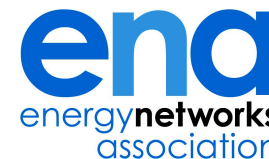


**Energy Networks Association  
Gas Futures Group**

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**Paul Rogers**  
**Chair of the ENA Gas Futures Group**  
**24 November 2010**

# Energy Networks Association Gas Futures Group



- **ENA Gas Futures Group established in Oct 2009**
  - to consider the future of gas transmission and distribution networks
  - the group's first objective was to gain an understanding, and conduct appropriate analysis, to determine potential gas supply / demand scenarios
  - scenario work to inform stakeholders, including Customers, Ofgem and Government in line with principles developed by Ofgem under the RPI-X@20 Review
- **Membership:**
  - National Grid Gas Transmission and Distribution, Northern Gas Networks, Scotia Gas Networks, Wales and West Utilities and Inexus
- **Redpoint commissioned to develop future gas scenarios to 2050 which meet government emission targets**
- **Final Report launched by Energy Minister Charles Hendry MP on 15 November 2010**

# Key messages

- There are credible and robust scenarios in which gas could play a major ongoing role in the GB energy mix while meeting both 2020 and 2050 environmental targets, incorporating:
  - deployment of CCS, allowing transmission-delivered gas to maintain its share of generation
  - biomethane, together with roll-out of district heating and / or ‘dual fuel’ systems, allowing distribution-delivered gas to maintain a significant role in heating
- Pathways with ongoing gas use could offer a cost-effective solution for a low carbon transition relative to those with higher electrification
- Gas is also a key transition fuel, and in 2050 can enhance diversity of energy supply and provide additional flexibility with respect to system balancing



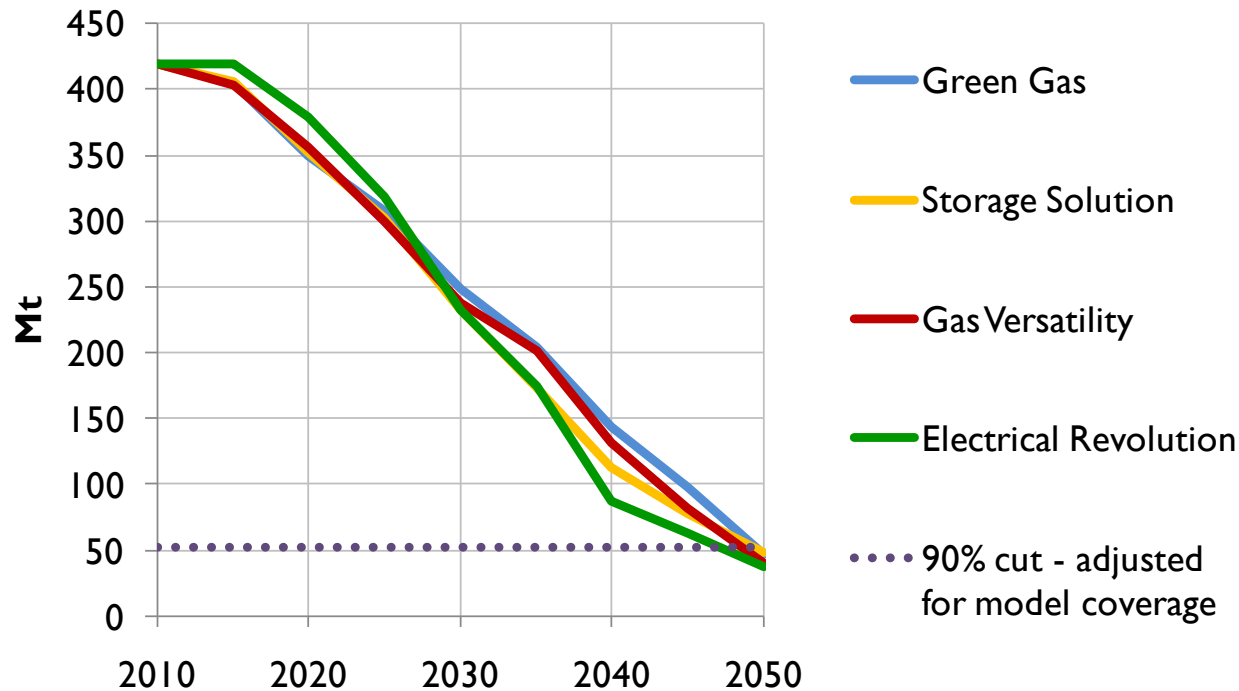
- There is significant value in retaining the option for a high gas future, given the level of uncertainty relating to technology development and costs across sectors
- Keeping this option open via maintenance of the existing gas networks is relatively inexpensive in comparison to other costs associated with system evolution

