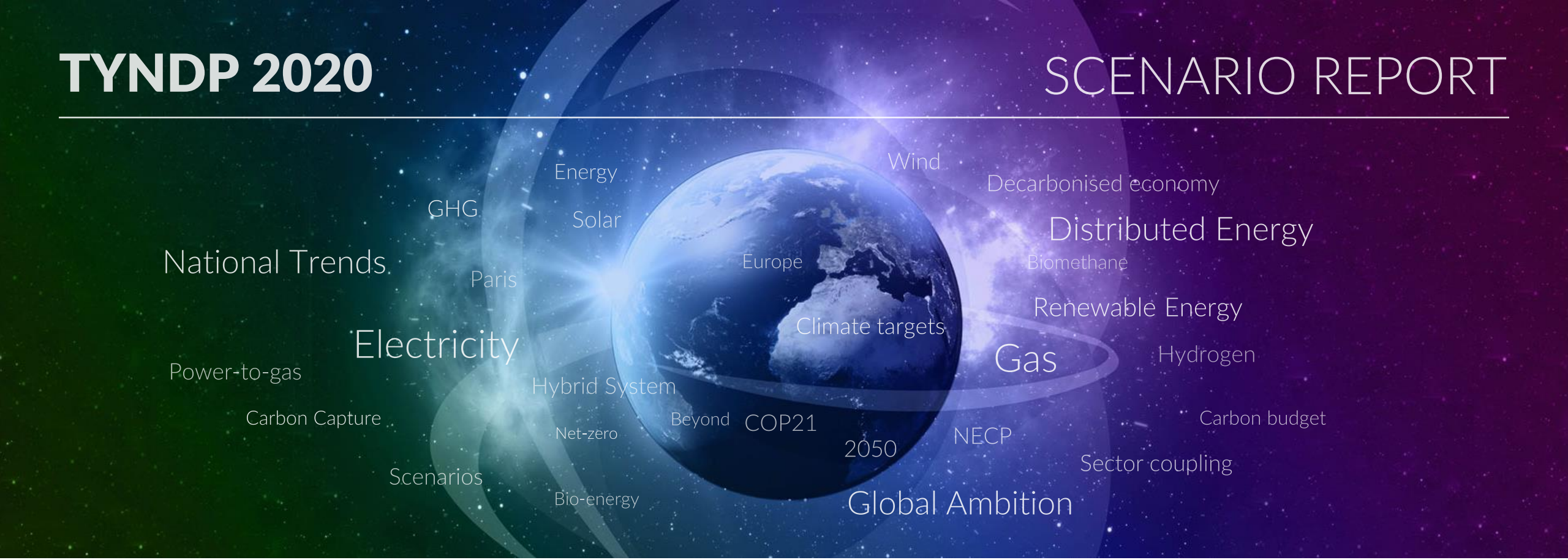


Joint TYNDP 2020 Scenarios

ENTSOG TYNDP 2020 Presentation Day – 16 Dec 2020

Cihan Sönmez

Scenario Manger

Purpose of TYNDP scenarios

TYNDP scenarios are designed for TYNDP infrastructure assessment

Will energy production develop centralized or de-centralized?

How be sure that infrastructure supports development?

Is it ready for the Green Deal development?

Can it deliver in terms of Security of Supply, Market Integration and Competition?

TYNDP scenarios are meant for analysis and information - rather than for predictions/forecasting

TYNDP scenarios complementary to EC's **Long-Term Strategy** scenarios – with focus on assessment of infrastructure readiness vis-à-vis possible - **contrasted** - futures

Rationale for ENTSOG and ENTSO-E

SCENARIO DEVELOPMENT TEAM
90 gas and electricity European TSOs
+30 regional teams (gas & electricity) working together to achieve common EU targets

Ethics

Commitment to EU Social Economic Welfare

National Relevance

Combining national commitments with EU targets

Innovation

Full-energy scenarios with country-specific data based on an EU Carbon Budget

Expertise

- Operating X-border infrastructure 24/7
- Security of Supply and Infrastructure Planning
- Interacting daily with producers (RES and conventional), DSOs, LNG and Storage operators
- Peer-review by TSOs

Stakeholder Engagement

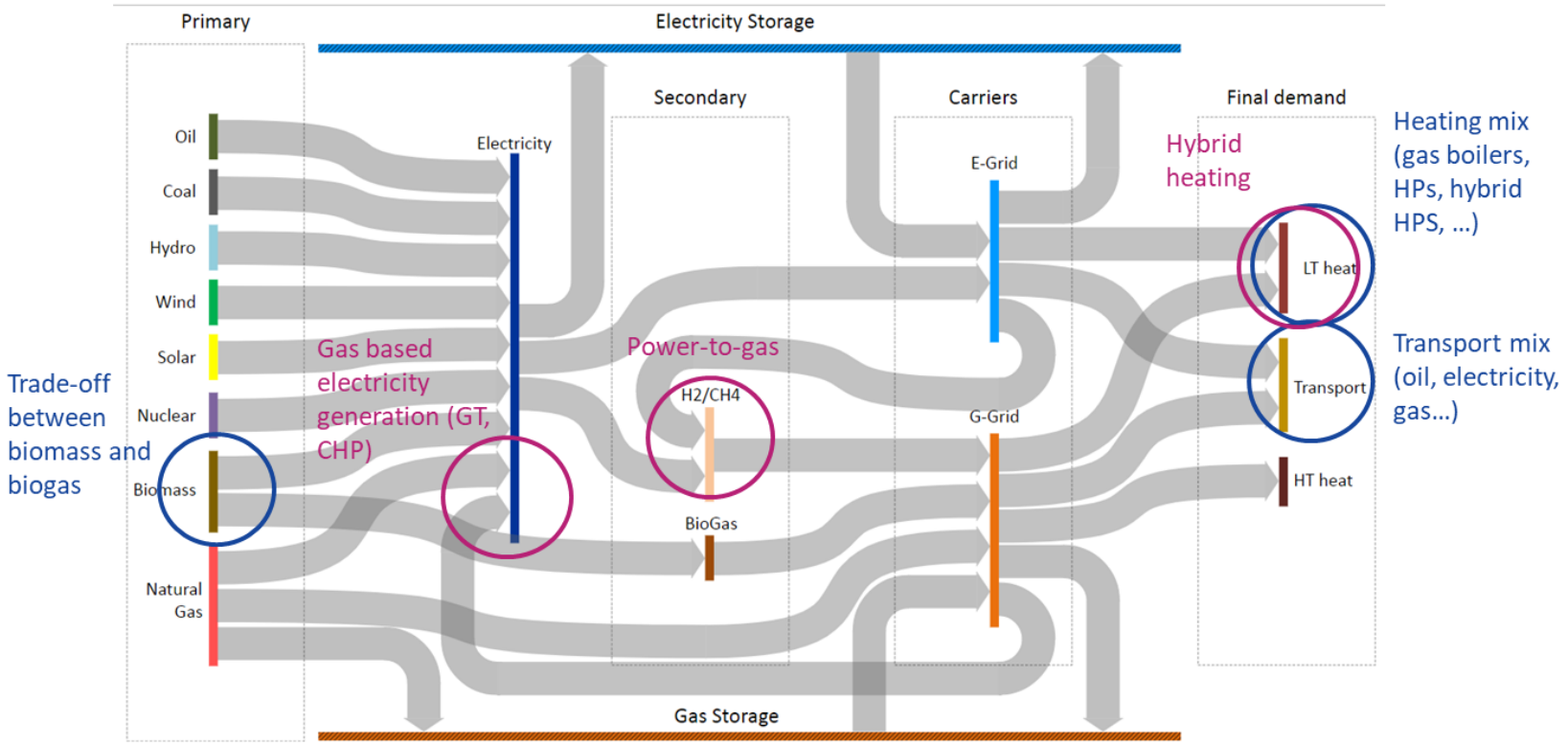
9 Public Workshops and Consultations with +100 Stakeholders over 2 years

