frontier economics

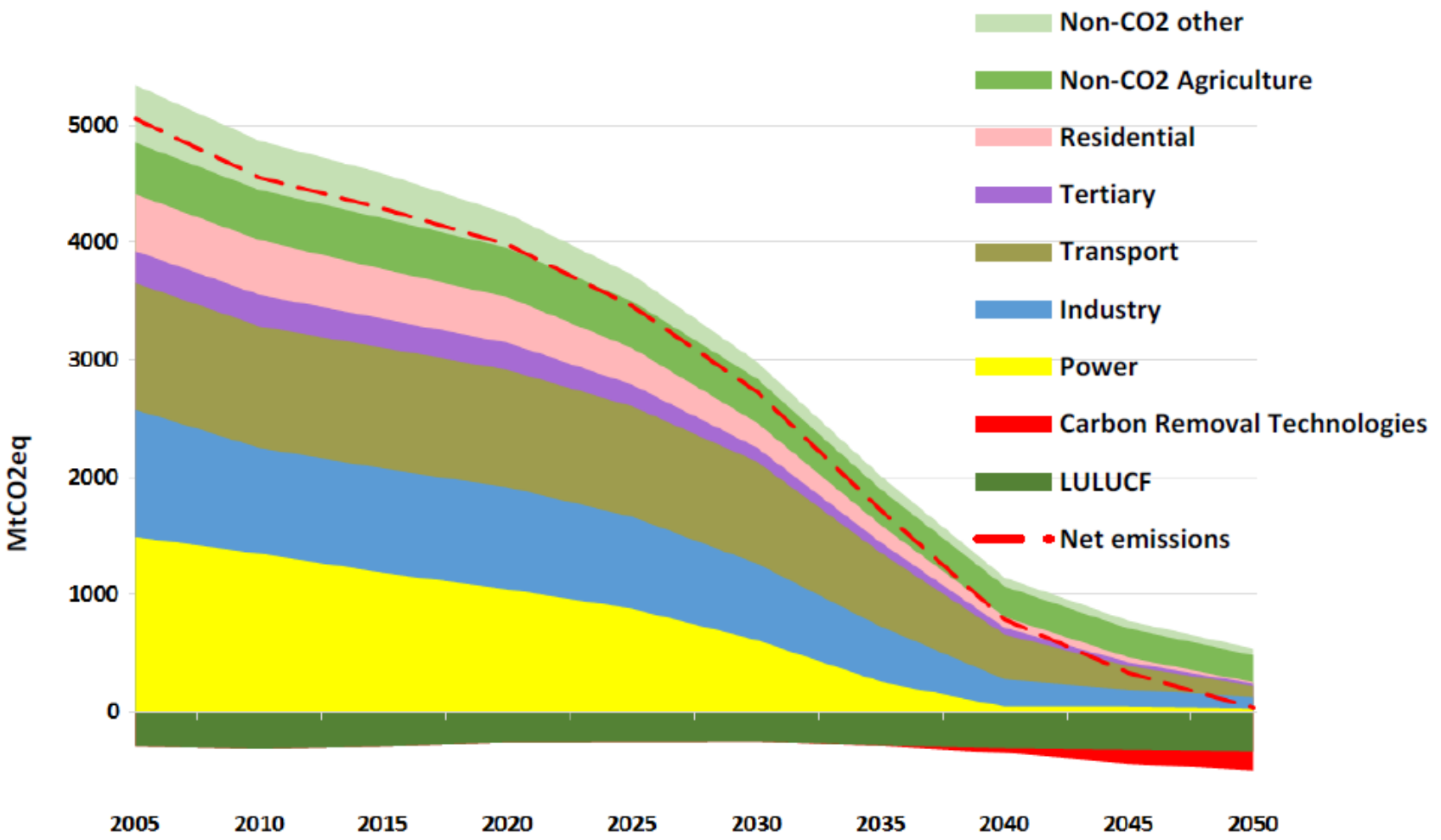
Sector coupling and its impact on future gas market

European Utility Week 2019, Paris

13 November 2019

Contents

To comply with 2050 climate targets the EU must achieve highly ambitious CO2 reductions in all sectors of the economy

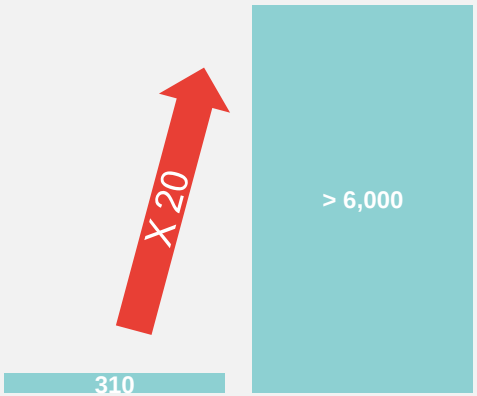


Source: EC (2018), A Clean Planet for all - A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy, COM(2018) 773 final Brussels, 28.11.2018,

