Working Group (WG) SCENARIO BUILDING

STORYLINES TYNDP 2020

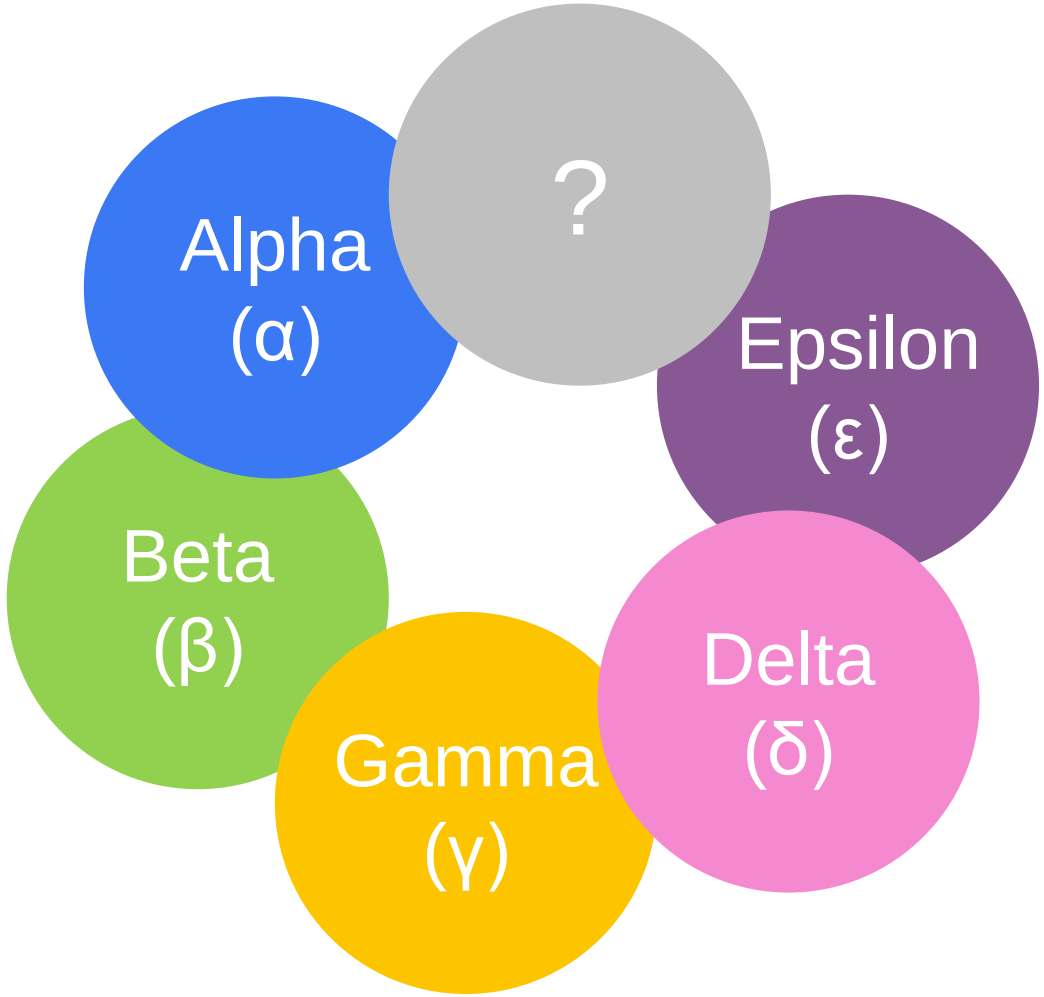
Scenario Workshop / Brussels

29th May 2018

entsog entsoe

Reliable Sustainable Connected

ENTSO Storylines



Storyline: Alpha (α)

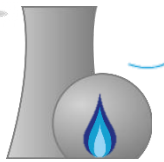
- National focus on climate change, driven by ETS and national subsidies
- Moderate economic growth
- Growth of RES but dependent on National Policies
- Gas-fired generation provides the necessary flexibility to balance renewables in the power system
- Low growth of storage, P2G develops after 2030
- Heat pump technology common in new buildings and moderate growth of the gas condensing boiler
- Electrification of heating and the light transport fleet sees stable development
- Gas sees a growth in the heavy goods transport sector depending on the country
- Low surplus capacity in generation portfolio

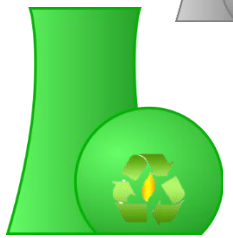
Macroeconomic Trends

ON TARGET

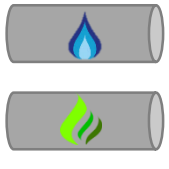
Industry

Electricity





Gas Supply



Storage Systems

Residential

Transport

Storyline: Beta (β)

- Sustainable growth
- Global emission trading
- Low-carbon technologies competitive without subsidies
- Wind & solar are the leading sources of generation
- Carbon-free gases substitutes natural gas, centralised production from P2G

- P2G and batteries are key storage technologies
- Electricity generation remains mainly centralised
- Fossil fuels replaced with electricity and green gas in heating & industrial sectors
- Electric vehicles used in passenger transport while gas used in heavy duty & shipping
- Bio energies sustainably managed