Full Transparency: Report, Data Set, Process

Energy System Integration in TYNDP

TYNDP scenarios look at the interfaces and interactions between all energy carriers, with a specific focus on gas (methane and hydrogen) and electricity – but not limited to them

Direct and indirect interactions



Storylines, Targets and Decarbonisation

TYNDP 2020 Storylines

National Trends

- Policy Scenario based on member states' National Energy and Climate Plans (NECPs)
- EU 2030 Energy and Climate Framework (-40% CO2, 32 % RES, 32.5 % energy efficiency)
- EC 2050 Long-Term Strategy: 80 – 95 % CO_2 reduction

Benchmarked with EC Long-Term Strategy

2 x COP 21 scenarios

+1.5°C target with 66.7 % probability

Carbon neutrality by 2050

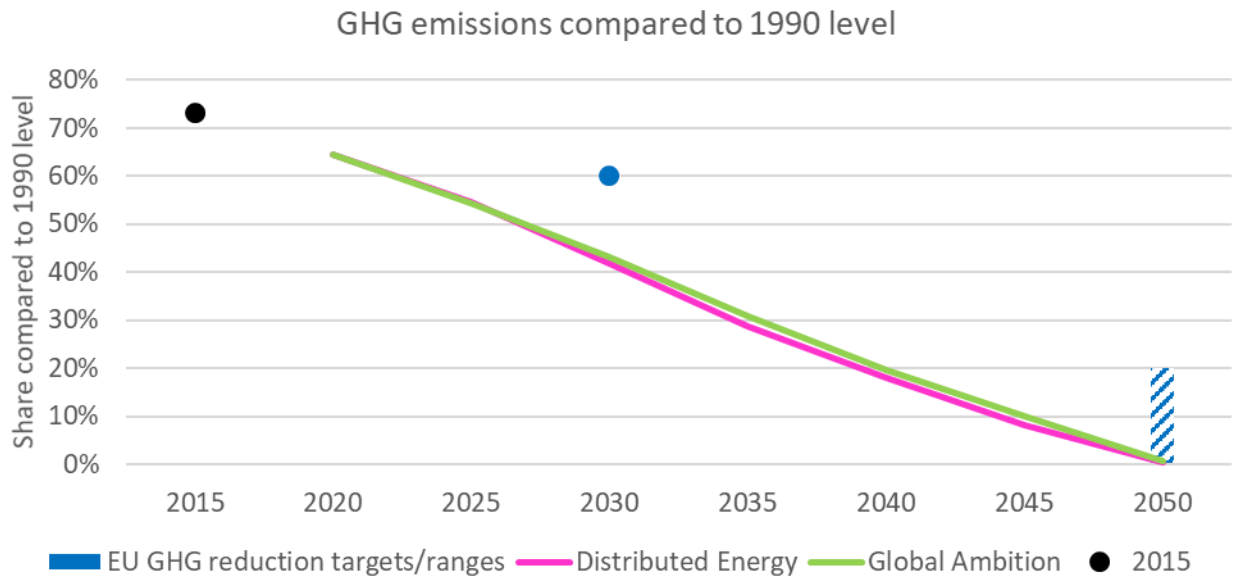
Distributed Energy

De-centralised approach to the energy transition: active customers, small-scale solutions, circular approach

Global Ambition

Centralised approach to the energy transition: large-scale renewables, imports and decarbonisation

EU Climate Neutrality by 2050



	<2050	2050	>2050
Energy and non-energy related CO_2 emissions	57.1	Carbon-Neutrality	Additional measures needed, e.g.: LULUCF, BECCS, CCS, DAC
Non-CO_2 GHG emissions (including methane and Fluorinated gases)*	17.7		
Carbon sinks**	-13.4		
Net cumulative emissions	61.4		-13

TYNDP National Trends Scenario - aligned with NECPs

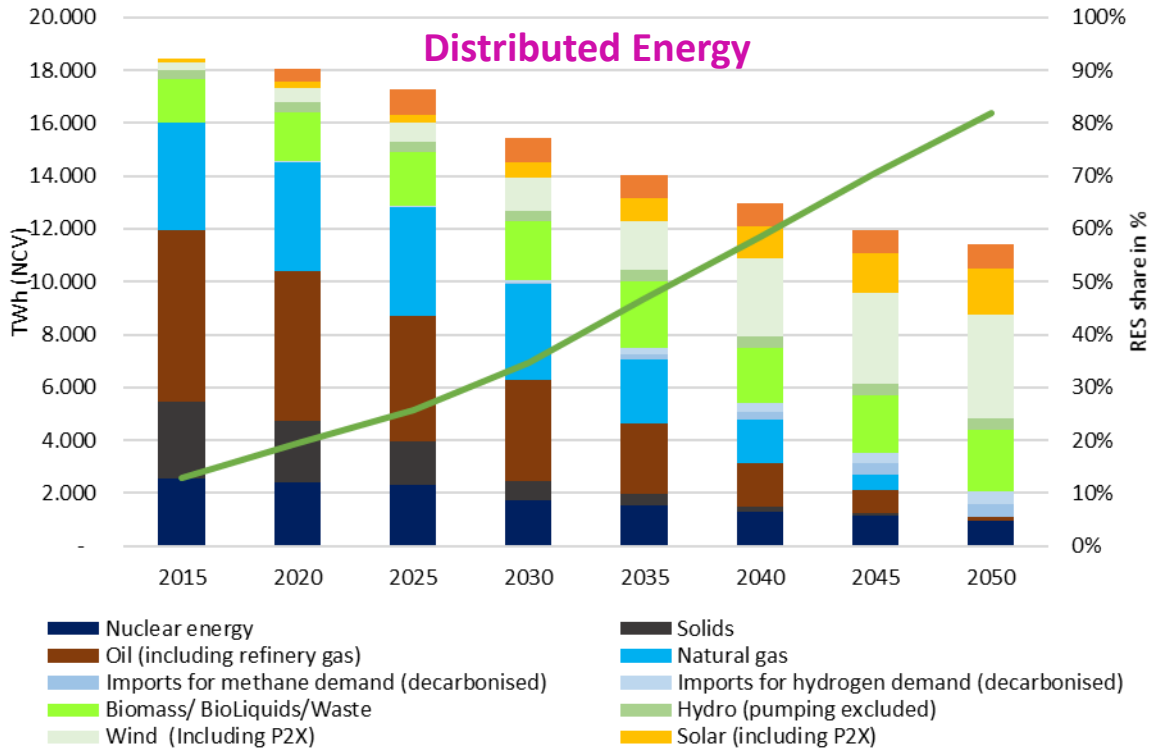
TYNDP COP21 Scenarios have assessed all GHG emissions on the path to 2050 - targeting net zero by 2050!

