



film:

<http://www.northerngasnetworks.co.uk/2016/07/watch-our-h21-leeds-city-gate-film/>

Executive summary:

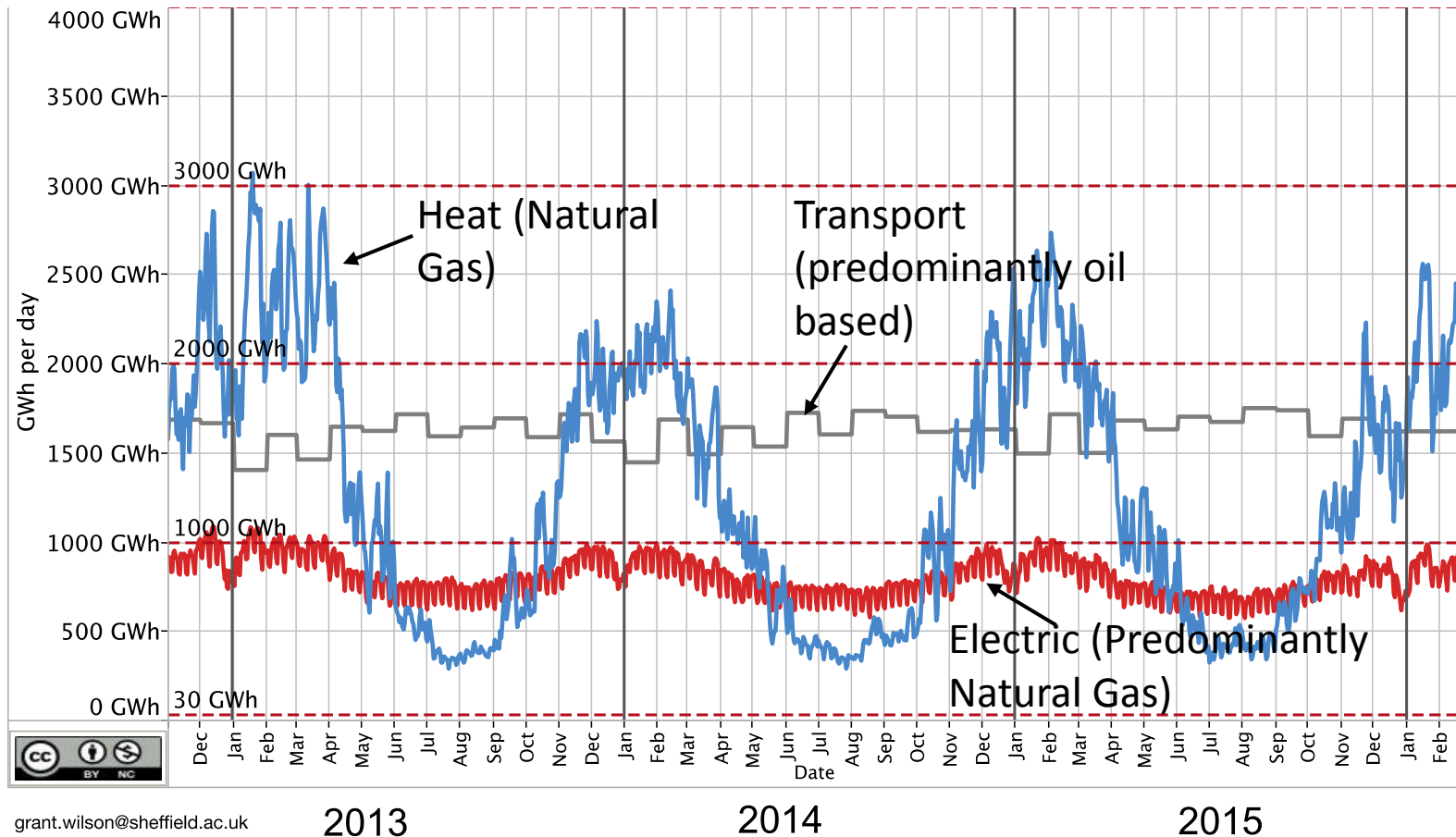
<http://www.northerngasnetworks.co.uk/wp-content/uploads/2016/07/H21-Executive-Summary-Interactive-PDF-July-2016-V2.pdf>

