Navigating the Roadmap for Clean, Secure and Efficient Energy Innovation

SET-Nav
Strategic Energy Roadmap

Effects of pathways scenarios on the gas infrastructure

Brussels,
21.03.2019.

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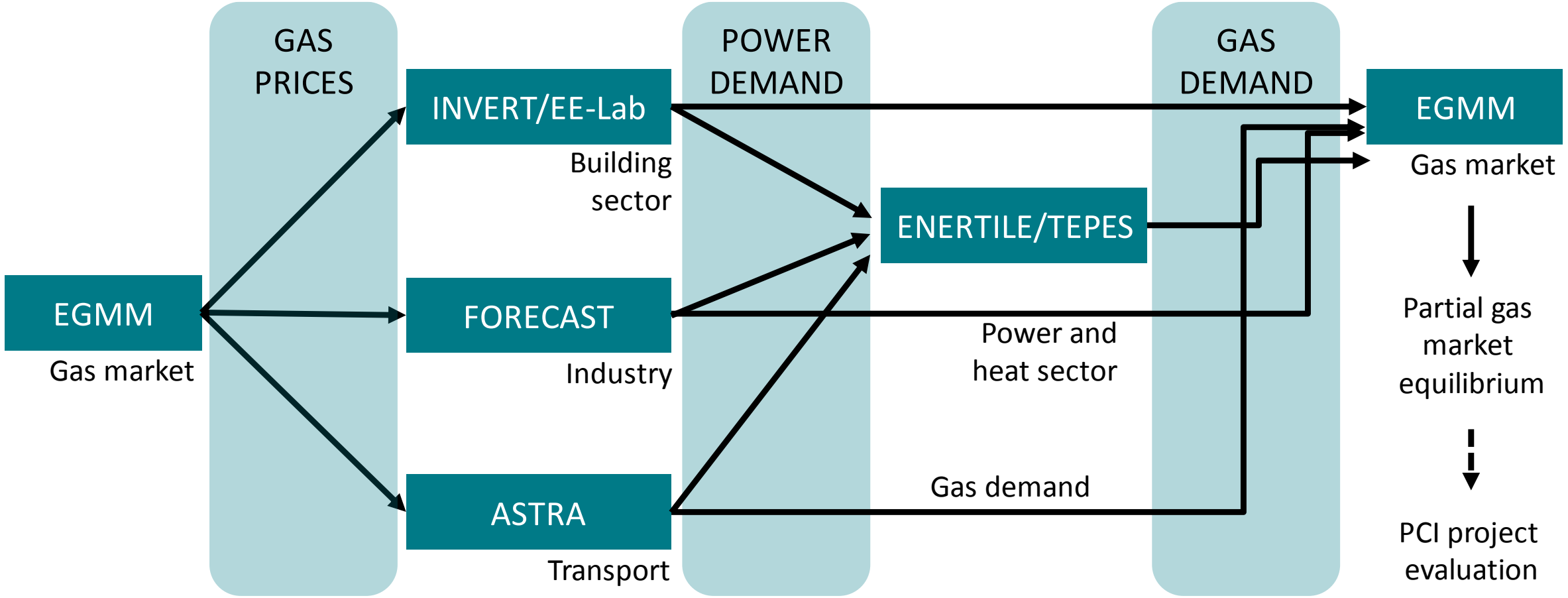
Research Question

- What is the natural gas infrastructure need of the EU28 assuming that decarbonisation happens?
- How does the decarbonisation affect the different stakeholders of the natural gas sector?

METHODOLOGY - MODELLING



FRAMING THE DECARBONISATION FOR MODELLING - PATHWAYS

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Heading	Reference	Diversification	Localisation	Directed Vision	National Champions
EU28 RES gas	Current	High	High	Current	Current
NS 2, TS2	Yes	No	No	Yes	Yes
UA transit	Only spot	Yes	Yes	Only spot	Only spot
EU28 tariffs	Current tariffs	No tariffs	Current tariffs	No tariffs	Current tariffs
EU28 gas cons.	PRIMES reference	Pathways	Pathways	Pathways	Pathways

