

Delivering the energy trilemma for customers

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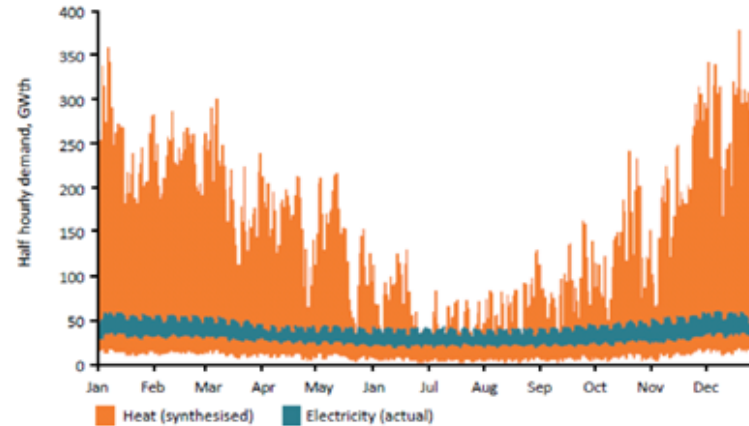


Context for customers and the energy system

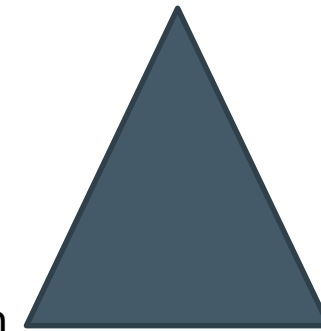
Key challenge: meeting peak demand

- Peak heat = 300GWs+
- Peak elec = c.60GW
- Supply challenge
- Network challenge

Figure 2.4: Annual heat and electricity demand profile for 2010⁷¹



Affordability



2050 Carbon targets

Security of supply

“in the years ahead two important areas of energy policy require a higher priority: the affordability of energy for households and businesses, and securing the industrial opportunities for the UK economy of energy innovation.” BEIS - building on our Industrial green paper 2017

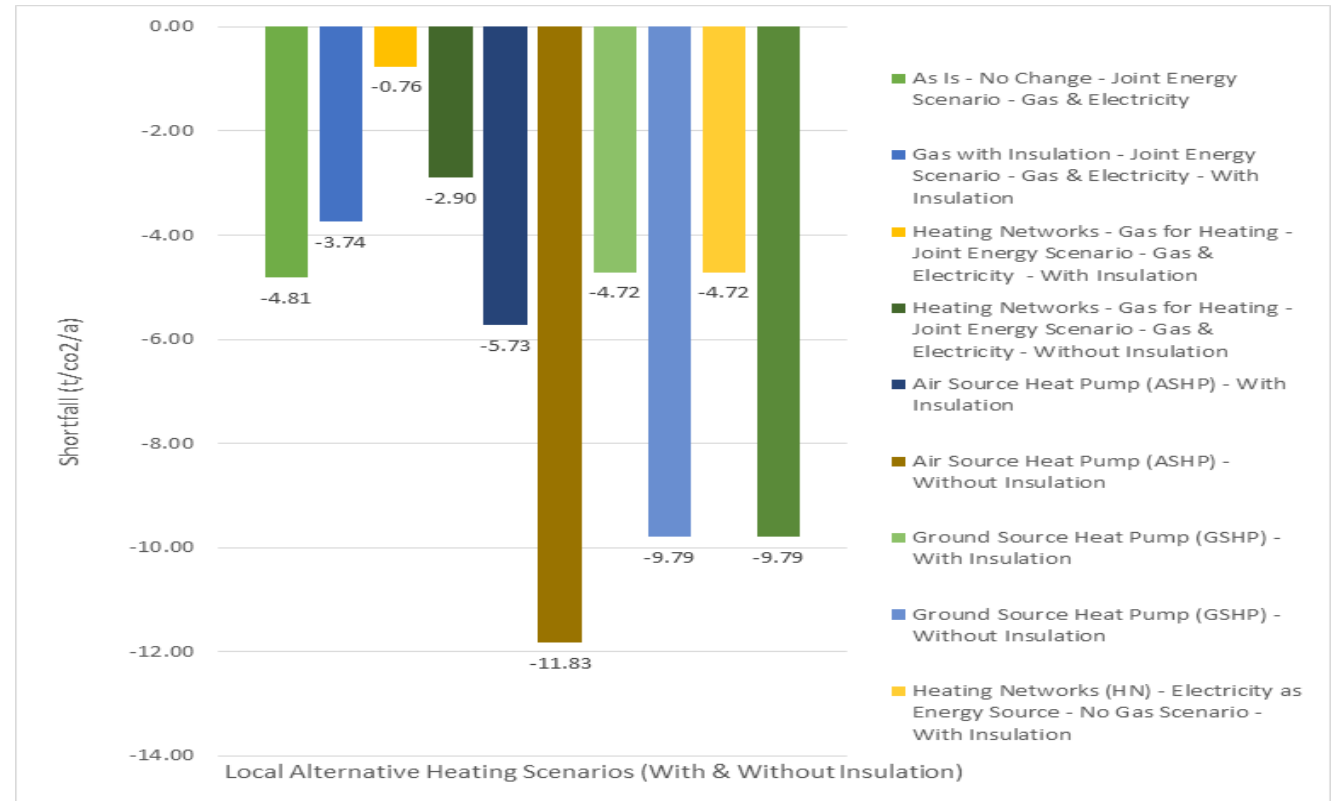
#HeatSummit

Gas and the gas network currently plays a major role and evidence supports a continued long term role for gas in a balanced future energy mix. There are no affordable alternatives to deliver the scale of peak energy required