Full report:

<http://www.northerngasnetworks.co.uk/wp-content/uploads/2016/07/H21-Report-Interactive-PDF-July-2016.pdf>

**Or** go to the Northern Gas Networks Website and type 'H21' in the main search bar.

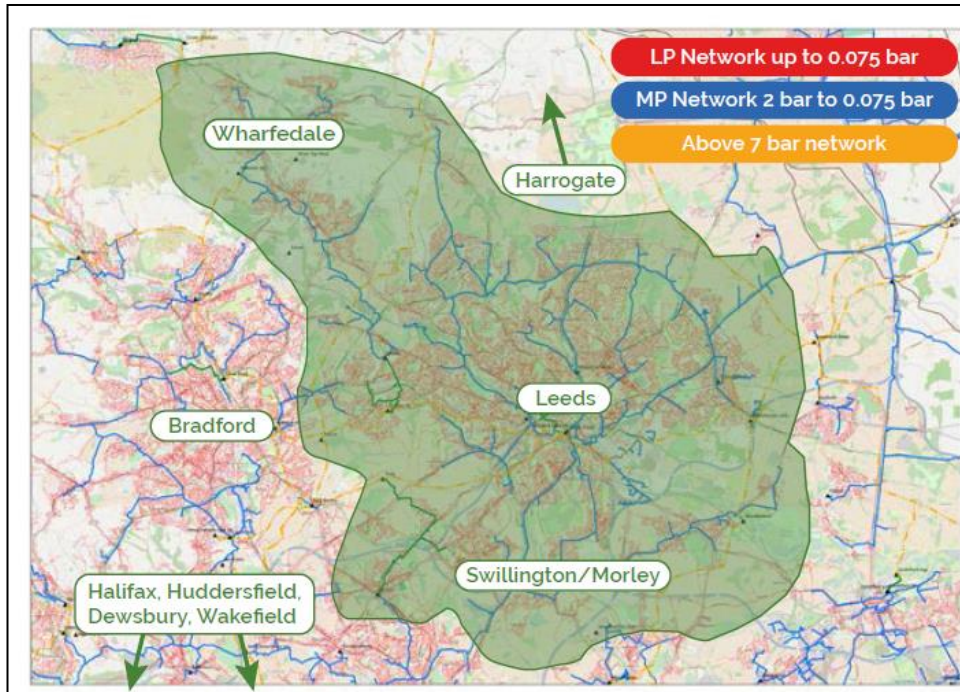
# The Energy Challenge



**On a cold winters day 90% of the UK's energy for heat, light and power comes from the gas network**

# Network Capacity & Conversion

(Section 3 & 4, H21 report)



## Area of Study:

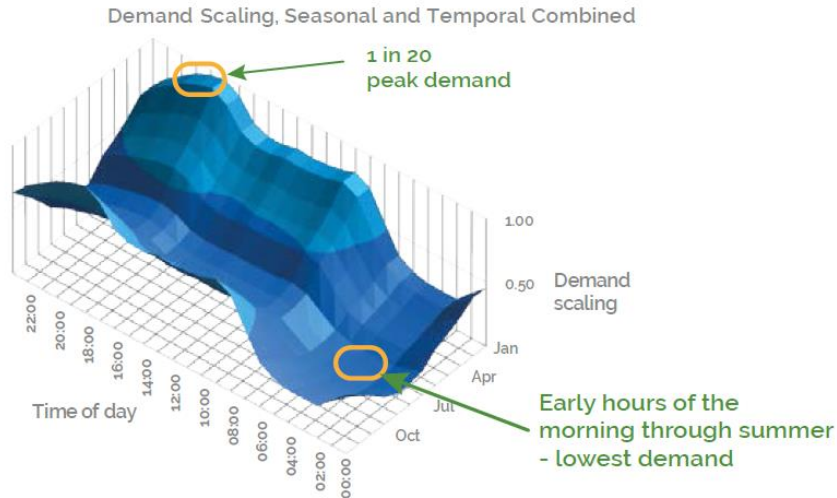
- 265,000 meter points
- 6Twh per annum, 3180MW peak
- 99% domestic with 60% consumption
- 1% Commercial / industrial with 40% consumption
- Conversion undertaken in the same way as it was managed between 1966 and 1977 (town gas to natural gas)