The three big challenges of decarbonisation: Supply, storage and transport of large amounts of (mostly renewable) energy …

1 REN **supply**

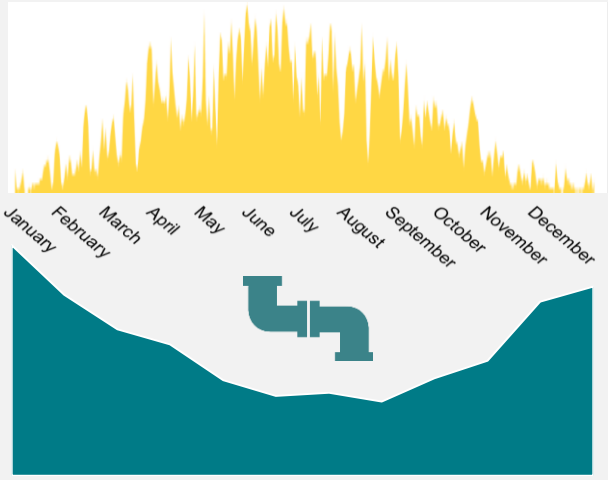
Final energy demand served by electricity from wind and solar (TWh/a) in EU28*



Need for renewable energy generation will be substantial, creating the challenge of finding appropriate and accepted **generation locations** within Europe

2 Energy **storage**

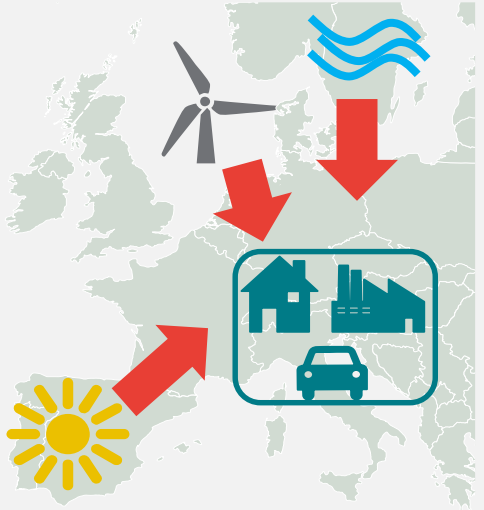
Schematic annual profile of **PV generation**



Monthly average **gas load** in 8 countries analysed

Intermittent renewables and seasonal heat demand **require vast seasonal energy storage**

3 Energy **transport**



Effective **energy transport and distribution** is crucial when exploring more and more renewables

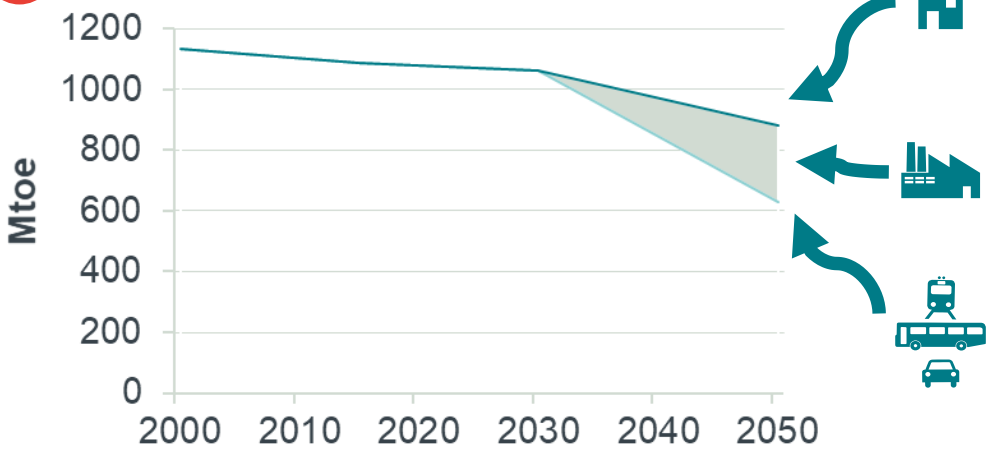
Source: Frontier Economics

… and (low carbon) gas can contribute in all three areas

Source: Frontier Economics (2019):The value of gas infrastructure in a climate neutral Europe, https://www.frontier-economics.com/media/3120/value-of-gas-infrastructure-report.pdf

