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Energy Systems Integration using Hydrogen

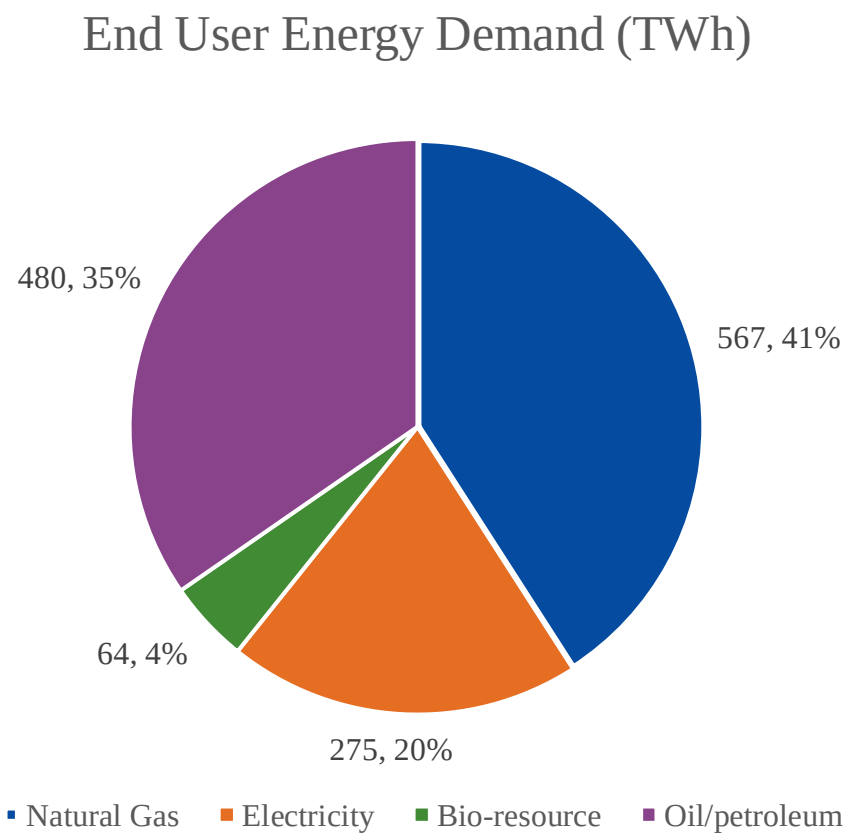
The Role of Scotland's Gas Network in reaching Net-zero

