Navigating the Roadmap for Clean, Secure and Efficient Energy Innovation

SET-Nav
Strategic Energy Roadmap

The role of natural gas in an electrifying Europe

Perspectives from SET-Nav

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Issues concerning natural gas and decarbonization

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- What are challenges and conditions determining the role of natural gas in the mid and long-term in EU energy supply?

- What are consequences of SET-NAV's deep decarbonization scenarios for EU natural gas market, infrastructure and participants?

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Challenges, conditions, drivers

Natural gas: a high or low carbon fuel?

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- Natural gas less carbon intensive than many energy sources used today.
  - Compared to coal-fired power but also *low quality* wind and solar.
  - But not shale gas
- Longer-term natural gas usage would add significantly to CO_2 stock in the atmosphere.
  - Unabated emissions
- Medium term, natural gas can contribute - as a flexibility and balancing source - to realising emissions reductions.
- Long term combined with CCS it may be compatible with deep decarbonisation.

Drivers

- Globally: plenty of supply, large increase in LNG

- Global population and GDP growth
- Access to energy developing countries
- Industry: feedstock & process heat
- Electric power: base load, peak load, flexibility and balancing
- Personal mobility and freight transport (land, sea, air).
  - Batteries heavy and low-energy density.
- Bio-methane, synthetic gas.
- Grey, blue, green hydrogen.
- Negative emission technologies.
- Carbon capture and storage.

ROLE NATURAL GAS IN FUTURE EU – BACK OF ENVELOPE

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Horizon / Application	2030	2050
Base-load power	Yes	Unlikely
Flexible power	Yes	Probably
Industry - Feed stock	Yes	Probably
Industry - Process heat	Yes	Probably
Building heating	Yes	Maybe
Transport	Specific segments	Maybe
Hydrogen feedstock	Yes	Probably

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Consequences deep decarbonisation EU

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EU Gas demand development in the pathways (bcm/y)

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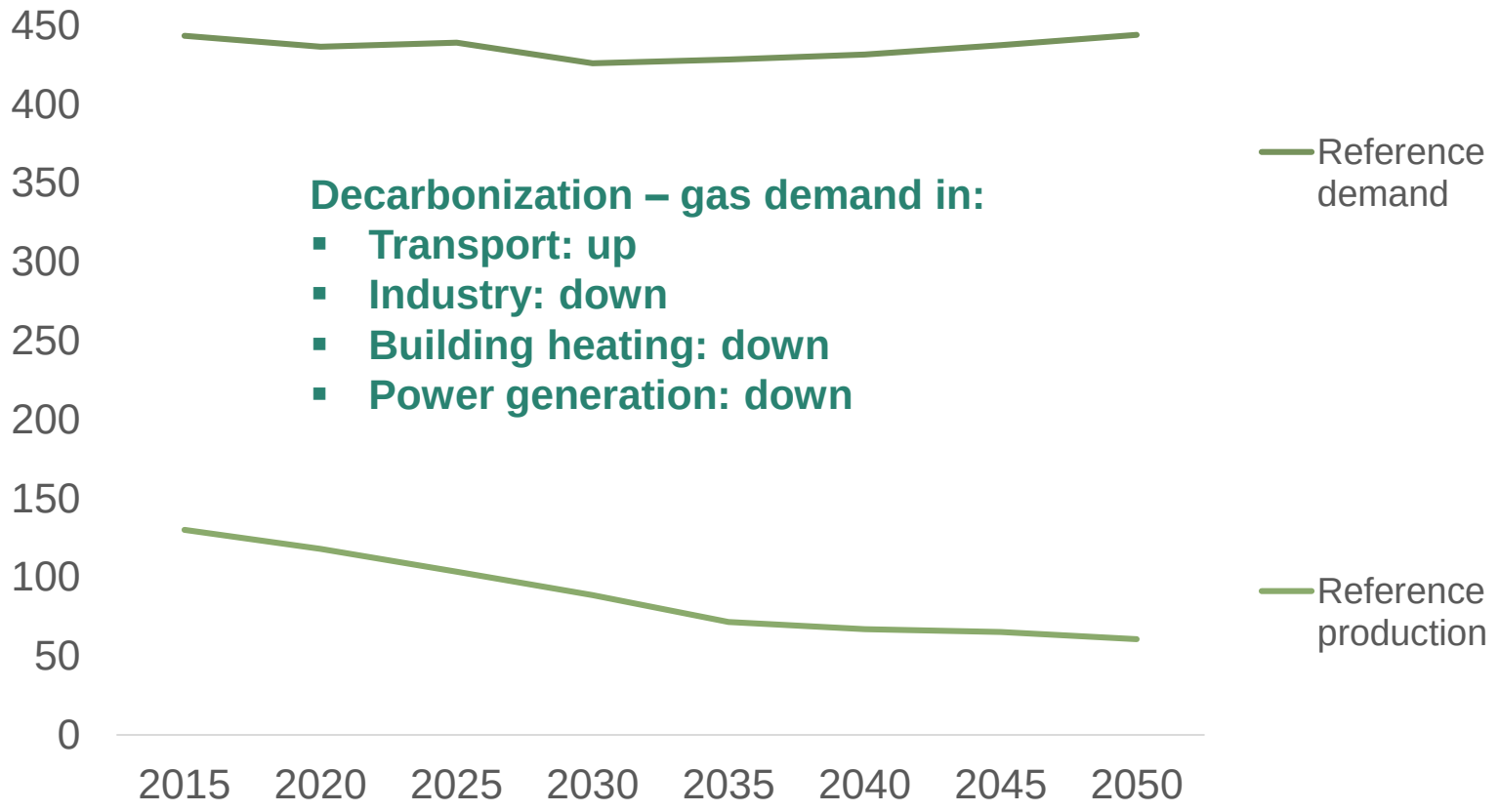