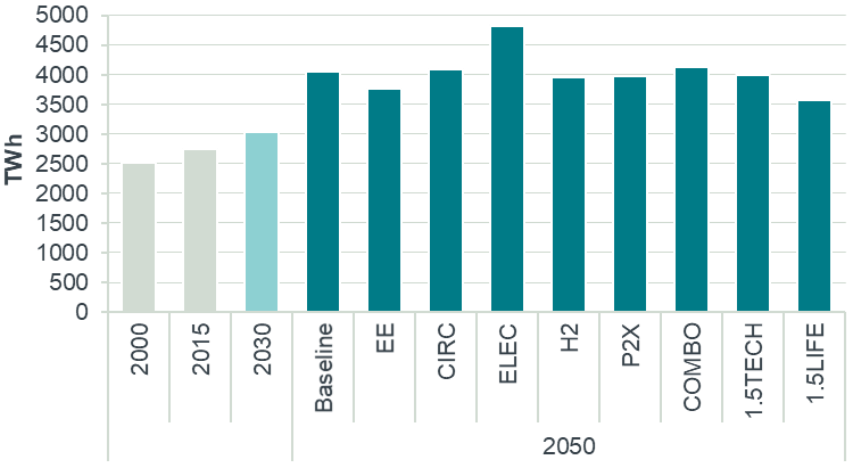
Despite the uncertainties, scenario studies featuring deep decarbonisation consistently find a long-term role for gases…

1 EU final energy demand is expected to fall



Source: Frontier Economics and CE Delft, based on EC (2018)

2 Electricity demand is expected to increase

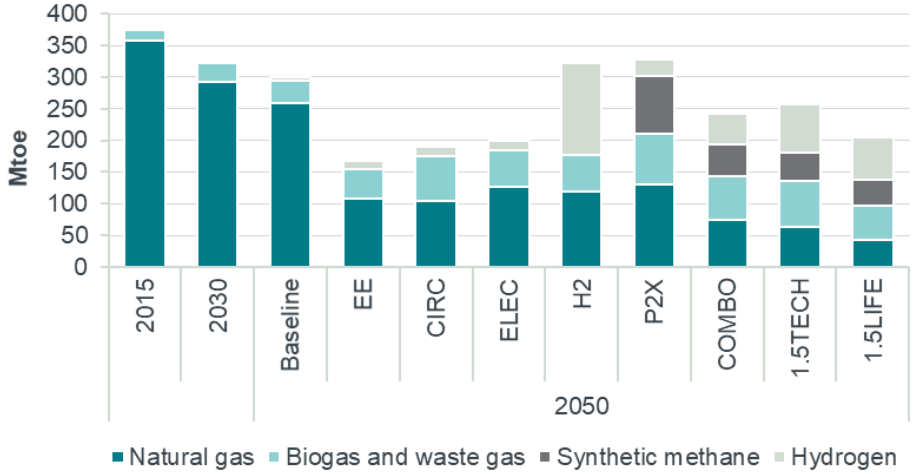


Source: Frontier Economics, based on EC (2018)