COP21 Scenarios reach >55% GHG emissions reduction by 2030

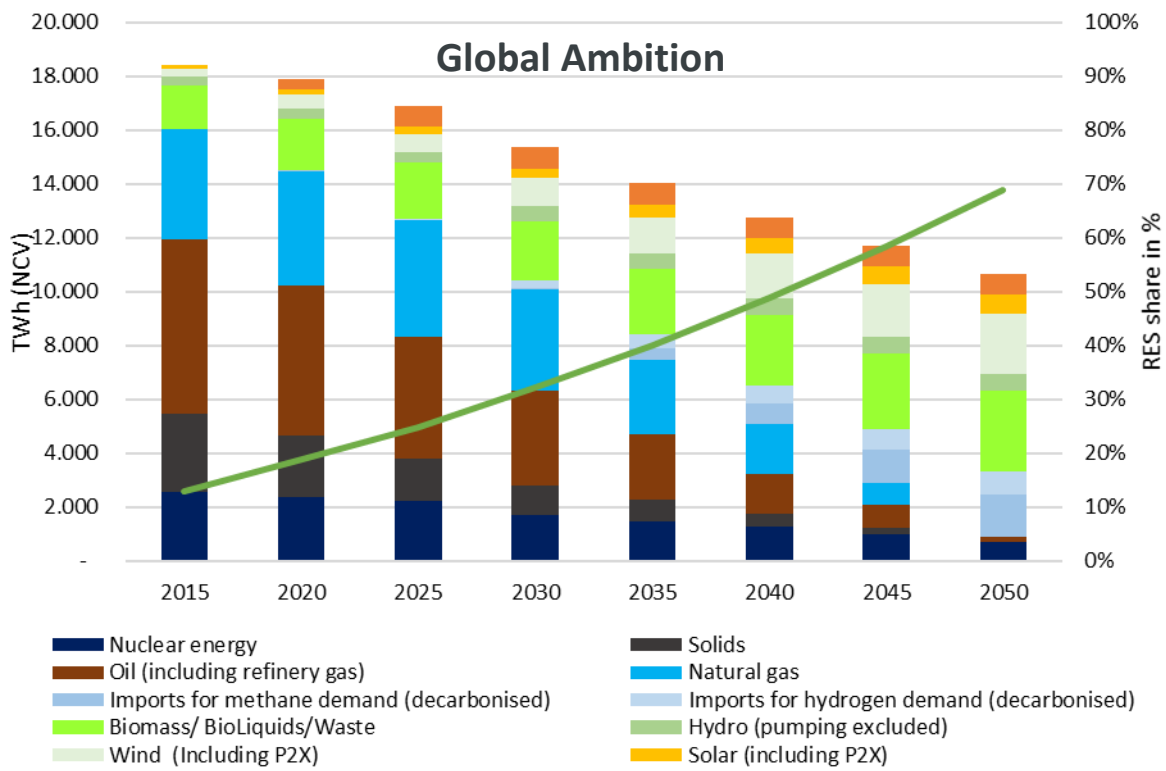
Cumulative GHG emissions in 2050 confirms EC LTS 1.5TECH/LIFE calculations (max 63.5 vs 65 GtCO2)