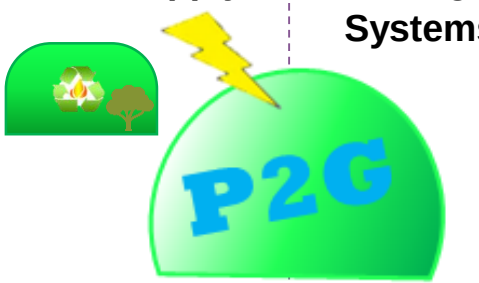
Macroeconomic Trends

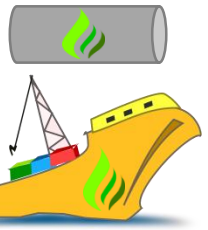
ON TARGET

Industry

Electricity

Gas Supply





Storage Systems

Residential

Transport

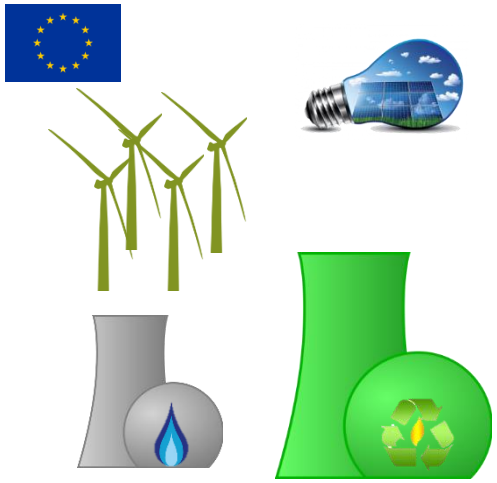
Storyline: Gamma (γ)

- Favorable economic environment
- Global emissions scheme
- RES is built on commercial conditions
- RES is built where the best resources are found
- High growth of P2G and Bio Methane
- P2G storage available
- High efficiency standards of consumer goods
- High increase of electric vehicles and heat pumps
- Electrification of cars, LNG for heavy goods and shipping
- Flexible gas-fired units provide adequacy

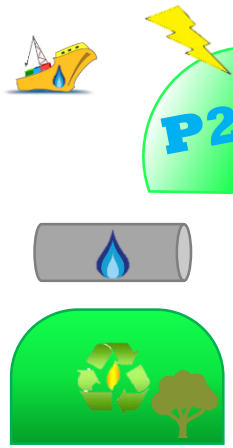
Macroeconomic Trends

Industry

Electricity



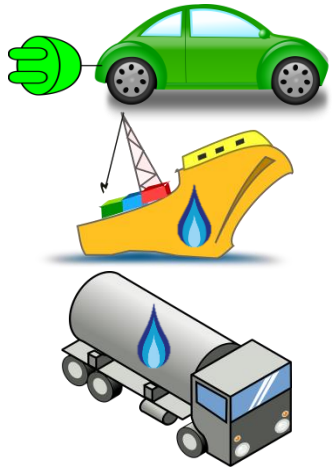
Gas Supply



Storage Systems

Residential

Transport



Storyline: Delta (δ)

- High economic growth with strong climate policy
- Prosumers engaged in decarbonisation but also selecting price competitive solutions
- Decentralised RES growth, driven mainly by small scale PV
- Electrification in combination with renewable gases decarbonises heating residential sector, utilising hybrid solutions

- Significant leaps in innovation of small scale generation and storage technologies
- Smart digital solutions develop at all scales
- Home energy storage systems become more common, with smart technology management
- Rapid increase in electric vehicles with smart charging
- Renewable gas solutions for heavy transport & shipping from bio sources

Macroeconomic Trends

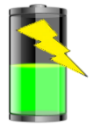
ON TARGET

Industry

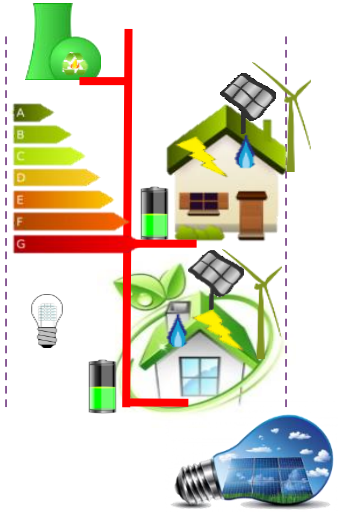
Electricity

Gas Supply

Storage Systems



Residential



Transport

Storyline: Epsilon (ε)

- Low economic growth
- Low climate action and limited national subsidies
- Potential for growth of renewable technologies lower, limited by lack of national policy or delayed implementation
- Some importation of carbon free fuels

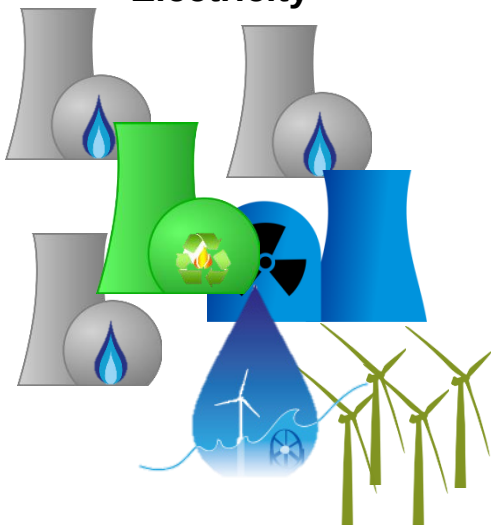
- P2G is slow to develop at scale, used for storage
- Hybrid heat pumps and gas boilers installed new dwellings
- Oil and hybrid technologies used in private transport, as electric vehicle uptake is slow
- Gas and oil significant in the shipping and heavy good transport sectors
- Low growth in new storage with adequacy problems solved locally

