Joint ENTSOs Scenario Workshop

What we envisage up to 2040

9 October 2017
ENTSOs premises, Brussels

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Welcome and Introduction

Laurent Schmitt, Secretary General ENTSO-E

Jan Ingwersen, General Manager ENTSOG

Workshop Agenda

1. Welcome and Introduction

2. TYNDP 2018 Scenarios
   - Why do the ENTSOs develop scenarios?
   - How did we build the scenarios?
   - What are the scenario storylines and results?

3. Gas and Electricity TYNDP 2018 Next Steps

4. Panel Discussion:
   What are the critical scenario elements for infrastructure assessment?

TYNDP 2018 Scenarios

David McGowan, Task Force Scenario Building, SONI

Dante Powell, System Development Advisor, ENTSO-E

James Gudge, System Development Advisor, ENTSOG

Why do the ENTSOs develop scenarios?

Why do the ENTSOs build scenarios?

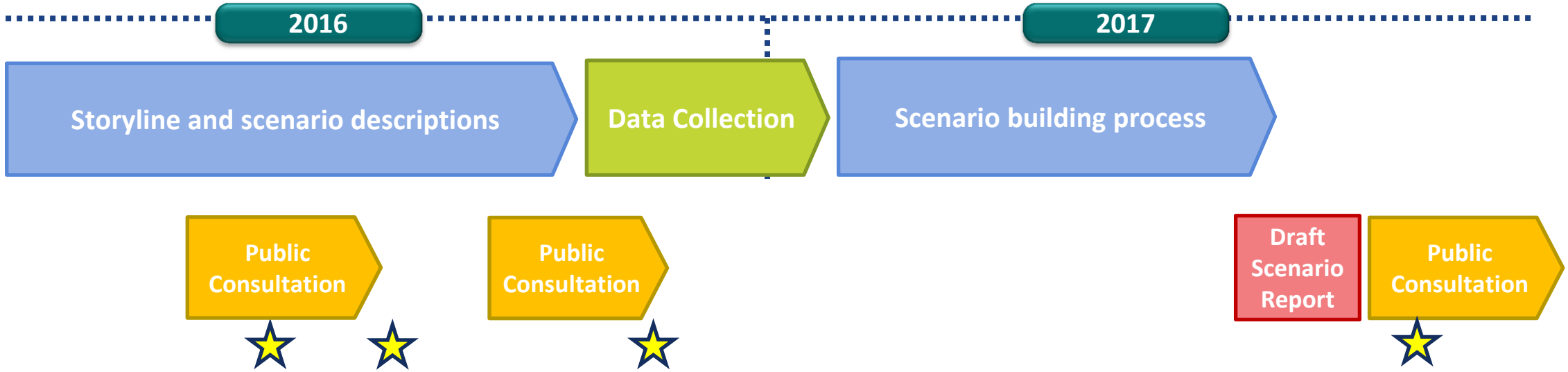
- To test and assess the network infrastructure
- To fulfil a core activity to analyse security of supply
- To create technically sound paths toward policy objectives and what this means in terms of infrastructure development

Why do the ENTSOs build scenarios together?

- To combine efforts in developing scenarios, utilising sectoral knowledge and expertise in planning and balancing
- To be a focus point for gathering inputs from a wide range of stakeholders interested in the energy sector
- To reflect that decarbonisation will see increasing synergies between electricity and gas
- **This ensures the consistent assessment of the two key energy networks of Europe against the same futures**

How did we build the scenarios?

Scenario building steps



Stakeholder workshops/webinars

- Joint process between the ENTSOs, combined with extensive stakeholder engagement

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Stakeholder engagement

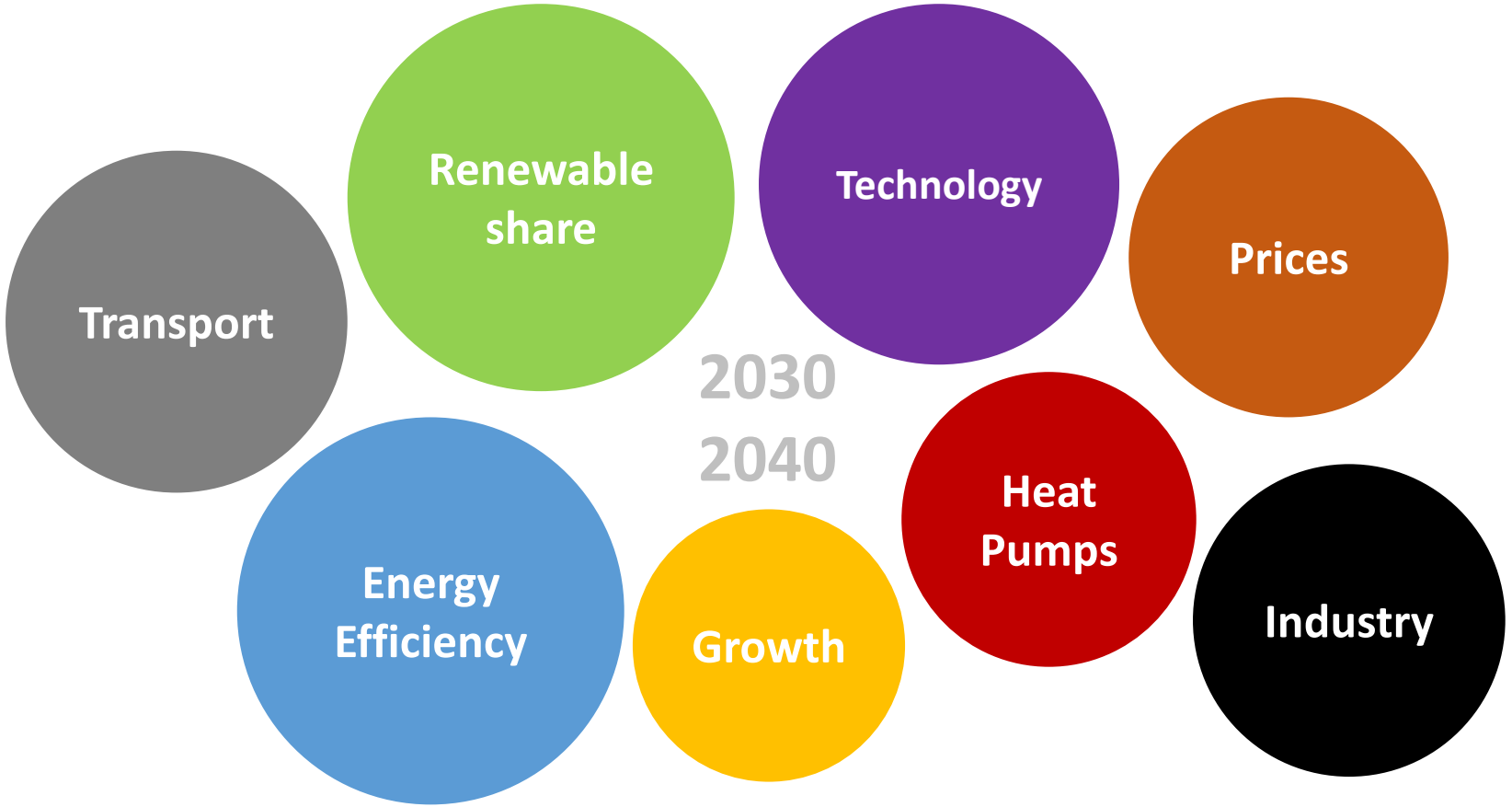
- Initial number of long-term storylines with the EU 2050 climate targets in mind
- Stakeholders asked to create their own scenarios

Stakeholder engagement

What did the stakeholders say? 2 June 2016 workshop	What did the MSs & NRAs say? 5 July 2016 workshop
1. Global Climate Action – 33%	1. Sustainable Transition – 29%
2. Sustainable Transition – 25%	2. Distributed Generation – 29%
3. Distributed Generation – 25%	3. Behind Targets – 20%
4. Subsidised Green Europe – 11%	4. Subsidised Green Europe – 14%
5. Behind targets – 7%	5. Global Climate Action – 8%

- Contrasted views lead us to focus on three storylines

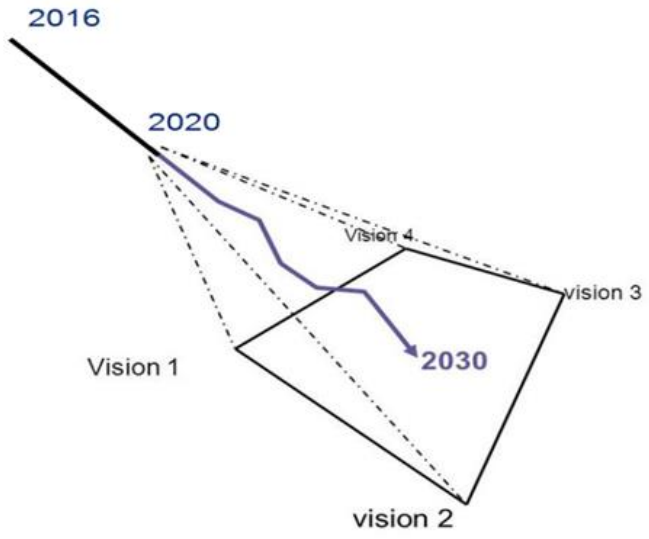
Stakeholder engagement



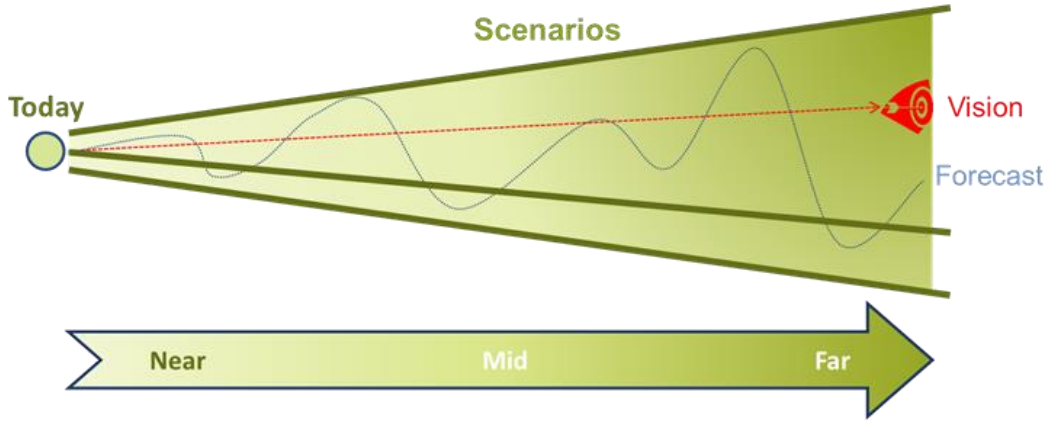
- Stakeholder quantification input to storylines

Scenario framework

- Previous TYNDP scenarios followed differing approaches…



ENTSO-E: TYNDP16

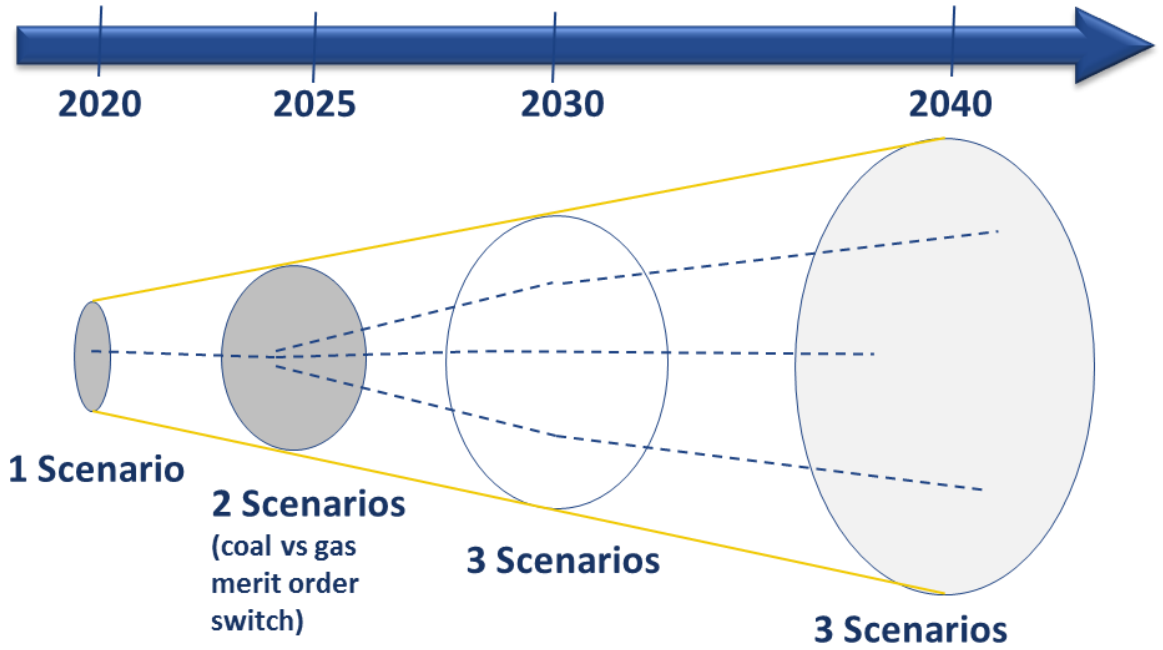


ENTSOG: TYNDP17

- What approach to take for the TYNDP 2018?

Scenario framework

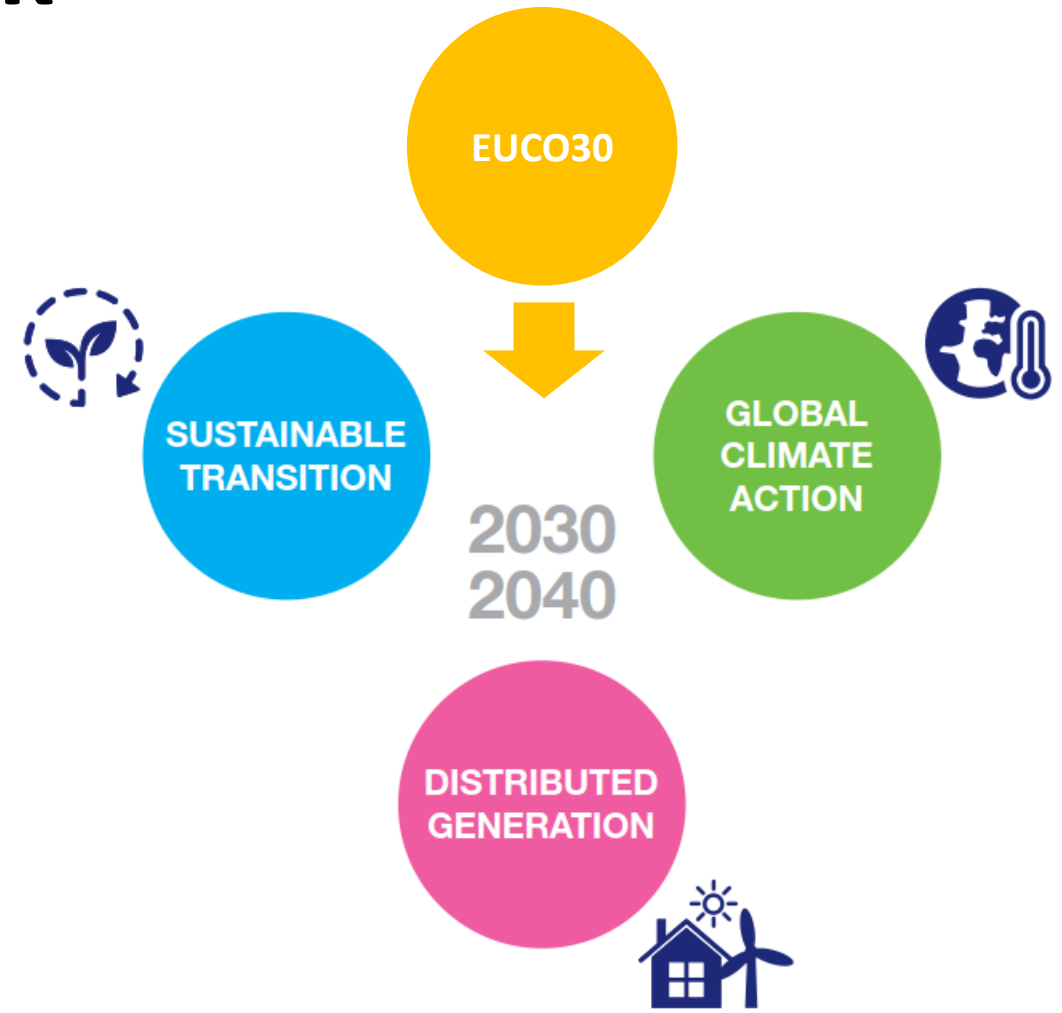
- Stakeholder input helped define the framework as a combination of approaches, leading to the best of both worlds



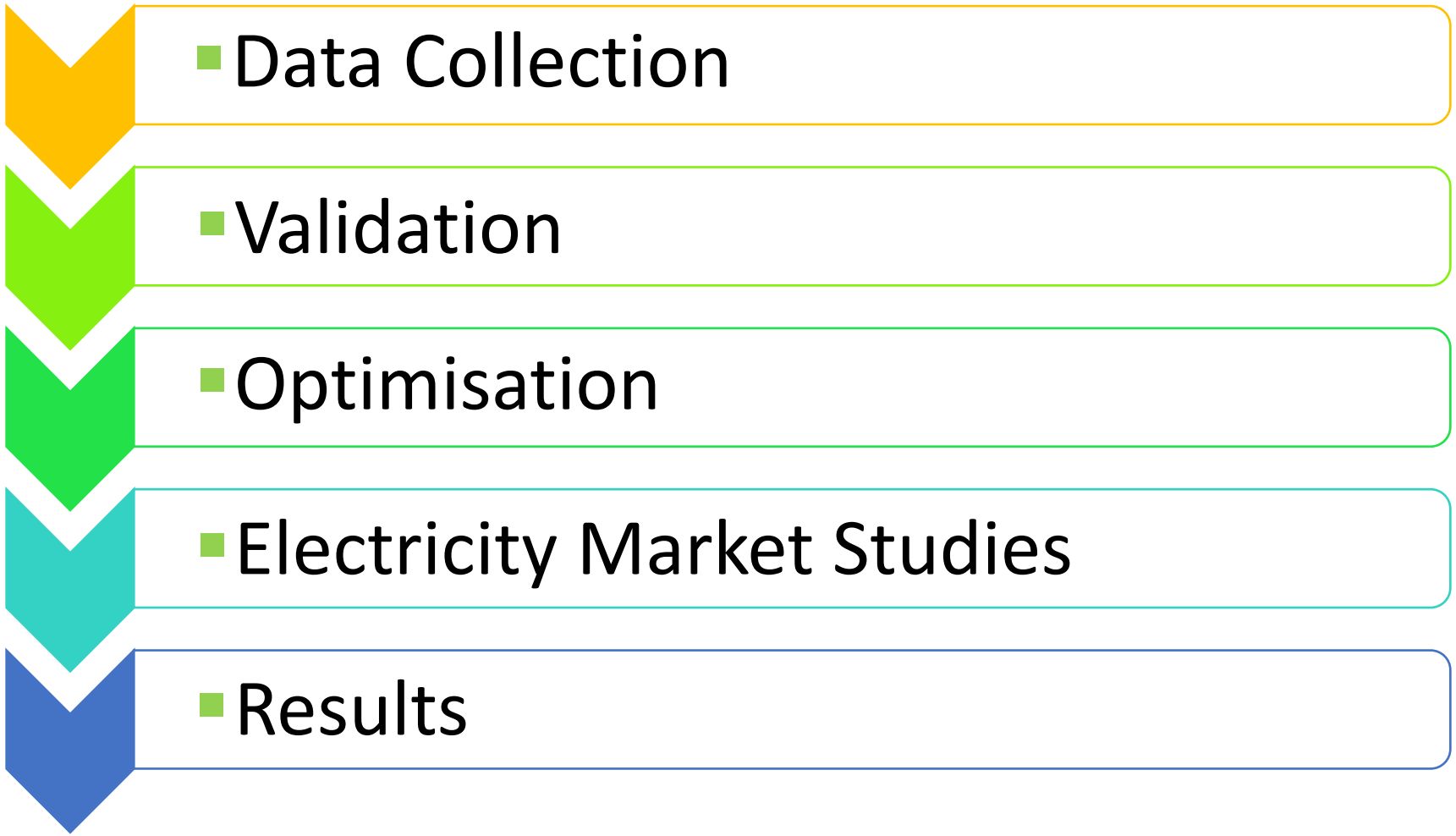
Scenario framework

- Following collaboration with the European Commission, value was seen to incorporate an external scenario into the framework

- Following the publication of the Clean Energy Package, the EUCO30 policy scenario was selected

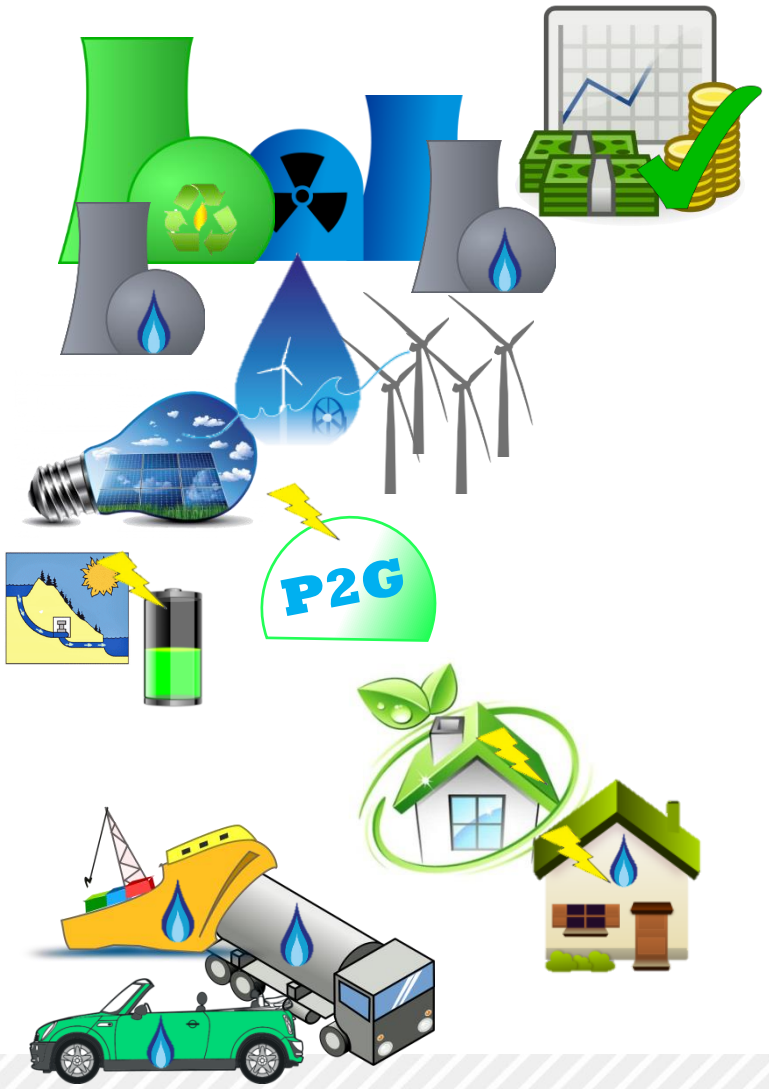


Scenario Building



What are the scenario storylines and results?

Global Climate Action



- Global emissions trading scheme
- Large scale development of renewable resources. Low Carbon technologies.
- High economic growth & Energy Efficiency
- Electric and gas vehicles displace oil in the private transport sector
- Gas helps the decarbonisation of the shipping and heavy good transport sectors
- Power-to-gas commercially available. Bio-methane
- Electric and hybrid heat pump technology help to decarbonise heating