3 More of that electricity will come from renewables – implying a greater need for energy system flexibility

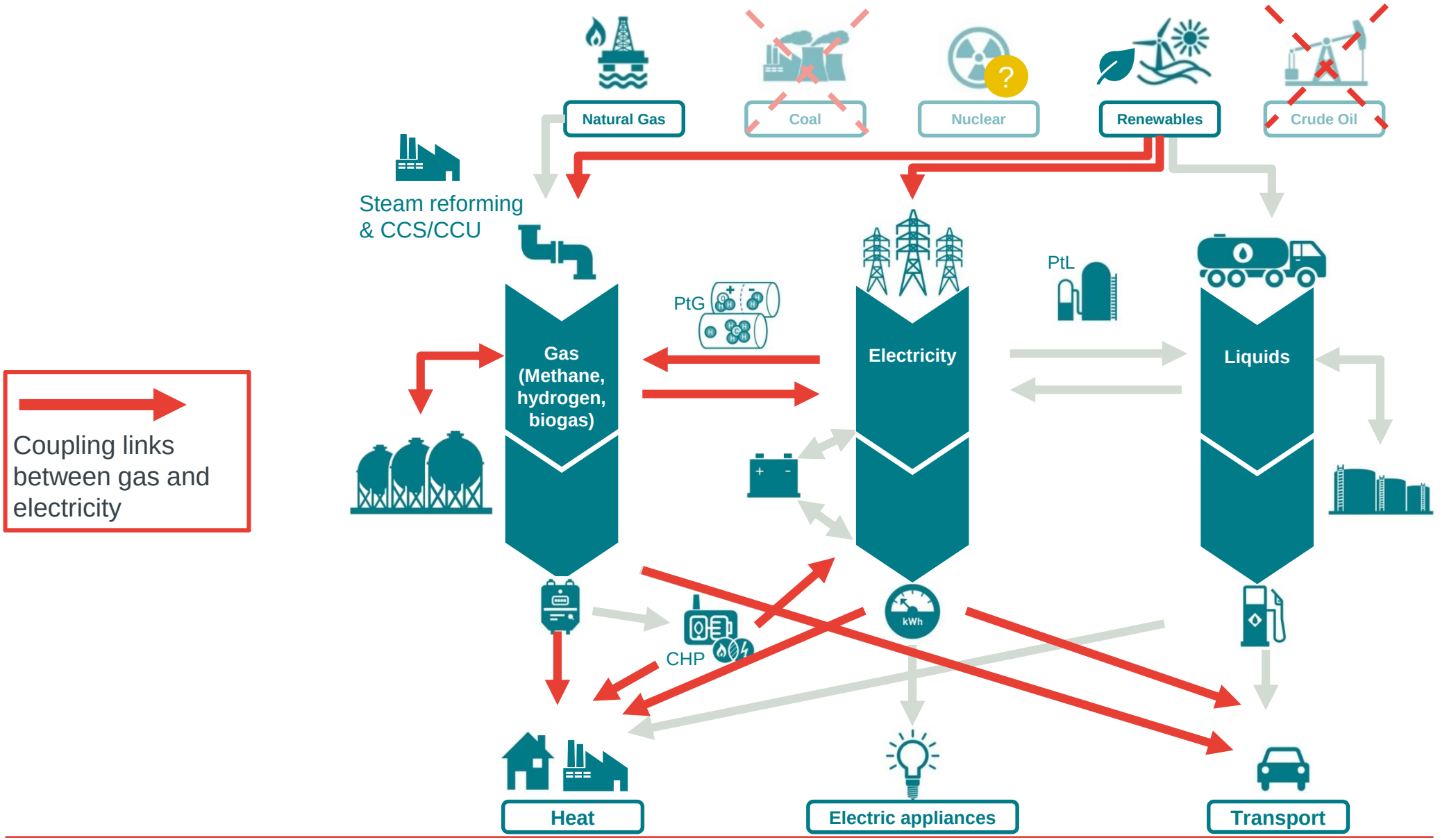
Source: Frontier, based on sources indicated. Projected 2050 RES-E share of electricity supply.