Adam Frew

11 March 2022

UK Natural Gas Consumption

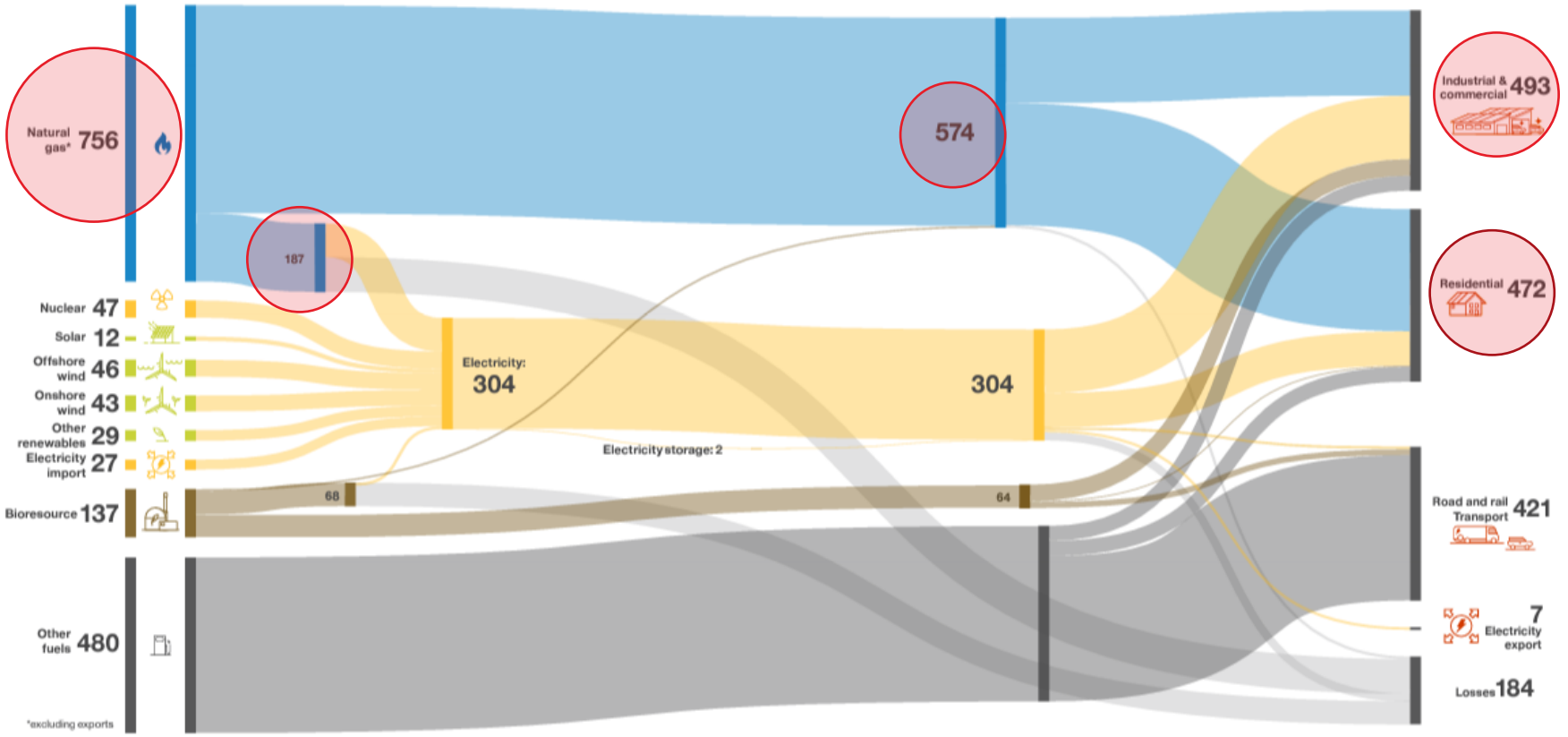
What do we use it for?



2020 Energy Flows
Source: National Grid ESO Future Energy Scenarios July 2021

UK Natural Gas Flows

What do we use it for?



2020 Energy Flows
Source: National Grid ESO Future Energy Scenarios July 2021

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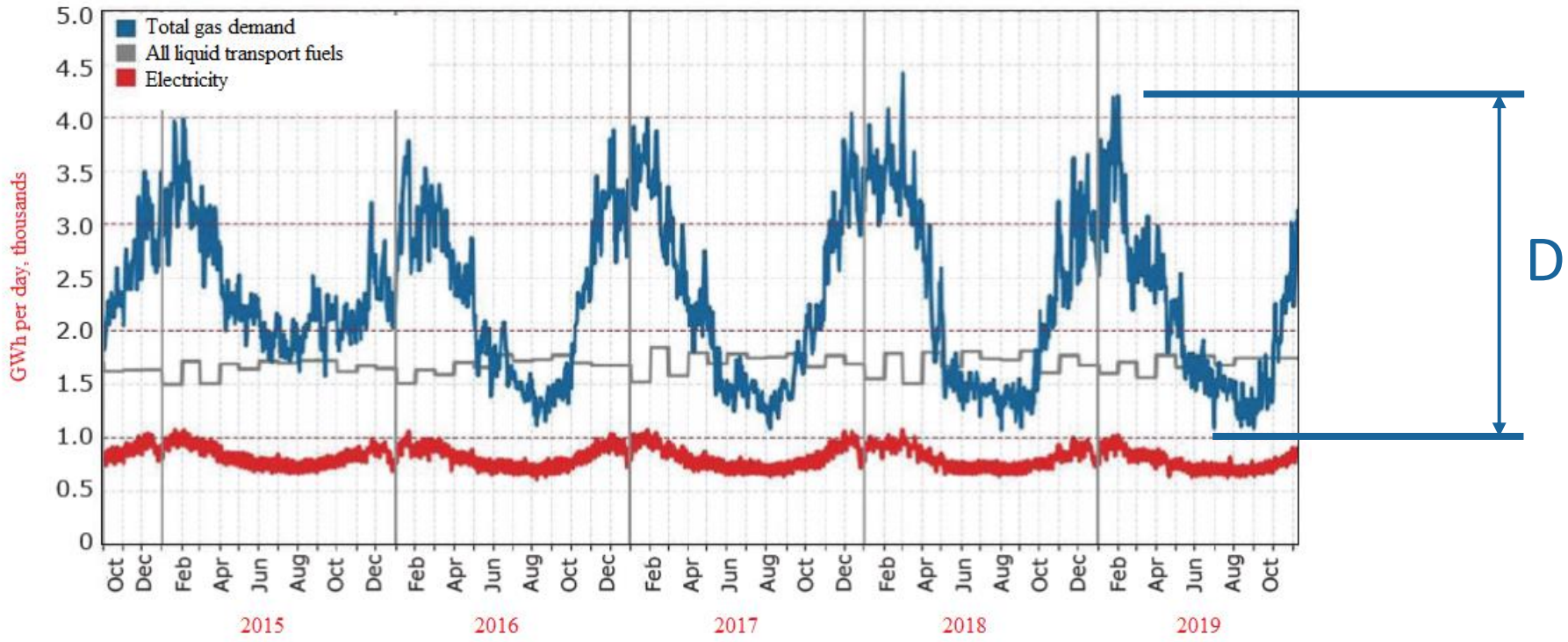
Scotland's Gas Network

