

14.00-14.45

Convergence: Heat, Power & Storage

Unlocking whole system benefits



Electricity investments in an integrated energy system

Convergence of heat, power and storage

Energyst Conference – 17 April 2018

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Overview of Baringa and presentation



Aim to be partner of choice based on a flexible approach, industry knowledge and excellent people

- ▲ **Market-leading consultancy** with distinct end-to-end capability in the energy space, from strategy to operation
- ▲ **Overview of this presentation**
 1. What is driving integration?
 2. Why is it important?
 3. How might it affect investments?

Our strategy: “good for our people, our clients and our brand”



UK's Leading Management Consultants
2018

Energy, utilities & environment

Company	Stars
Baringa Partners	★★★★★
McKinsey & Company	★★★★★
Accenture	★★★★★
Atkins	★★★★★
BCG - The Boston Consulting Group	★★★★★

Best Workplaces Master 2007-2016
United Kingdom

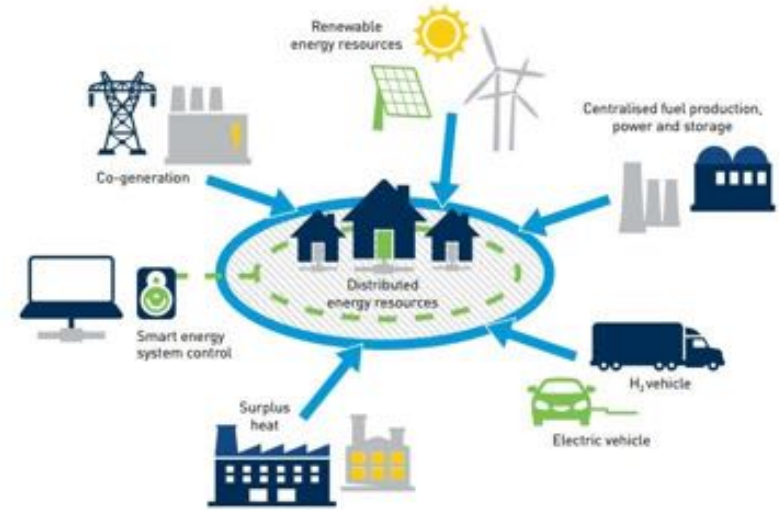
Best Workplaces 2016
Category: Medium
United Kingdom



Decarbonisation a key driver of an integrated energy system Baringa

Electrification of heat and transport in particular will alter economics of new investments

- ▲ Will affect investments across energy asset classes
- ▲ Drive changing cross-sector risks and opportunities
- ▲ Alter energy, capacity and 'flexibility' value drivers

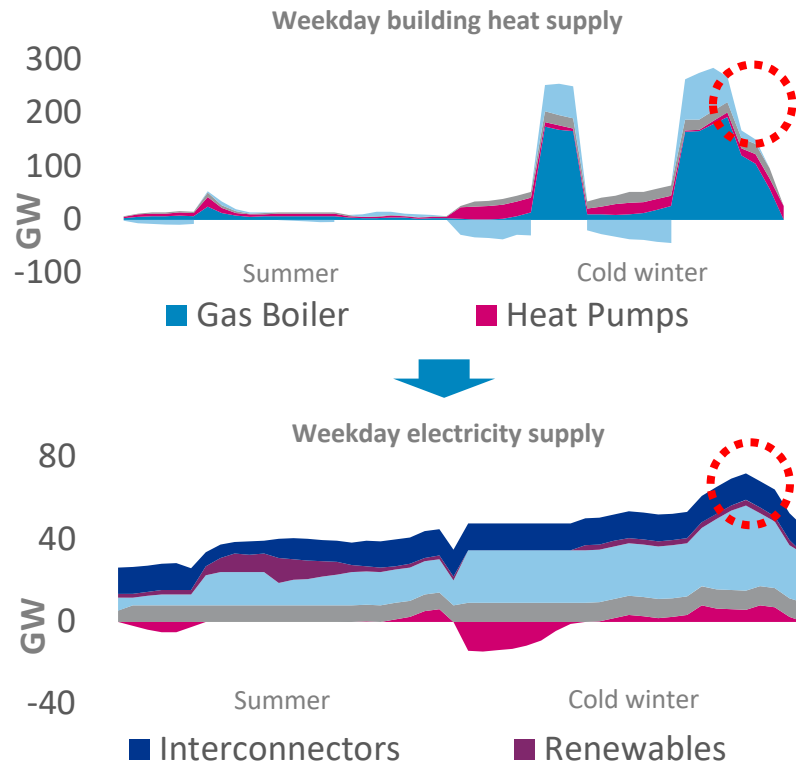


Source: Carbon Trust

Electricity impacts could be material even by 2030

Example: scale and variability of heat demand dwarfs that of the electricity system

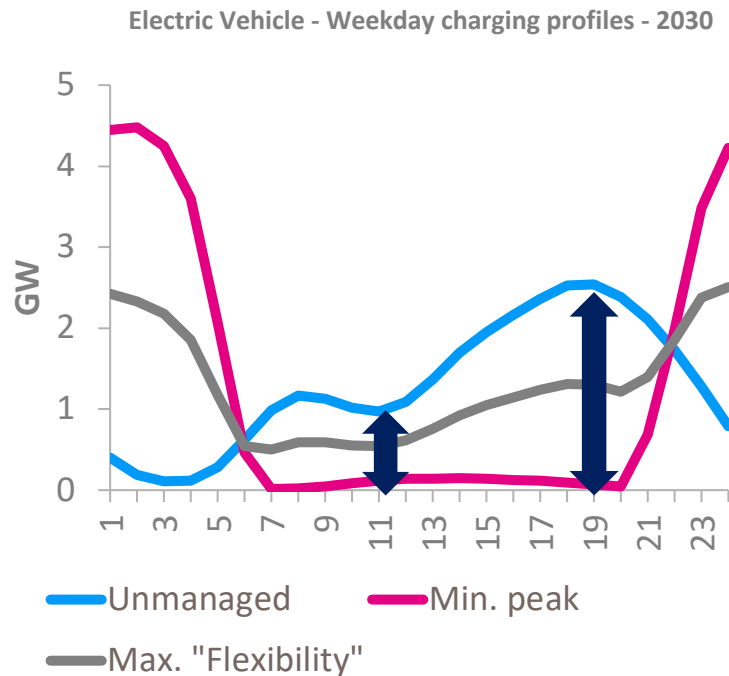
- ▲ **Mix of heat solutions needed but electricity still key**
 - Various issues for district heat, H2 and bioenergy
 - New policy intervention needed for Low-C heat
- ▲ **Managing variability of electrified heat is critical - e.g.**
 - Efficiency and heat storage
 - Hybrid gas boiler + heat pump
- ▲ **Example: new elec-heat providing ~20% on cold day**
 - Significant, optimised storage and some hybrids
 - Second peak still drives 3+ GW of extra load



Integration of demand provides new sources of flexibility

Example: 3rd-party 'smart managed charging' of Electric Vehicles

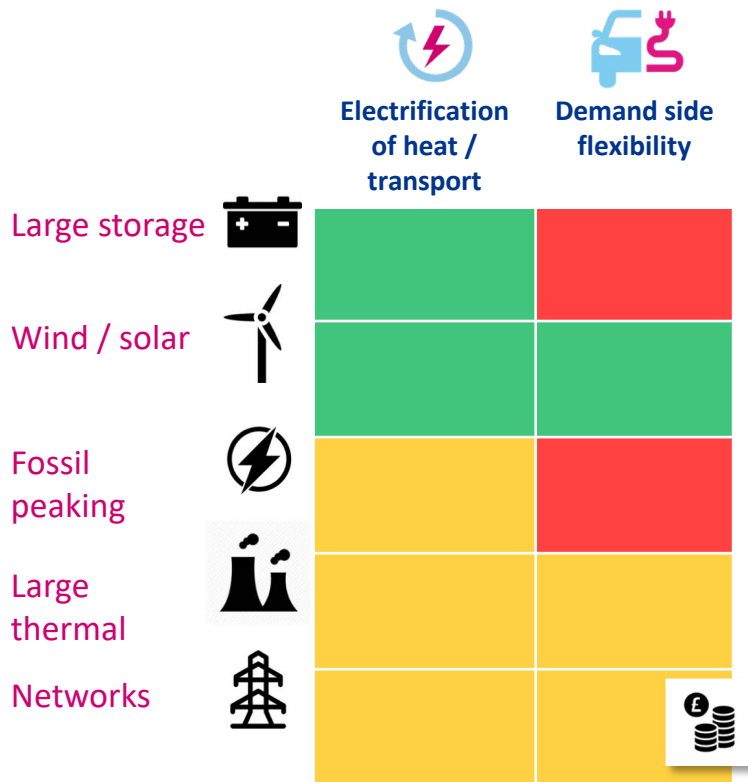
- ▲ Reduce price volatility or provide Balancing Services (BS)
 - Competing with e.g. grid-scale batteries
- ▲ Flexibility interacts with peak / network management
 - Similar flex / peak issues for electrified-heat
- ▲ GB example: 'flex' from ~20% of electric cars by 2030 cf.
 - Primary/secondary reserve volumes ~2–3 GW
 - ½+ Balancing Mechanism actions within +/- 1 GW