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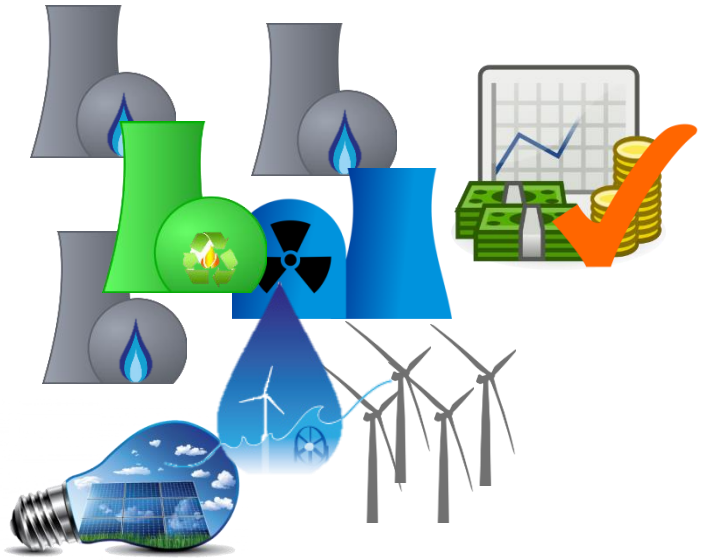
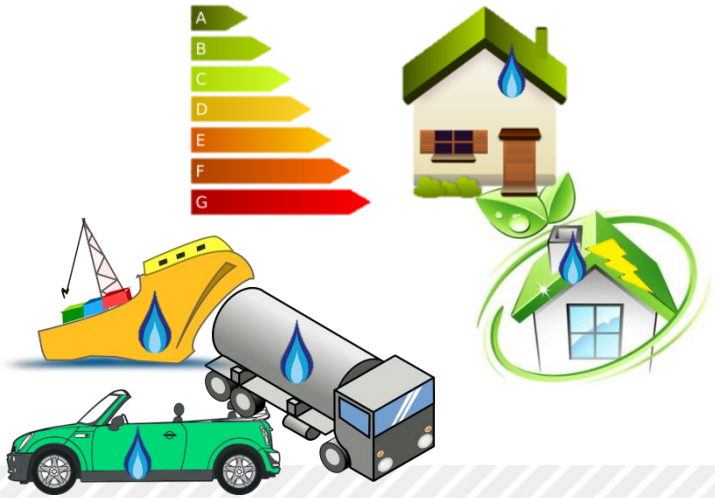
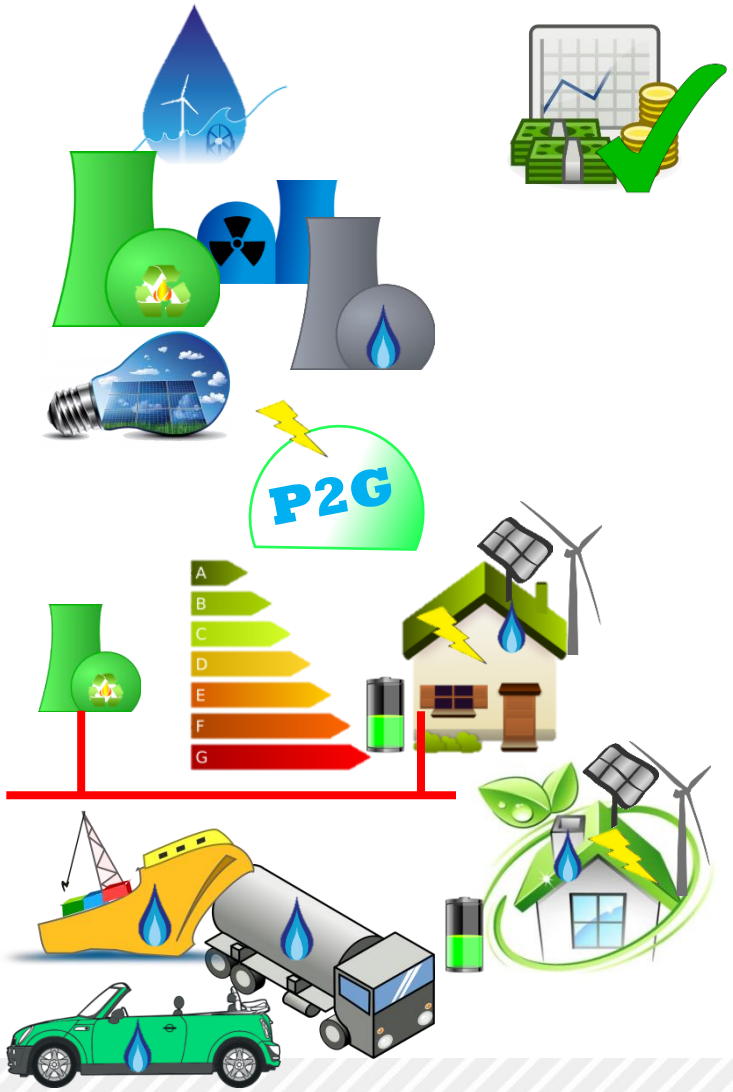
Sustainable Transition





- National focus on climate change, driven by ETS and national subsidies
- Steady growth of renewable resources
- Moderate economic growth
- Gas sees significant growth in the shipping and transport sectors
- Electrification of heating and transport sees stable development
- Strong development in Bio-methane but none in Power-to-gas
- Heat pump technology most common in new buildings

Distributed Generation



- ‘Prosumer’ lead climate action, helped by strong EU Policies and an efficient ETS.
- Storage drives climate action
- Decentralised growth of renewable resources
- High economic growth
- Smart cities enabled with electricity storage and demand response
- Decarbonisation of transport driven by electric vehicles
- Hybrid heat pumps offer consumer choice and flexibility

European Commission EUCO 30

- EUCO30 is a core policy scenario produced by the European Commission
- The scenario models the achievement of the 2030 climate and energy targets as agreed by the European Council in 2014, but including an energy efficiency target of 30%
- The ENTSOs both welcome this new collaboration with the European Commission and further cooperation

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Key indicators

Scenario		Global Climate Action	Sustainable Transition	Distributed Generation
Category	Criteria	Parameter		
Macroeconomic Trends	Climate action driven by	Global ETS	EU ETS & direct RES subsidies	EU ETS
	EU on track to 2030 target?	Beyond	On track	Slightly beyond
	EU on track to 2050 target?	On track	Slightly beyond	On track
	Economic	High growth	Moderate growth	High growth
Transport	Electric and hybrid vehicles	High growth	Moderate growth	Very high growth
	Gas vehicles	High growth	Very high growth	Low growth
Residential/ Commercial	Demand flexibility	High growth	Moderate growth	Very high growth
	Electricity flexibility	Moderate growth	Stable	Moderate growth
	Gas demand	Reduction	Slight reduction	Reduction
	Electric heat pump	High growth	Low growth	Moderate growth
	Energy efficiency	High growth	Moderate growth	High growth
	Hybrid heat pump	High growth	Moderate growth	Very high growth
Industry	Electricity demand	Stable	Stable	Moderate growth
	Gas demand	Stable	Stable	Reduction
	CCS	Low growth	Low growth	Not significant
	Demand and flexibility	Moderate growth	Low growth	Very high growth
Power	Merit order	Gas Before Coal	Gas Before Coal	Gas Before Coal
	Nuclear	Depending on national policies	Reduction	Reduction
	Storage	Moderate growth	Low growth	Very high growth
	Wind	High growth	Moderate growth	High growth
	Solar	High growth	Moderate growth	Very high growth
	Other RES energies	Moderate growth	Moderate growth	High growth
	CCS	Not significant	Not significant	Not significant
	Adequacy	Some surplus capacity	Some surplus capacity	High surplus capacity
Non-fossil gas sources	Power-to-gas	High growth	Not significant	High growth
	Bio-methane	High growth	High growth	High growth

	Global Climate Action	Sustainable Transition	Distributed Generation

Transport

Electric and hybrid vehicles	High growth	Moderate growth	Very high growth
Gas vehicles	High growth	Very high growth	Low growth

Heating

Electric heat pump	High growth	Low growth	Moderate growth
Hybrid heat pump	High growth	Moderate growth	Very high growth

Power

Storage	Moderate growth	Low growth	Very high growth
Wind	High growth	Moderate growth	High growth
Solar	High growth	Moderate growth	Very high growth

Renewable Gases

Power-to-gas	High growth	Not significant	High growth
Bio-methane	High growth	High growth	High growth

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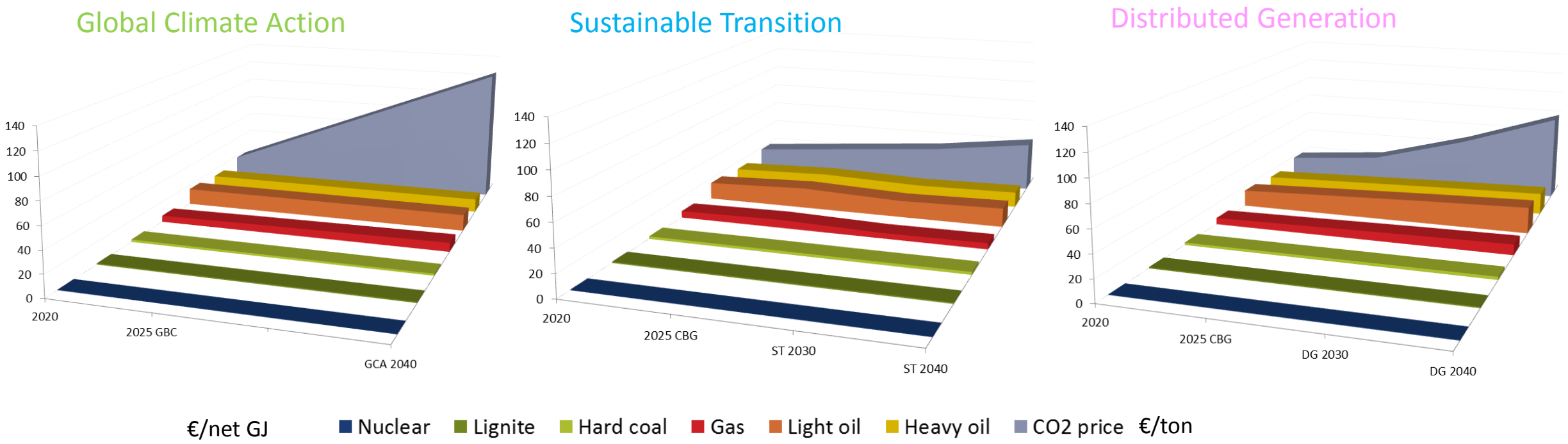
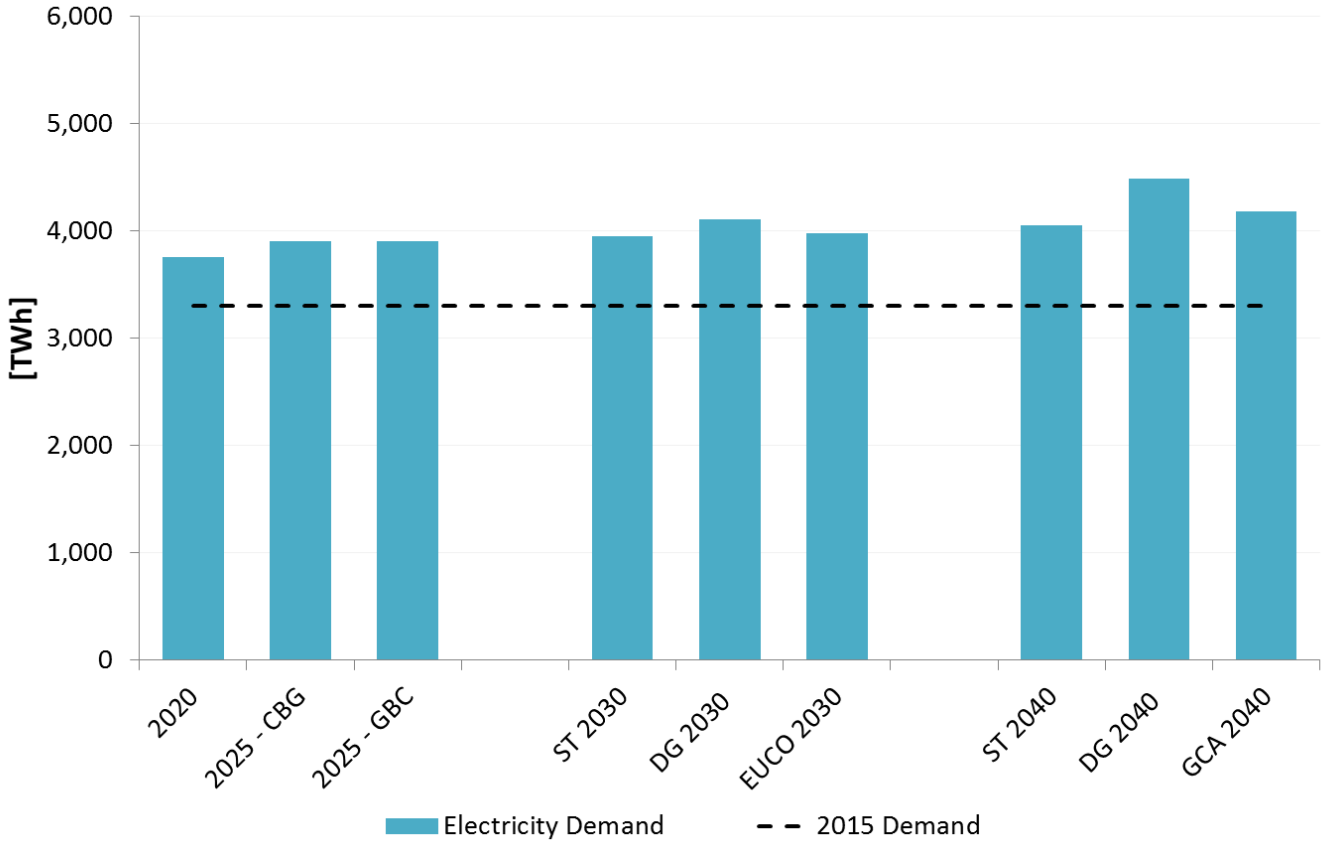
Scenario prices

CBG – Coal before Gas
GBC – Gas before Coal
ST – Sustainable Transition
DG - Distributed Generation
GCA - Global Climate Action



- CO_2 price provide the largest variance between scenarios

Electricity demand



- New use of electricity leads to a demand increase across all scenarios, mitigated by energy efficiency measures