Annual Seasonality of Gas Demand



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A Decarbonised Gas Network

Role and Rationale Considerations

- Decarbonising existing end-users of natural gas via electrification may not be appropriate, desirable or practicable.
- A gas network can both store and transport energy, reducing the need to over-size renewable power generation.
- A decarbonised network could be expanded upon to facilitate transport, power and industrial decarbonisation.
- Scotland's abundant renewable energy could be exported via gas pipelines as hydrogen to nearby markets.
- CO_2 disposal and sequestration from difficult-to-decarbonise and negative emitters could be achieved via gas networks.

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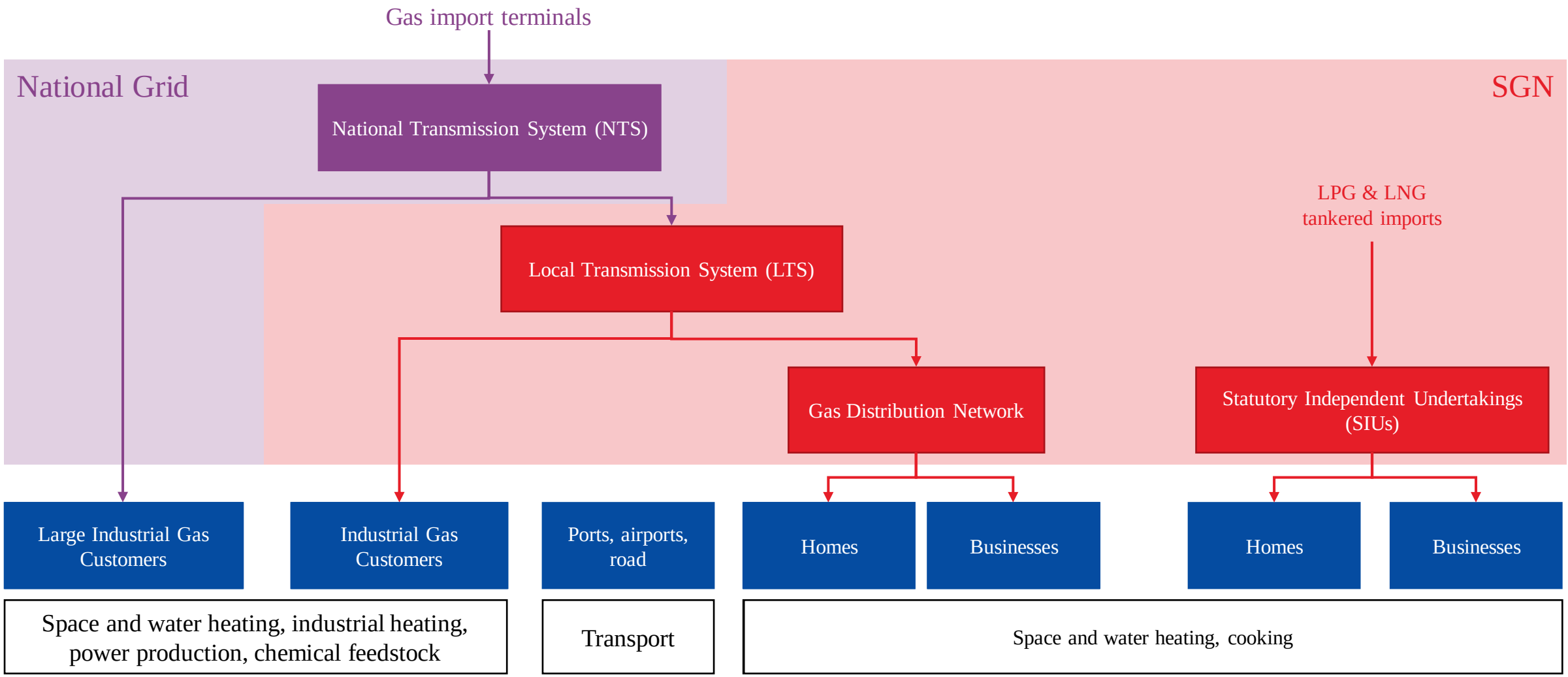
Scotland's Gas Network

Gas Transport Overview



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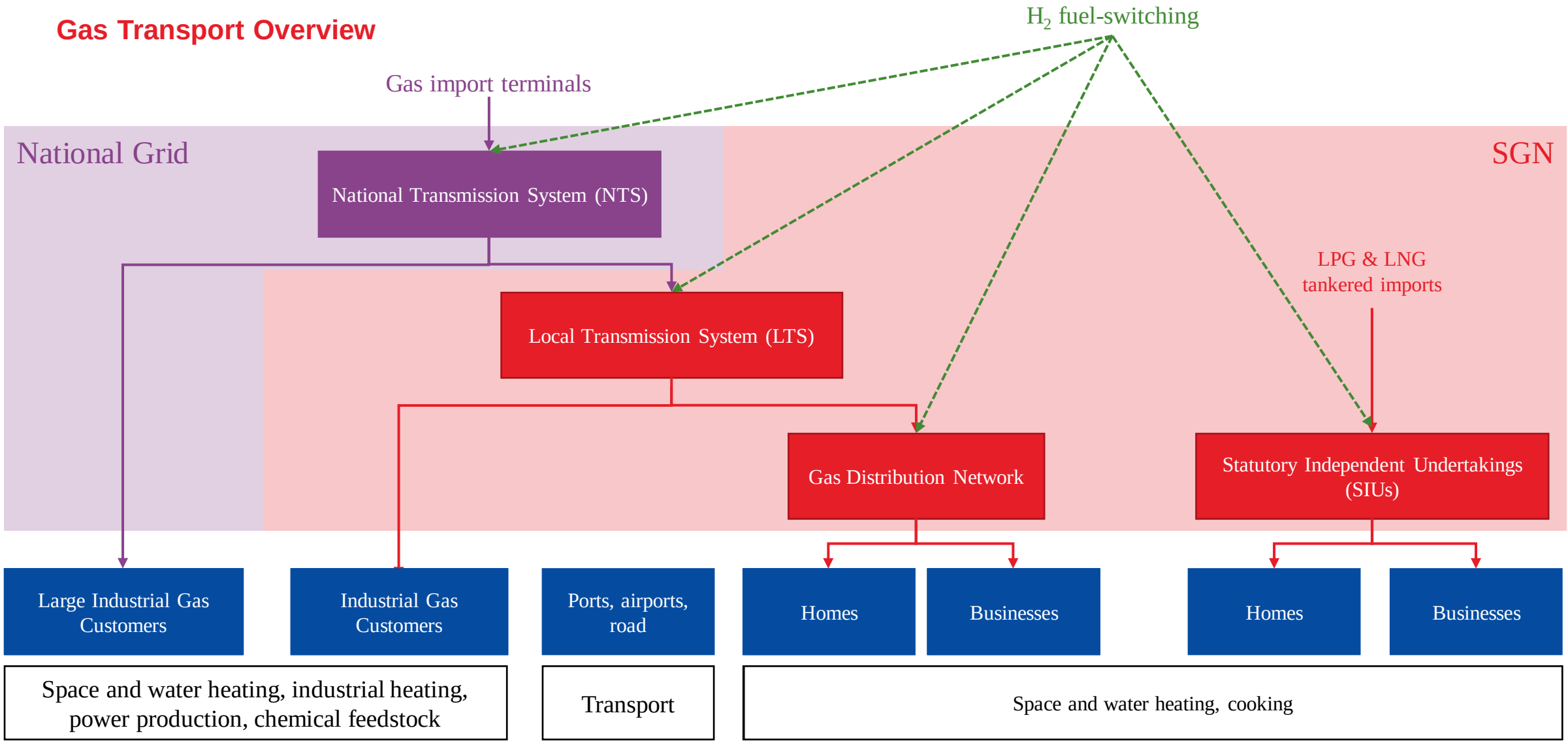