BAU

Pathways

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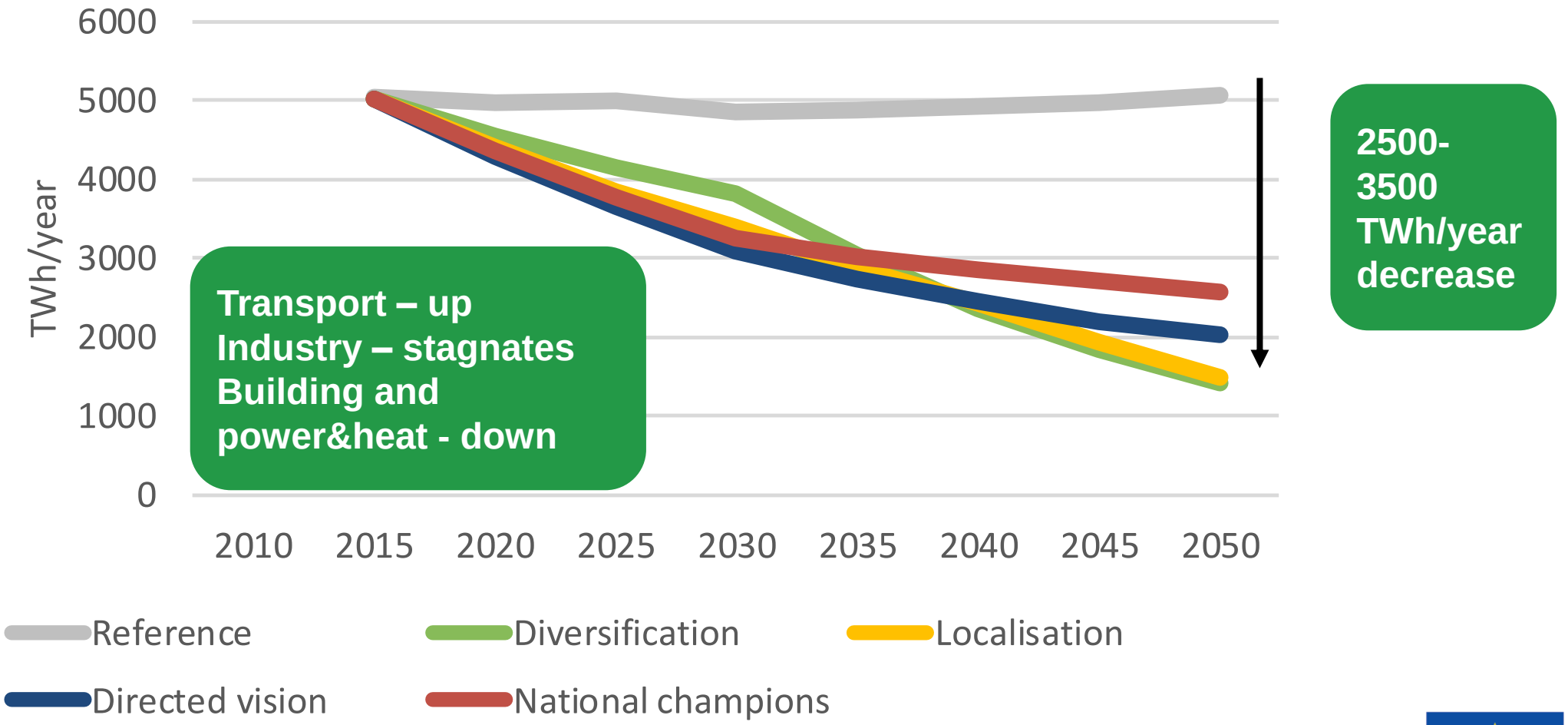
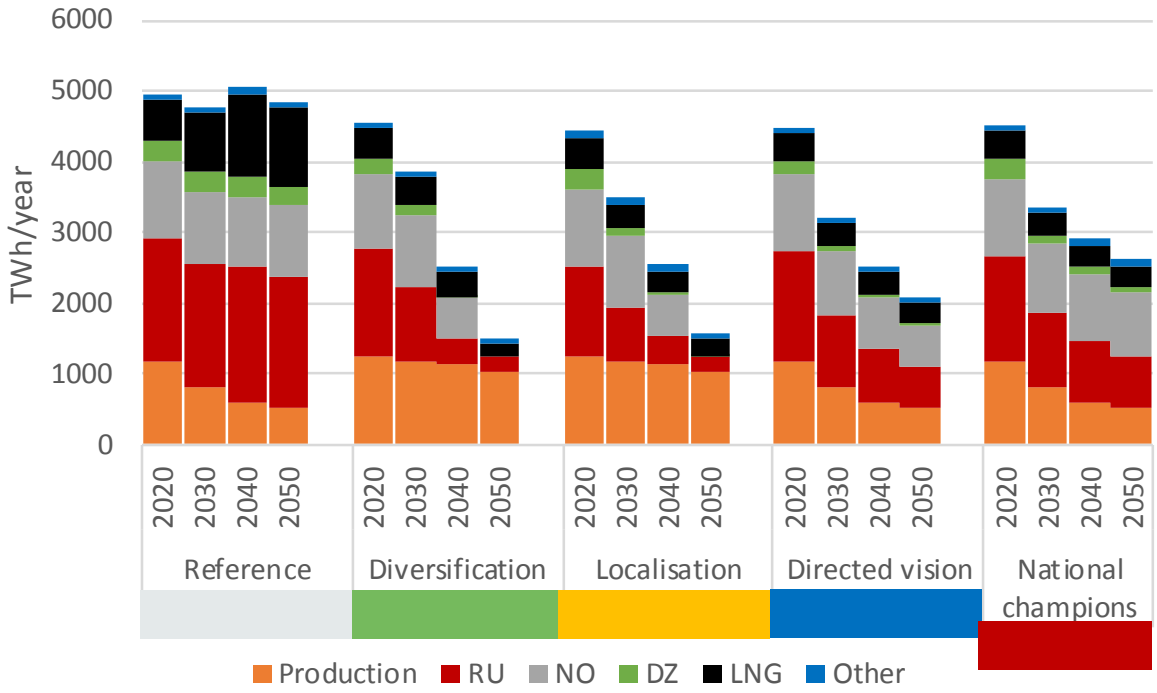
GAS DEMAND DEVELOPMENT IN THE PATHWAYS SCENARIOS