Renewables in Primary Energy Demand

RES share reaches 82% in Distributed Energy by 2050

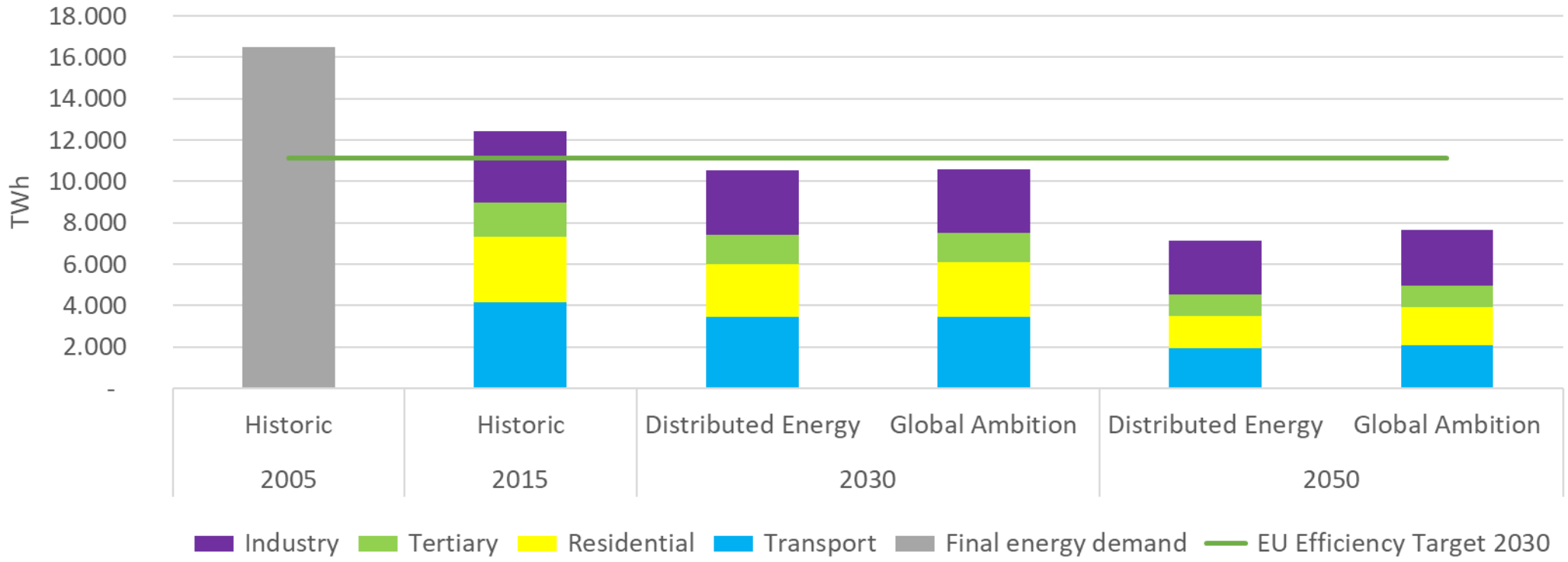


RES share reaches 69 % in Global Ambition by 2050



COP21 Scenarios are in line with EU's 32% target for Renewables in 2030

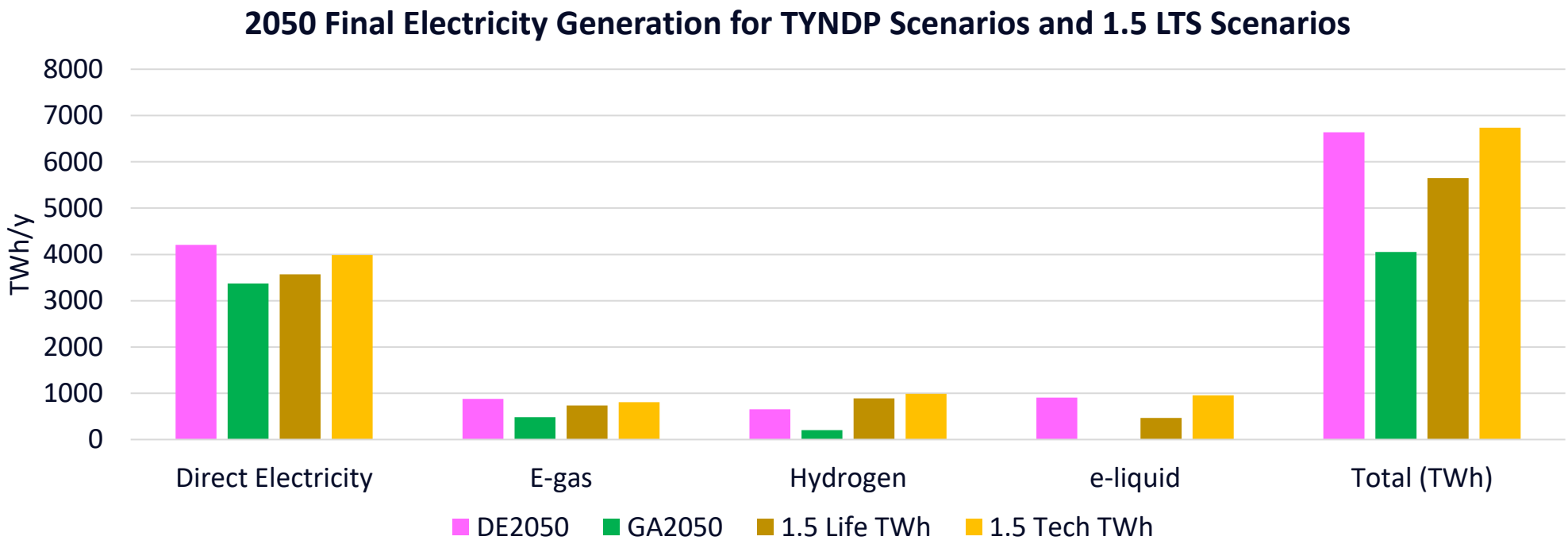
Energy Efficiency



COP21 Scenario Storylines engineered energy efficiency driven by technology improvements per sector. COP21 Scenarios reach higher efficiency in 2030 - max. 10.600 TWh of final demand

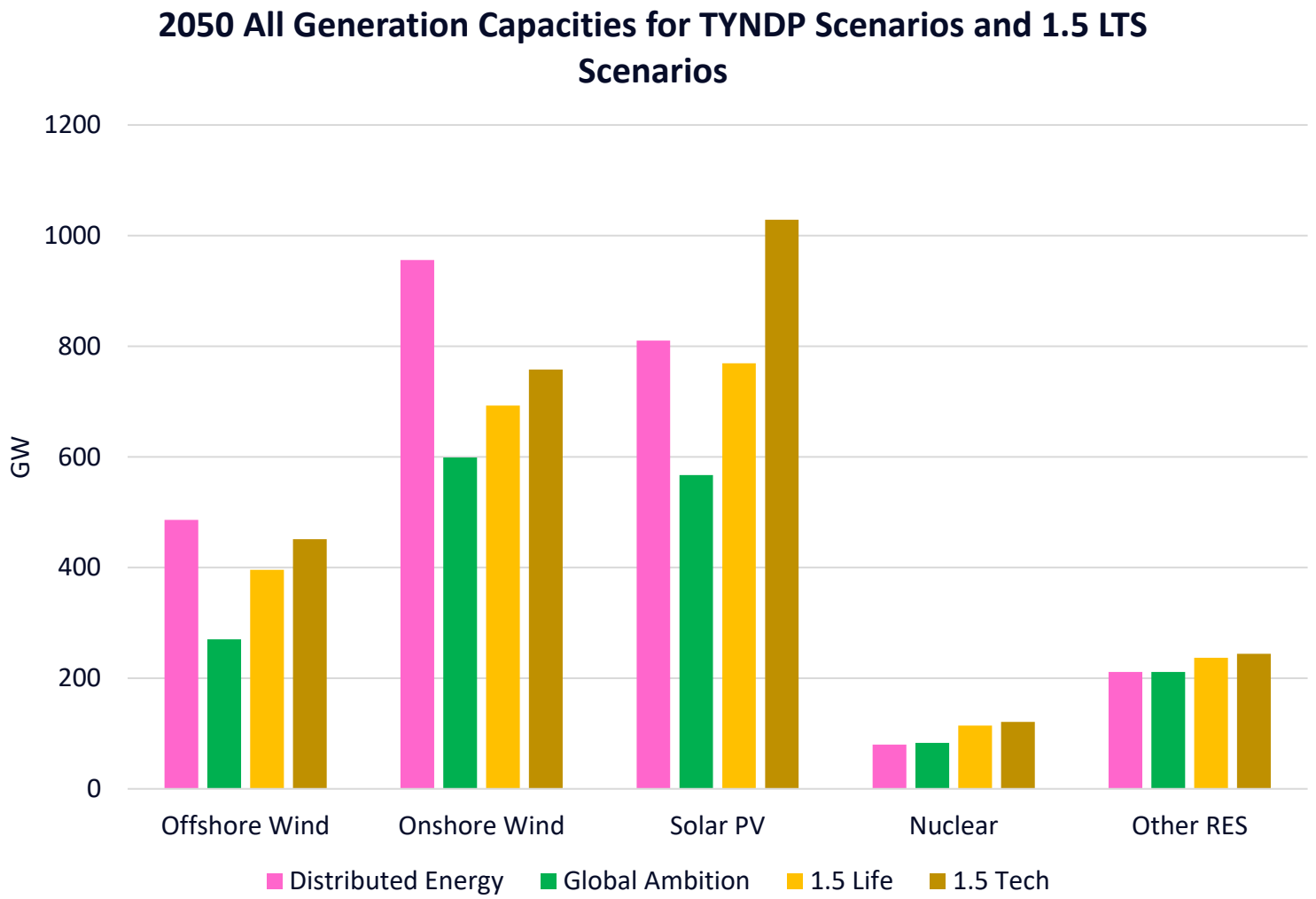
Electricity and Gas Results

Final Electricity Generation



Distributed Energy well aligned with 1.5 Tech - only 1% difference in Final energy consumption. P2x similar in both scenarios.