- With minimal reinforcement (Circa £5m) The network can still meet the 1 in 20, 6 minute peak design requirement.

**The UK gas network is the correct capacity (size) for conversion to take place**

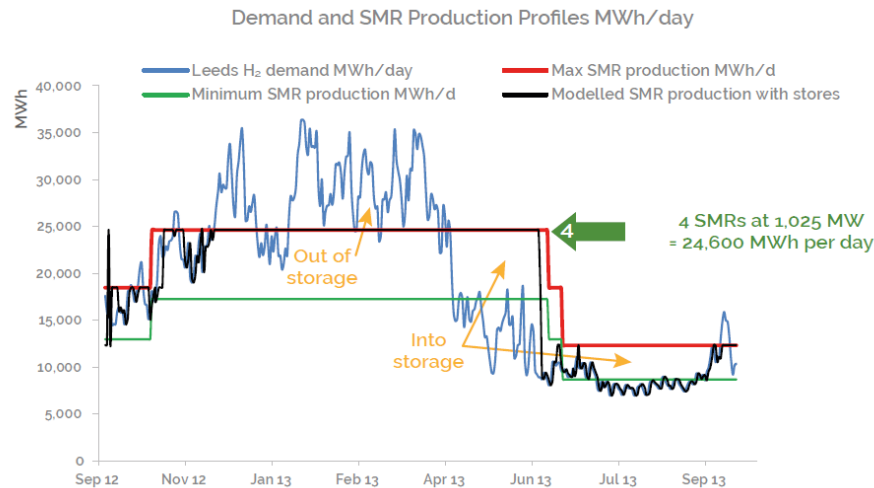
# Supply, Demand and Storage

(Section 2, – H21 Report)



Leeds areas requires:

- 1025WM
- X4 256MW Steam Methane Reformers



# The System and Costs

(Section 8 H21 Report)