To date much of the focus has been on electricity generation. The vital role of the gas network and the significance of energy for (peak) heat is only now being understood

Bridgend research – key findings on a real town

- Electric heat pumps currently increase emissions and cost compared to gas boilers
- Real examples of UK energy switching revealed that initial capital cost is the key factor that influences consumer switching behaviour
- 80% of consumers would not/could not afford to change to alternative heating solutions such as heat networks
- Very large subsidies or penalties would be needed to change consumer preferences
- Energy (heat) demand varies significantly seasonally and large scale peak heat demand is not met via non gas network solutions
- Green gases (e.g. Biomethane) require lower total investment than other renewables



Alternatives do not deliver the energy trilemma – gas is currently lowest cost, lowest emission and most secure.

Cornwall Energy model – a whole systems approach– key findings

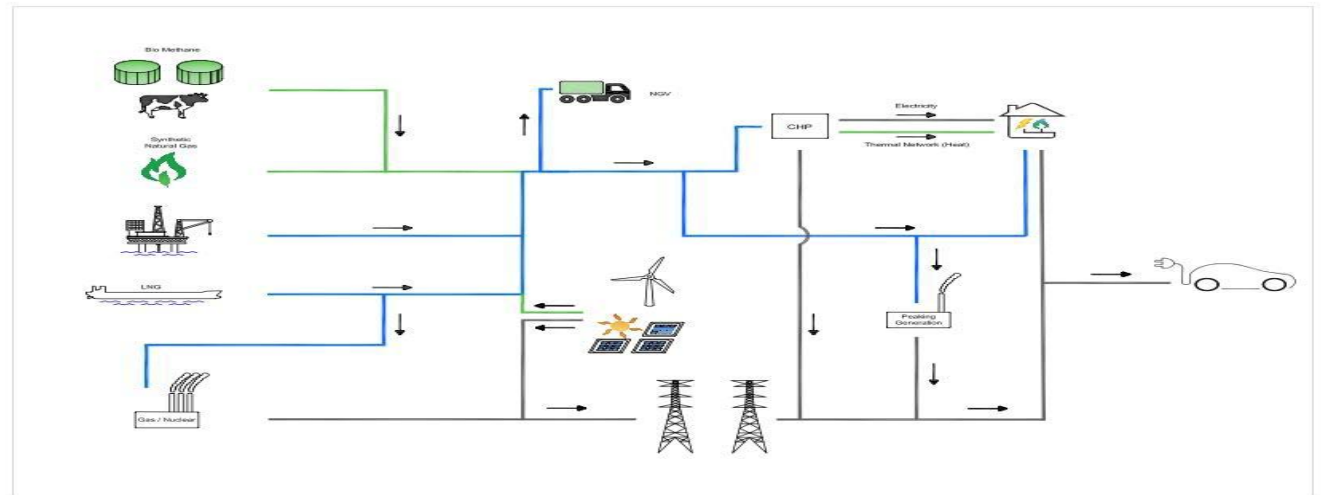
- Overall objective:

- A unique and innovative project to develop a bottom up Energy model for heat, light and power

- The approach:

- Gather information on heat, light and power demand and supply for Cornwall
- Ensure annual and peak data points are included
- Build an energy model to show the costs, security of supply and environmental impacts of different “energy mix” options
- Independently test the model inputs and outputs
- Share model outcomes / learning with policy makers
- Apply model to UK and other regions

- Only 6.5% of heat, light and power needs are currently being met from renewable energy generation
- If the renewable generation % increases, huge additional storage is required
- The cost of current non gas storage is so high it cannot be considered as viable option to support renewables
- The gas network is providing secure, low cost and flexible within day and inter seasonal storage that cannot be feasibly replaced
- Utilising the gas network with natural gas alternatives will save consumers significant amounts of money compared to alternatives
- The wide range between Winter / Summer demand and within day ranges of energy demand require long term use of the gas network



Alternatives do not deliver the energy trilemma – the gas network is currently lowest cost, lowest emission and most secure route to long term energy solutions

Further Reading/References

- Bridgend Future Modelling
<http://www.smarternetworks.org/Project.aspx?ProjectID=1662>
- A Renewable Cornwall – Summary Report
<http://www.wvutilities.co.uk/>
- FREEDOM project
<http://www.smarternetworks.org/Project.aspx?ProjectID=1978>
- Commercial BioSNG Demonstration Plant
www.nationalgrid.com/BioSNG,
<http://www.smarternetworks.org/Project.aspx?ProjectID=1837>
- Too Hot to Handle – Policy Exchange
https://policyexchange.org.uk/wp-content/uploads/2016/11/PEXJ4810_Too_hot_to_handle_09_16-V2-WEB.pdf
- Ecotricity – Green Gas Mills
<https://www.ecotricity.co.uk/our-green-energy/our-green-gas/how-green-gas-works>

An integrated energy system coupled with Hybrid heating and power systems may solve the energy trilemma for customers



Thank you