Electricity Generation Capacities: 1.5 Scenarios

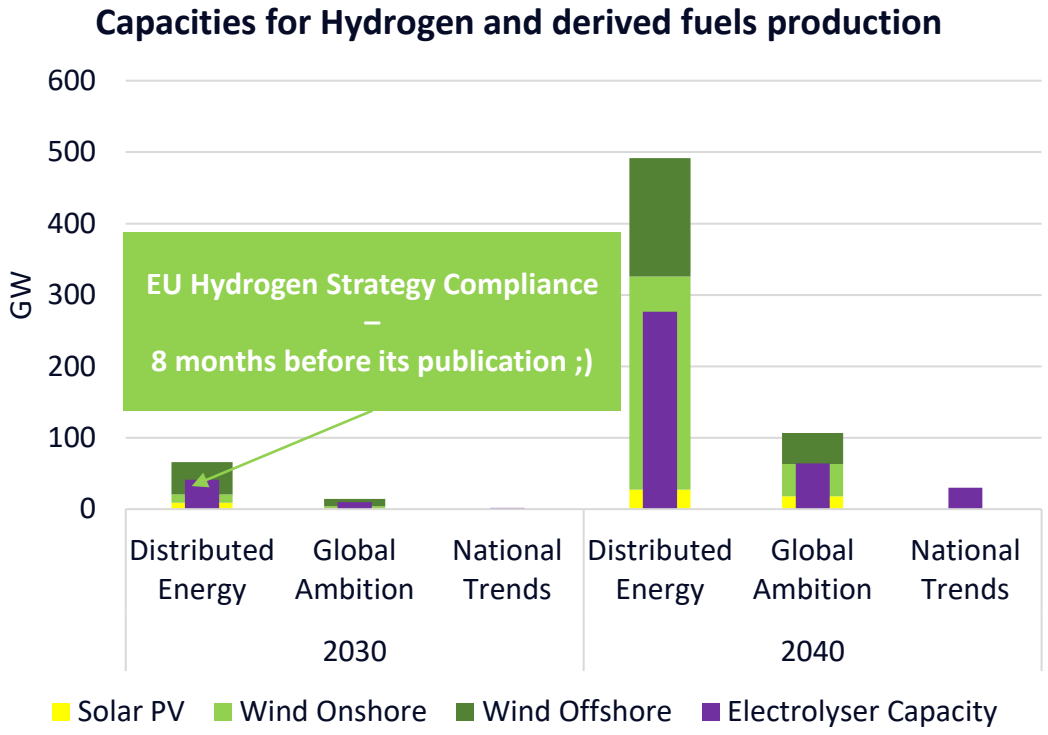


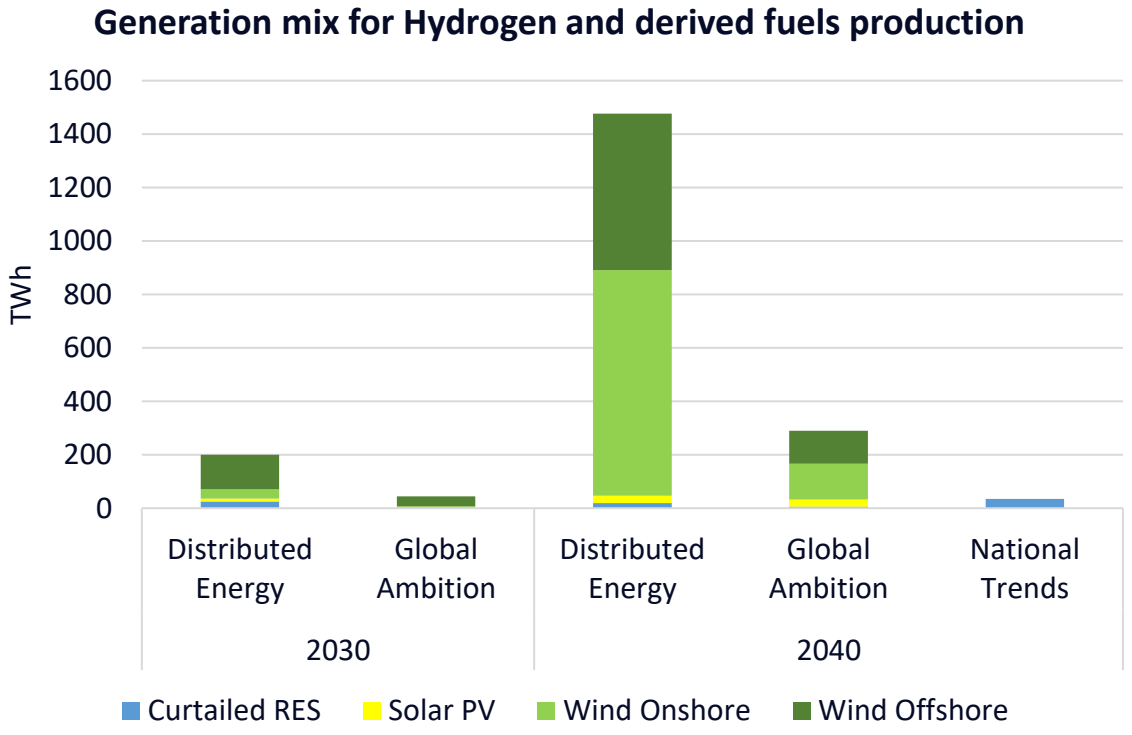
1.5 Tech and *Distributed Energy* - same order of magnitude for all technologies except onshore wind, where DE is higher.

***Global Ambition* - lower renewable capacities due to lower demand.**

For TYNDP assessment the 2 scenarios show a good bandwidth of possibilities, whilst aligned with Paris and Green Deal targets.