Macroeconomic Trends

SLIGHTLY BEHIND

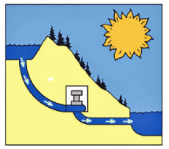
Industry

Electricity

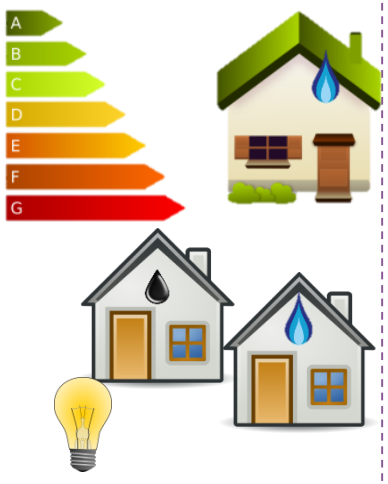


Gas Supply

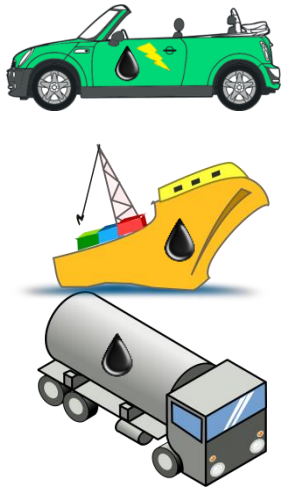
Storage Systems



Residential



Transport

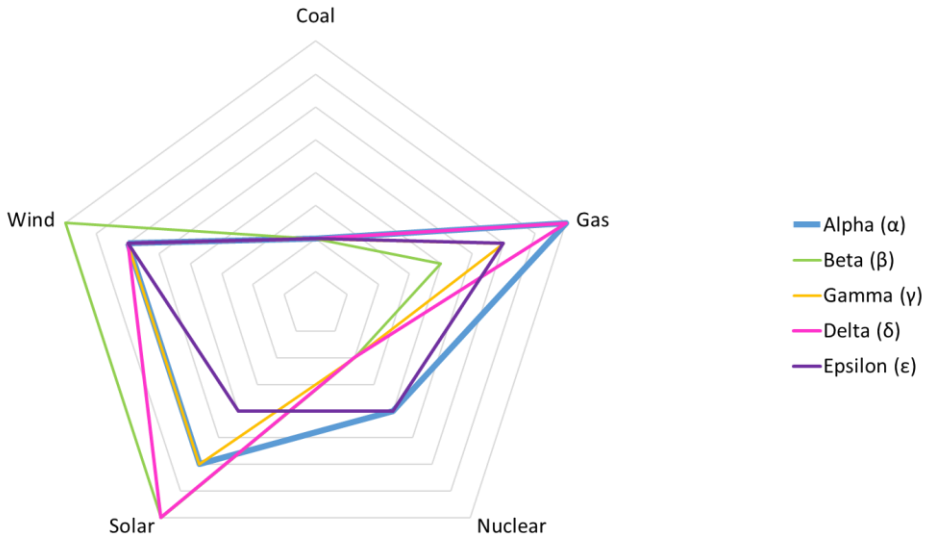


Qualitative Spiders

The storyline matrix allows a relative description on growth or short description on the leverage applied by each component of the scenario.

Factor		Scenario Overview				
Scenario		Storyline: Beta (β)				
Category	Criteria	Parameter				
Electricity	Gas	Reduction	Low growth	Moderate growth	High growth	
	Coal	Reduction	Low growth	Moderate growth	High growth	
	Nuclear	Reduction	Stable	Minimum new units	Potential for growth	
	Storage	Low growth	Moderate growth	High growth	Very high growth	
	Wind	Low growth	Moderate growth	High growth	Very high growth	
	Solar	Low growth	Moderate growth	High growth	Very high growth	
	CCS	Not significant	Low growth	Moderate growth	High growth	
	CHP	Low growth	Moderate growth	High growth	Very high growth	
	Adequacy	Low surplus capacity	Some surplus capacity	High surplus capacity		