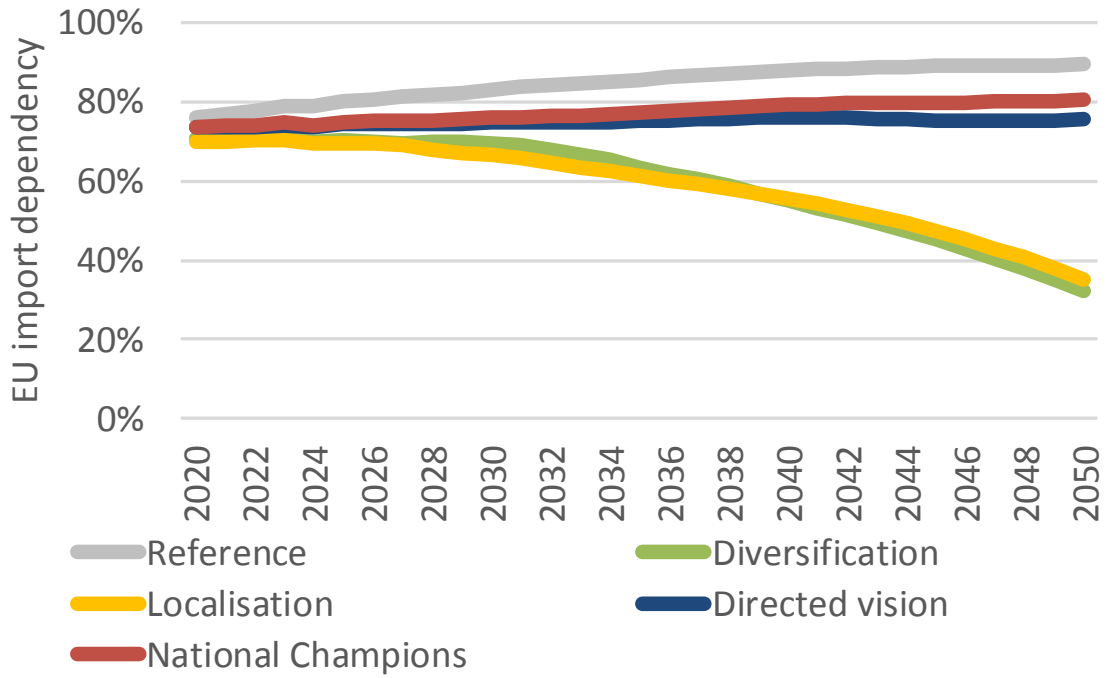


SUPPLY STRUCTURE EU28



Reference: Russian market share is increasing, more LNG to the markets

Diversification and Localisation: Import dependency falls with the appearance of increased RES gas