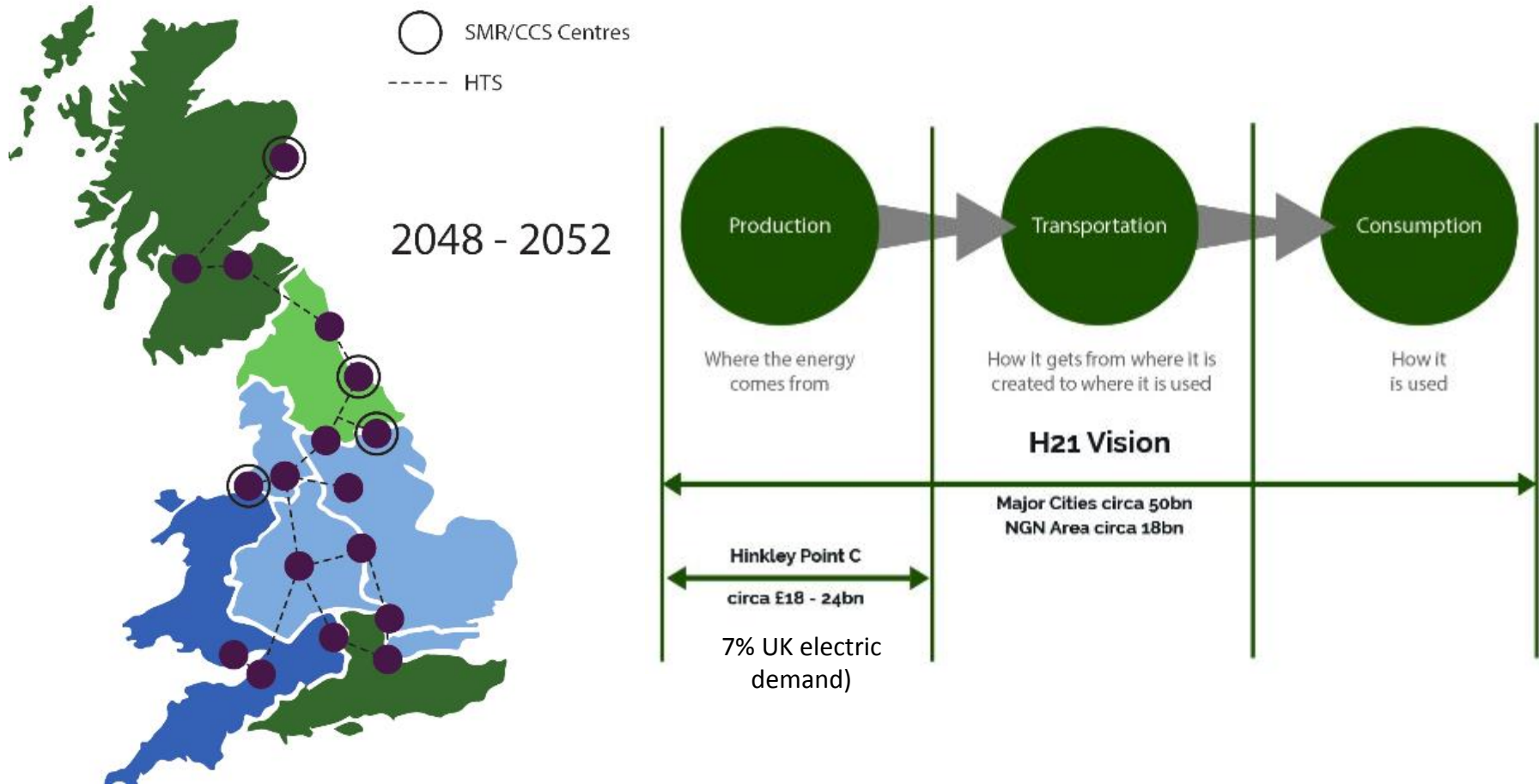
Cost Summary (£m)	Cost incurred (£m)	Ongoing costs each year (£m)
Network Capacity and Conversion Preparatory Work (Section 2.2)	10	
<b>Hydrogen Infrastructure/Conversion Costs</b>		
Steam Methane Reformer (SMR) Costs (Section 2.1)	395	
Intraday Salt Caverns (Section 2.1)	77	
Inter-Seasonal Salt Caverns (Section 2.1)	289	
Appliance Conversion (Domestic, Commercial and Industrial users within area of conversion) (Section 2.3)	1,053	
Hydrogen Transmission System (HTS) (Section 2.4)	230	
<b>Ongoing OPEX Costs</b>		
Carbon Capture and Storage		60
SMR/Salt Cavern/HTS Management		31
SMR Efficiency loss (30%)		48
<b>Total</b>	<b>2,054</b>	<b>139</b>

- Due to the natural expenditure profile in the regulated Industry the conversion could be **managed with almost no impact in customers bills.....** Including appliance conversion.
- All the technology is evident in the world today



# The H21 Vision

(Section 11 – H21 report)



‘If the 19<sup>th</sup> century was dominated by Town Gas, and the 20<sup>th</sup> century was dominated by Natural Gas could, could the 21<sup>st</sup> century be dominated by hydrogen?’