

Delivering Net Zero: satellites for energy assets control

Supporting the transition to a Smart Energy Grid

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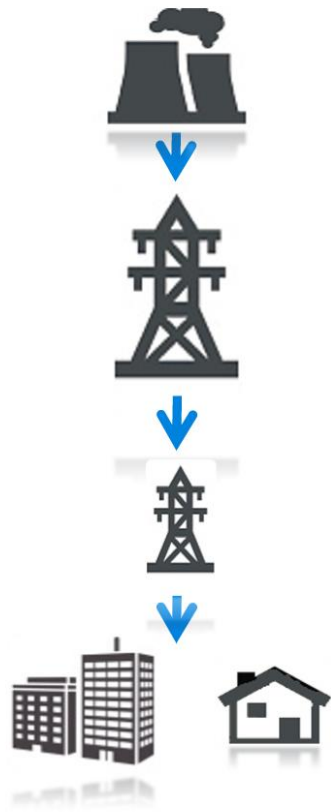
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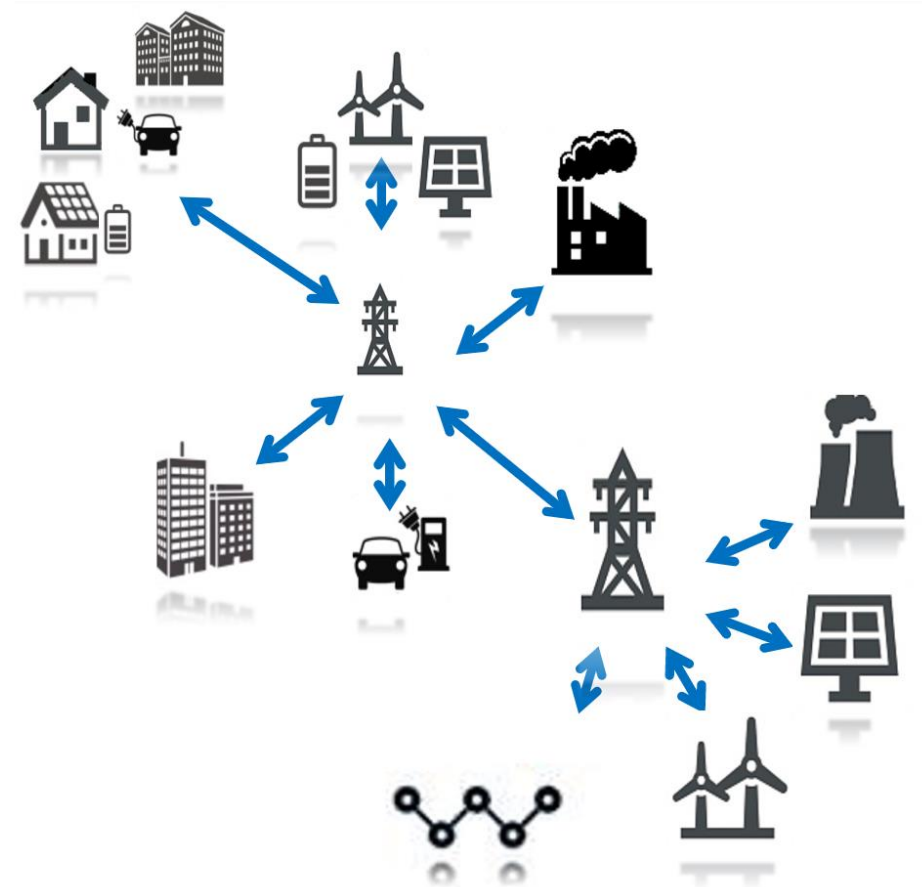
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Transition to a Smart Energy Grid



- Decentralised
- Non-dispatchable generation
- Heat and transport electrification