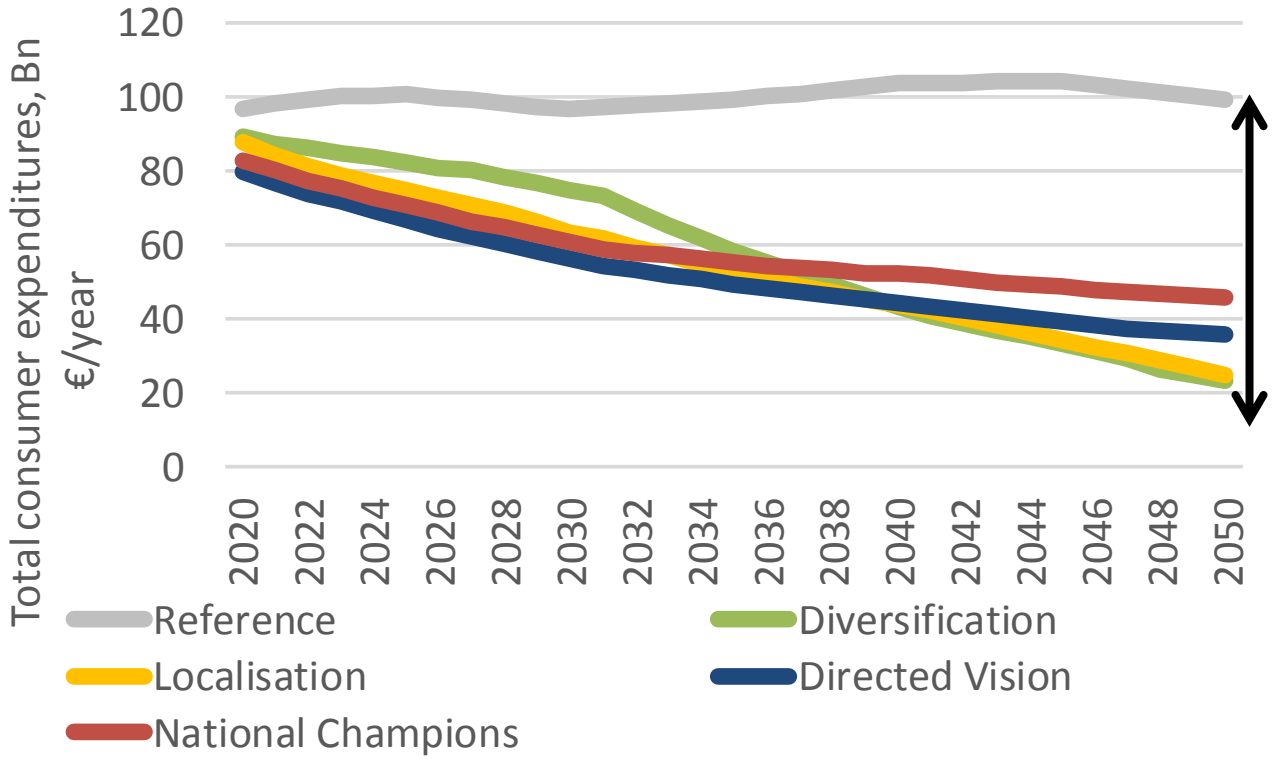
PCI EVALUATION – EU28 CBA

NPV, M€ total	Reference	Diversification	Localization	Directed vision	National champions	Case study Reference	Case study EUCO30
Shannon LNG	581	-550	-338	-552	-545	229	-148
ES-PT	-239	-219	-219	-219	-220	-219	-219
Midcat	-348	-327	-305	-320	-325	-333	-333
Eastring	-2307	-1369	-1563	-1495	-1566	n.a.	n.a.
Stork II	-795	-761	-763	-722	-750	-1031	-680
BACI	-93	-81	-81	-81	-81	-81	-82
HU-SI	-105	-104	-105	-93	-103	9	-102
BRUA 2	-1912	-1186	-1359	-1261	-1359	1026*	-433
LT-LV	-89	-79	-79	-82	-79	2794*	3527*
Baltic Pipe	-1020	-791	-921	-986	-839	-982	-967
LNG Gothenburg	32	3268	481	1069	1372	n.a.	n.a.

*Can not be compared with Pathways; Larger project cluster assessed; now part of reference case (e.g. BRUA phase 1, Balticconnector cluster)

PCIs identified in the case study with positive NPV have received and FID or have been commissioned (GIPL, Krk LNG, BRUA phase 1, Balticconnector)
No new infrastructure is needed in neither the Referenca case nor the Pathways
HU-SI interconnector competing infrastructure commissioned (Krk LNG)