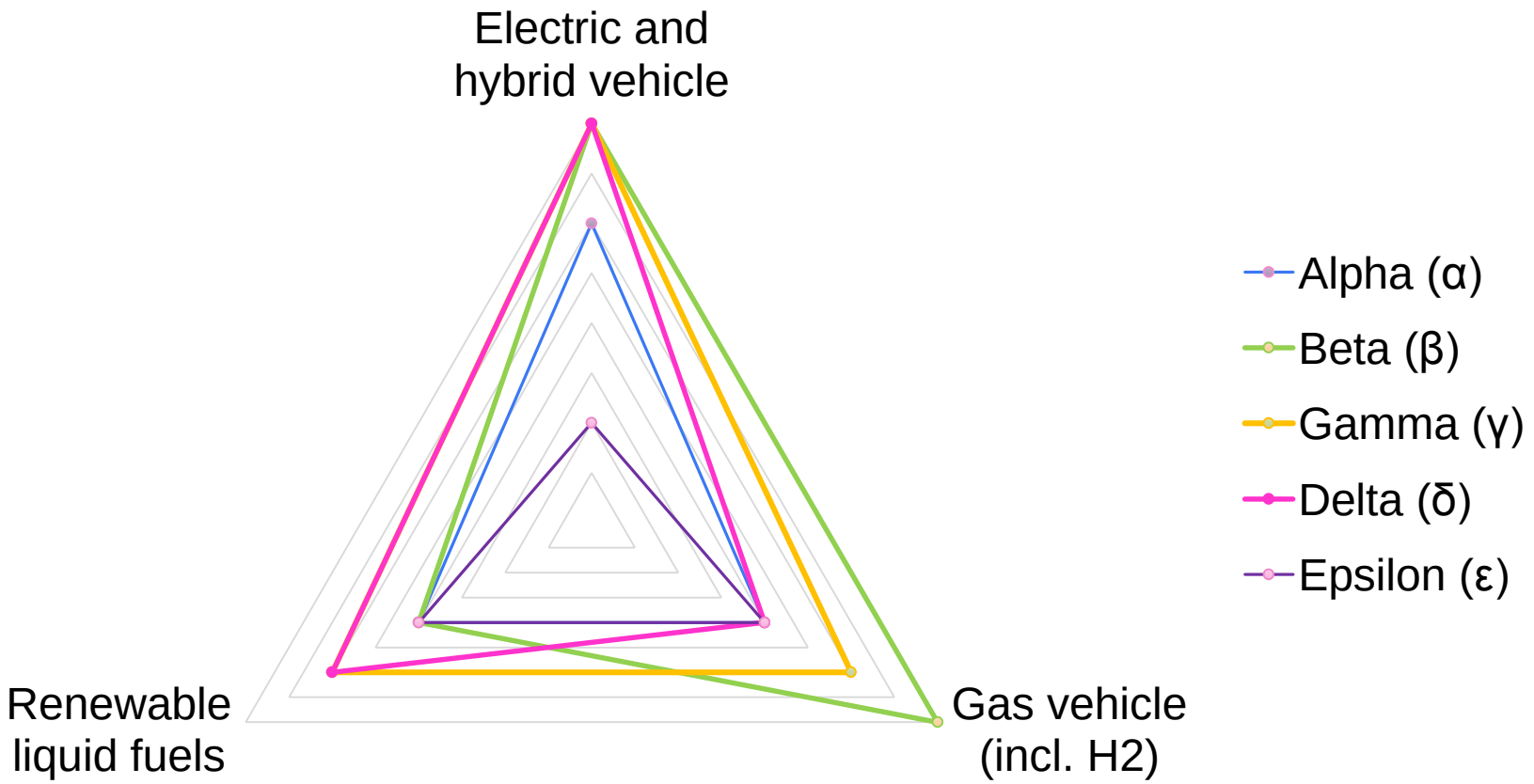
From Storylines Matrix to Spider Diagrams



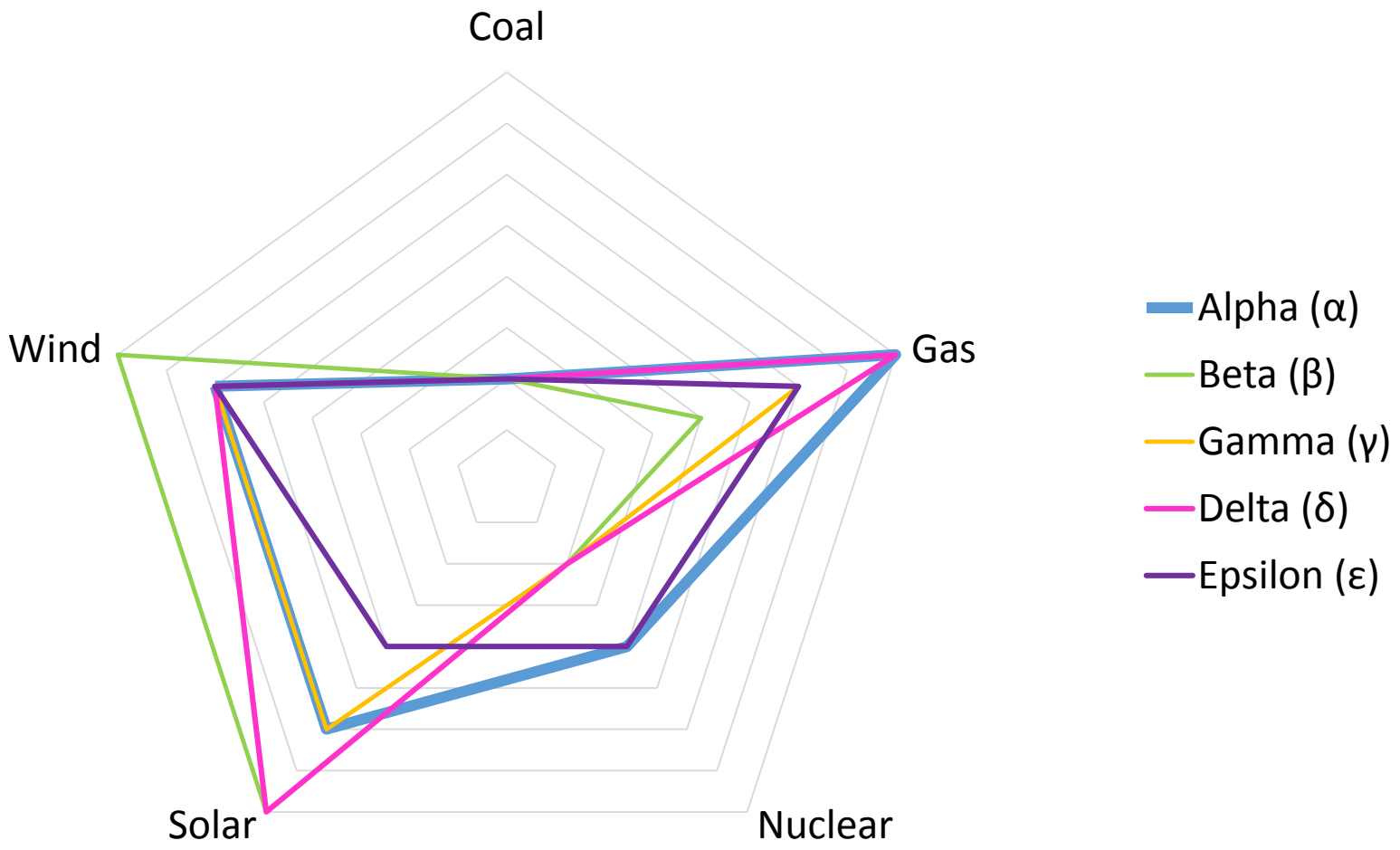
The purpose is to identify gaps or overlaps in the Storylines