1 bcm = 1 billion m^3 = 11.4 TWh = 0.9 Mtoe

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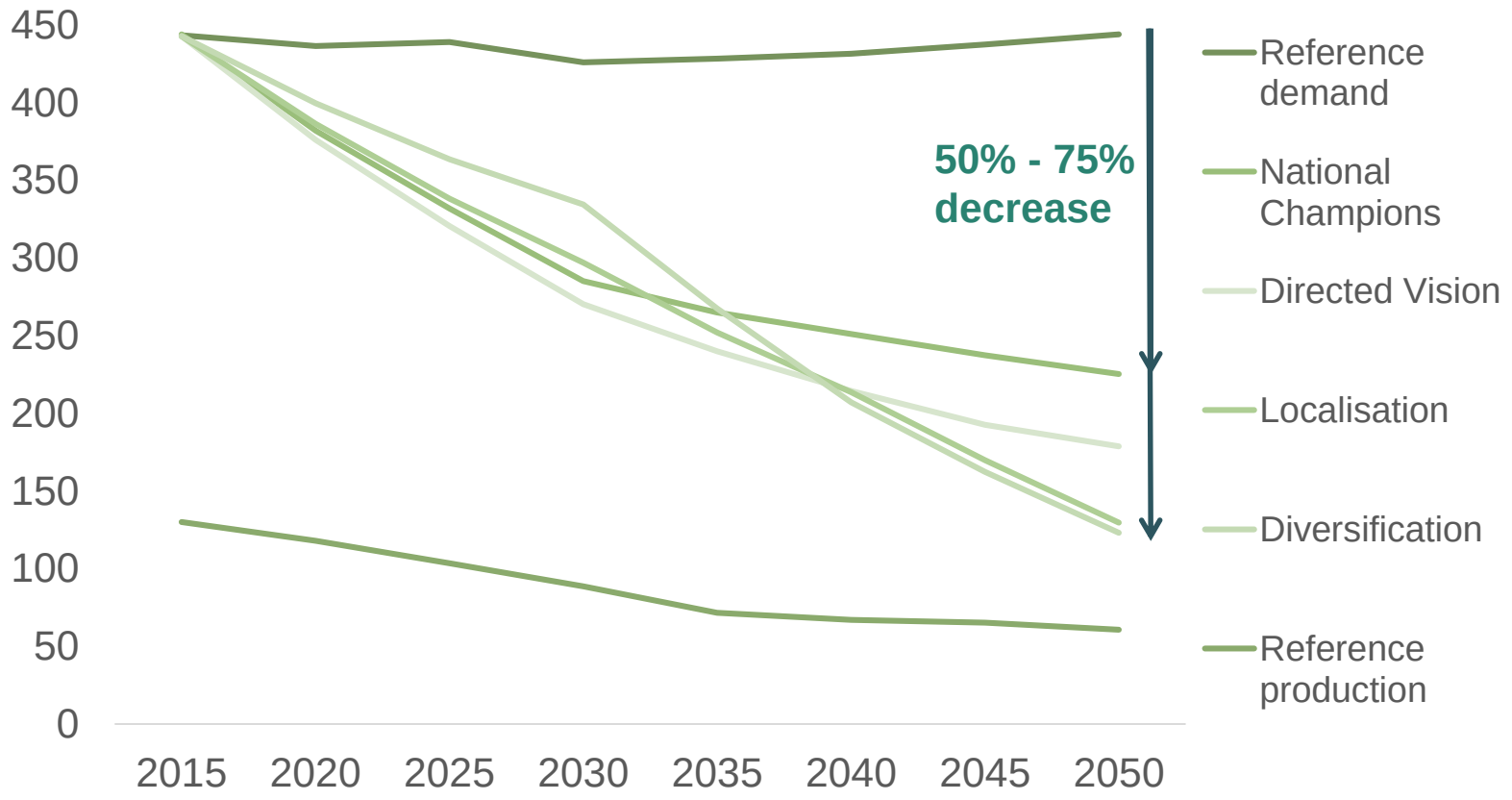
Gas demand development in the pathways (bcm/y)