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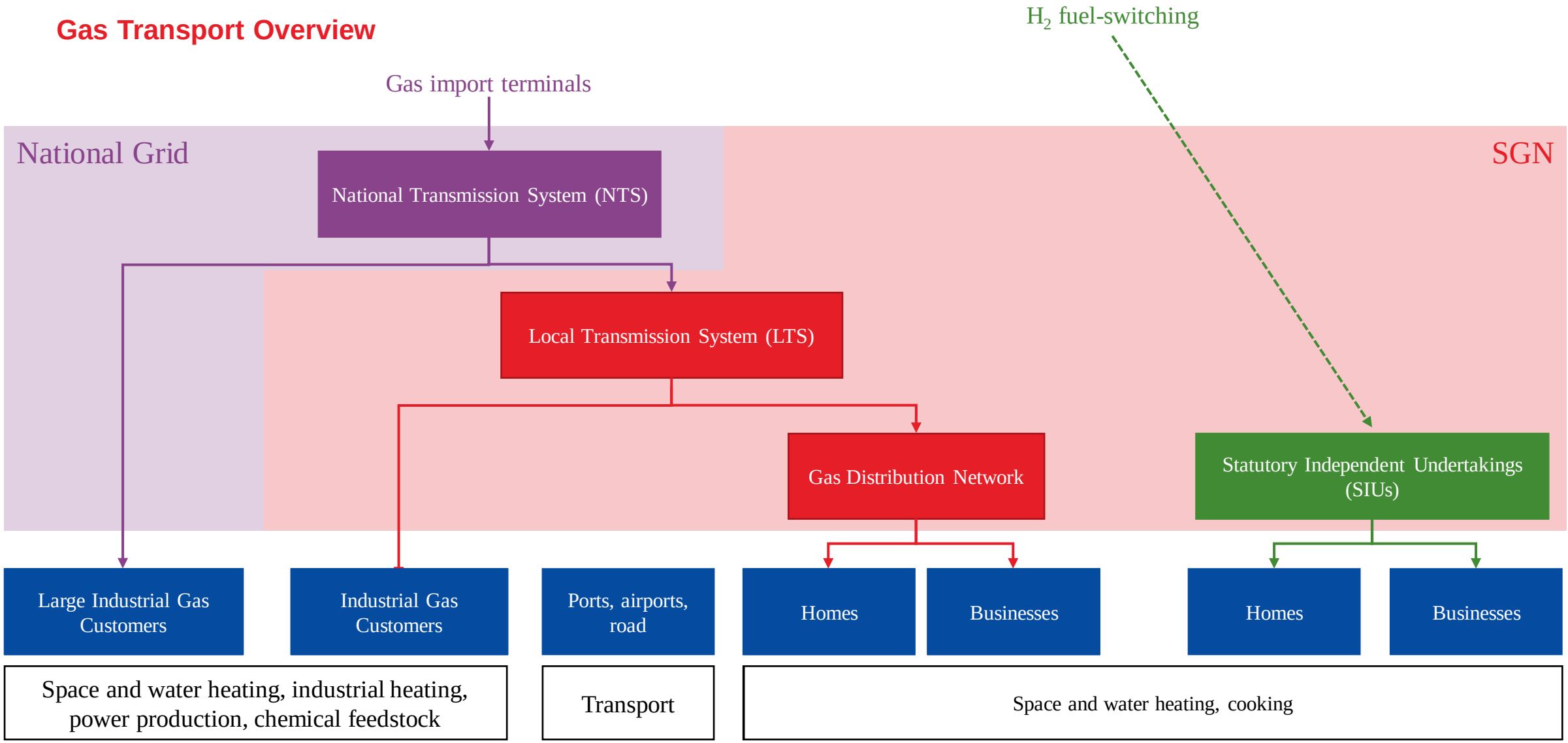
Gas Transport Overview



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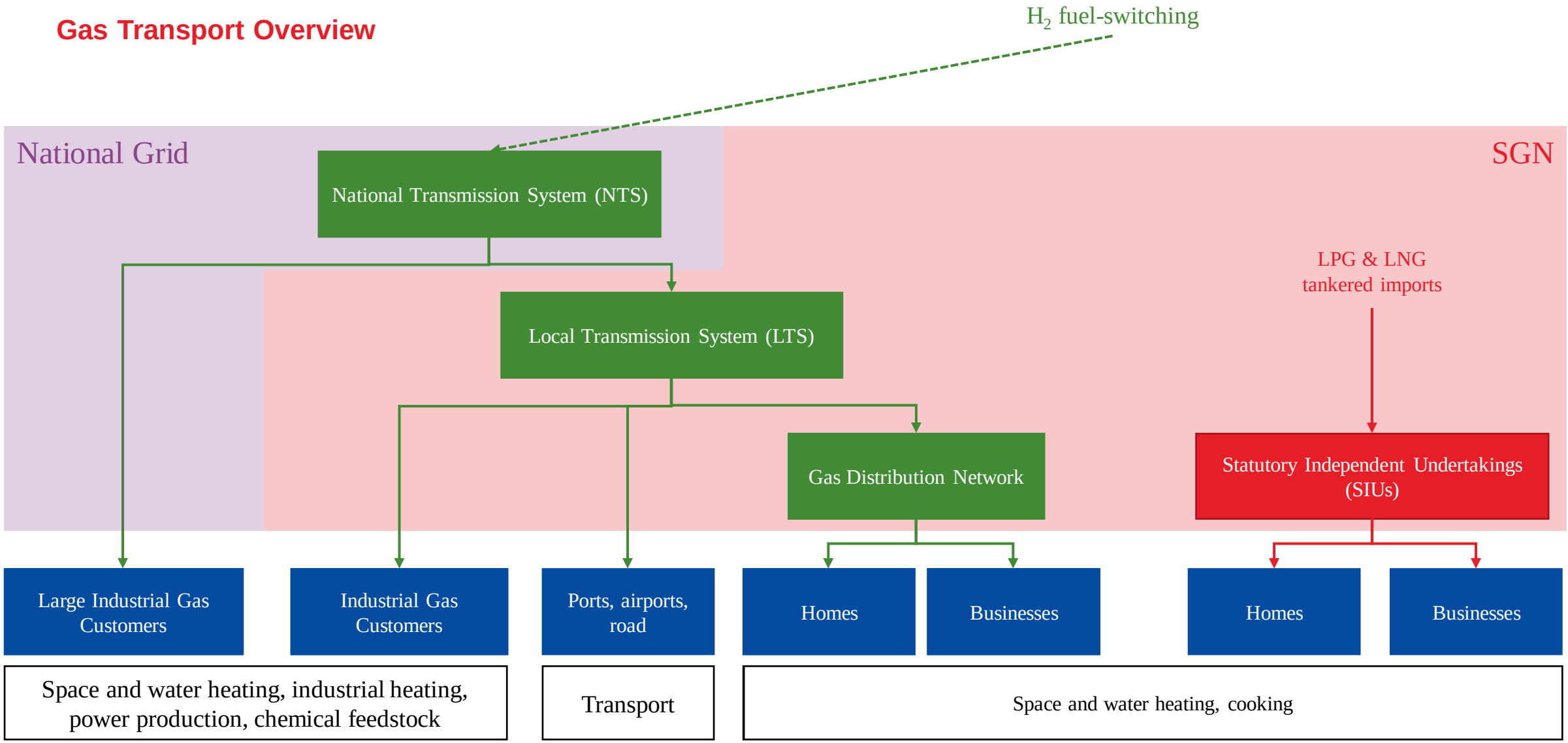