NOTE: The figures shown are illustrative.

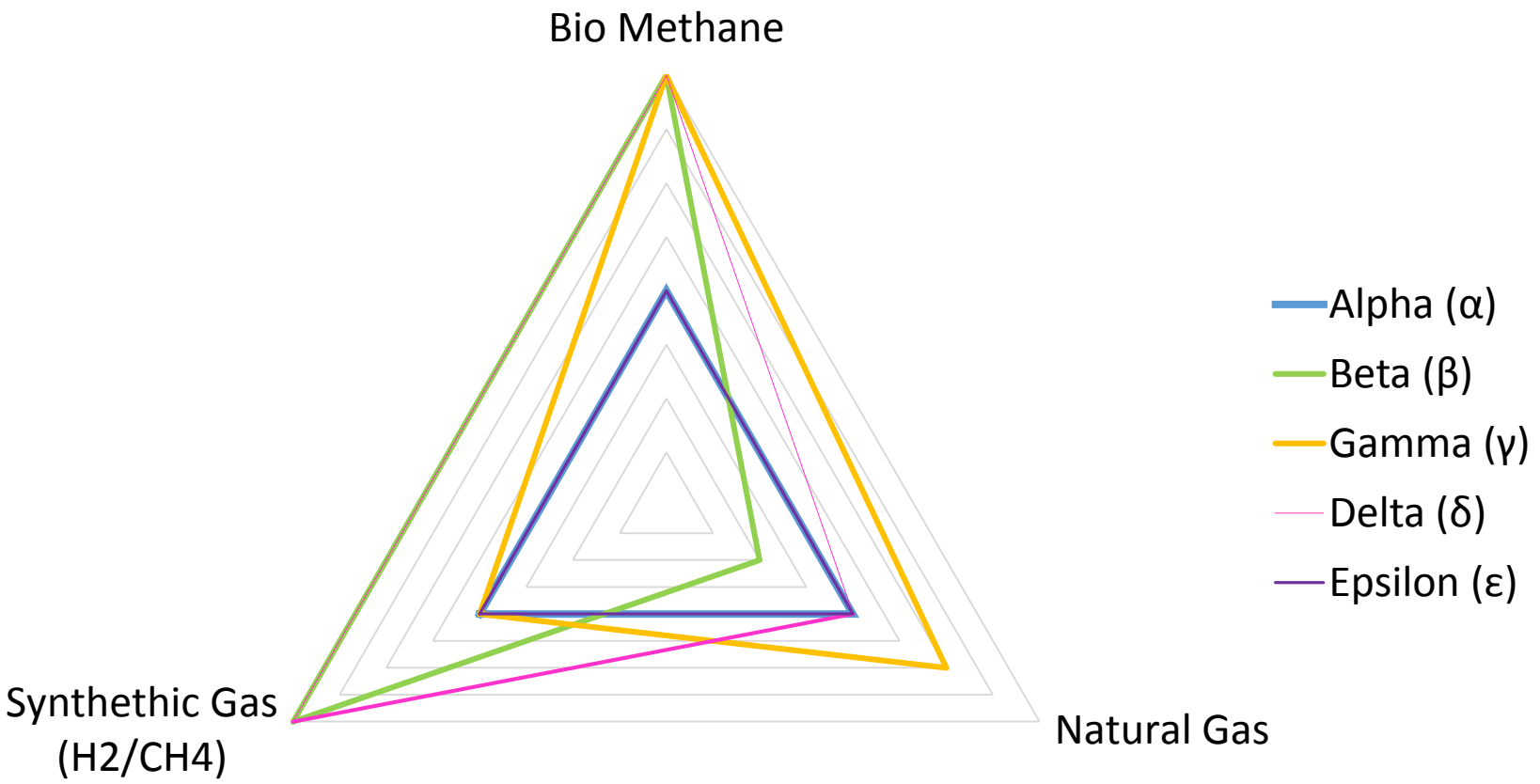
Evolution of Fuel Use in Transport



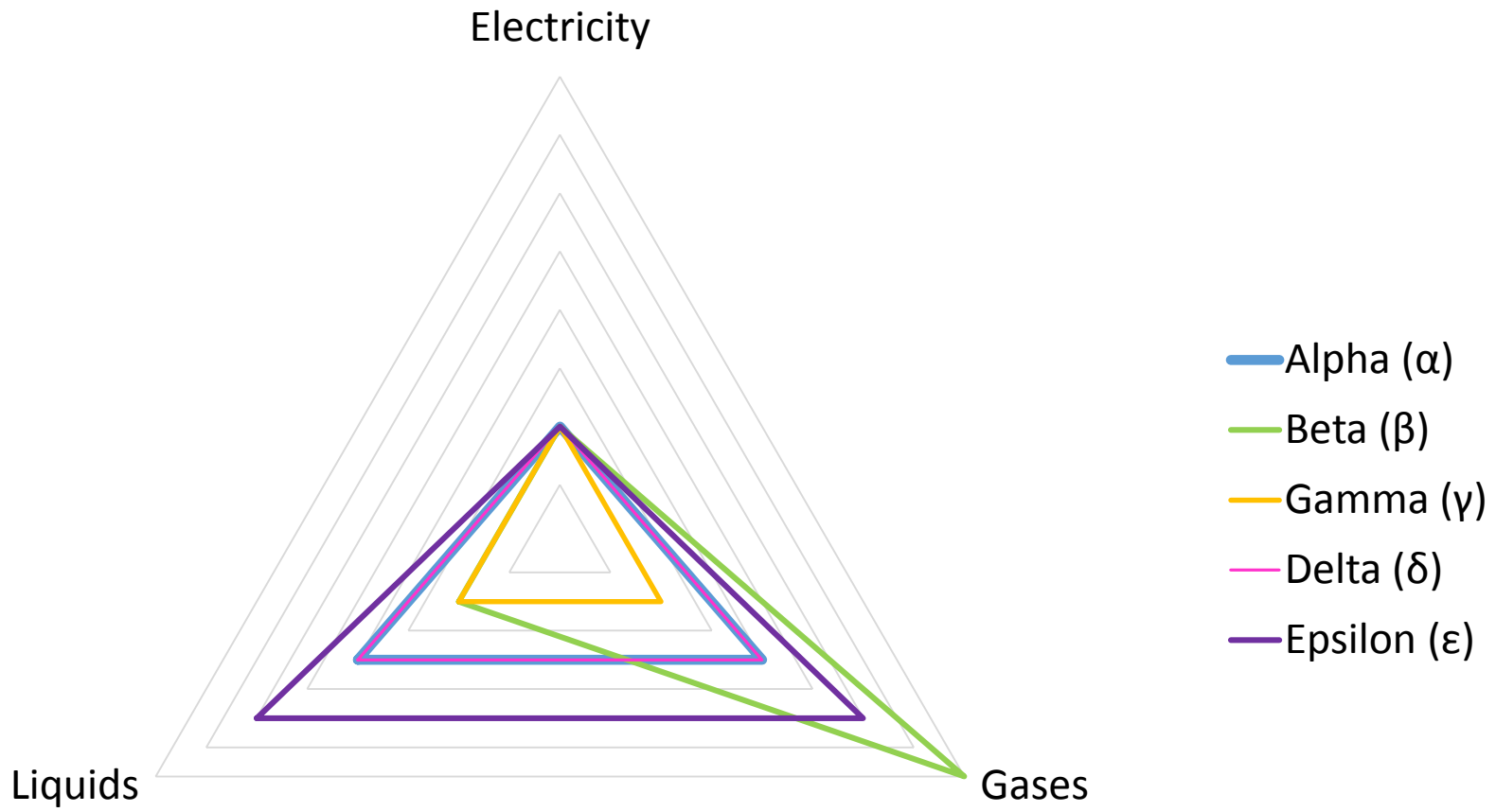
Evolution of Electricity Generation



Evolution of Gas Demand



Evolution of Carbon-Neutral Imports

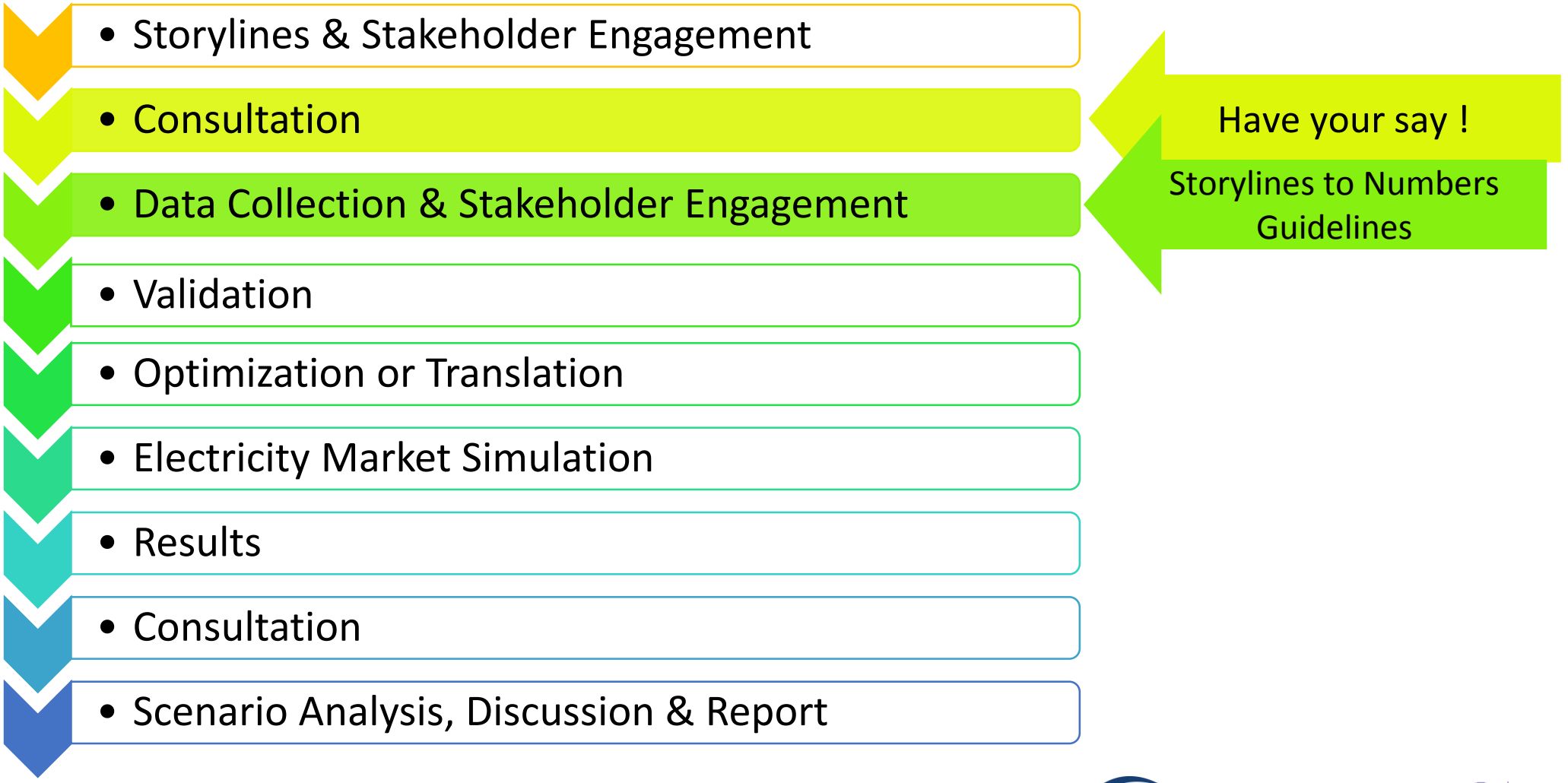


Your comments on the Storylines

Based on the Storylines descriptions do you believe that they capture a broad enough scope of possible futures?

Are there any elements / drivers in the Storylines that are missing?

Next Steps in the Process



From Qualitative to Quantifiable

Once the storylines are confirmed the next step is to add quantities:

We propose to use spiders that provide energy volumes (TWh) and installed capacities (GW) to highlight scenario differences, with the possibility to compare to today! Do you agree?

NOTE: The figures shown are illustrative.