Effects on Consumers

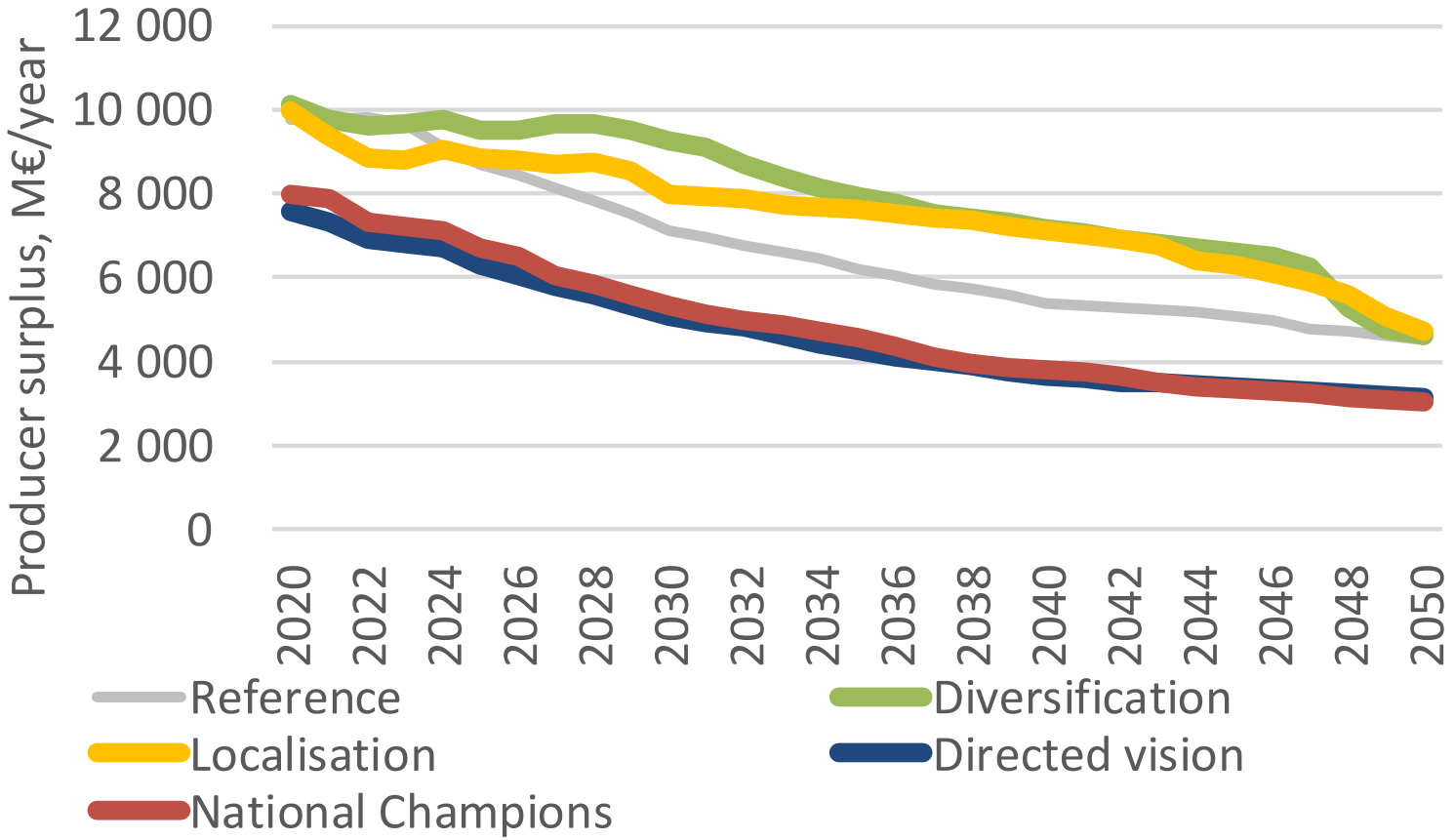


Drastic decrease in consumer bill for natural gas due to demand drop in Pathways

European consumers are paying 50-70 Bn €/year less in 2050

This decrease in consumer expenditures relates to the gas market – cost increase of new technologies is covered in other sectoral models!

EFFECTS ON PRODUCERS



European gas producers and new entrants are selling higher volumes but by 2050 realise the same level of revenues in Diversification and Localisation scenarios