4 So no surprise that studies show a role for gases



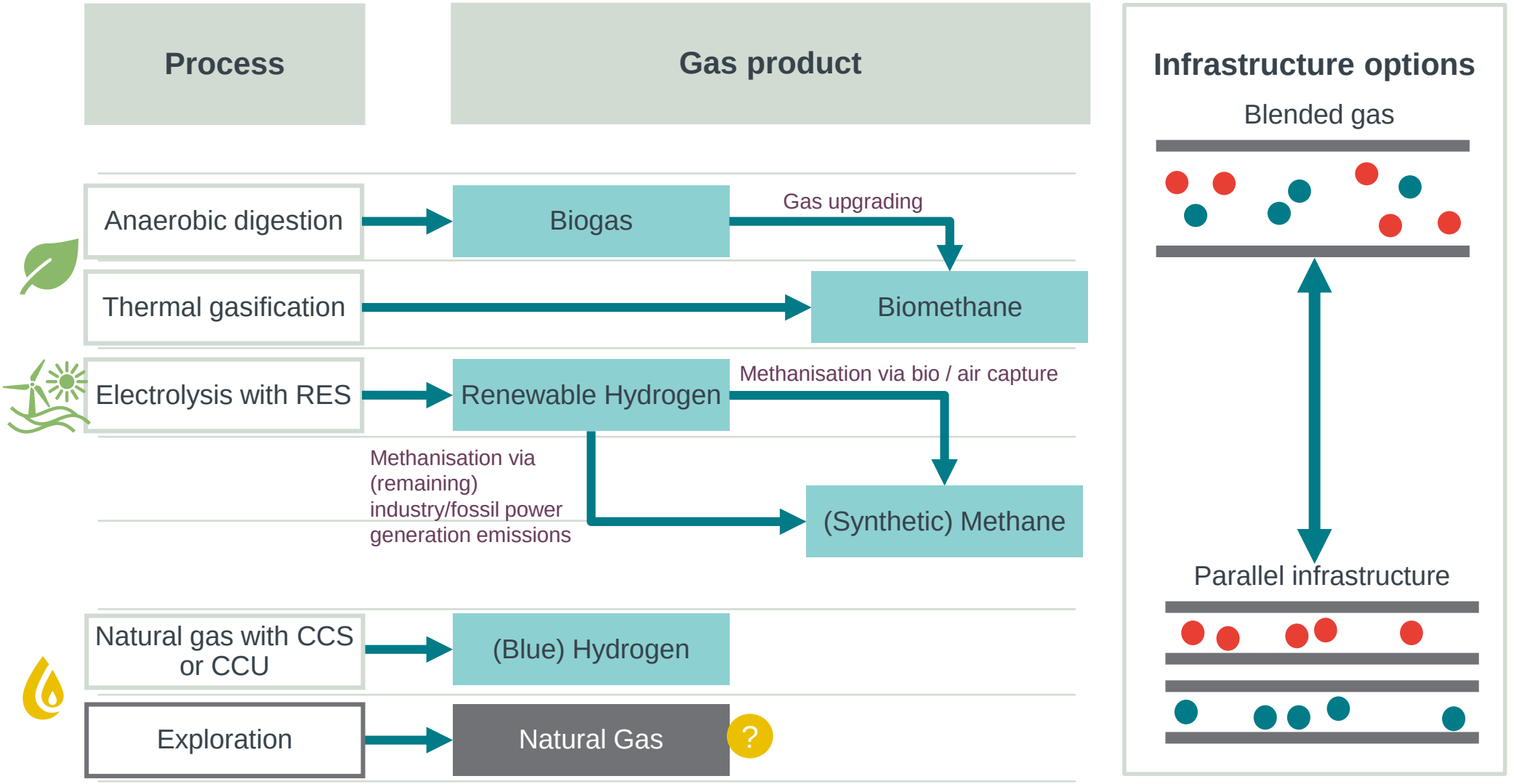
Source: Frontier Economics and CE Delft, based on EC (2018)

… and increasing interaction between electricity and gas, as well as between different types of gases



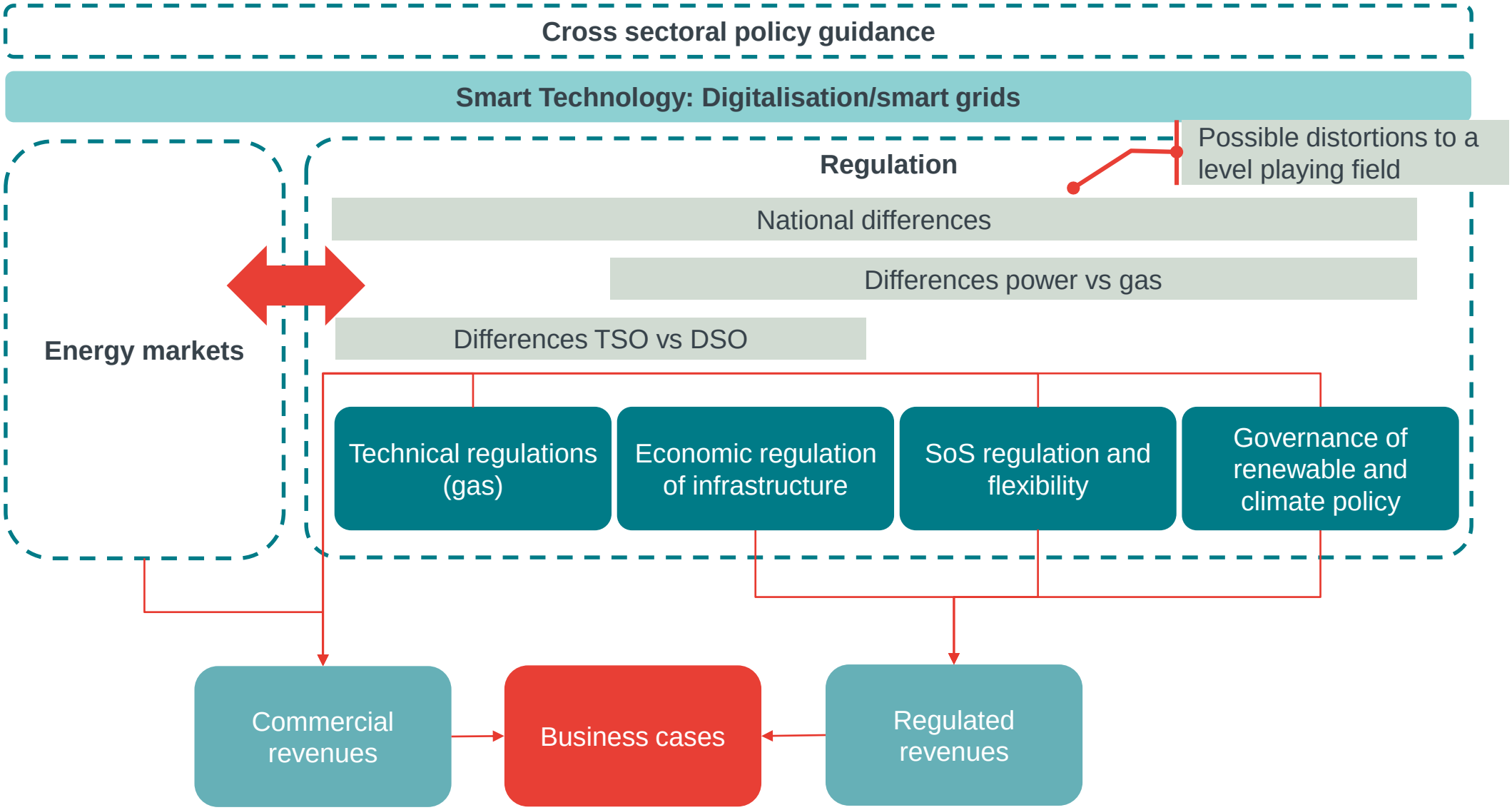
Source: Frontier Economics and CE Delft (2019): https://ec.europa.eu/info/sites/info/files/frontier_-_potentials_of_sector_coupling_for_decarbonisation.pdf

