markets are set to be tight in 2023, with just over 20 bcm of capacity coming online. Non-Russian pipeline suppliers have limited upside potential, while domestic production within the EU is expected to decline by 5%

...and so the EU faces a possible gas deficit in 2023

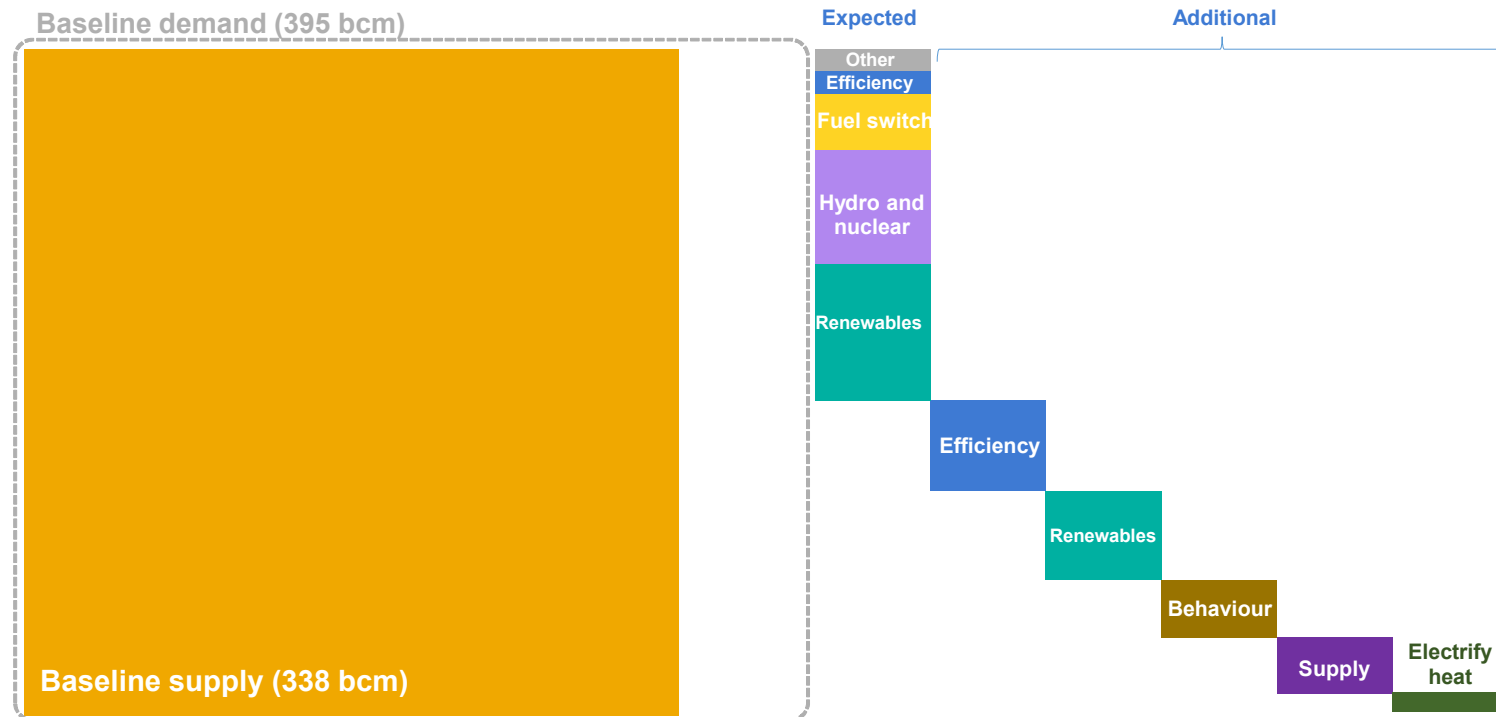
Natural gas balance of the European Union in case of total cut-off of Russian pipeline flows and limited LNG availability, 2023



If pipeline imports to the European Union from Russia drop to zero in 2023 and China’s LNG demand rebounds to 2021 levels, then the European Union faces a 57 bcm supply-demand gap in 2023.