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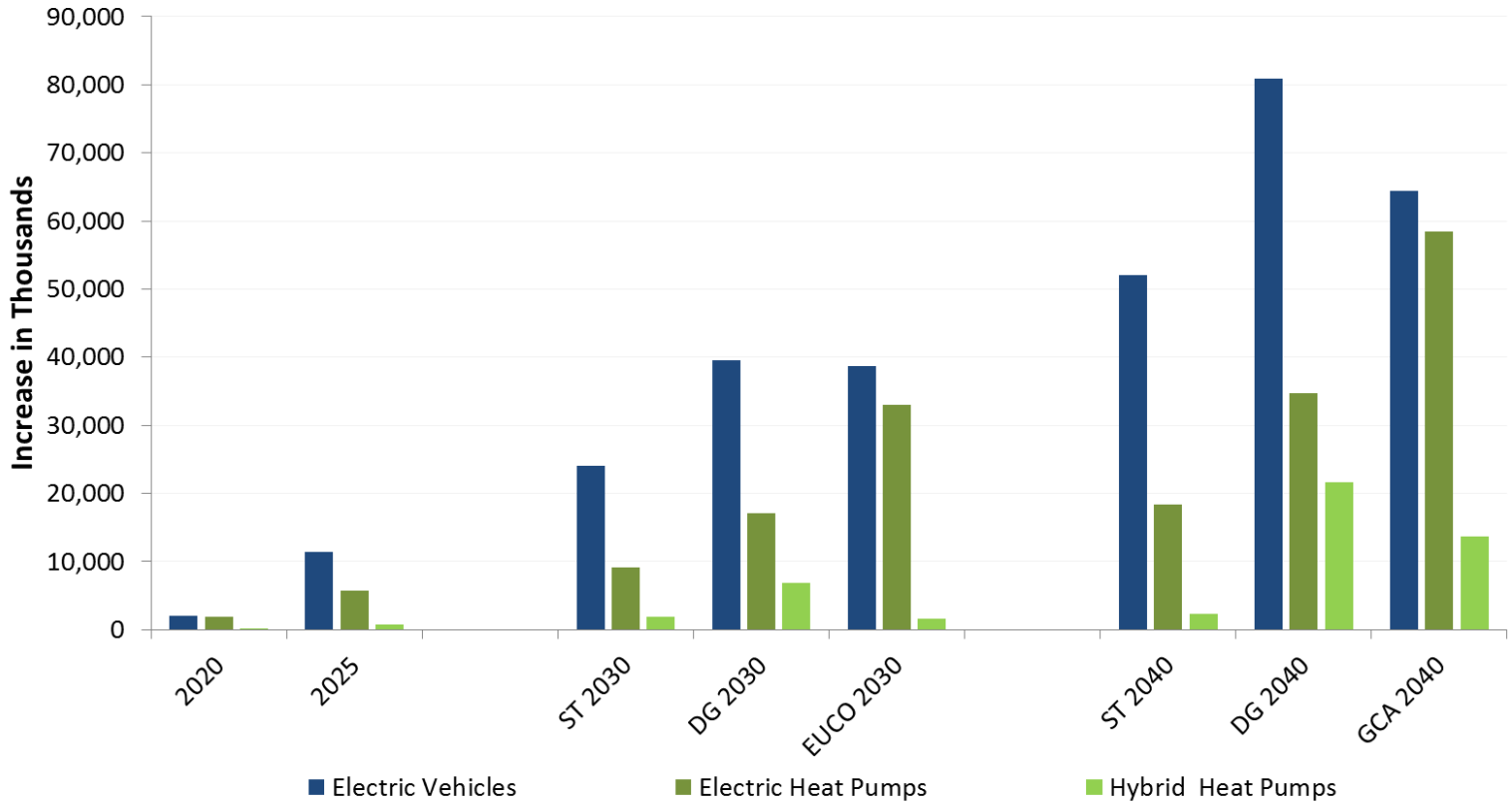
Electric Vehicles & Heat Pumps



- Decarbonisation of heating and transport see a significant uptake of new technology

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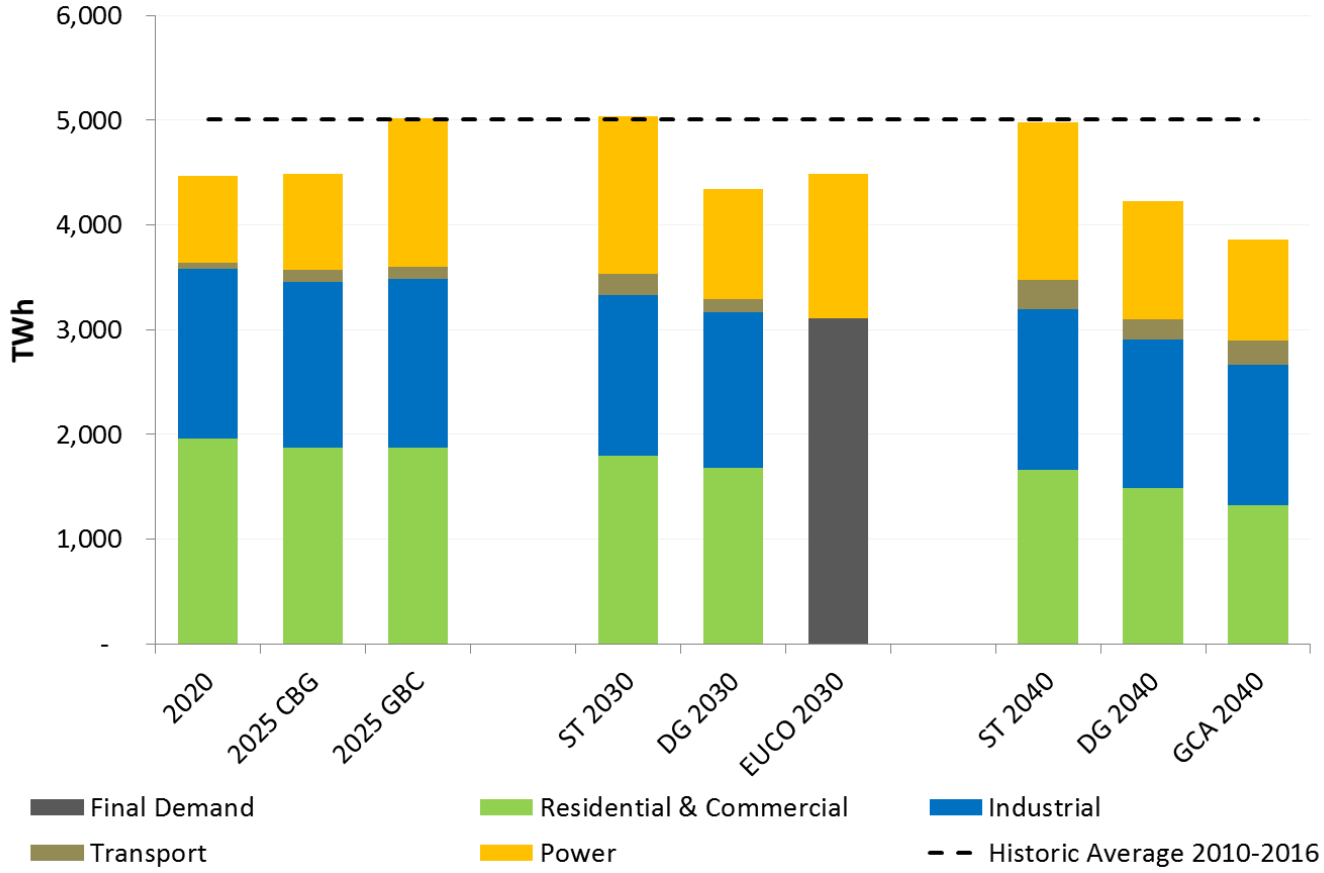
Gas Demand



- Gas demand decreases compared to recent history and over time, with decarbonisation influencing sectors differently

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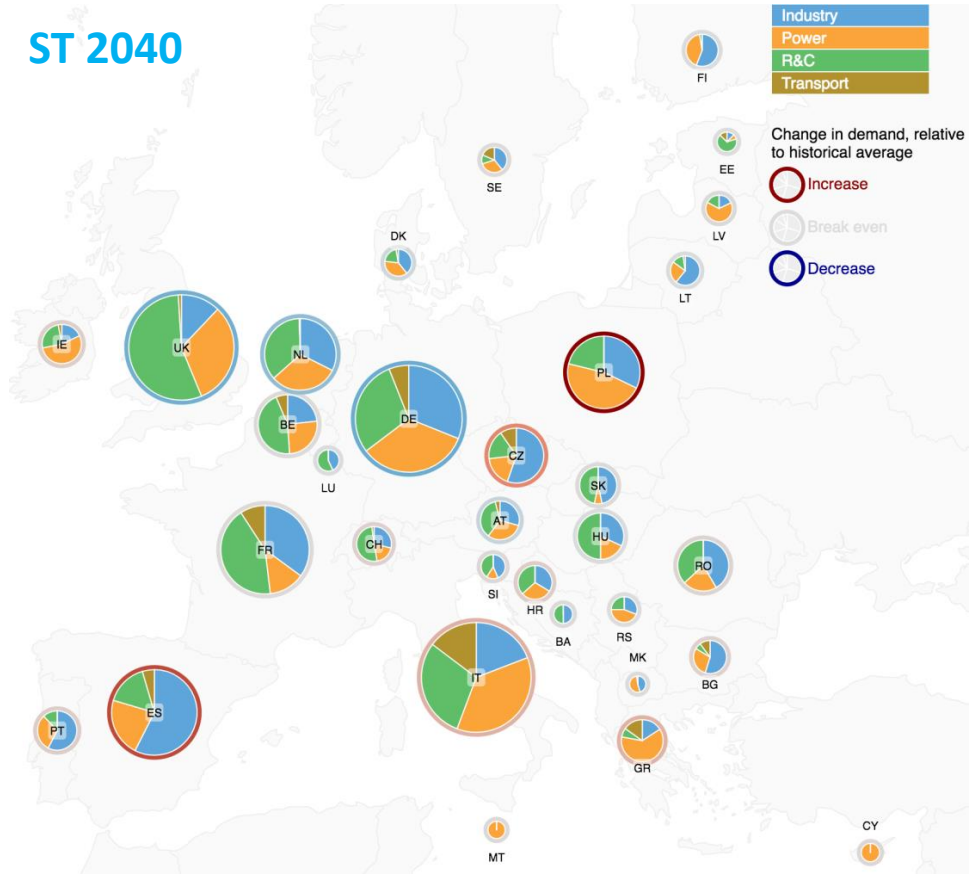
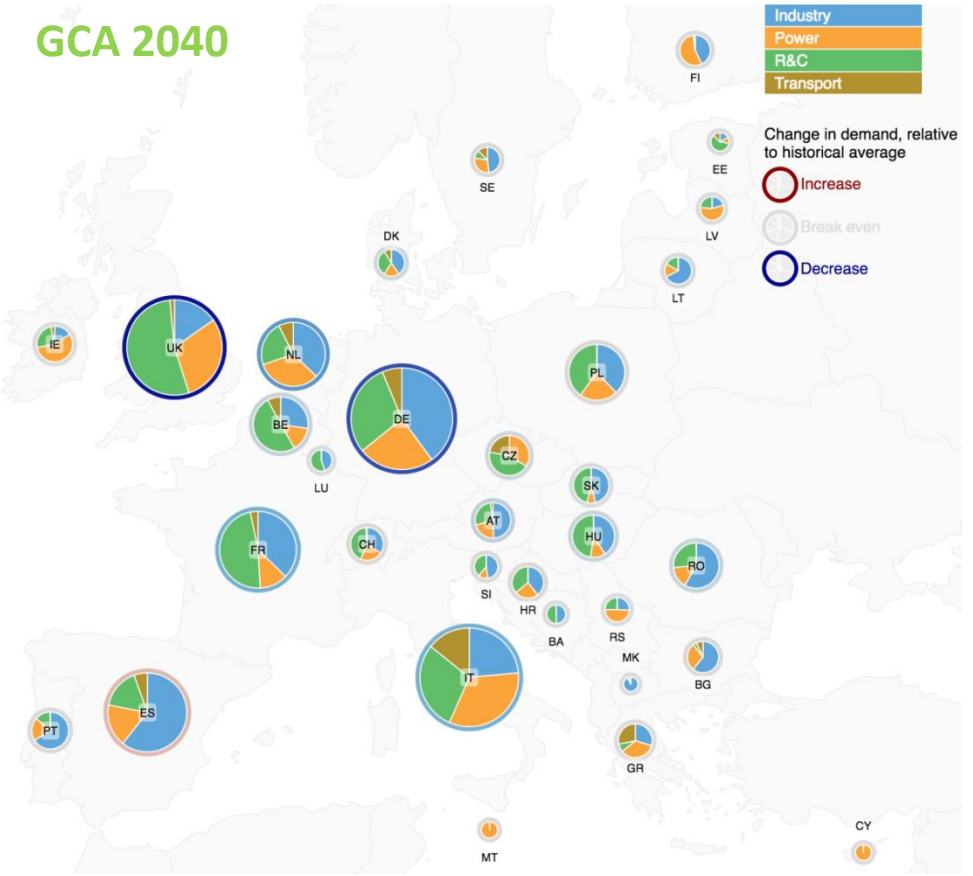
Gas Demand

ST 2040



GCA 2040



- Evolution of demand varies between countries over time and is influenced by sectoral split