# Scenario matrix summary table

		<b>DIMENSION 2: Commercialisation of Electricity and Heat Storage Technologies</b>	
		<b>Low / Slow</b>	<b>High / Rapid</b>
<b>DIMENSION 1: Commercialisation of Carbon Capture and Storage</b>	<b>High / Rapid</b>	<p><b>GREEN GAS</b></p> <p><i>Transmission-delivered gas 2050: HIGH</i></p> <ul style="list-style-type: none"> <li>- gas + CCS</li> <li>-some unabated gas for balancing</li> </ul> <p><i>Distribution-delivered gas 2050: HIGH</i></p> <ul style="list-style-type: none"> <li>- 'dual fuel' world for domestic heating</li> <li>- biomethane injection</li> <li>- district heating + CCS</li> <li>- some use of CNG in transport</li> </ul>	<p><b>STORAGE SOLUTION</b></p> <p><i>Transmission-delivered gas 2050: HIGH</i></p> <ul style="list-style-type: none"> <li>- gas + CCS</li> <li>- small amount of unabated gas</li> <li>-additional balancing via electricity storage and DSR</li> </ul> <p><i>Distribution-delivered gas 2050: LOW</i></p> <ul style="list-style-type: none"> <li>- heating and transport largely electrified</li> <li>- heat storage used to balance seasonal heat</li> </ul>
	<b>Low / Slow</b>	<p><b>GAS VERSATILITY</b></p> <p><i>Transmission-delivered gas 2050: LOW</i></p> <ul style="list-style-type: none"> <li>- renewables / nuclear dominate</li> <li>-Some unabated gas for balancing</li> </ul> <p><i>Distribution-delivered gas 2050: MEDIUM</i></p> <ul style="list-style-type: none"> <li>- biomethane injection at max potential</li> <li>- some use of CNG in transport</li> </ul>	<p><b>ELECTRICAL REVOLUTION</b></p> <p><i>Transmission-delivered gas 2050: NONE</i></p> <ul style="list-style-type: none"> <li>- renewables / nuclear dominate</li> <li>-balancing via electricity storage, flexible nuclear, interconnection and DSR</li> </ul> <p><i>Distribution-delivered gas 2050: NONE</i></p> <ul style="list-style-type: none"> <li>- heating and transport largely electrified</li> <li>- heat storage used to balance seasonal heat</li> </ul>