1.4-1.5 Bn €/year losses in Directed Vision and National Champions

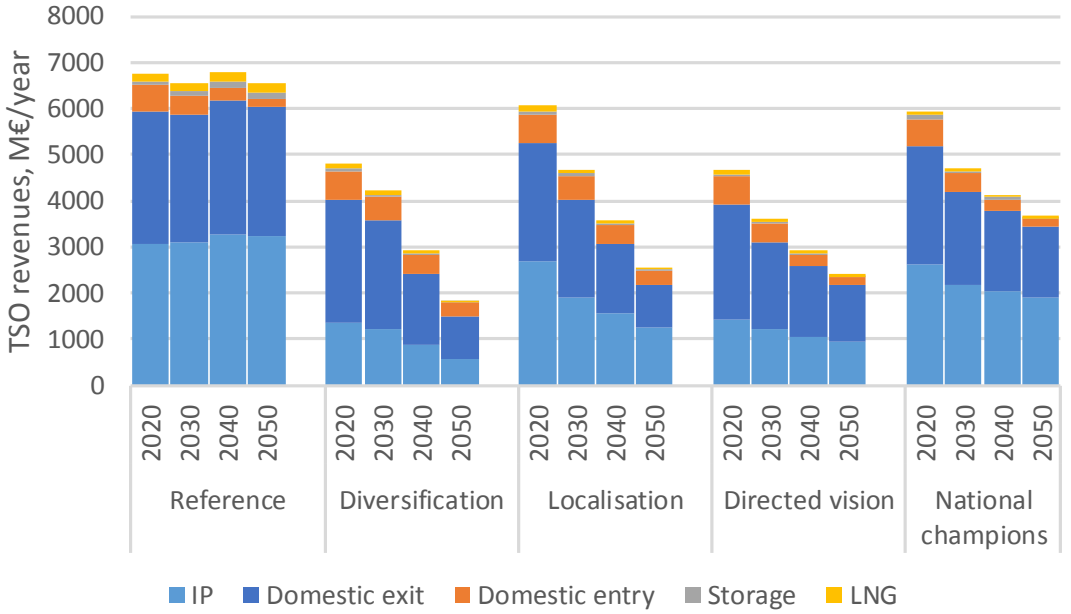
Effects on TSOs

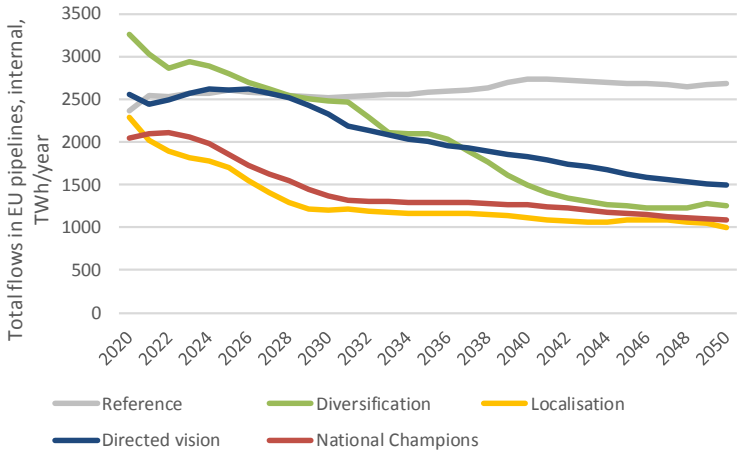
Operational income drops to ¼

Drastic cost-cuts and no CAPEX increase is advised

Pressure on regulators to increase tariffs is a risk, this might further decrease the competitveness of gas

Decommissioning of pipelines might have distortive effect on SOS, however decrease in share of gas in primary energy mix solves the SOS issue