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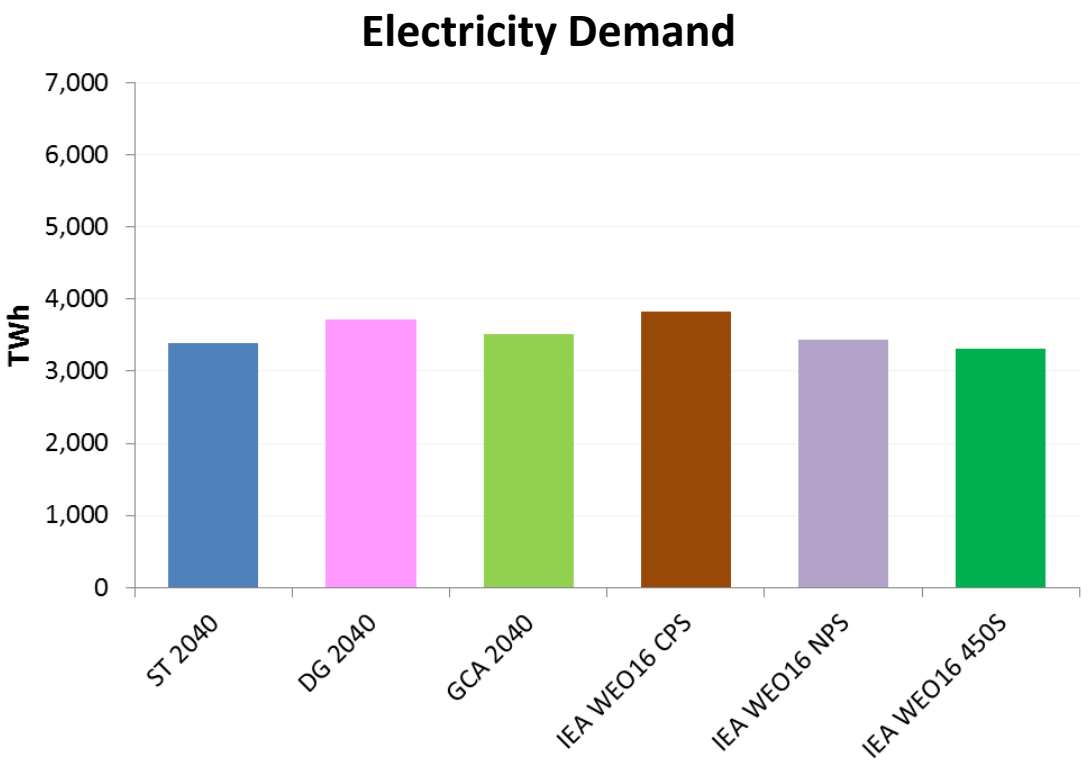
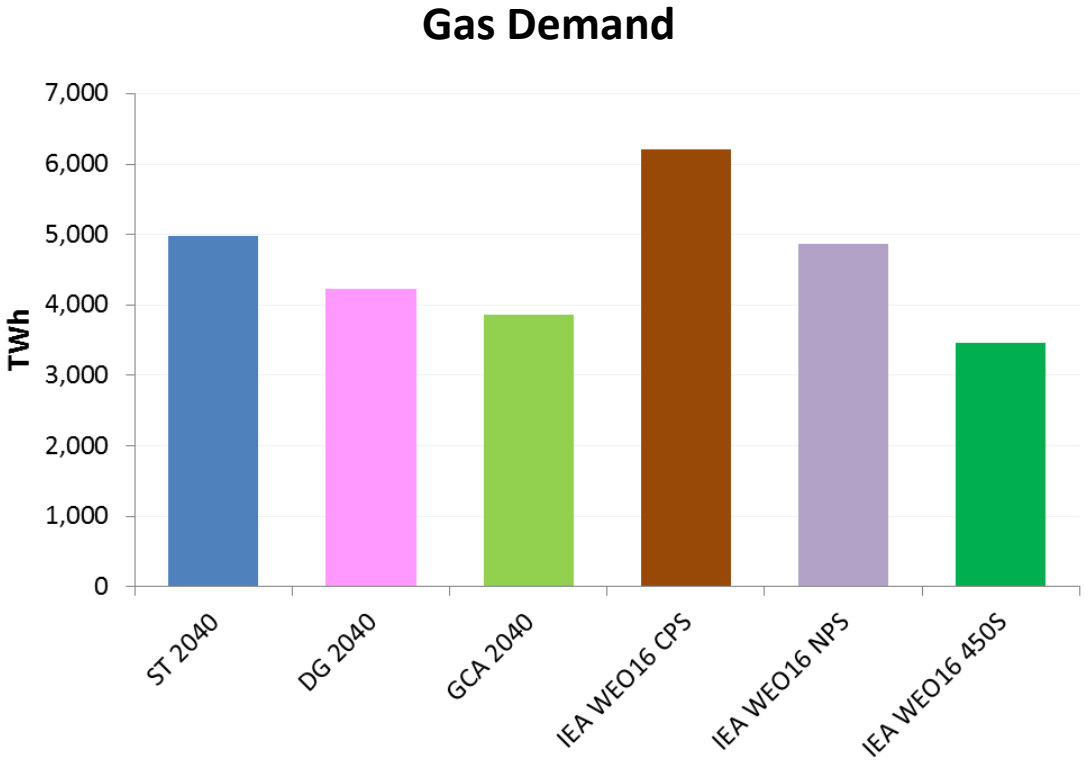
Comparison with External Scenario





- All scenarios sit in the range of the World Energy Outlook Scenarios

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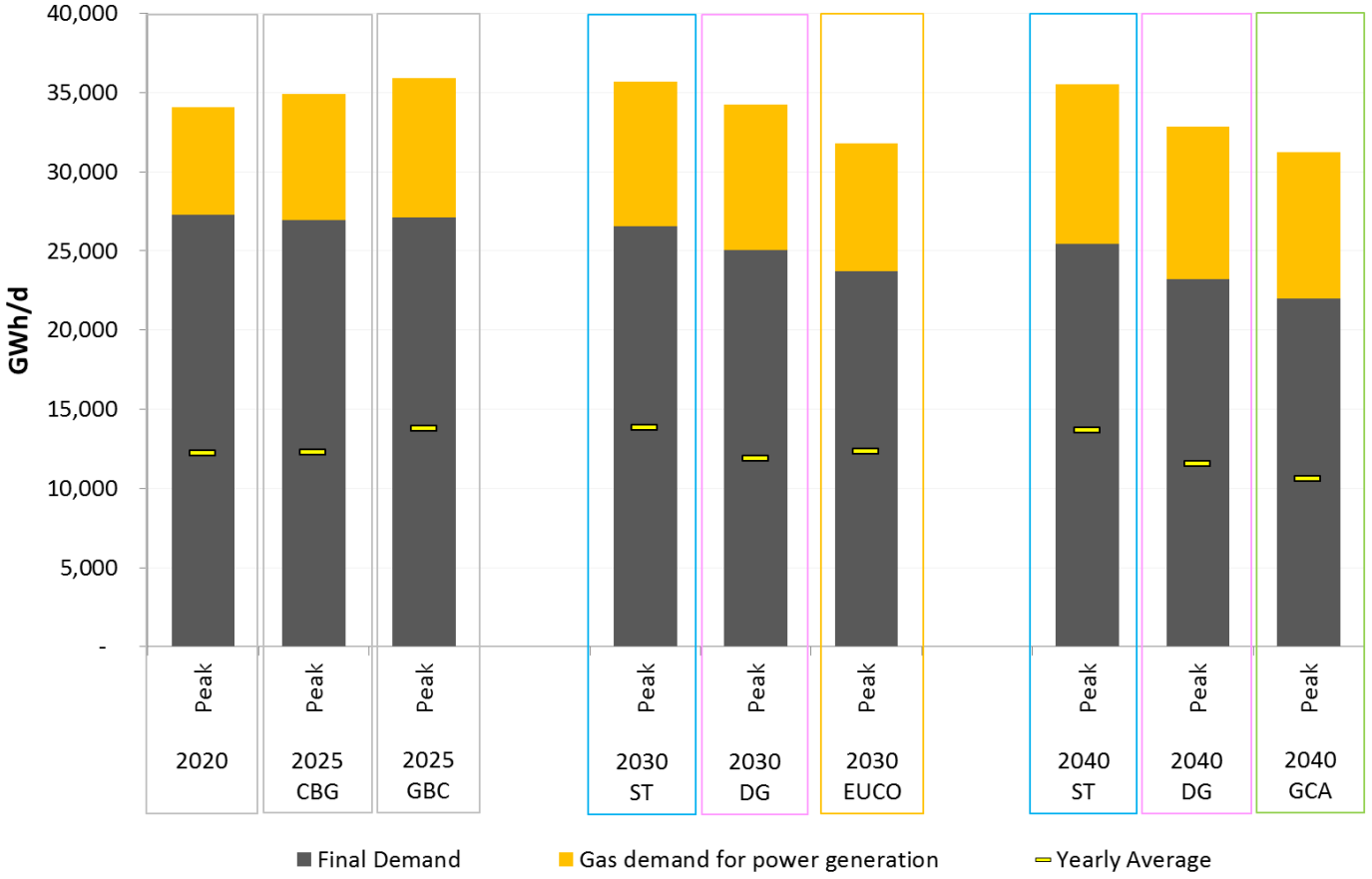
Peak gas demand



- Peak demand requirement remain high, in particular to address the variability of renewable generation

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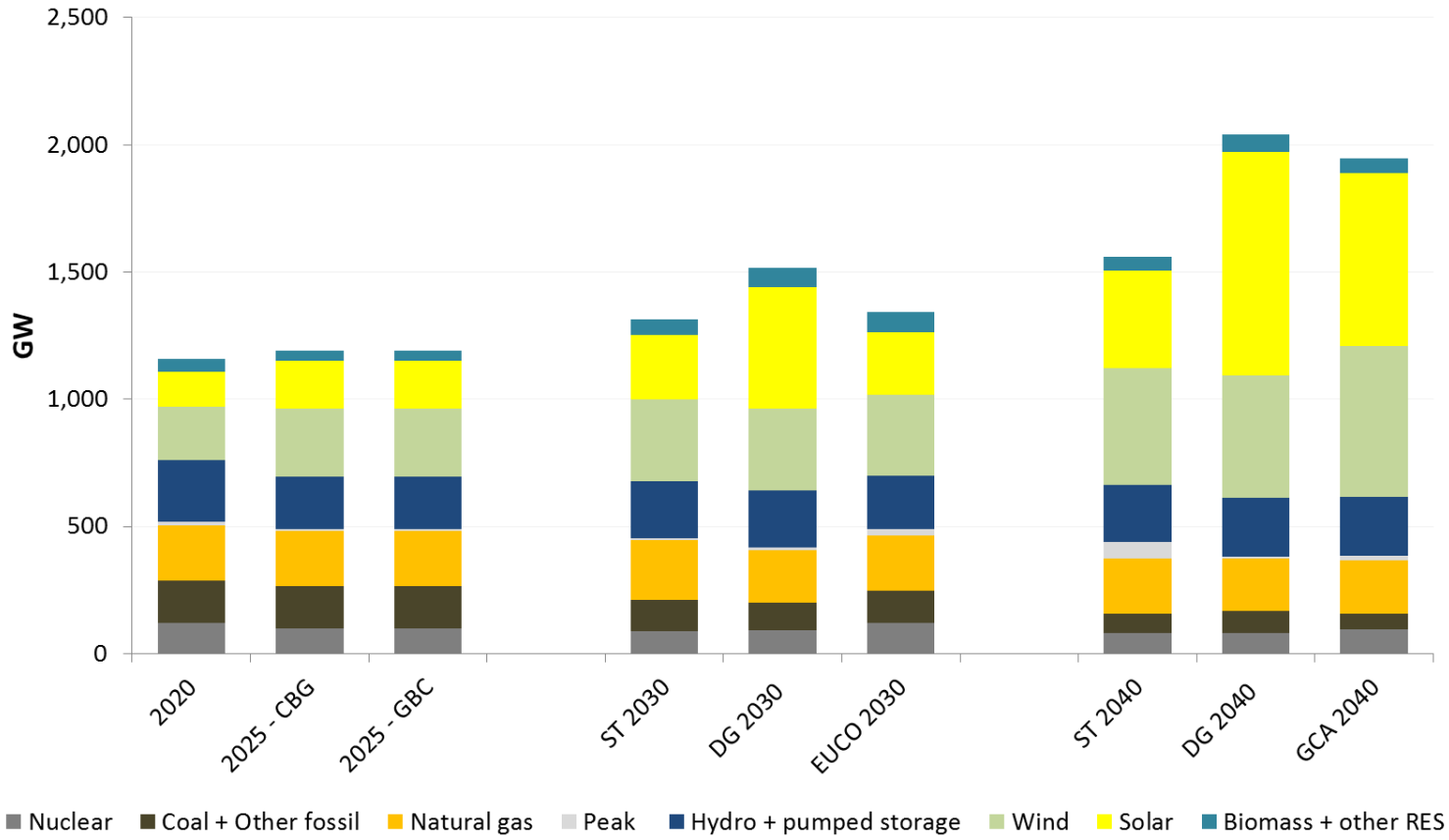
Electricity – Installed Capacity



- Solar and wind capacity drive the increase in renewable capacity

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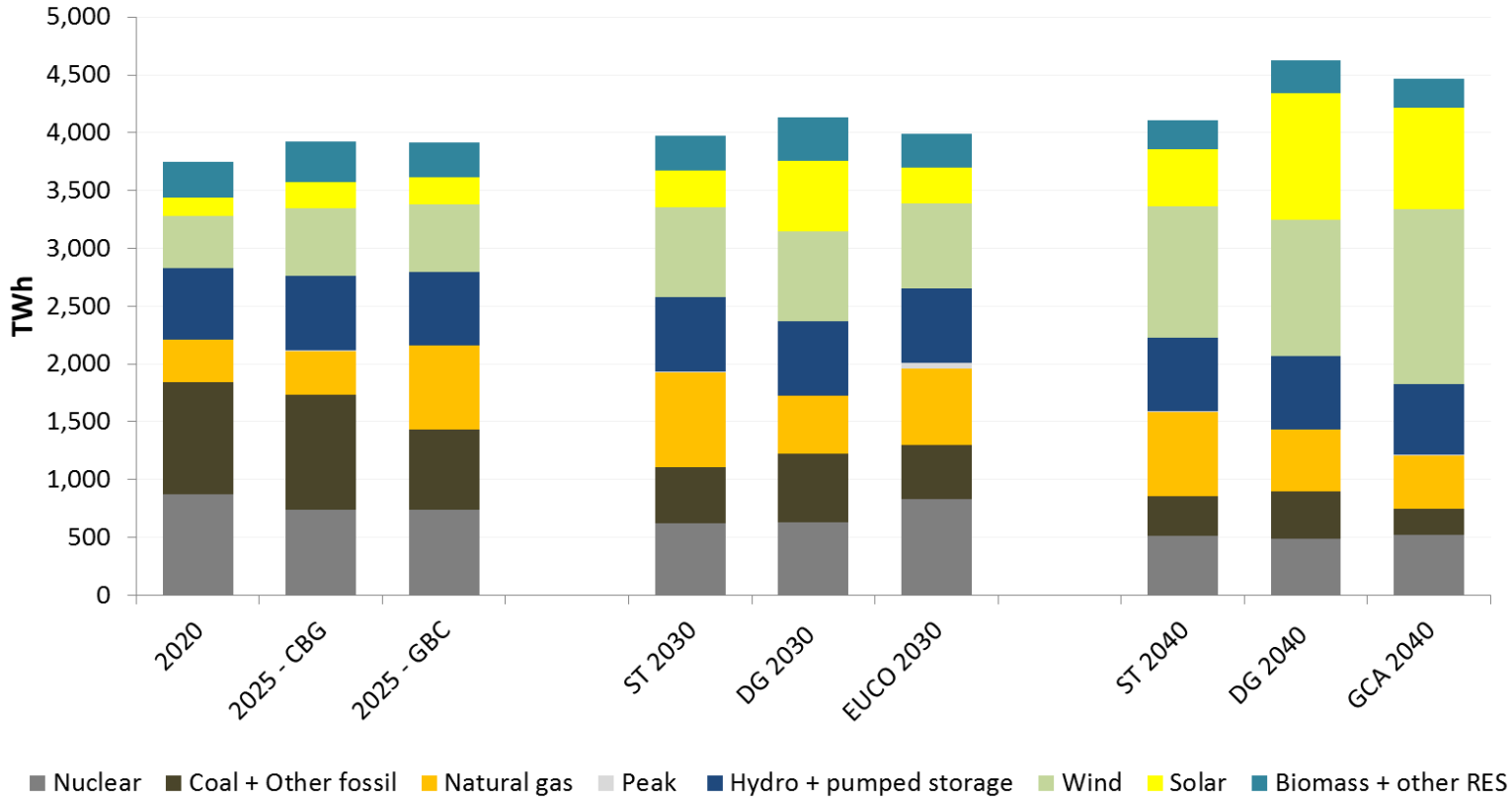
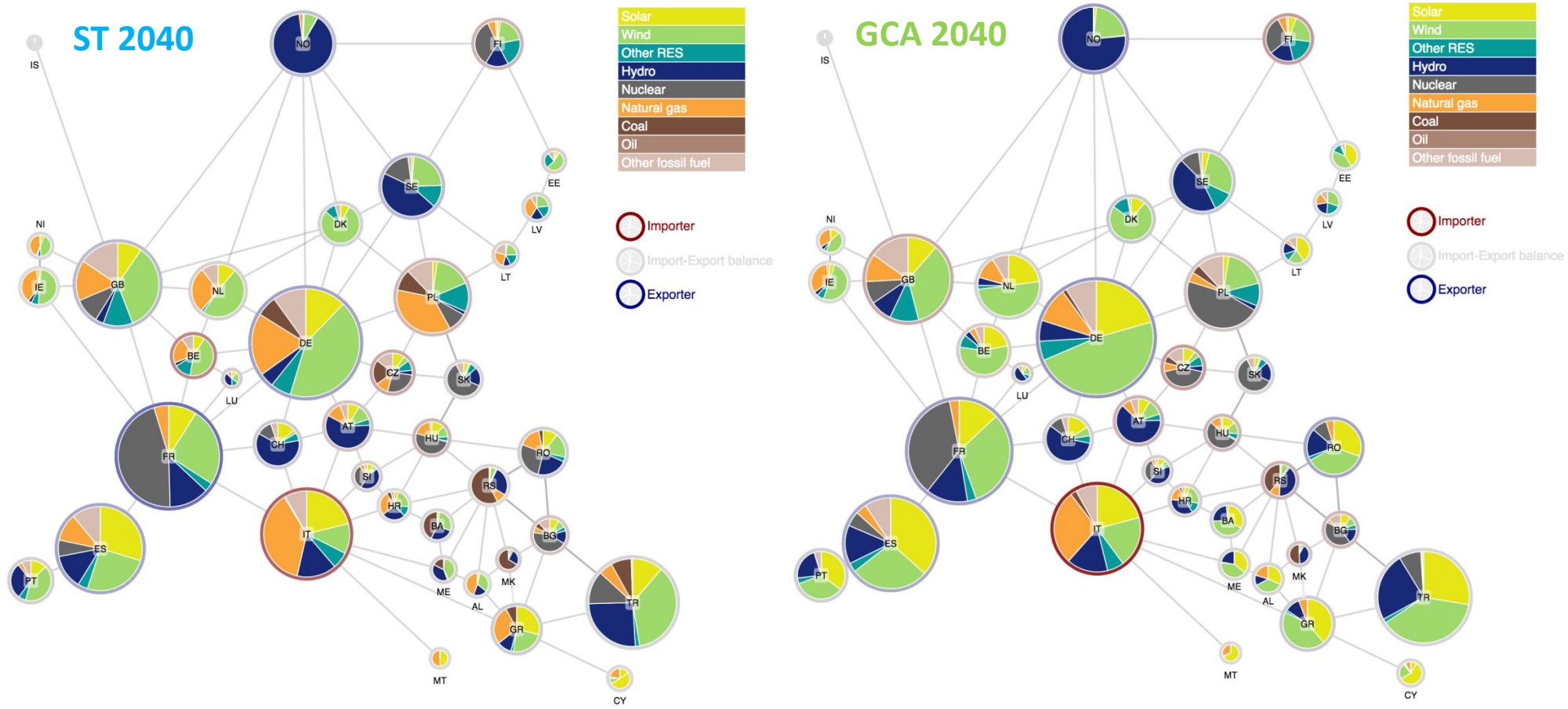
Electricity – Generation Mix



- Generation mix shifts towards low carbon sources

Electricity – Generation Mix



- The scenarios create contrasted country level results

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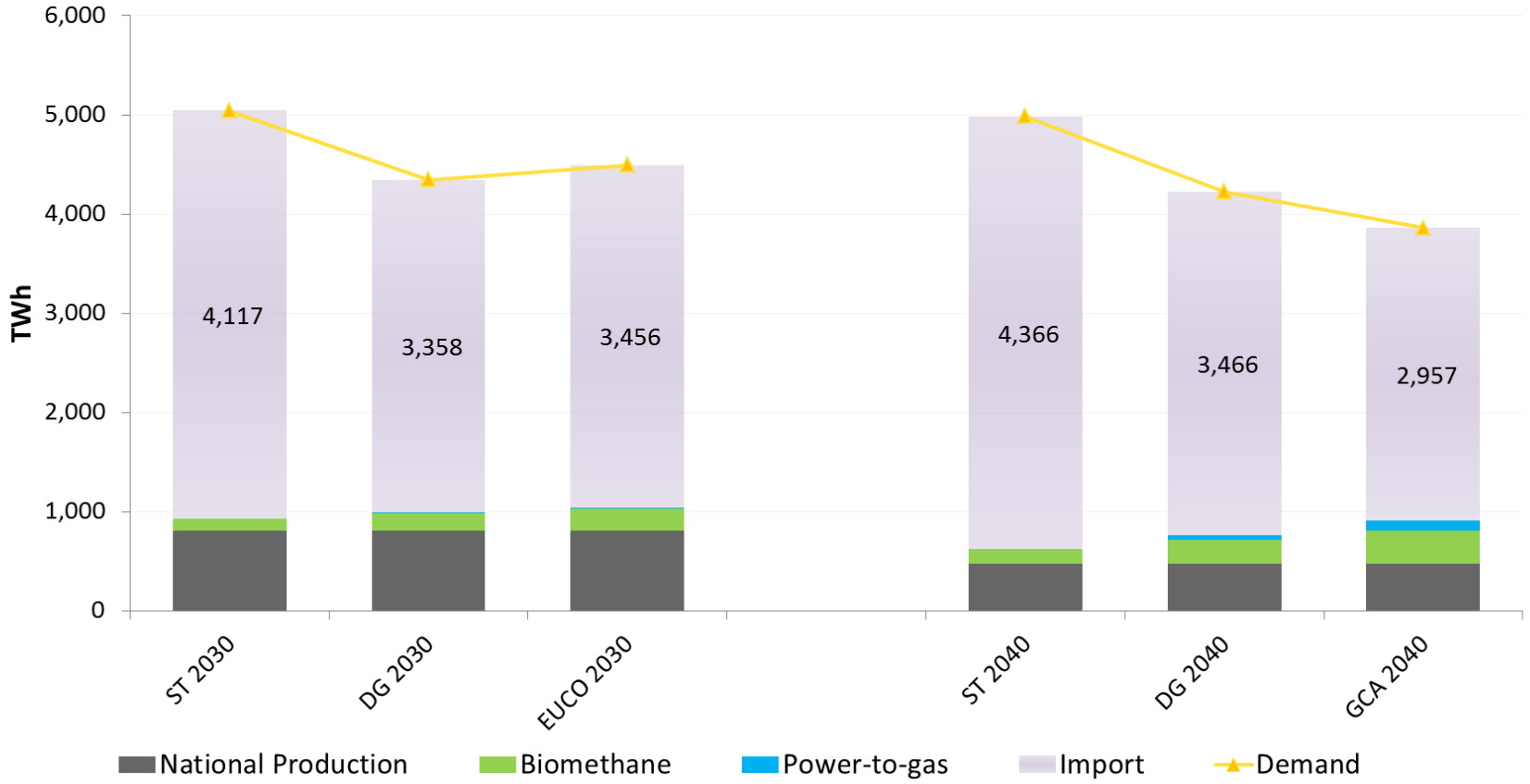
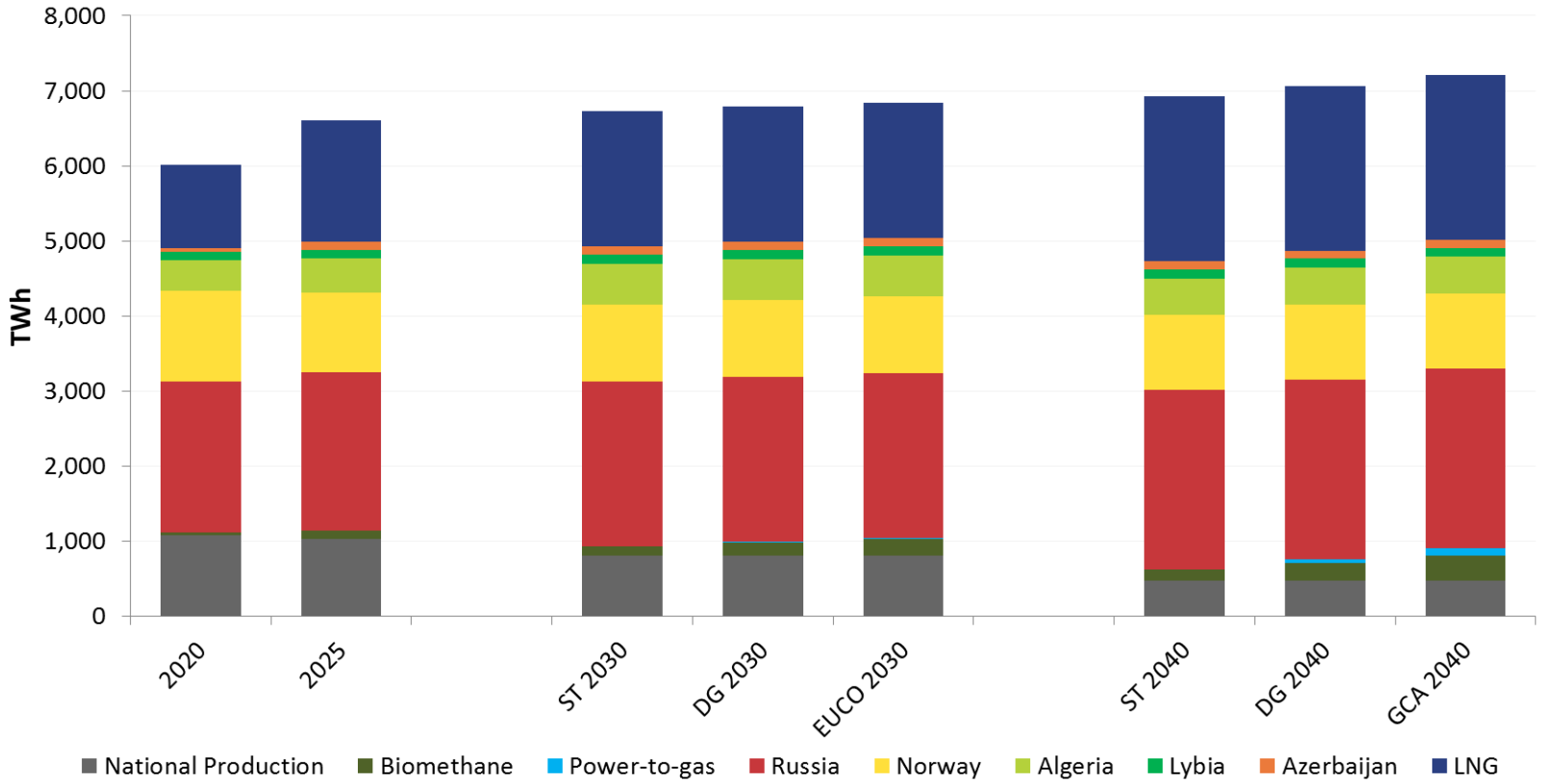
Supply Gas



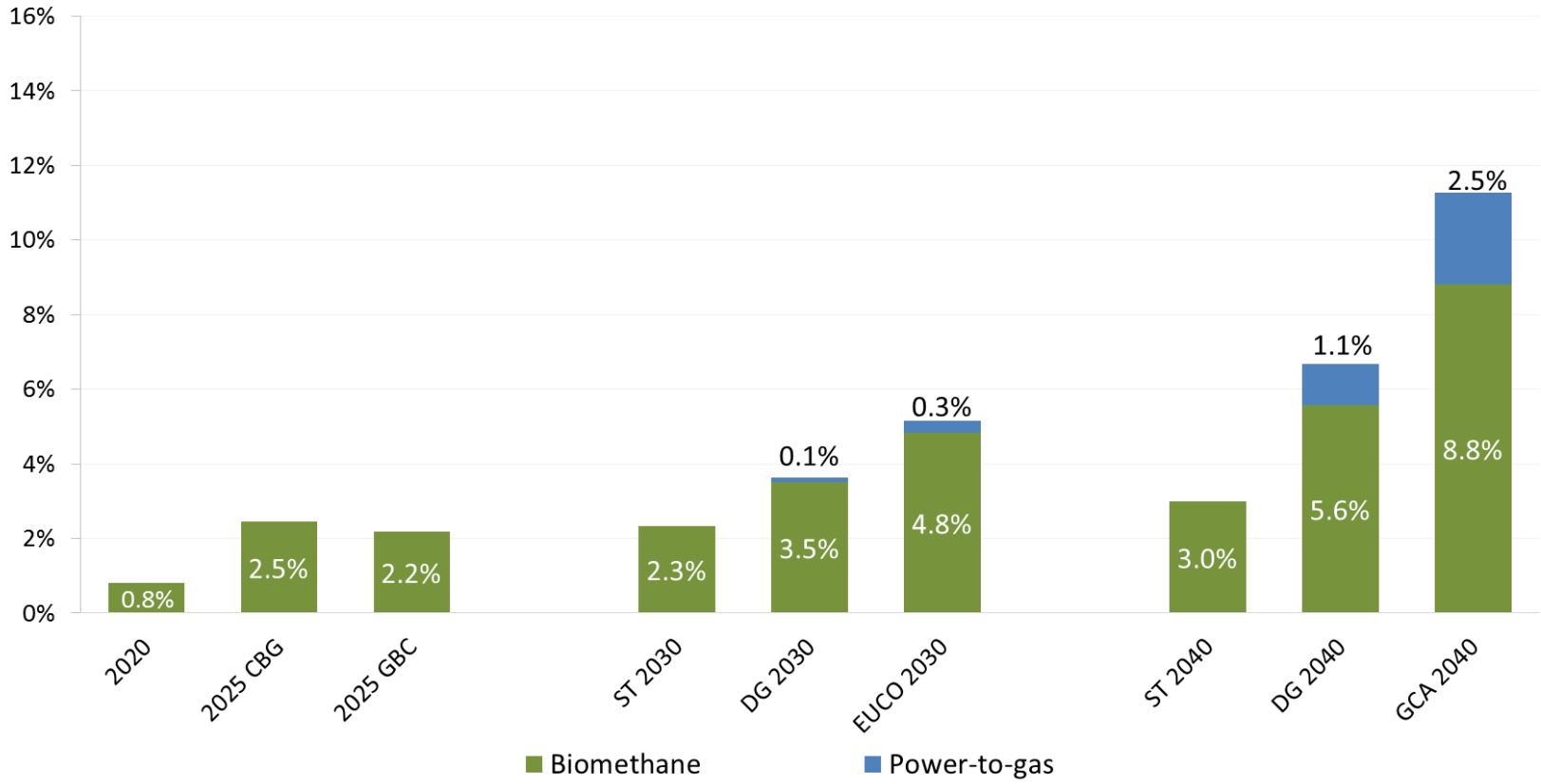
- Import requirements driven by demand and renewable gas production

Supply Gas



- Based on external sources, a diverse range of supply is available with the maximum potential increasing over time

Gas - RES Share of demand



- The gas renewable share shows significant increase over time, while potential production may well exceed these levels

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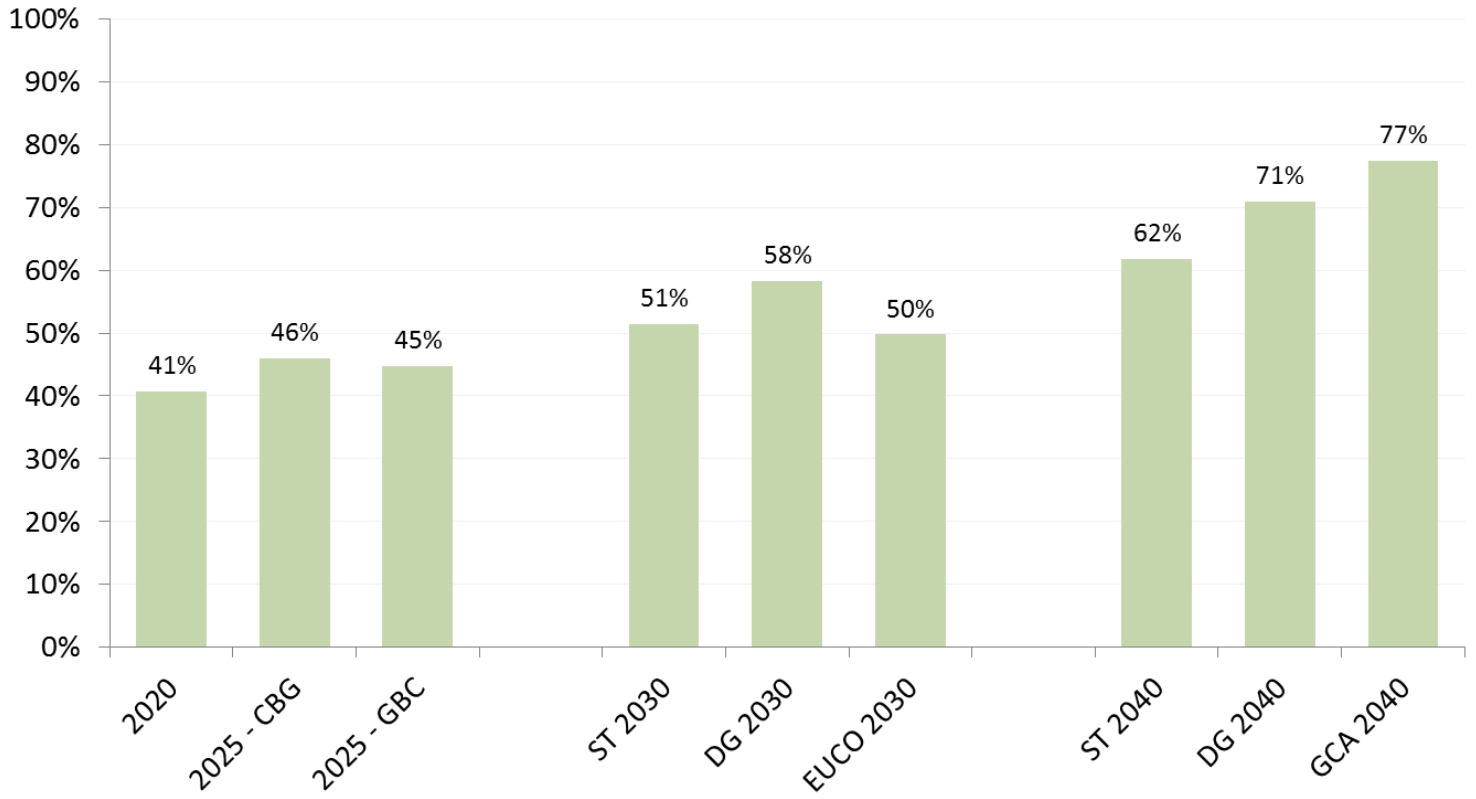
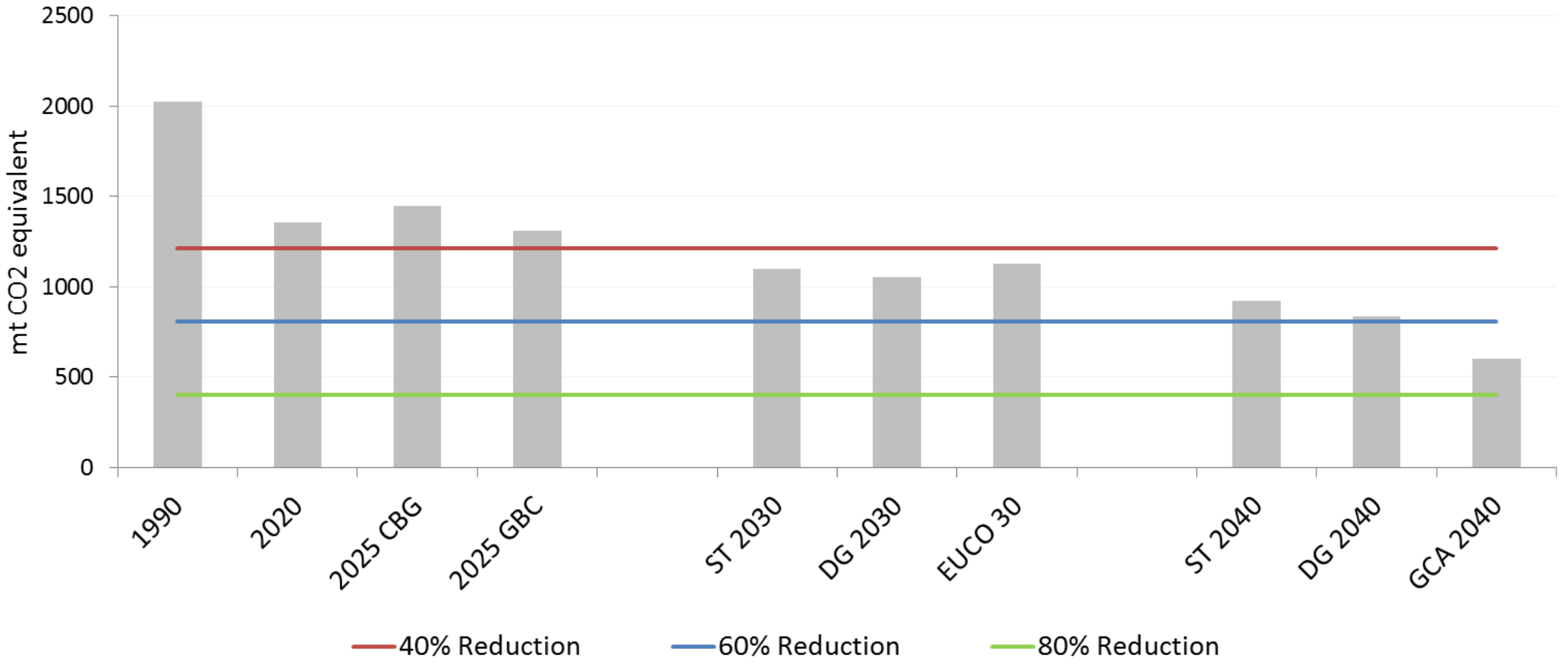
Electricity - RES Share of demand