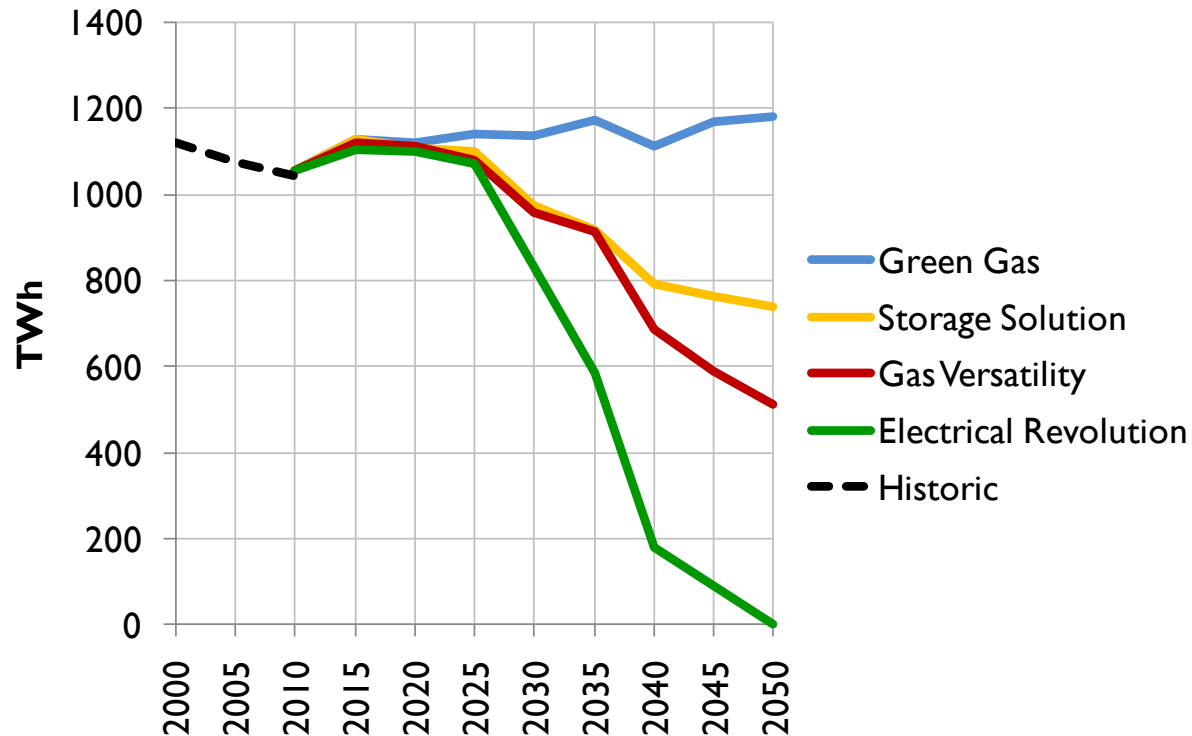
# Annual total carbon dioxide emissions

All scenarios meet 2050 carbon targets based on a 90% cut in emissions  
Electrical Revolution and Storage Solution have lowest emissions cumulatively –  
Green Gas has the highest



# Annual gas demand by scenario

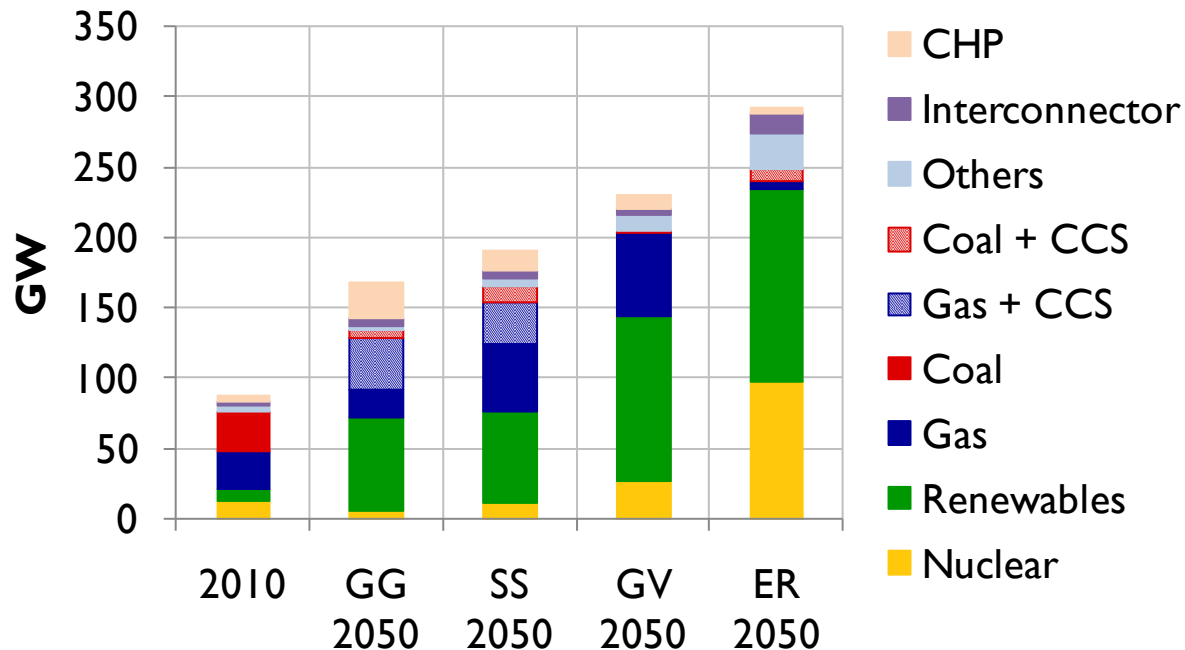
*Four scenarios capture a broad range of trajectories of future gas utilisation, from slight increase above today's level down to zero by 2050*