1 bcm = 11.4 TWh = 0.9 Mtoe

EU28 IMPORT DEPENDENCY (REKK EGMM MODEL)

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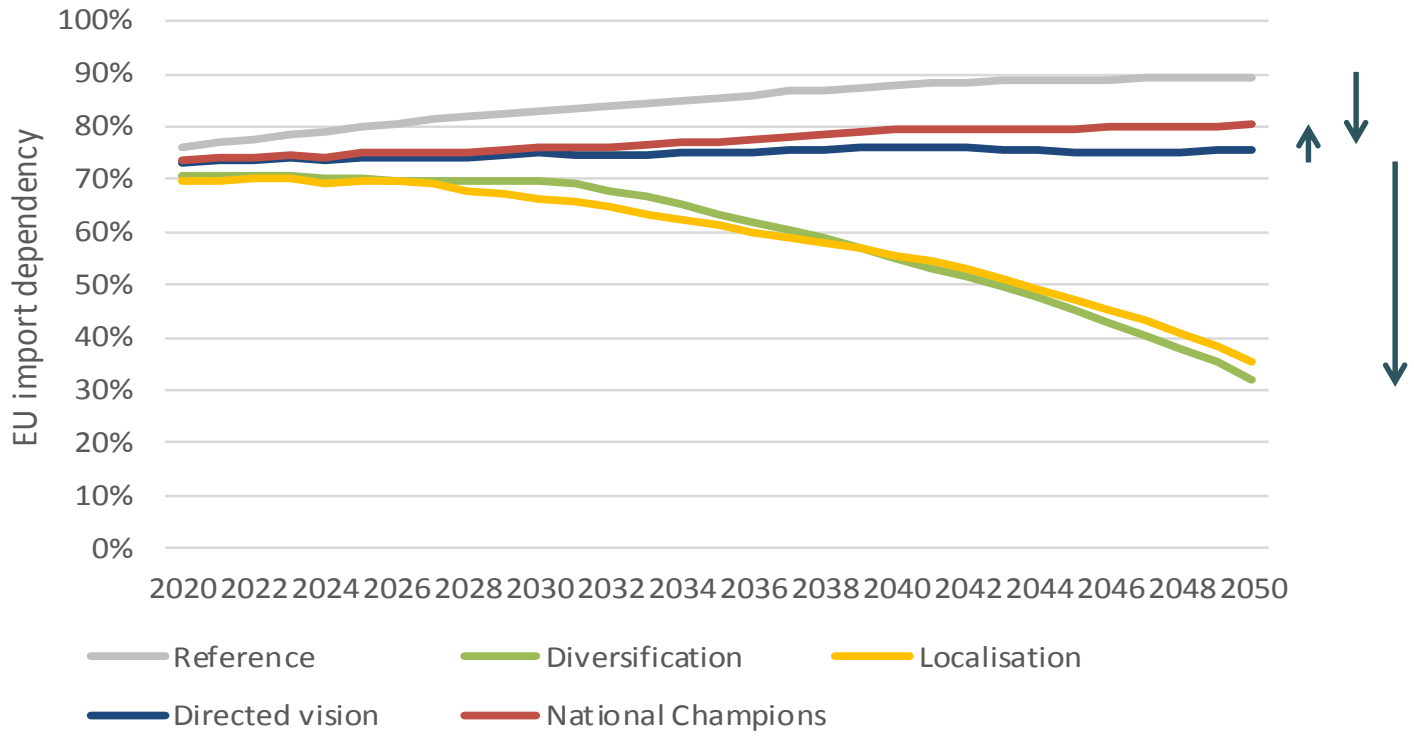