Gas supplies will need to be increasingly renewable / low-carbon – with natural gas potentially helping the 'transition'



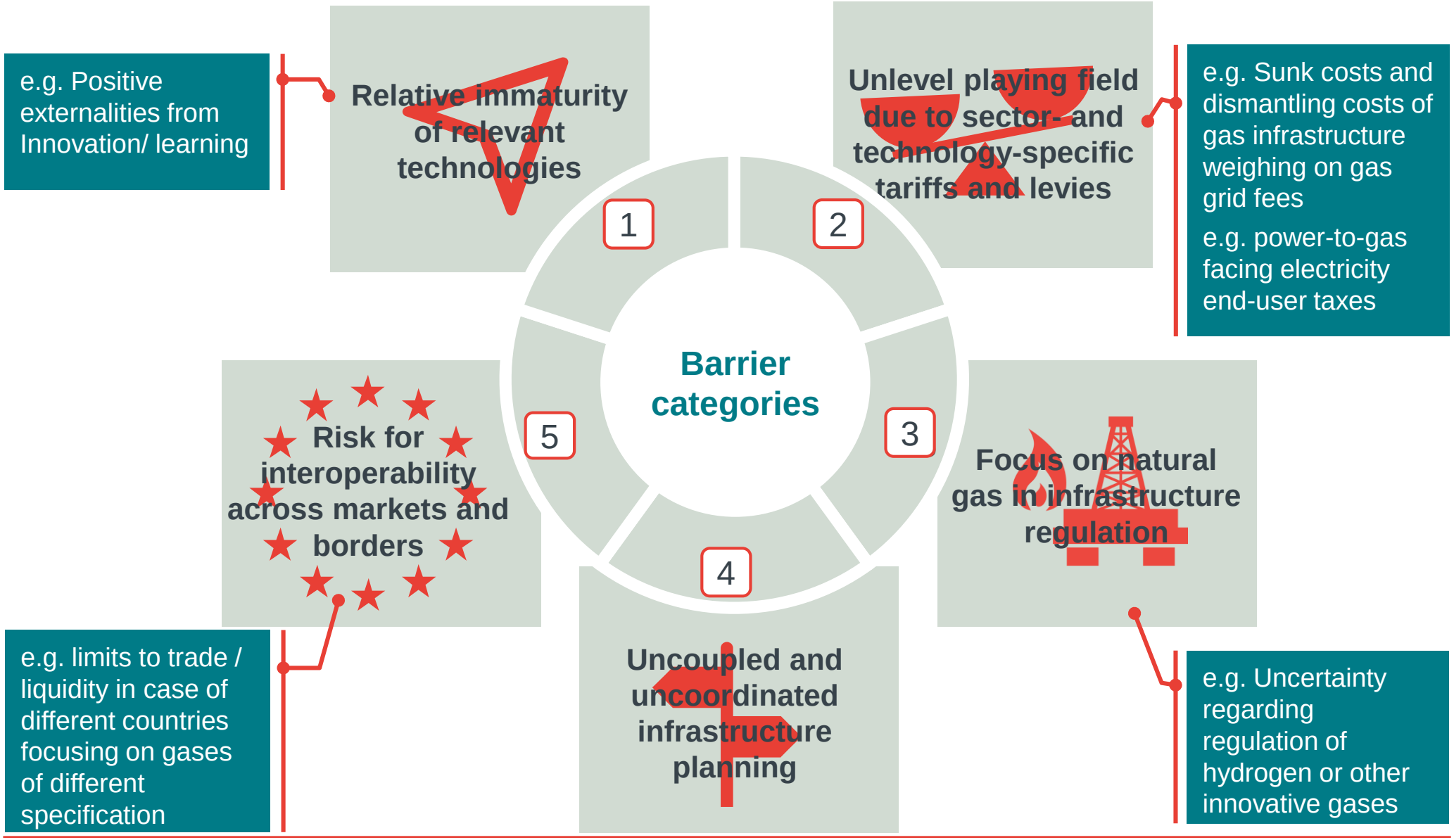
Source: Frontier Economics and CE Delft (2019)