Impact on fundamentals could materially affect returns

No longer 'just over the horizon' but within economic life of new electricity investments

- ▲ **Greater integration leads to different impacts**
 - Electrification driving higher peak prices and utilisation
 - New flexibility reducing value of price arbitrage or BM/BS
- ▲ **Asset revenue stacking more complex in an integrated system**
 - Need whole system analysis (not just electricity T&D)
 - Consider future routes to market (e.g. LDN value)
- ▲ **Challenges to facilitate mass consumer-scale 'DSR'**
 - High-value customer proposition(s)
 - Technical e.g. optimising large pool of small providers



In summary

1. Decarbonisation is key driver of a more integrated energy system – esp. demand-side electrification heat / transport
2. Impact could be material even by 2030 – due to scale of electrification and competing sources of flexibility
3. Changing fundamentals will affect returns for new electricity assets – more holistic ‘whole system’ valuation needed

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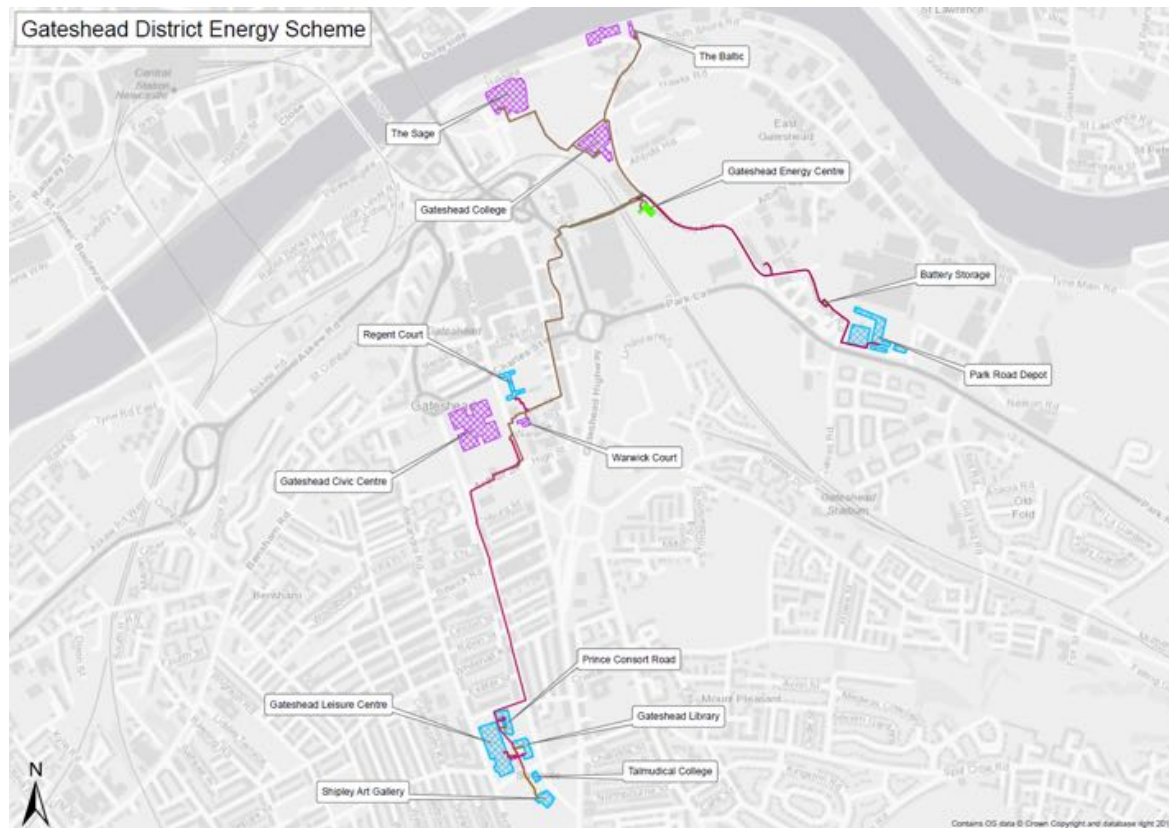
The Gateshead Area



The District Energy Scheme



The District Energy Scheme



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Thank you for attending