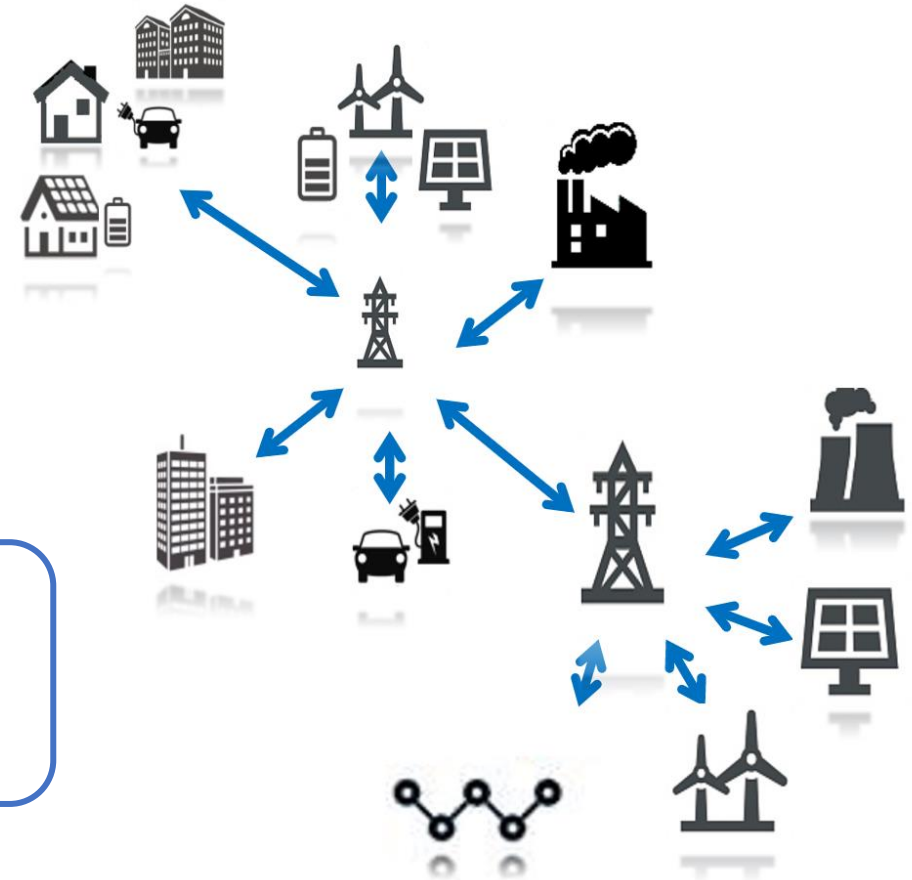


What is a smart, flexible energy system?

A smart, flexible energy system

- Smart: ability of a device to respond in real time to communication signals using digital technologies to deliver a service
- Flexible: ability to shift in time the consumption or generation of energy

A smart and flexible system is one which uses smart technologies to provide flexibility to the system, to balance supply and demand and manage constraints on the network.



<https://es.catapult.org.uk/report/energy-data-taskforce-report/>

<https://www.gov.uk/government/publications/transitioning-to-a-net-zero-energy-system-smart-systems-and-flexibility-plan-2021>

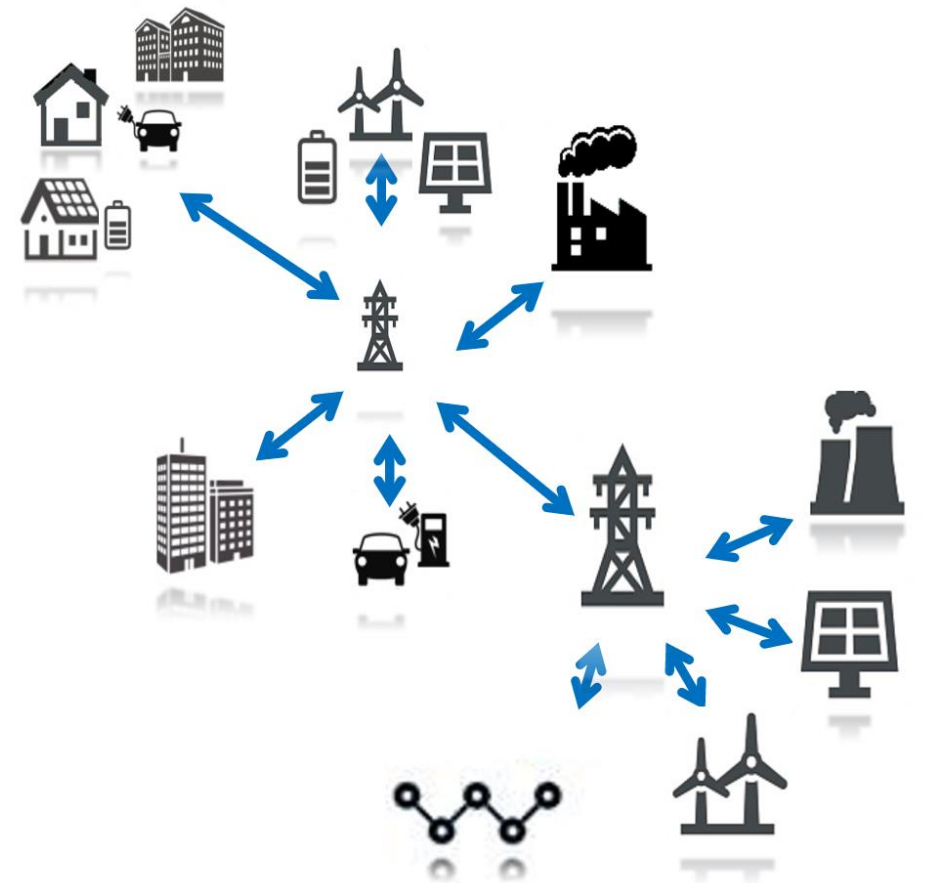
The Energy Data Taskforce

The energy system becomes more disparate, diverse and decentralised



Data sharing will be crucial to coordinate the wide range of actors undertaking new roles across the sector and ensure system stability

Data is vital to creating a smarter, cleaner and more flexible Energy System



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Increased data rate – new connectivity solutions

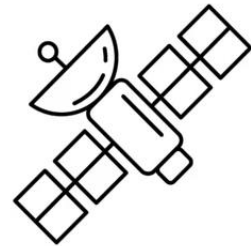
- Supply side: increased requirement for renewables power and need to manage energy storage
- Demand side: electrification will increase and change profile of **demand**



- Transition from passive to **smart networks**
- **Increased data rate**



Require **novel** communications network solution

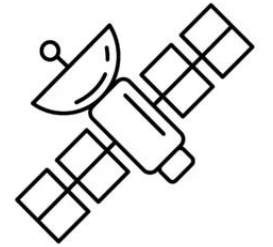


Could **satellites** be the solution?

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Satellites for energy assets control



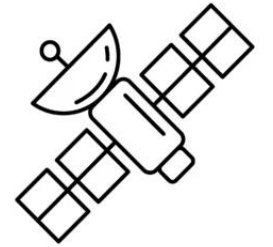
Comms network key requirements – achieving the highest benefits

- Able to **reach assets** outside the range of conventional cellular coverage
- Able to operate in case of **power failure**
- Data sent on **timely** fashion <1s latency
- **High reliability**: many assets are difficult to access for maintenance
- **Cyber security** and denial of service protection
- **Cost** of the ground station as low as possible

“Increase in monitoring, control and data cannot be met with existing terrestrial communication technologies and require new methods”
industry reps

<https://www.contractsfinder.service.gov.uk/Notice/d1f18984-c211-4ac6-94ae-7805c2909d9b>

Satellites for energy assets control



Purpose of project

Feasibility study of developing bespoke satellites system for communication to distribution assets in the UK to support the transition to a Smart Grid.

What we are interested in:

- Physical links of the satellite communication, signal margins and latency
- Details of radio transmitting system, frequency and bandwidth requirements
- Number of satellites required for good coverage over UK/Europe and location
- Methods for support to power outage scenario, type of battery system to ensure resilience, ground station antenna size
- Cyber security and radio jamming requirements
- Financial costs / barriers to achievability

Thank you!

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