- The electricity renewable share could exceed 75% by 2040

Combined Electricity and Gas sectors: CO2 Emissions and Reductions



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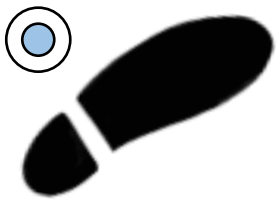
Gas and Electricity
TYNDP 2018 - Next Steps

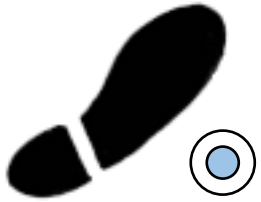
Céline Heidrecheid, Business Area Manager System Development, ENTSOG

Irina Minciuna, System Development Advisor, ENTSO-E

Gas and electricity TYNDPs - 3 main steps

Step 2: Project Inclusion and identification of system needs





Step 3: Projects Assessment

Step 1: Scenario Building

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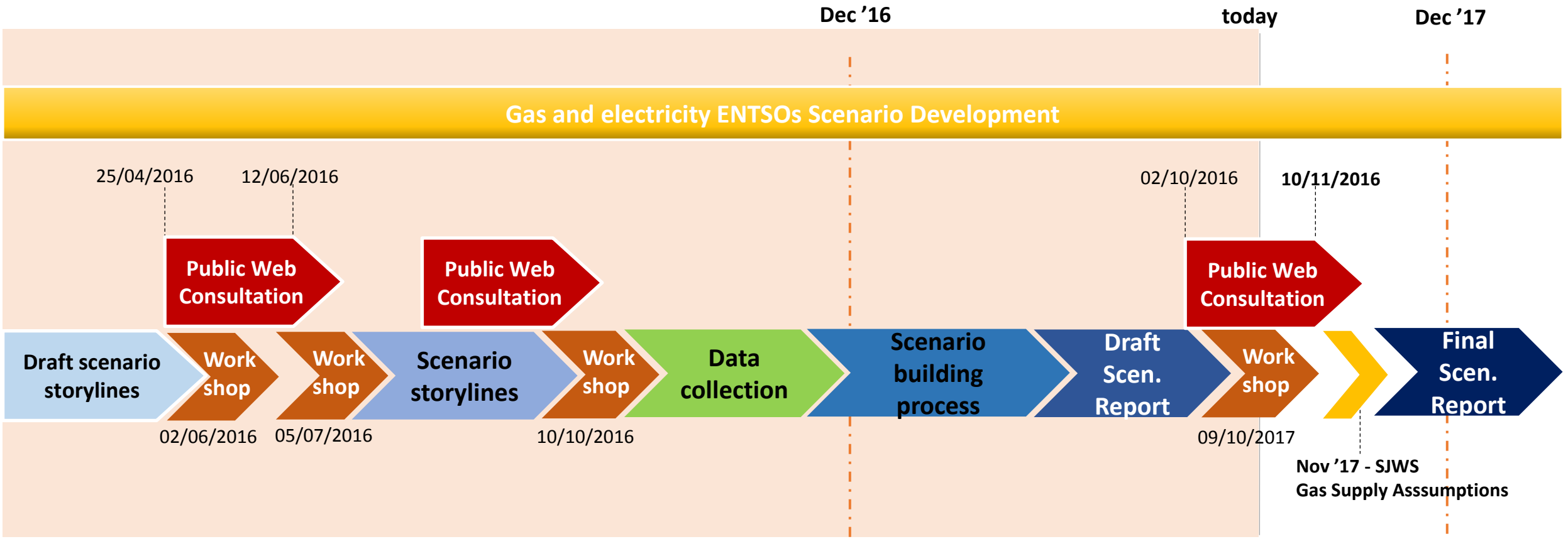
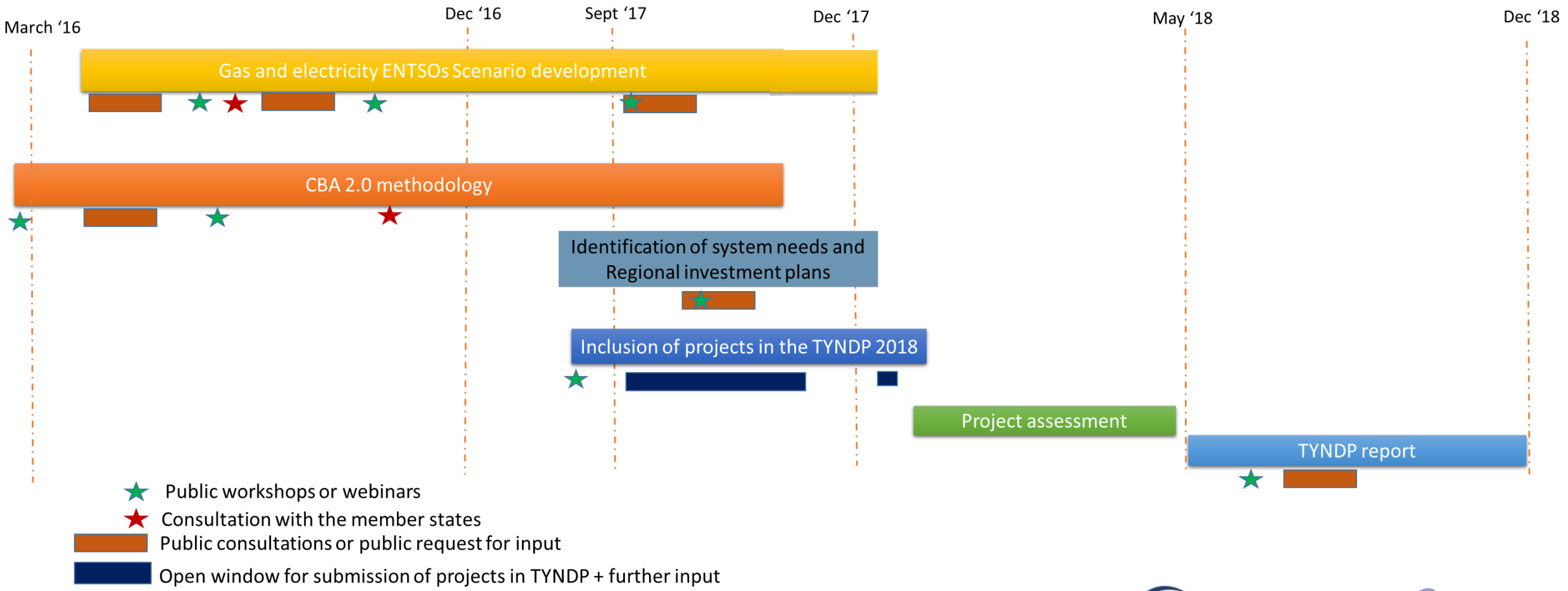
Scenarios steps



Electricity TYNDP 2018 main steps



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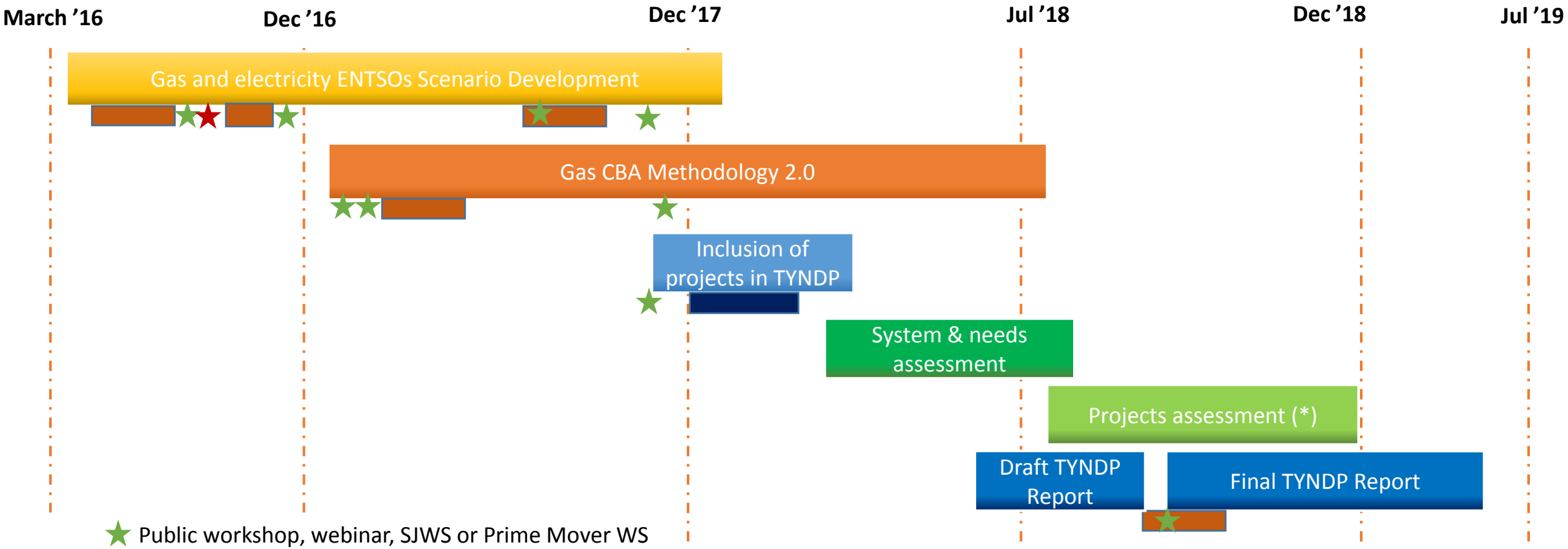
Gas TYNDP 2018 main steps



(*) Dependant on CBA 2.0

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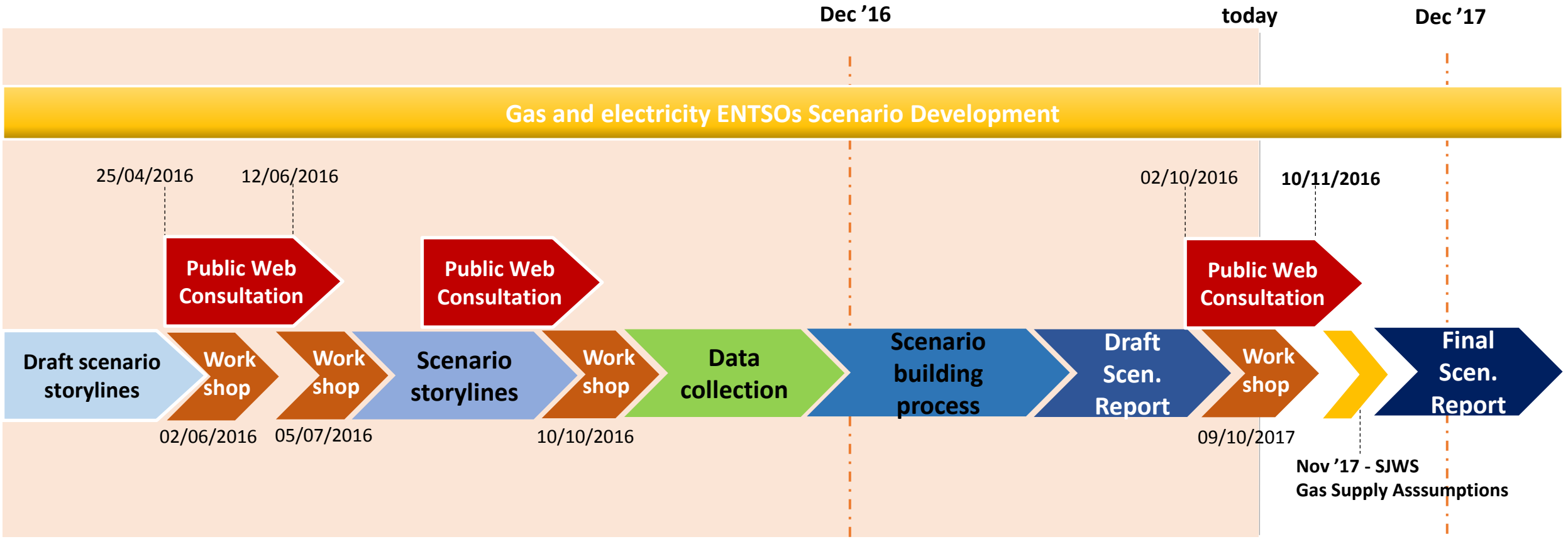
Scenarios steps



The Scenario Report consultation runs until **10 November**.

We welcome your contributions!

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Panel discussion: What are the critical scenario elements for infrastructure assessment?

Moderator: Walter Boltz, Senior Advisor , Frontier Economics

Panellists

Catharina Sikow-Magny
Head of Unit,
European Commission – DG Energy

Jan Kostevc
Infrastructure Regulation Officer – Team Leader,
ACER

Cesar Alejandro Hernandez
Senior Electricity Analyst,
International Energy Agency

Jonathan Gaventa
Director,
E3G

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Sébastien Lepy
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THANK YOU FOR YOUR ATTENTION

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