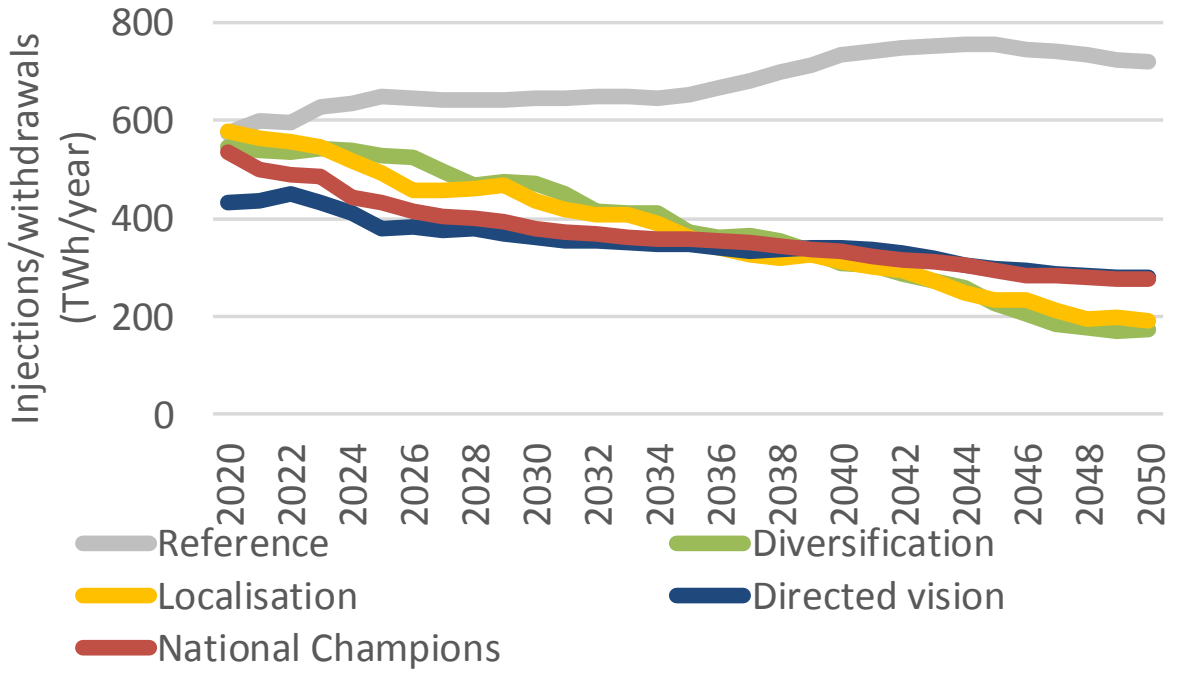


EFFECTS ON STORAGES

Without decarbonisation, need for storage is growing (due to increased import needs)

Current (overbuilt) storage infrastructure would be better utilised in the reference scenario. Still, no further storage investment is needed

In all Pathways scenarios need for storage decreases drastically to 200-300 TWh/year (currently 600-700 TWh/year)