The supply-demand gap can be closed by a wide range of actions

Expected changes and additional actions to close the supply-demand gap in the European Union in 2023



Half of the supply-demand gap will be filled by measures already taken, but the other half will require an extra push by governments to achieve rapid demand reductions or secure additional supplies

The focus should be on practical actions that can save gas in a hurry

Additional actions to close the supply-demand gap in the European Union in 2023

Efficiency

- Increase home renovations and efficient appliance sales
- Energy savings in public buildings and for public lighting
- Support for industrial energy efficiency programmes

Renewables

- Reduce permitting timelines
- Increase investor confidence through stronger incentives and market regulation
- Promote integration of renewables and distributed resources

Behaviour

- Adjust heating controls in gas-heated buildings, deploy smart meters
- Embed efficiency into default settings on appliances,
- Support the public sector to develop and implement emergency energy-saving measures.

Supply

- Capture gas flared and vented in exporting countries
- Bring new low-emissions gases into the mix, and joint gas purchasing.

Electrify heat

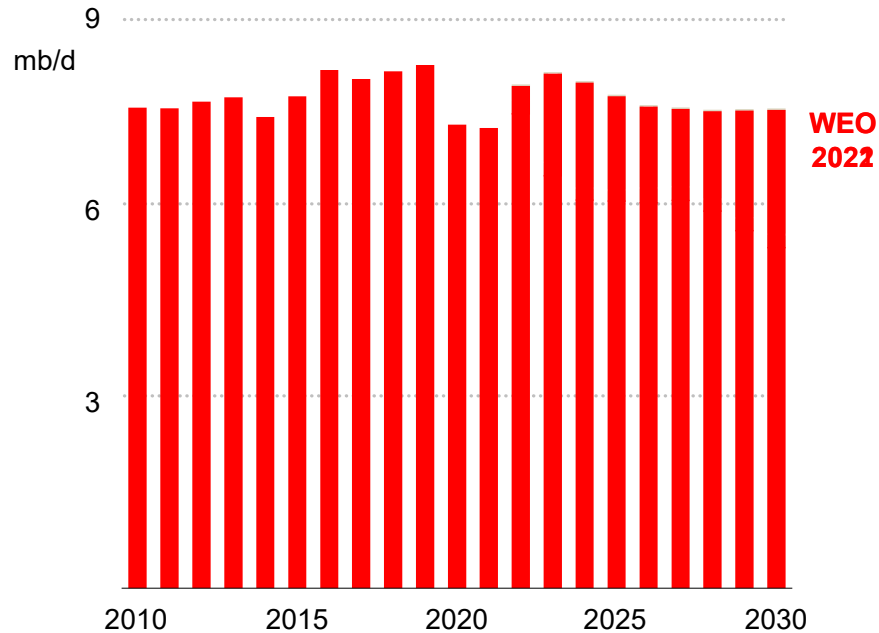
- Provide financial incentives for heat pump purchases and reform tax measures
- Scale up support for industrial electrification.

There are real-world examples of measures that could be implemented quickly. Doing so would decrease the likelihood of price spikes, industrial demand destruction, additional coal use, or competition for LNG cargoes.

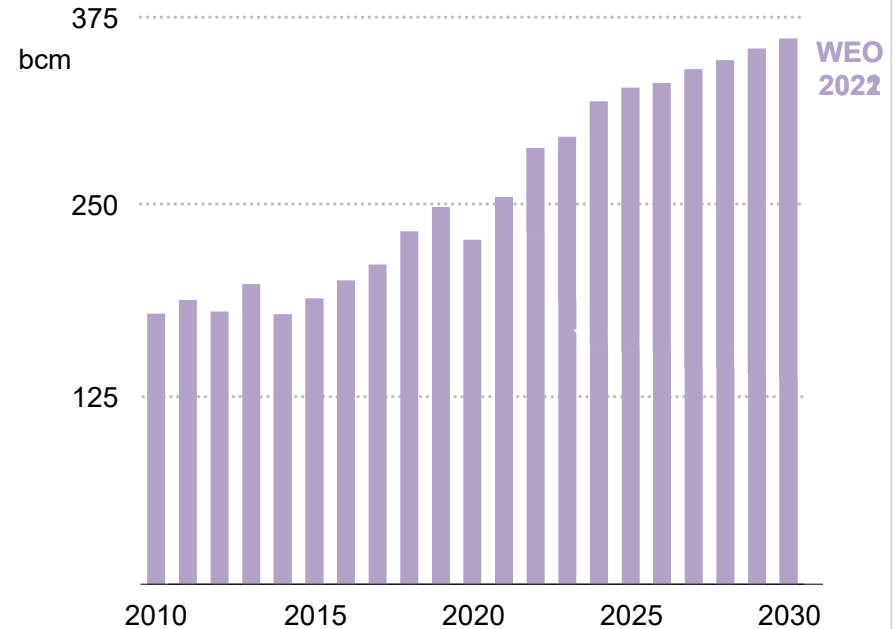
Russia faces a much-diminished role in international energy