Market design and regulation need to be consistent and technology neutral to support appropriate sector coupling business cases



Source: Frontier Economics and CE Delft (2019): https://ec.europa.eu/info/sites/info/files/frontier_-_potentials_of_sector_coupling_for_decarbonisation.pdf

Barriers and gaps have been identified in five areas



A range of solutions helps addressing the barriers and gaps

Barriers

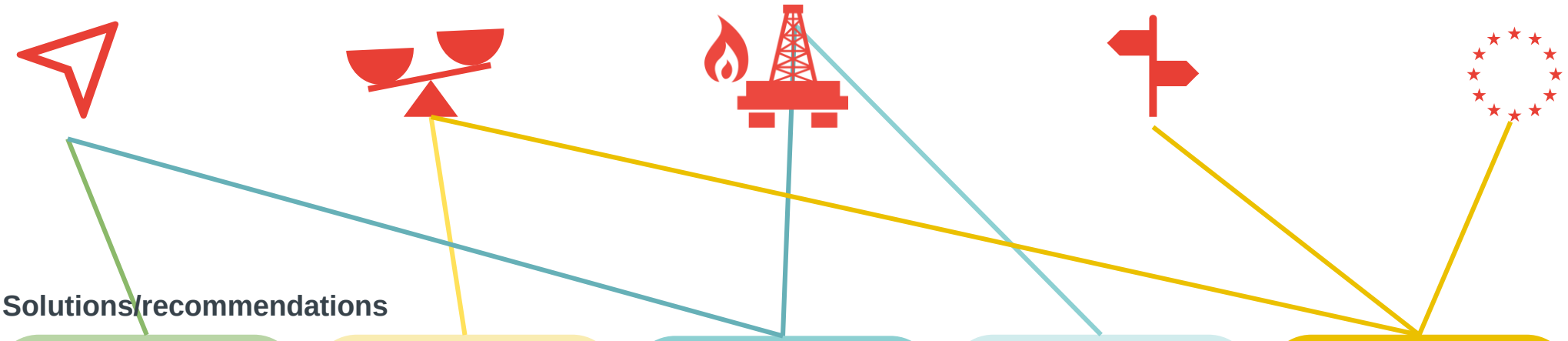
1 Relative immaturity of relevant technologies

2 Unlevel playing field due to sector- and technology-specific tariffs and levies

3 Focus on natural gas in infrastructure regulation

4 Uncoupled and uncoordinated infrastructure planning

5 Risk for interoperability across markets and borders



Solutions/recommendations

Climate / renewable policy and support for innovation

Regulatory toolbox to address cost recovery issues

Fit for purpose market design and charging arrangements

Clarity on access to infrastructure

Co-ordinated infrastructure planning and decommissioning

Regulatory clarification – role of grid operators in PtG for R&D/pilots

Clarify who is best placed to bear the cost of stranded assets (and other legacy costs, e.g. for RES support)

Clarify under what conditions Gas Directive rules on TPA / unbundling apply to hydrogen (and other gases)

Two key dimensions incentivise investment / operation: price or subsidy (or a hybrid version), and level of application

Climate / renewable policy and support for innovation

		Carbon price	Hybrid carbon price & subsidy regime	Subsidy regime
		Price paid for emitting CO2 varying by gas CO2 content	Mix of carbon price and subsidy scheme for different types of gases	Subsidy paid to low carbon gas producers based on CO2 abated
Applied at production / import level	Producers or importers pay CO2 price or receive support payments	Design 1	Design 5	Design 3 (tenders for low carbon gas)
Applied at sale to final customer	Party selling to final customers pays CO2 price or has obligation to purchase low carbon	Design 2	Design 6	Design 4 (certificate scheme)