# Installed generation capacity – 2050

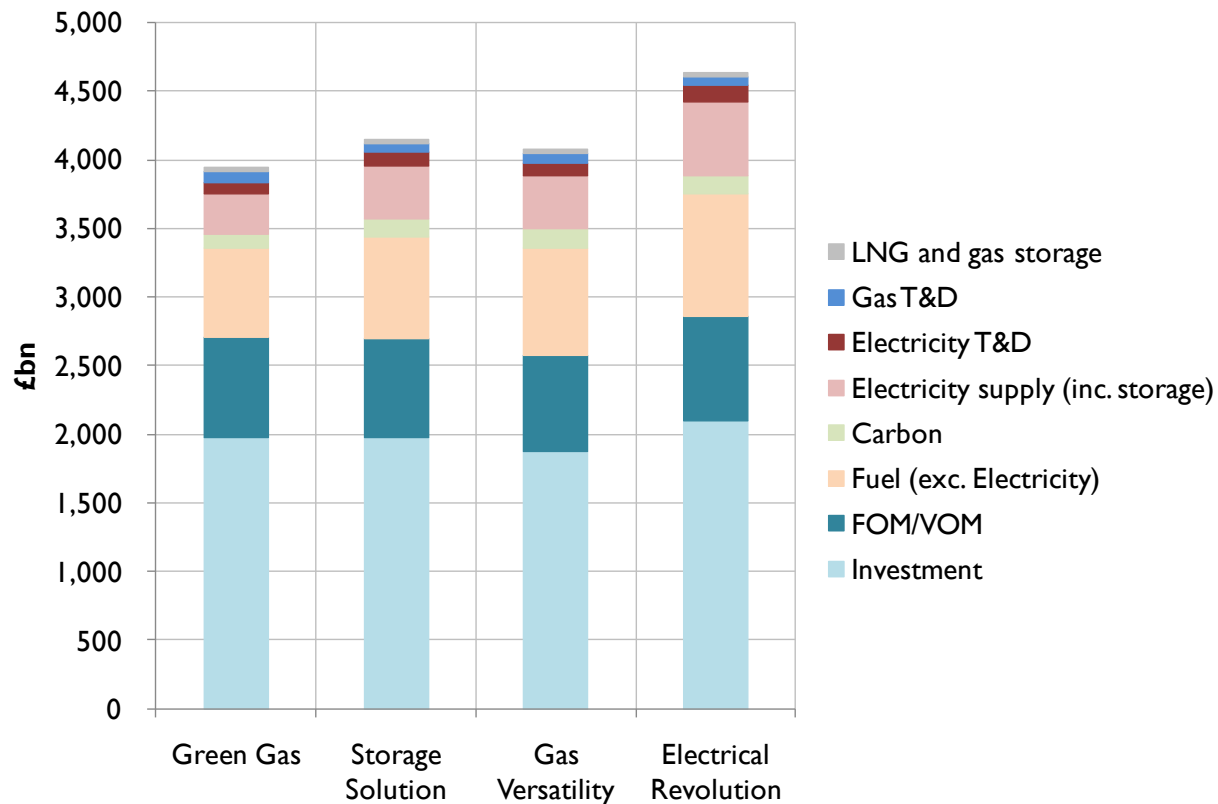
*Significant increases in capacity in all scenarios*