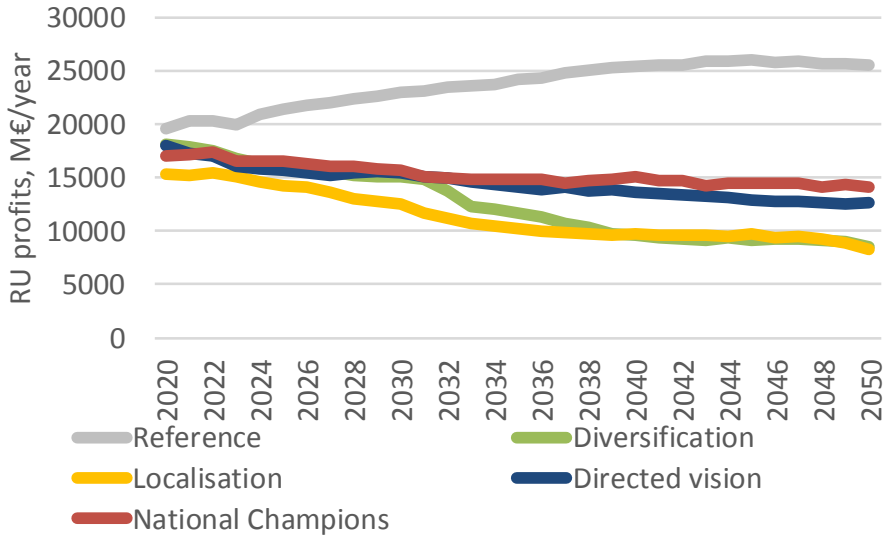


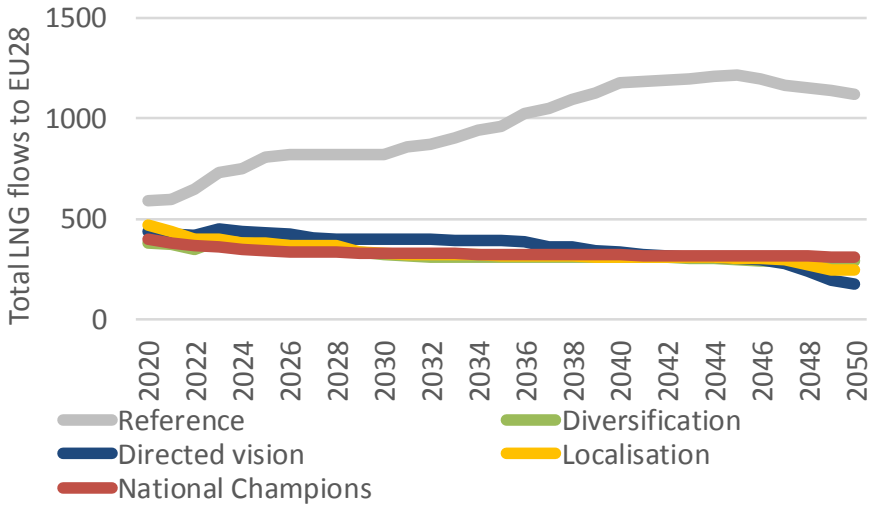
EFFECTS ON MAIN EXTERNAL SUPPLIERS

Falling demand: smaller size of the pie

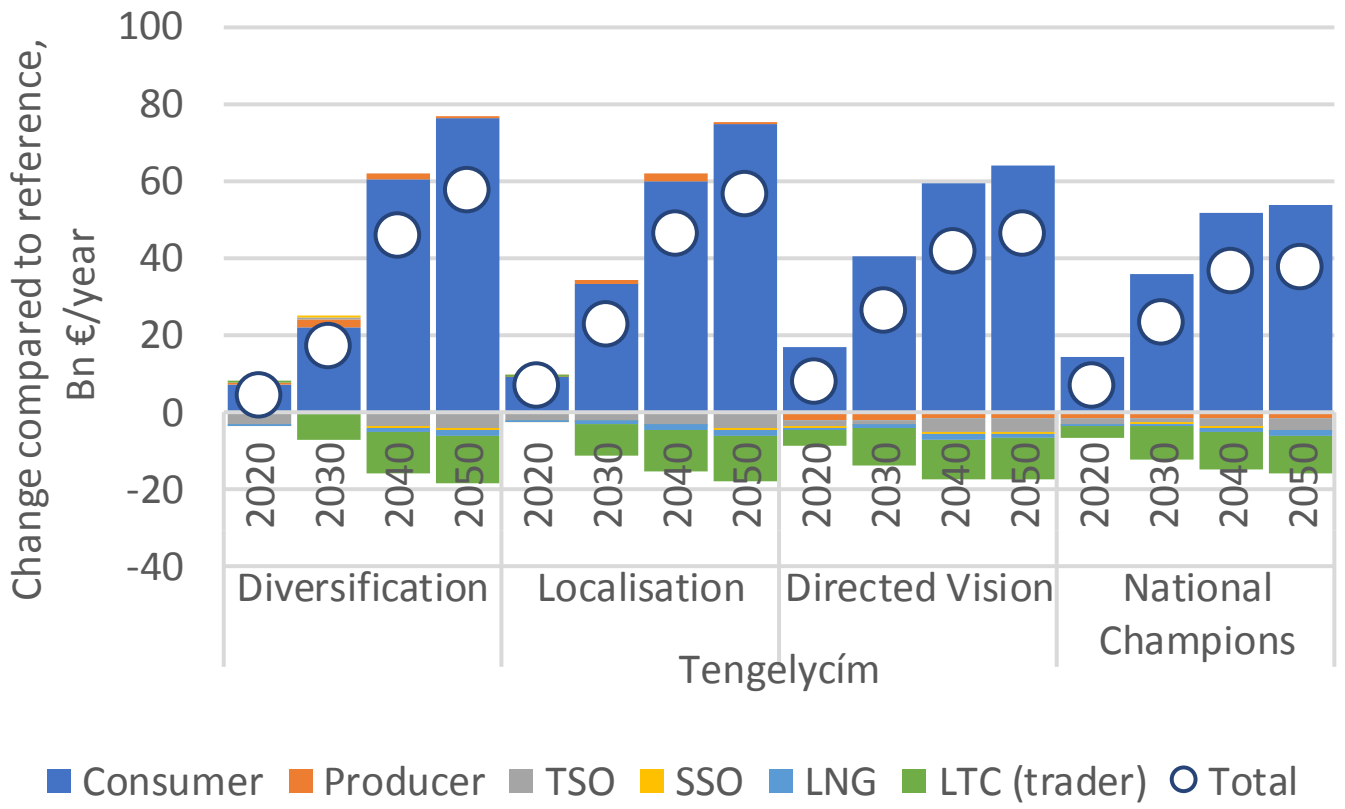
Increased competition between Russian and Norwegian gas, falling sales

Lower prices for European consumers





Effects by stakeholders



TAKEAWAYS

All decarbonisation scenarios bring drastic gas demand drop

Reduction in gas procurement cost may be allocated to new technologies and support for biomethane production, but not to create stranded infrastructure

Do not encourage any new investment to the gas infrastructure

Do not give wrong signal to infrastructure operators

PCI investment was assessed with three different gas models, which found the same investment development need for Europe (which were included in current reference)

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Thank you!

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GAS MARKET MODEL EGMM

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INPUT

- Demand by countries (annual quantity, monthly distribution)
- Domestic production (annual quantity, minimum and maximum production)
- LTC contracts (ACQ/DCQ), flexibility
- Infrastructure: Interconnectors, storage, LNG, tariffs
- External price: for LTC, LNG, DZ, NO, TR, RU

OUTPUT

- Wholesale gas price by country
- Consumption by countries
- Gas flows on interconnectors
- Storage stock change
- Import through long term contracts and spot trade

Social welfare:

- Consumer surplus
- Producer surplus
- Storage operation profit
- Storage arbitrage profit
- Net profit from long-term contracts
- TSO auction revenue
- TSO operation profit
- LNG terminal operator's profit

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