Reflects the reality of most support for RES-E today

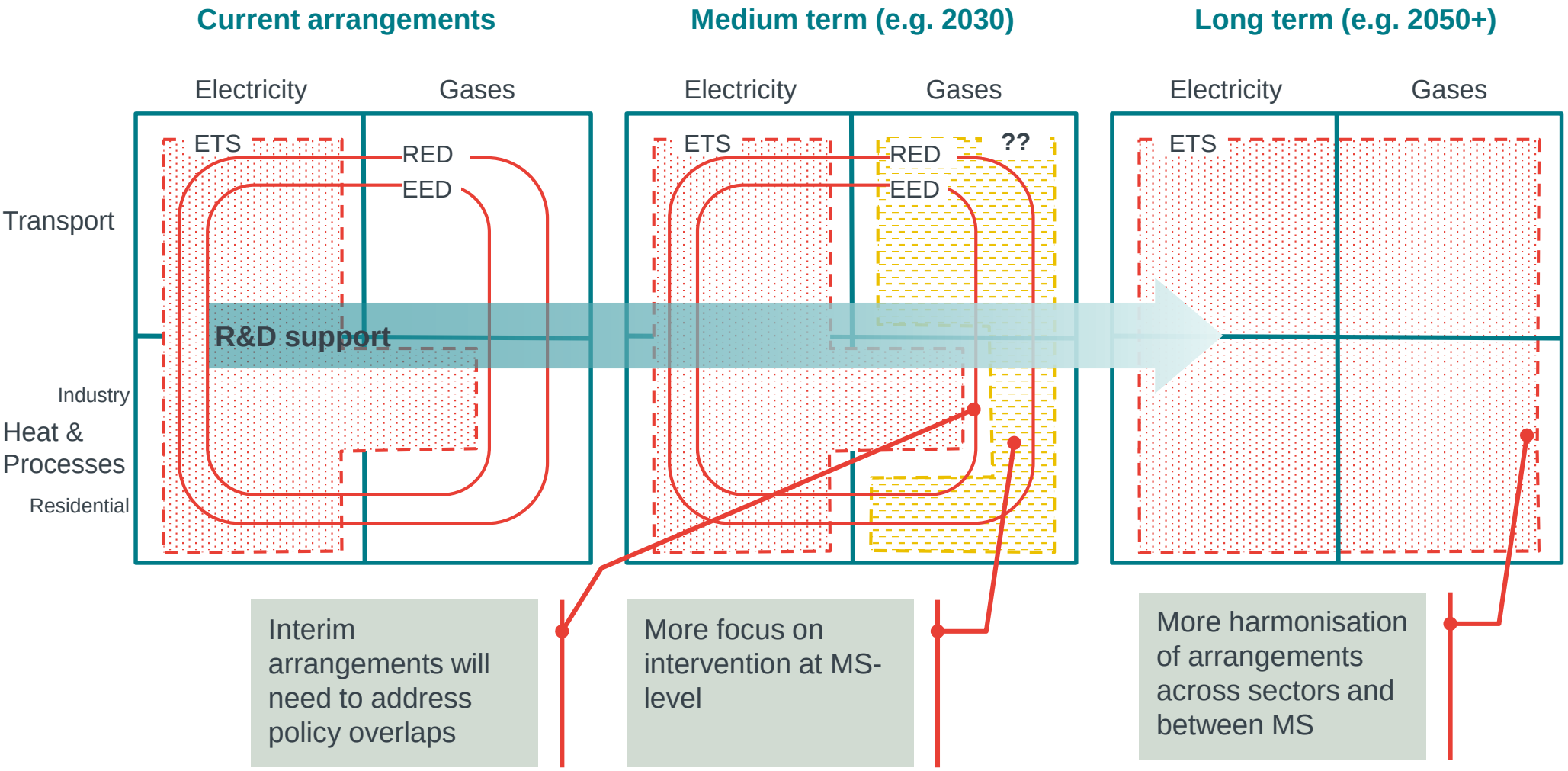
Interim period to 2030

Enduring regime to 2050

Source: adapted from Frontier report for EFET (interim results)

Over the longer-term, it is possible to envisage a more stringent and integrated climate policy

Climate / renewable policy and support for innovation



For consistency the climate policy framework could and should extend to liquid fuels

Source: adapted from Frontier report for EFET (interim results)