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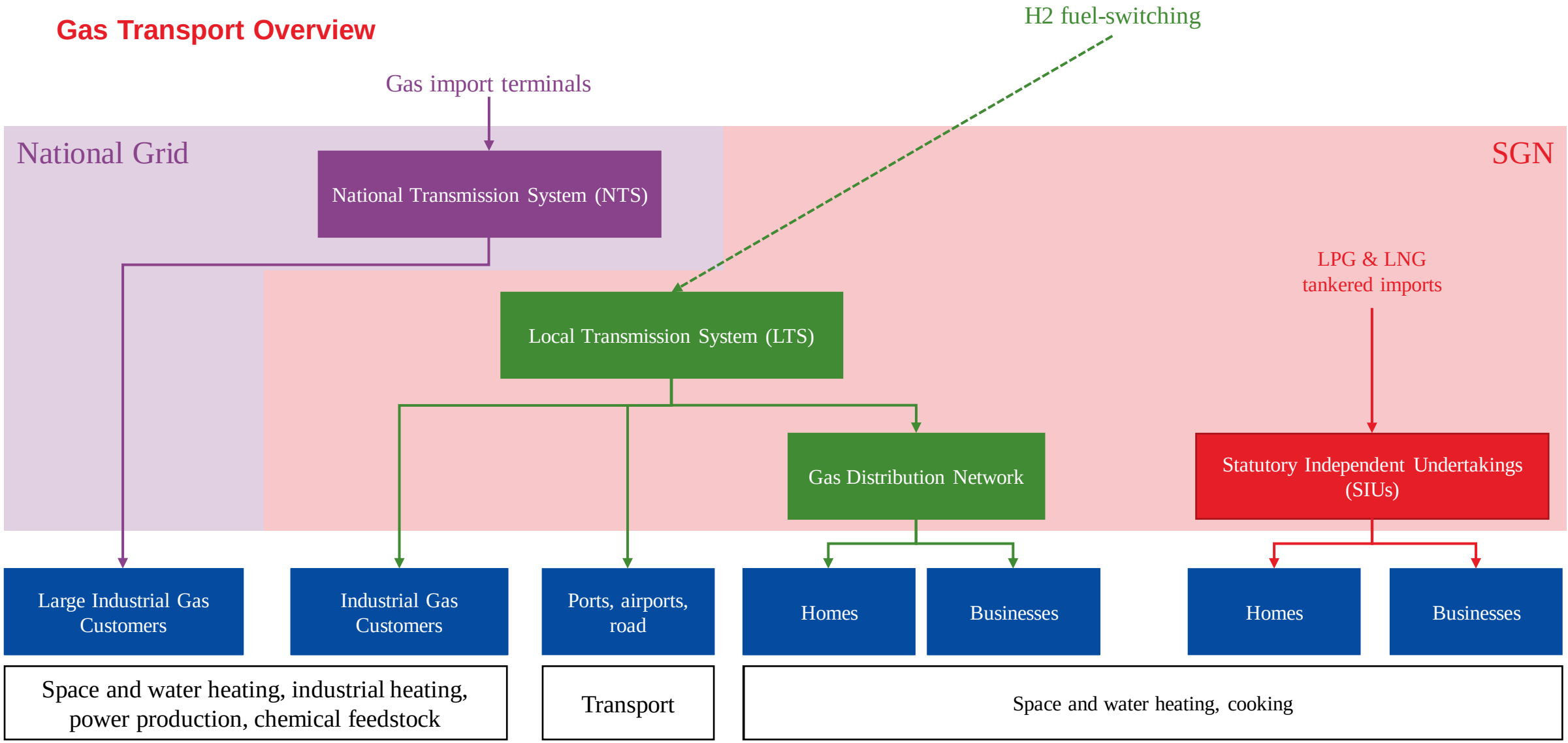
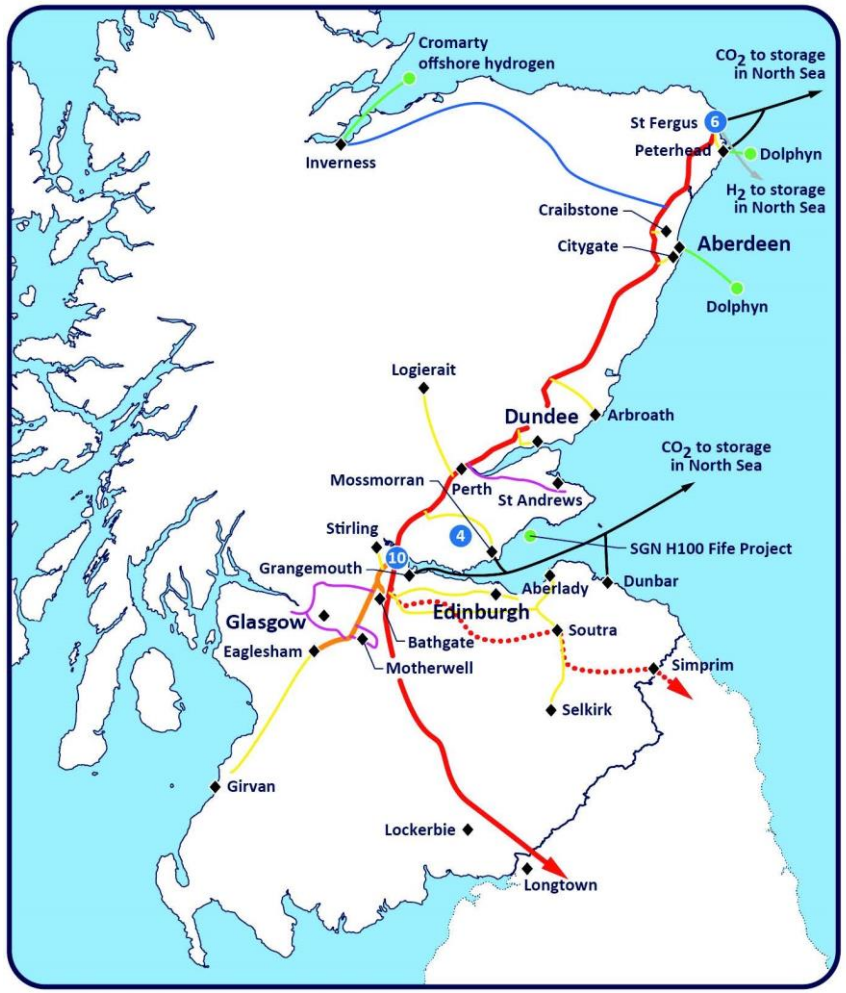
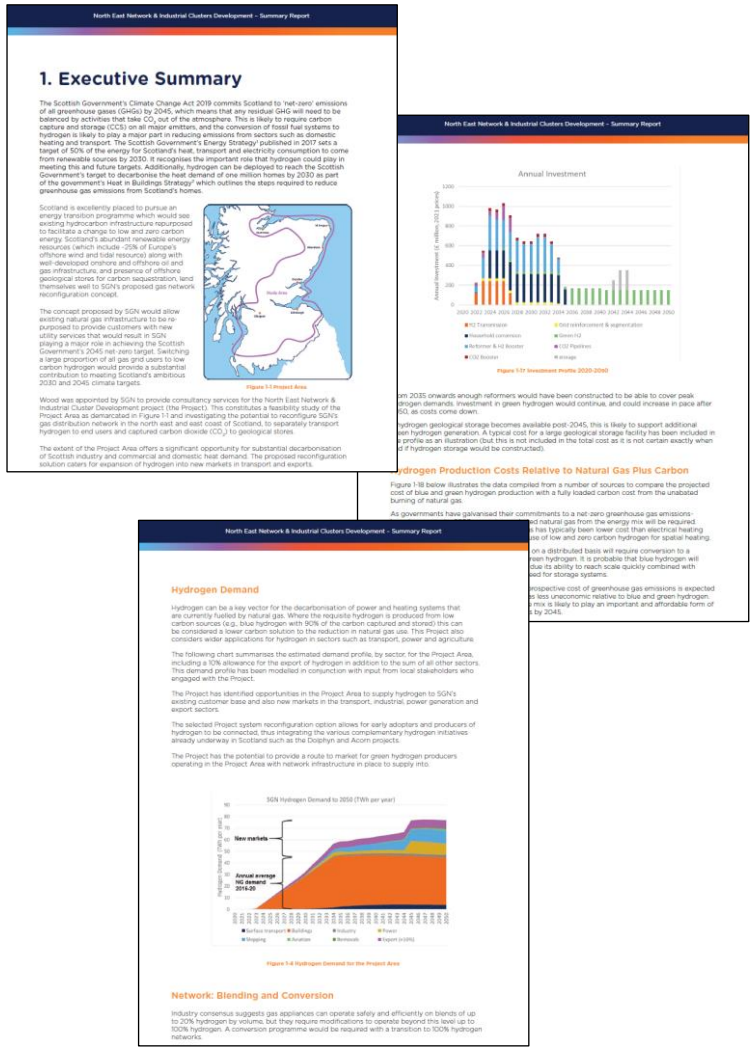


Initiatives Underway

SGN North-East Network & Industrial Clusters Project





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Implementation

Things to Consider

- Should we pursue hydrogen blending or jump to 100% conversion?
- Does separate ownership and operation of the NTS and GDNs help or hinder implementation?
- How does a GB energy system spanning different jurisdictions convert?
- How far, if at all, should we rely on ‘blue’ hydrogen?
- What is the opportunity for CO_2 disposal as a service?
- How do we ensure future hydrogen producers and consumers can rely on gas networks to facilitate transport?

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