*Installed capacity in Electrical Revolution almost double Green Gas by 2050*



# NPV of system costs – total (baseline)

Total system costs ~£700bn higher in ER relative to GG  
Equates to ~£20k per household or £10k per person



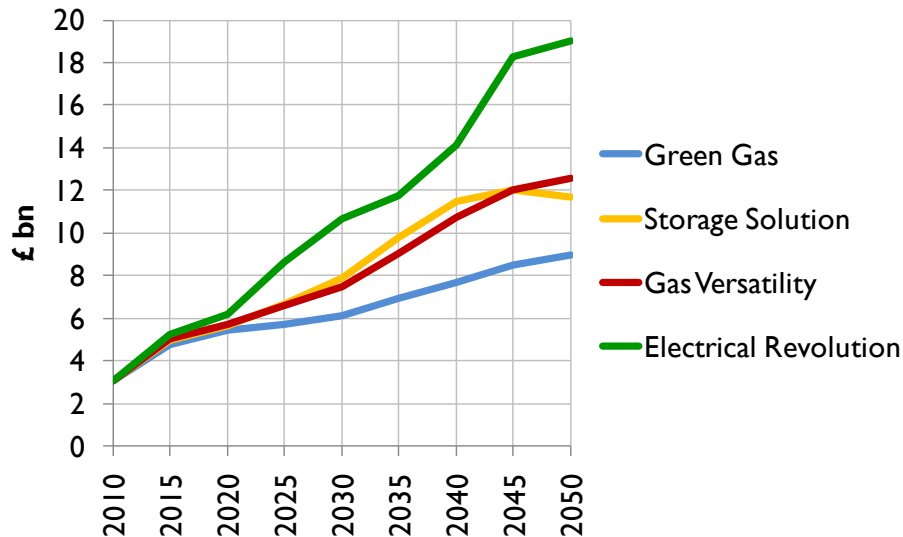


# Annual network costs by scenario

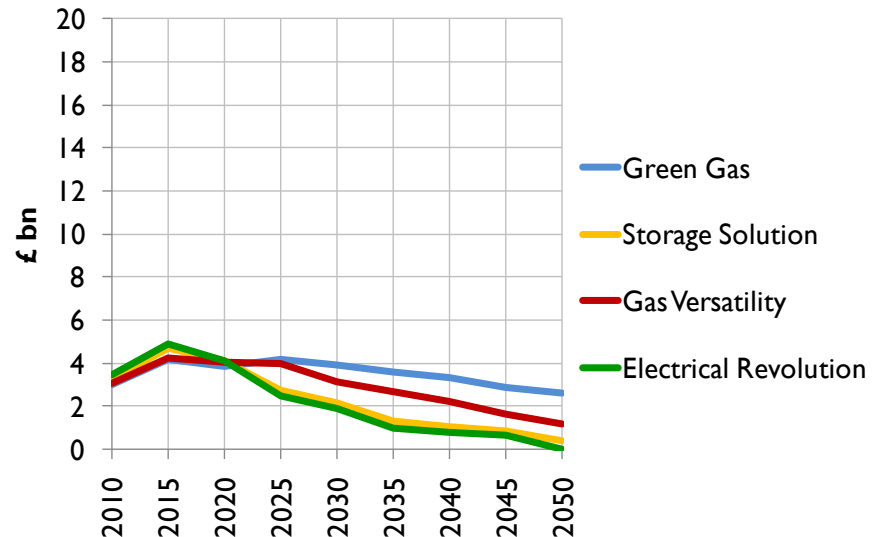
*Costs of electricity networks rise in all scenarios, but particularly in ER due to increased demand*

*Costs of gas T&D fall due to limited requirement for new capex even in high gas scenarios*

### Electricity T&D



### Gas T&D



*Includes capex, opex, connections, business rates, and decommissioning costs*