Sector Coupling: P2G and P2L

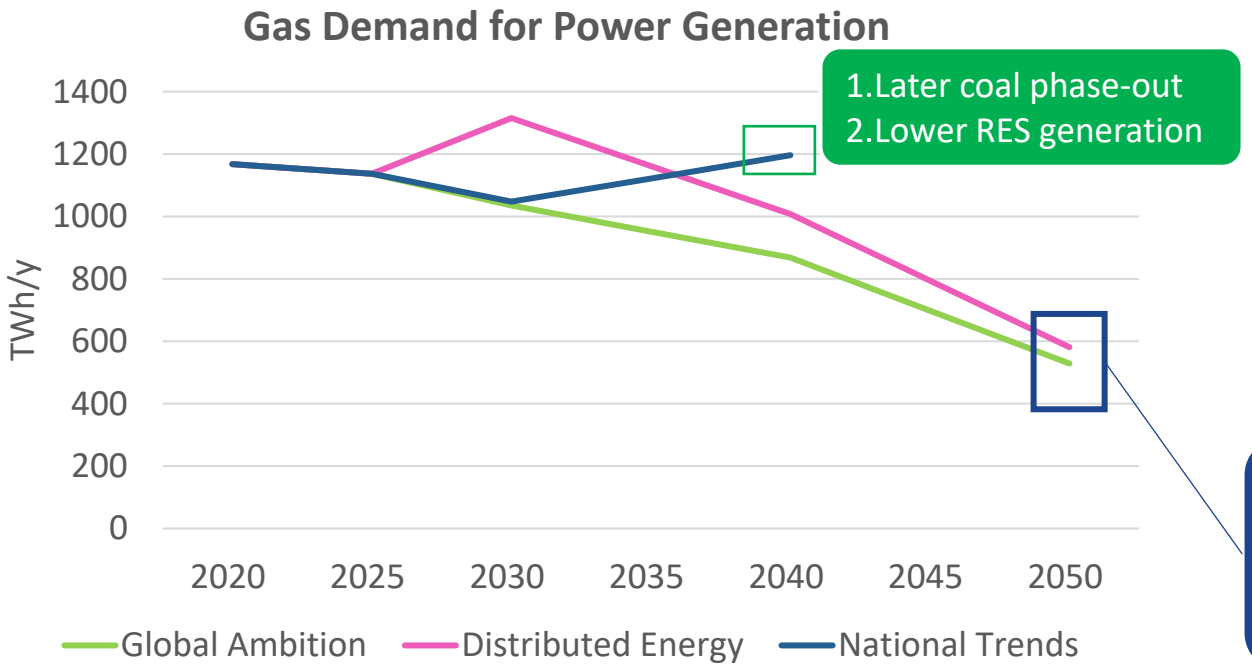




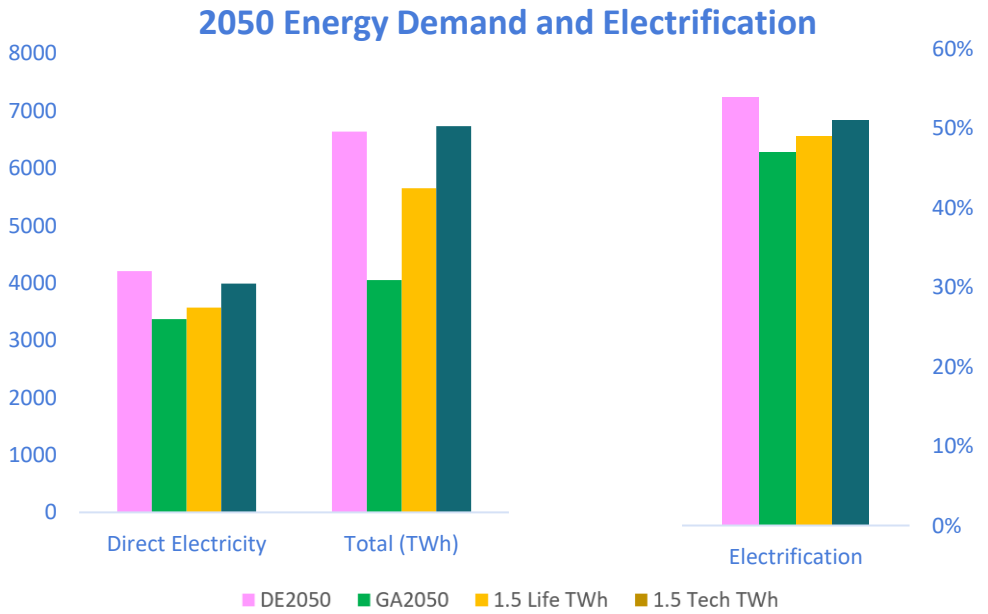
**Sector Coupling enables a link between energy carriers and sectors;
thus it becomes key in contributing to achieving the decarbonisation target.
In the long-term, Power-to-Gas will play a key role in both the integration of excess electricity from variable renewables and decarbonising the gas supply.**