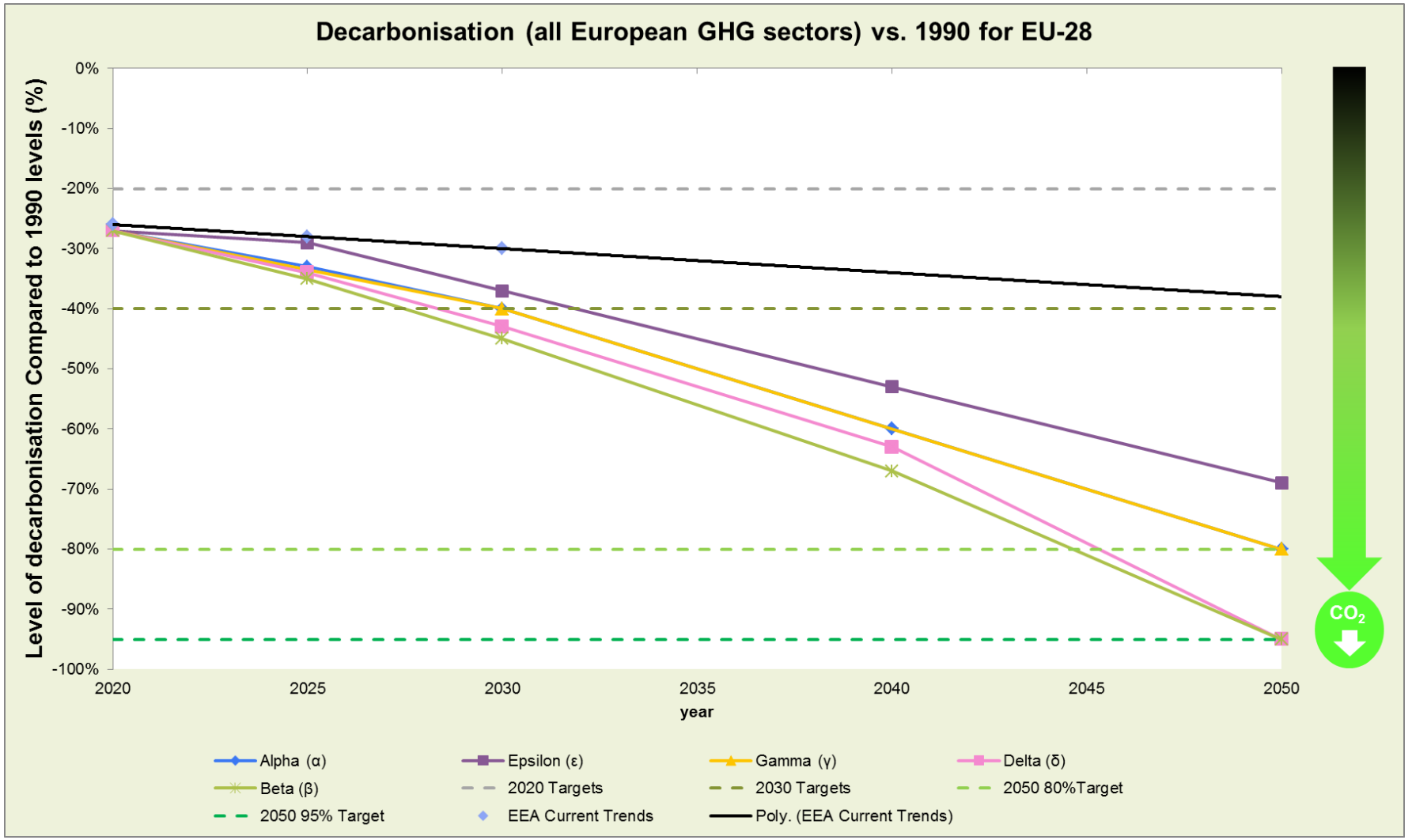
From Qualitative to Quantifiable

From storyline to numbers:

For TYNDP 2020 we propose to use decarbonisation ambition charts to provide a primary energy mix.

Do you agree with this approach?

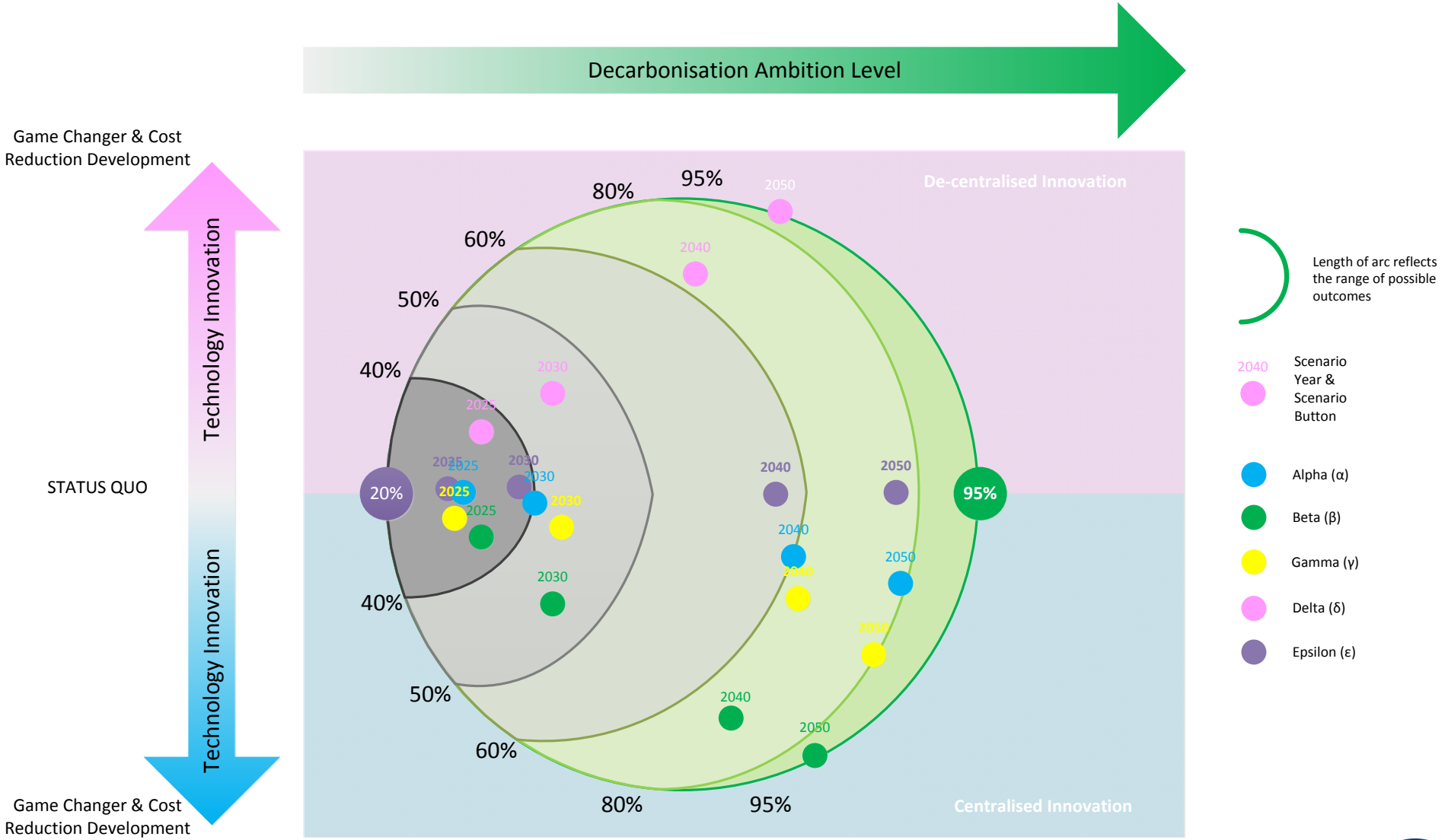
Decarbonisation Ambition



Proposed GHG reduction projections for our storylines.

Do they look reasonable?

Decarbonisation Ambition



Thank you for listening

Next on the Agenda

Lunch 12:30

Please return to the Room at 13:30

Interactive Sessions:

13:30 Storyline Discussion

15:00 “Build your own Scenario”