Russian oil and gas exports in the Stated Policies Scenario

Oil exports



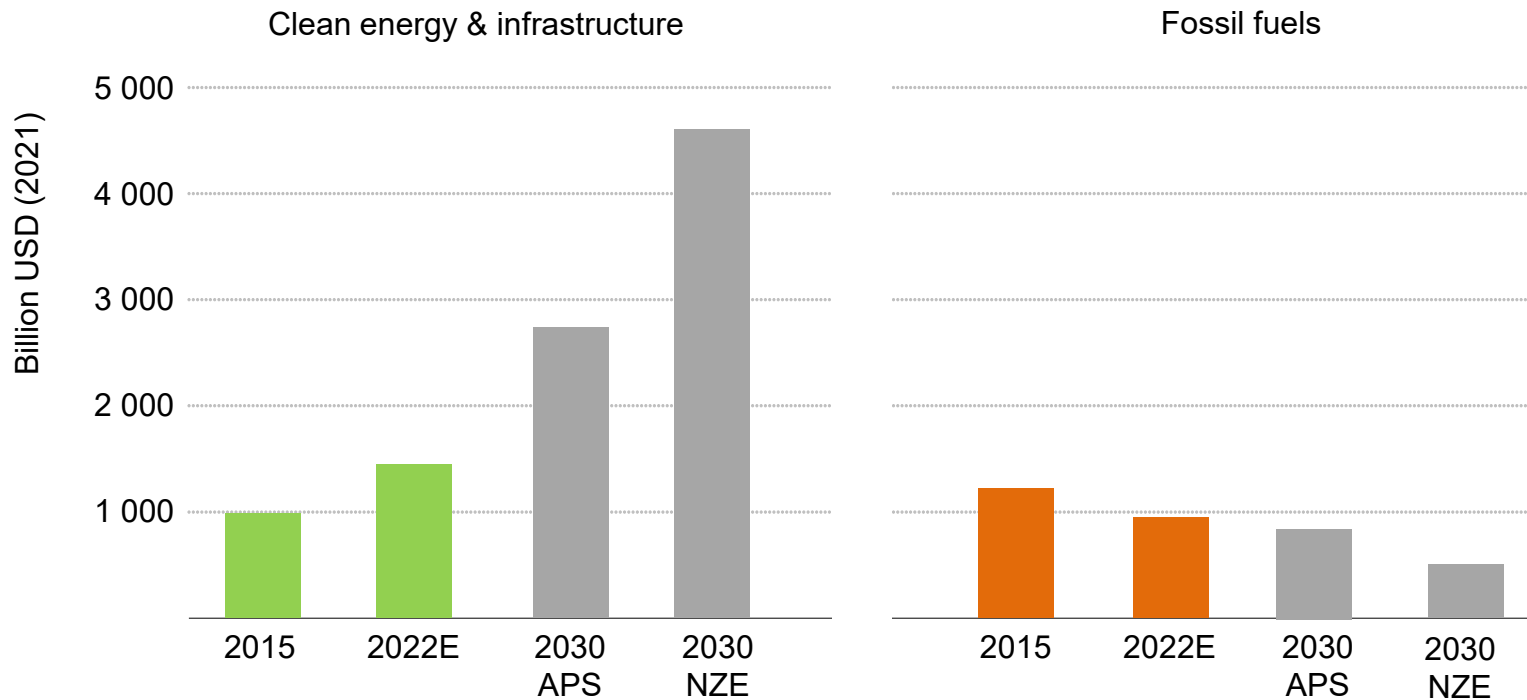
Gas exports



Russia's share of global oil and gas trade halves by 2030, with exports from the United States, Middle East, South America and East Africa – and enhanced efforts to reduce demand – filling the gap

The world has been underinvesting in energy

Global annual energy investment benchmarked against future needs



Investment to bring more clean and affordable energy into the system is rising, but not yet quickly enough to forge a path out of today's crisis or to bring emissions down to net zero by mid-century

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