An Interlinked Energy System

Gas will need decarbonised electricity & Electricity will need decarbonised gas

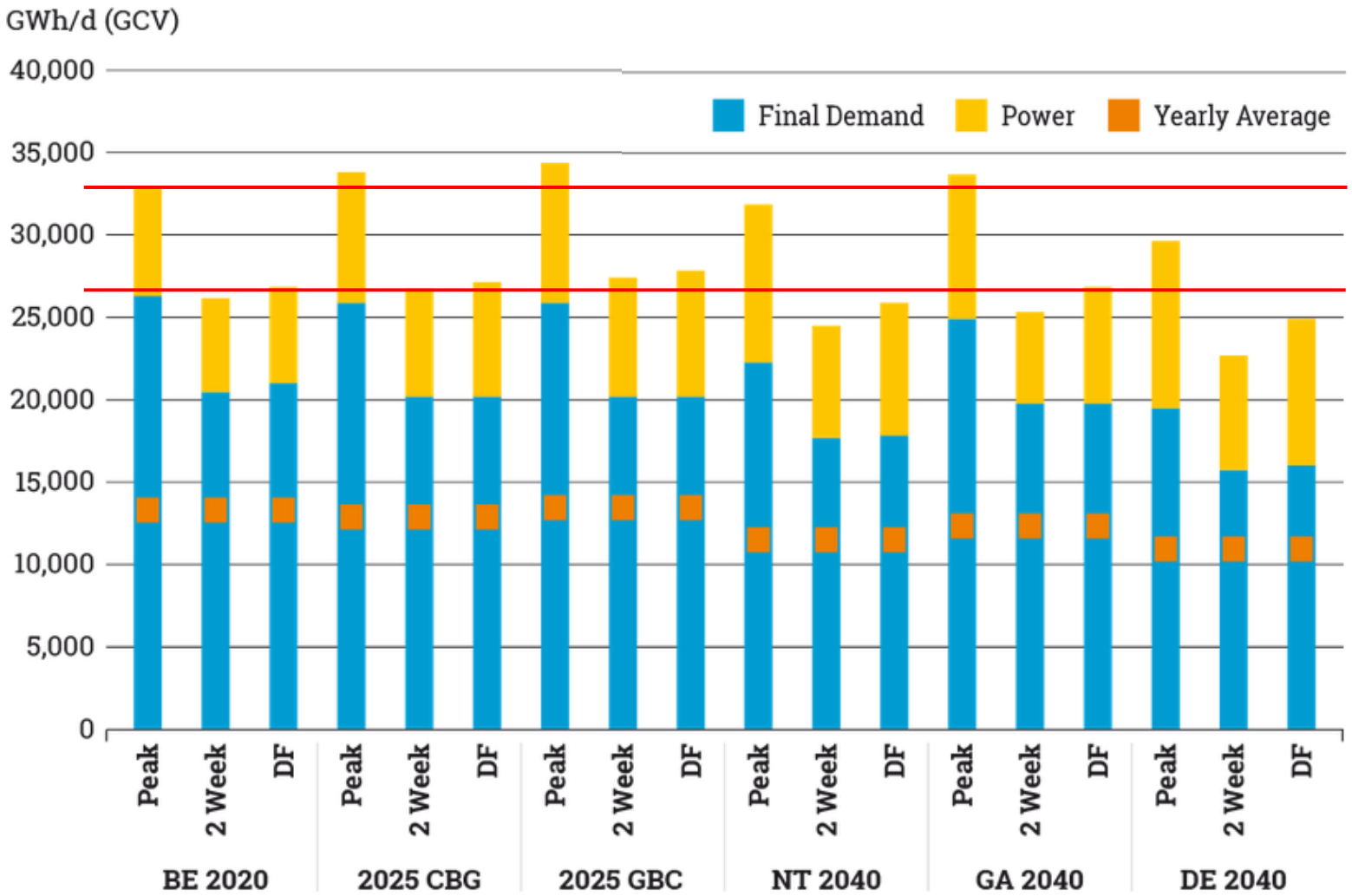


Direct/indirect electrification in DE2050 scenario in line with EC 1.5 TECH and 1.5 LIFE 2050 scenarios



Higher Electricity Demand comes with higher gas demand for power generation - also for peak and "Dunkelflaute" situations

Sector Coupling: Dunkelflaute is the new stress test



Peak Case

Dunkelflaute

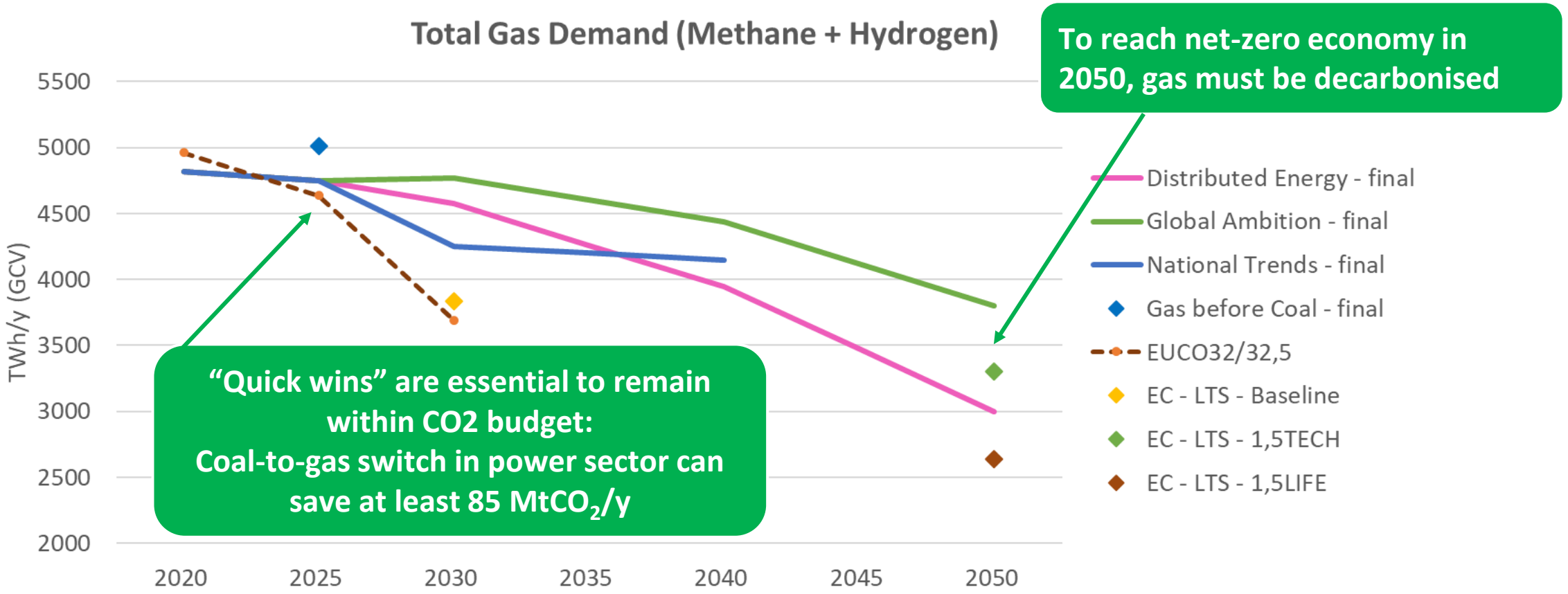
Definition:
Cold Spell[1] ("Beast from the East[2]") + Low Variable RES Generation[3]

With increasing shares of variable renewables, Dunkelflaute becomes the new standard to test the robustness of interlinked electricity and gas infrastructure.

Decrease of annual gas demand does not relate to decrease of peak demand cases.