(Relative) import dependency stabilizes or decreases
In scenarios with significant RES-gas, dependency decreases drastically

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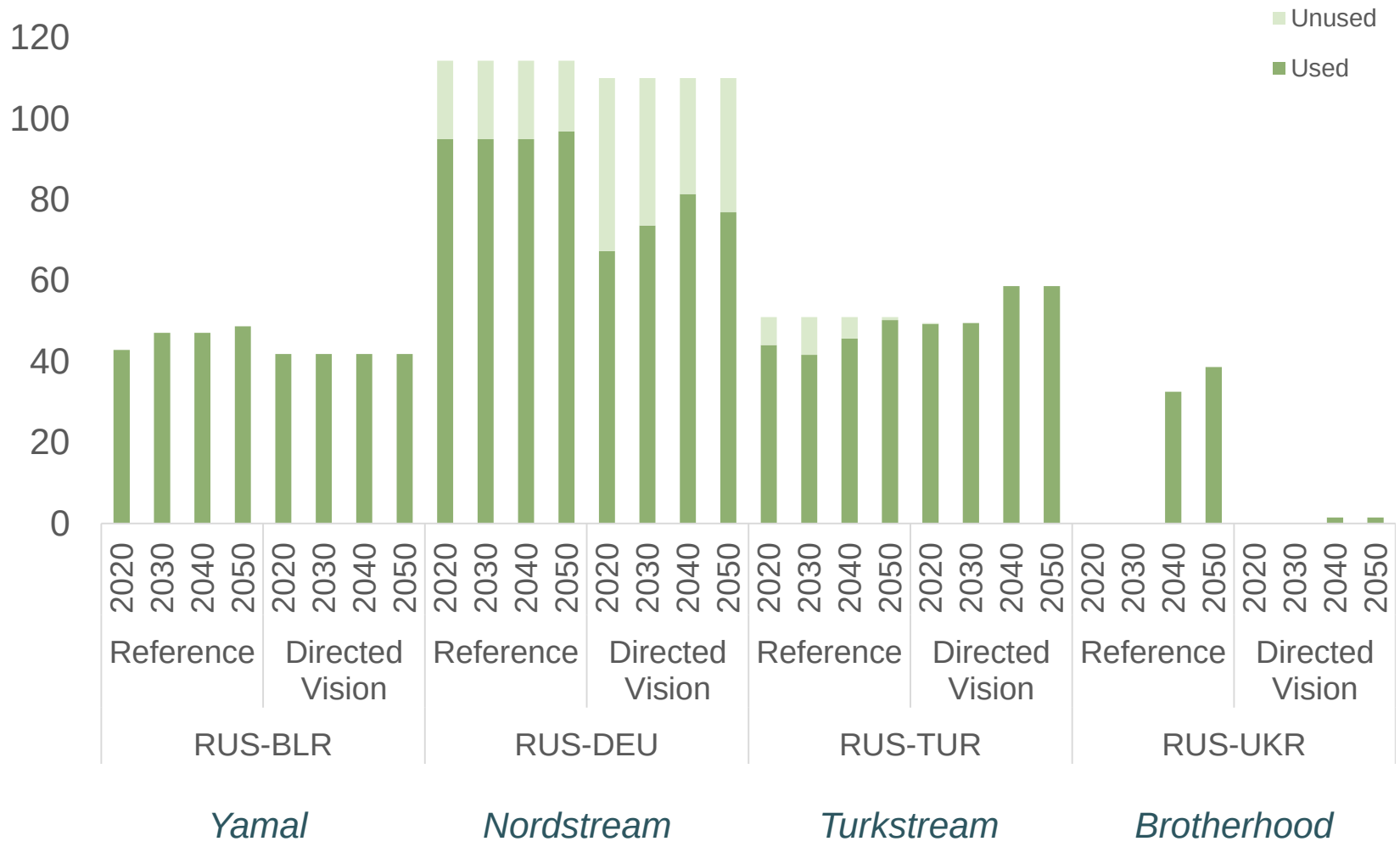
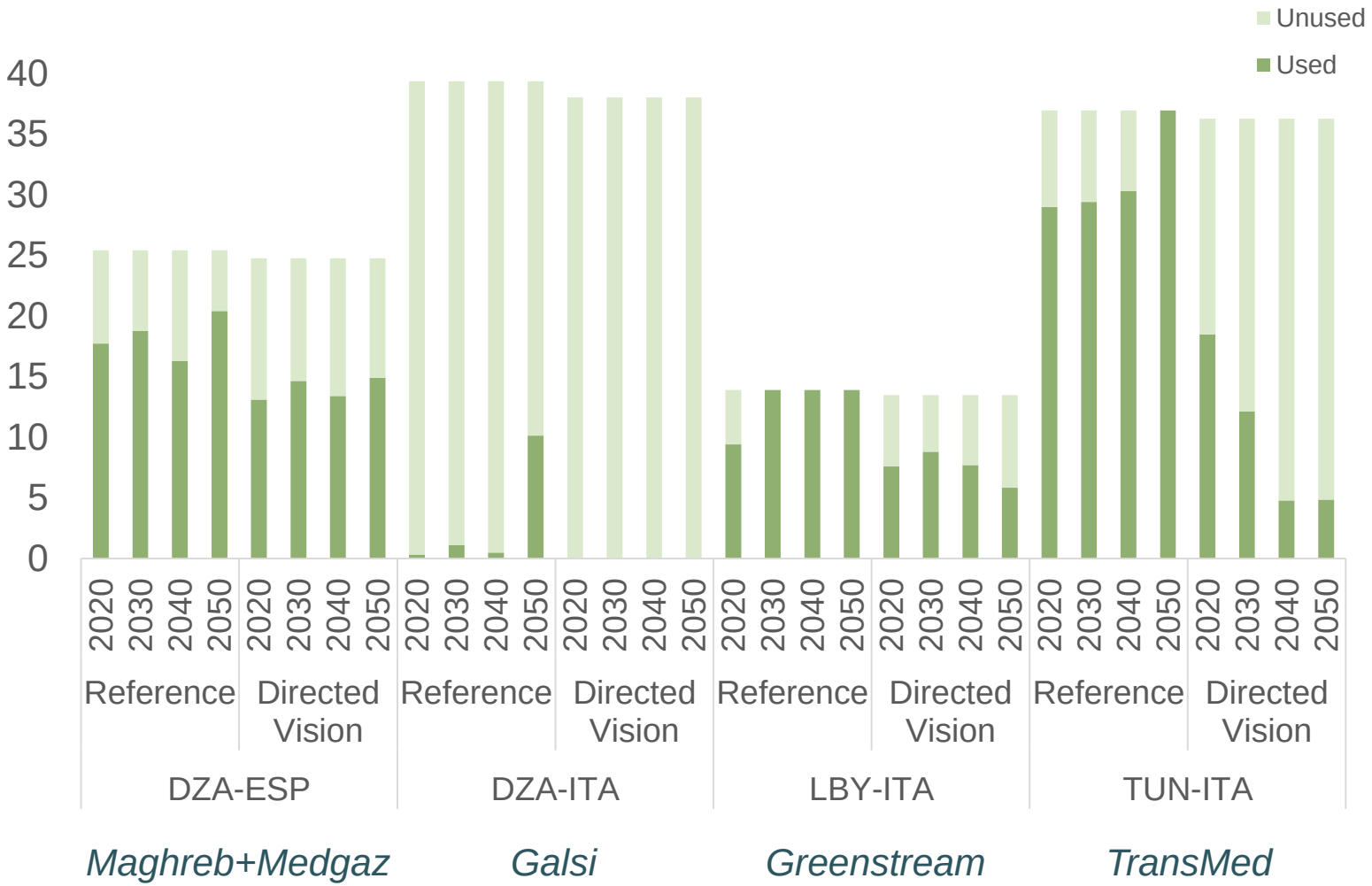
Infrastructure Utilization pipelines from Russia (bcm/y) (NTNU DIW GGM model)



INFRASTRUCTURE UTILIZATION PIPELINES FROM AFRICA (BMC/Y)



Infrastructure Utilization pipelines from Russia (bcm/y)

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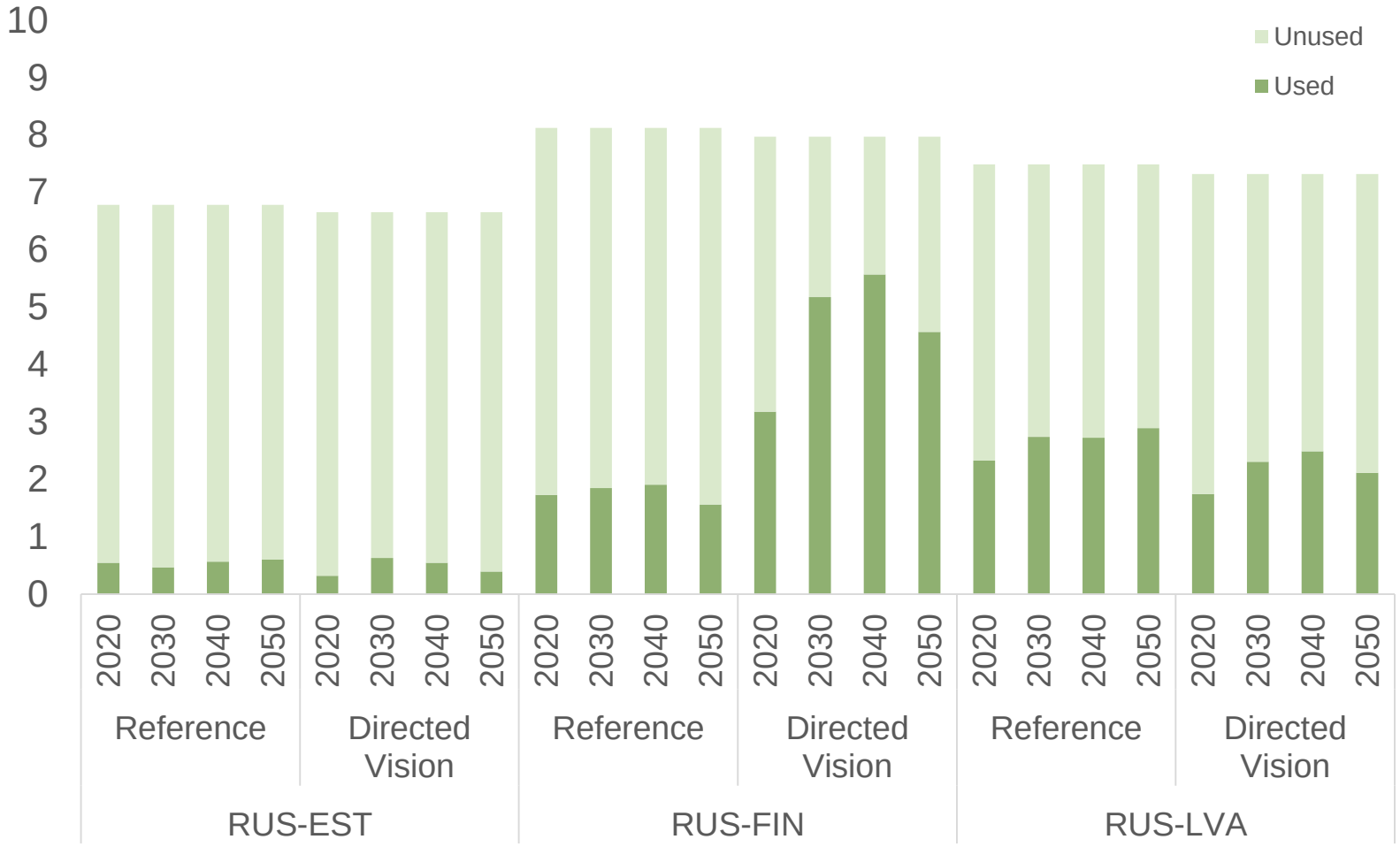
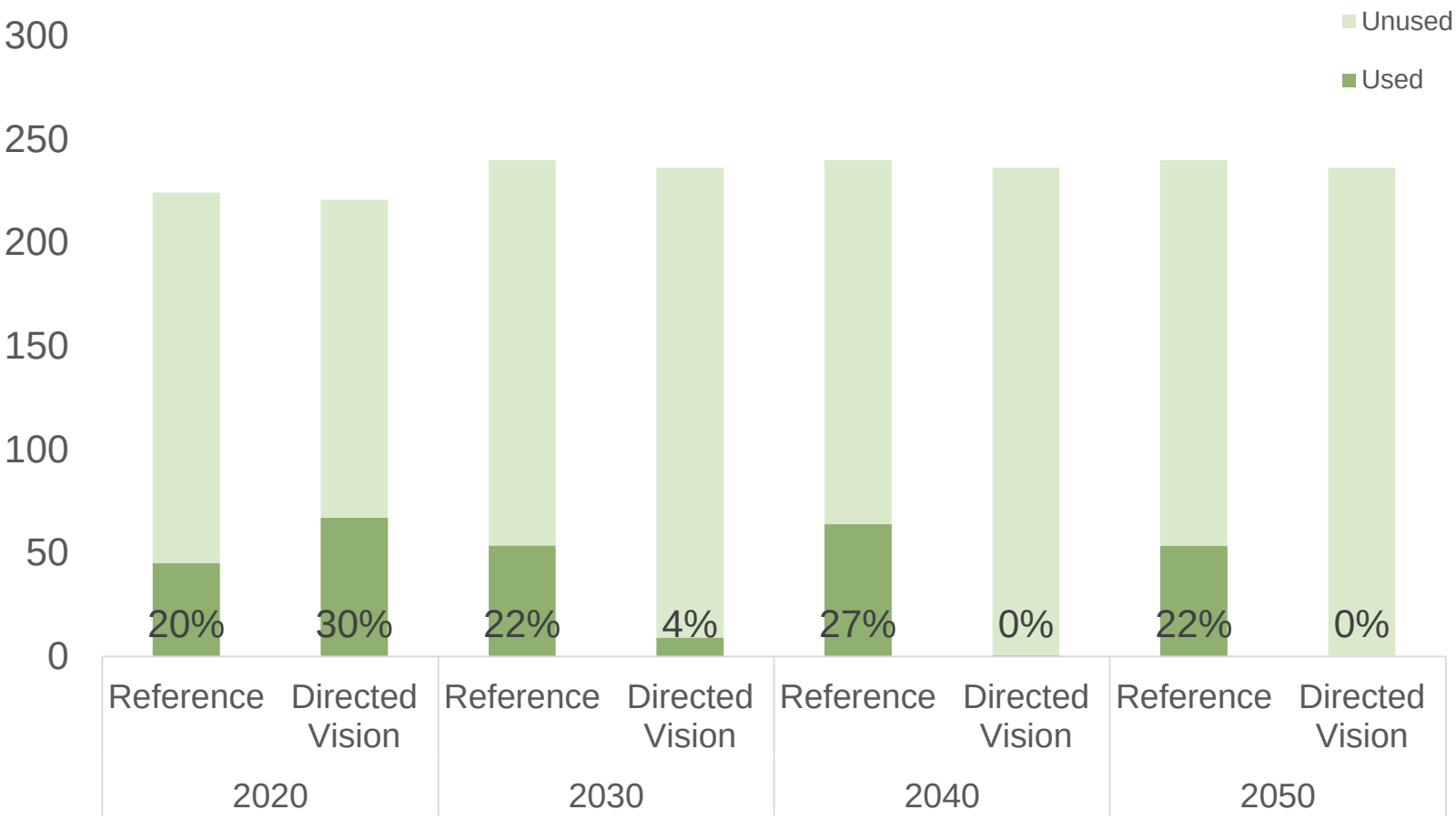
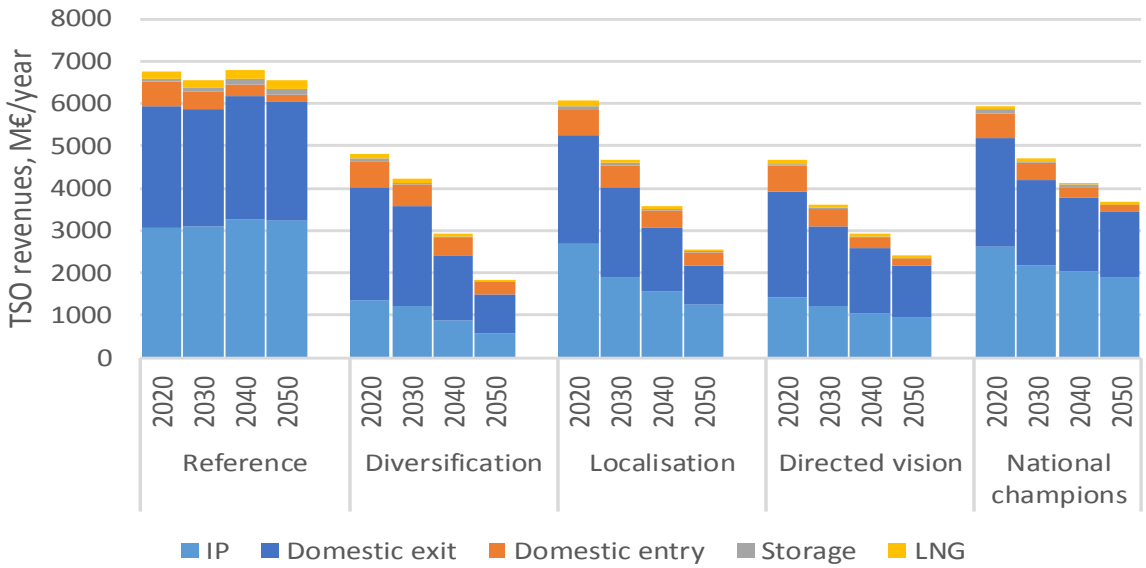


INFRASTRUCTURE UTILIZATION REGASIFICATION (BCM/Y) GGM

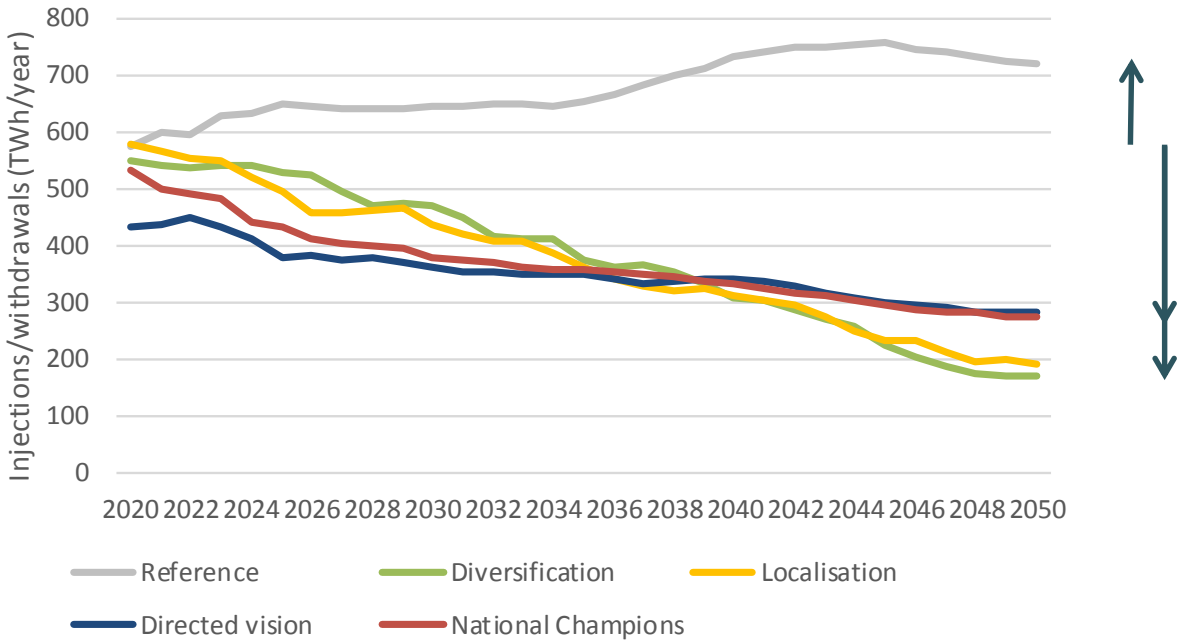


Effects on TSOs



- Operational income drops by ¾
- Upward pressure on tariffs
  - May further reduce competitiveness
- Decommissioning pipelines
  - may distort SOS; possibly not critical when gas share in primary energy so low (?)

Effects on storages



- Without decarbonisation, need for storage grows
  - Reference 2020 52 bcm/y → 2050 64 bcm/y (+23%)
- In scenarios storage usage decreases 50%-75%
  - Scenarios: 2050 15-25 bcm/y
  - Based on monthly loads, not accounting for intermittency “backup”

TAKEAWAYS

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- EU gas consumption reduction implies imports and infrastructure utilization will go down dramatically.
- Momentum will pick up until 2030; drastic impacts after
- No new gas infrastructure.
  - Possible exception small LNG terminals in Sweden & Finland.
- Changing consumption patterns and reduced seasonality detrimental for business models infrastructure operators.
- Huge tariff increases and infrastructure decommissioning.
- EU PCI support should be directed to electricity infrastructure and energy efficiency.
- Continued innovation and cost decreases in RES will most probably result in RES dominated energy supply by 2050.
- For natural gas to play a role in long-term energy supply, value chain must become (nearly) carbon neutral.

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Thank you!

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