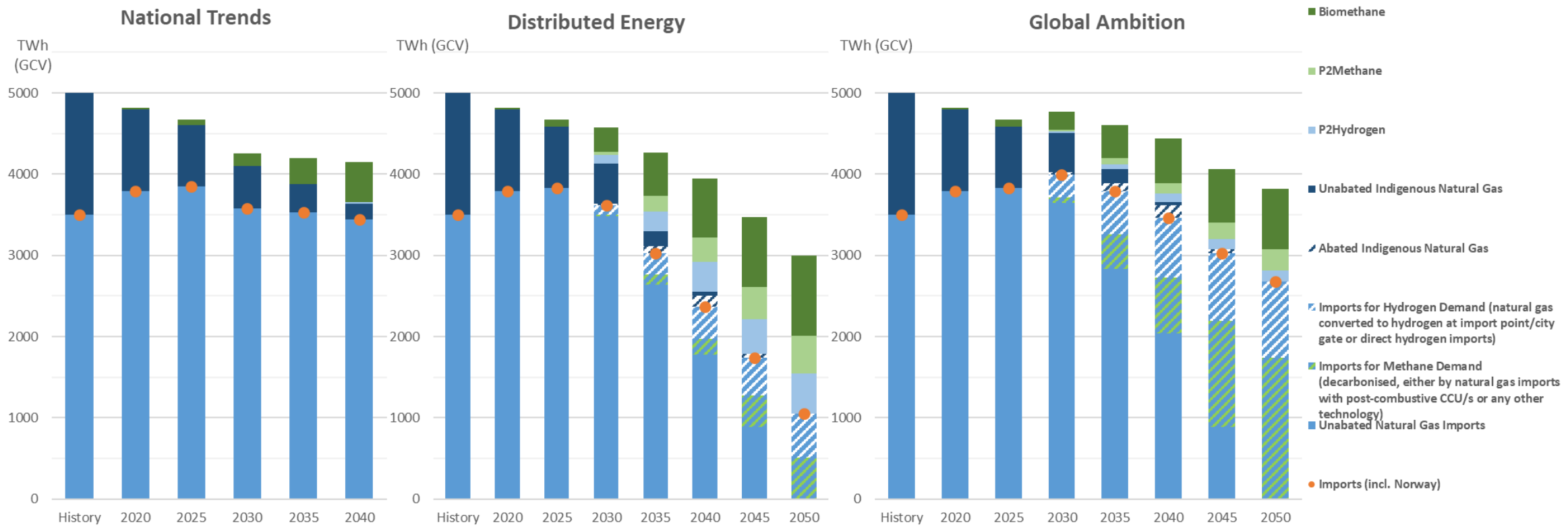
[1]https://bit.ly/2WjgBCr; [2]https://bit.ly/3qVCPst; [3]https://bit.ly/3gQJS0R

Gas Demand



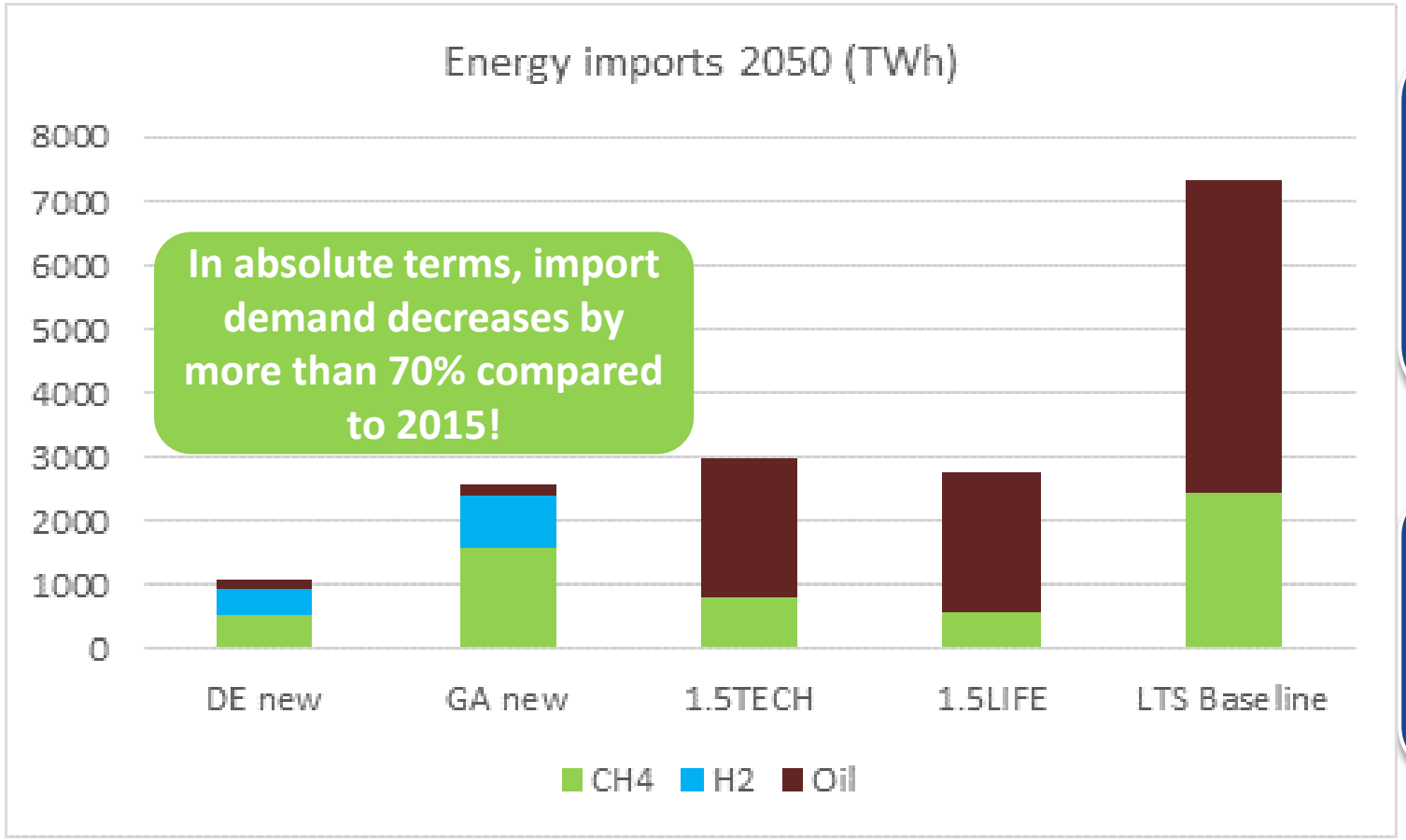
COP21 Scenarios and EC LTS 1,5TECH show similar gas demand for 2050

Gas supply mix



Gas supply needs different technologies and sources to fully decarbonize. P2G, Biomethane & CCS can play important roles in decarbonising the gas supply.
+70% of gas demand is currently supplied by imports – infrastructure assessments needs to take this into account.

Energy Imports



Current EU28 import share of primary energy is ca. 55 %

Decarbonisation and RES development can reduce import dependency* to ca. 20 % (DE) to 36 % (GA).

Imports will remain important in future energy supply
- making use of competitive natural resources outside EU

*considering nuclear energy as imports

Further improvements for the TYNDP 2022 Scenarios

- Increase transparency for data, methodologies, input assumptions
- Increase level and number of stakeholder engagement
- Improve sector integration/coupling methodologies:
  - Improved sectoral demand quantification in line with EU targets for efficiency and sectoral market shares and fuel switch
  - Cost-optimized P2X modelling
  - Enhanced district heating quantification
  - Inclusion of DSO electricity grids
- Inclusion of “Kalte Dunkelflaute” as new modelling case

Thank you for your attention

Location:

Date: