

**Electricity
Transmission**

Preparing for Data Centre Connections with DCConnect

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nationalgrid



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Data Centre Types



Enterprise (up to ~5MW IT load)

Owned and operated by a single organization for internal use. Typically smaller, lower utilisation and higher Power Usage Effectiveness (PUE) (~1.9) on average.



Colocation and Service Provider (up to ~20MW IT load)

DC owner lease space (colocation) and/or computing equipment (service providers) to organizations.



Hyperscale (typically >30MW capacity)

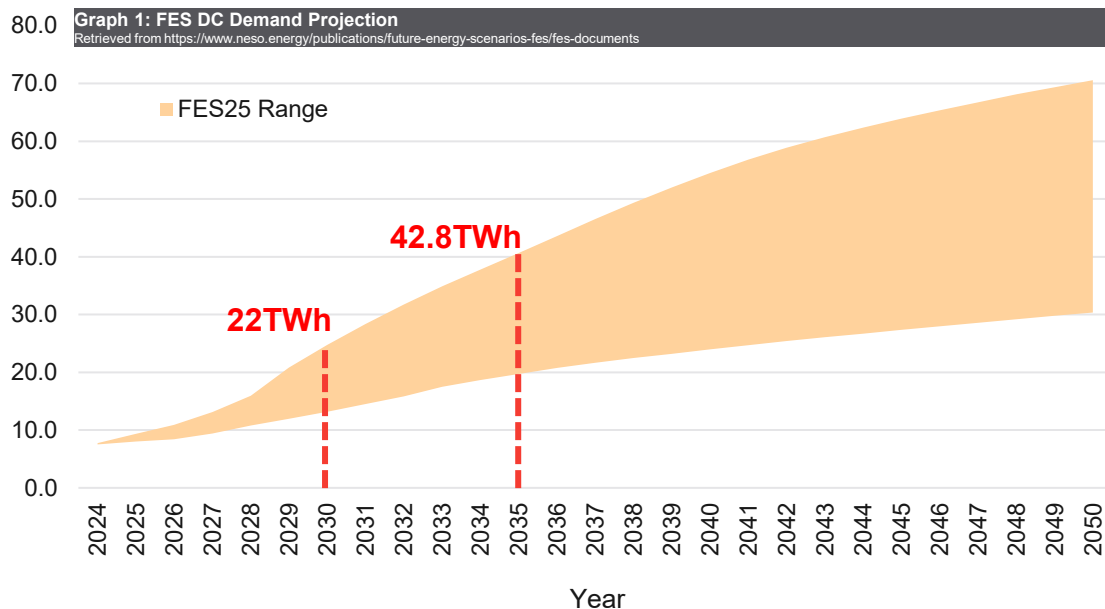
Massive, highly efficient facilities (~1.2 PUE) run by the big tech providers for mainly data processing, storage needs, cloud services. Able to easily scale with demand for resources and data.

Data Centre Services

- Artificial intelligence, big data and machine learning
- Cloud Services, Data management, storage, backup
- Ecommerce activity and transactions
- Real time collaboration and productivity tools, file sharing and email
- High Performance Computing (HPC)

The Problem

- DC growth will rise by **162%** in **2030** and **408%** in **2035**.
- NGET data centre connection applications have doubled in the last 18 months.

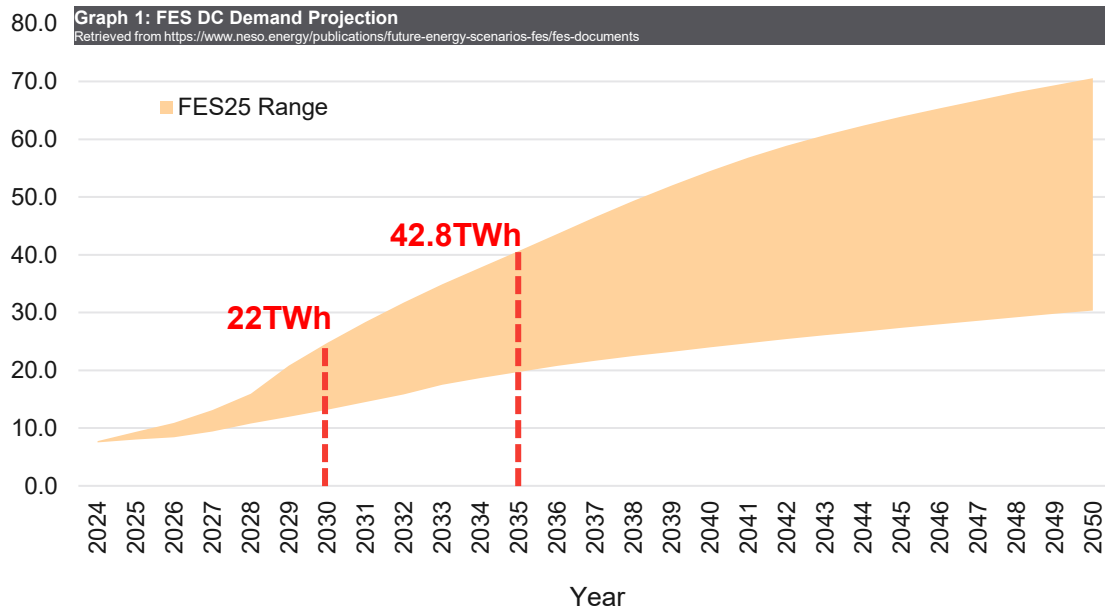


Drivers for growth:

- Geographic location
- Customer type
- Workload evolution
- Technology innovation
- Energy & sustainability pressures
- Regulatory & policy environment
- Edge compute expansion
- Resilience and security demands

The Problem

- DC growth will rise by **162%** in **2030** and **408%** in **2035**.
- NGET data centre connection applications have doubled in the last 18 months.



Network Challenges:

- Difficulty planning for DC growth
- Grid highly constrained in urban areas
- Conflicting priorities between DCs and network operators e.g. should flexibility capability be mandatory?, fault-ride through capability etc.

Data Centre (DC) Connect Project

The DCConnect project will:

- Provide NGET with an evidence-based view of current and future data centre (DC) growth in England & Wales and its implications for the transmission network.
- Identify drivers of siting and demand (technology, commercial, planning and resilience requirements).
- Develop long-term growth scenarios (to 2050) and explore DC-side and grid-side mitigation strategies.
- Deliver an interactive visualisation tool and a network model to see and study the impact of DCs and inform strategic planning.



Key Benefits

- ✓ Faster and data-driven evaluation of data centres/AI growth zones
- ✓ Improved coordination of data centre requirements and network operator requirements

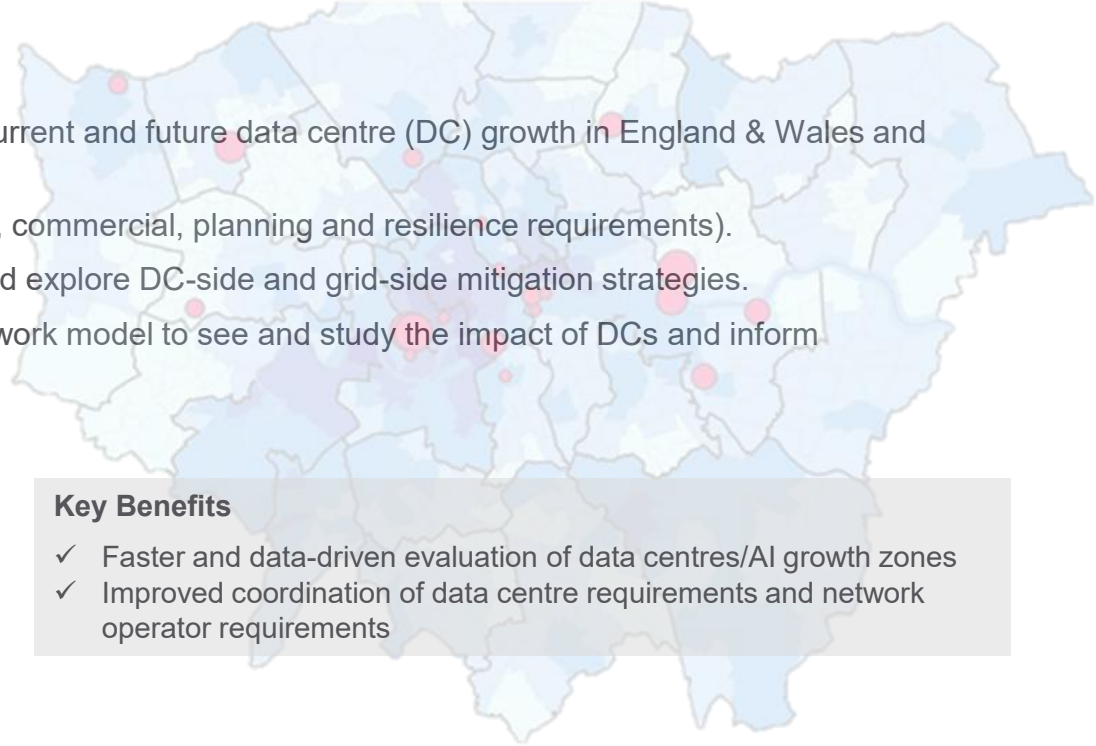




Figure 1: Live colocation and self-build sites across GB
 Retrieved from <https://app.dcbite.com/search?searchType=Colocation,Self-build&stageOfDevelopment=live&view=map>

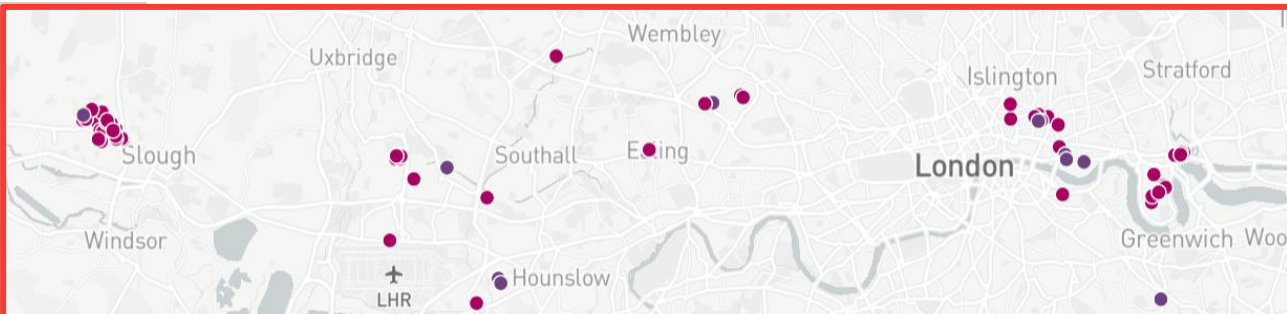
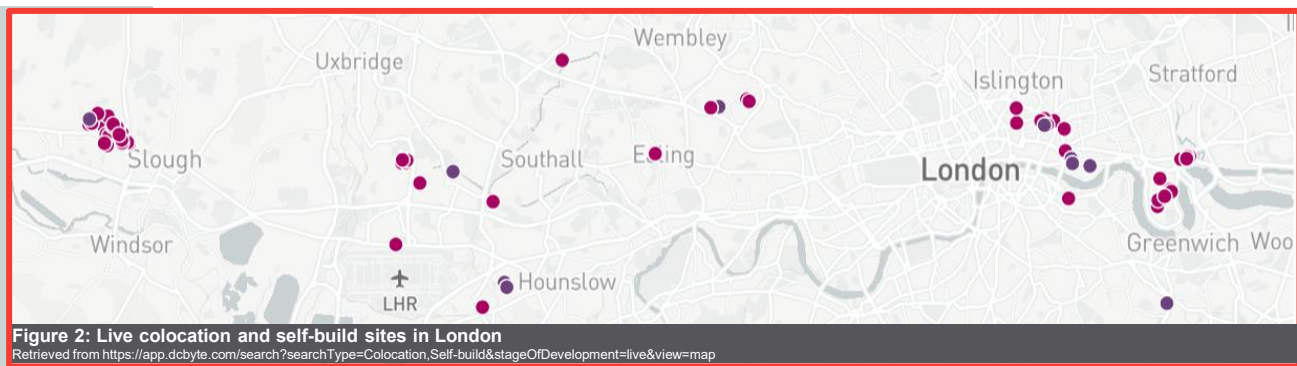
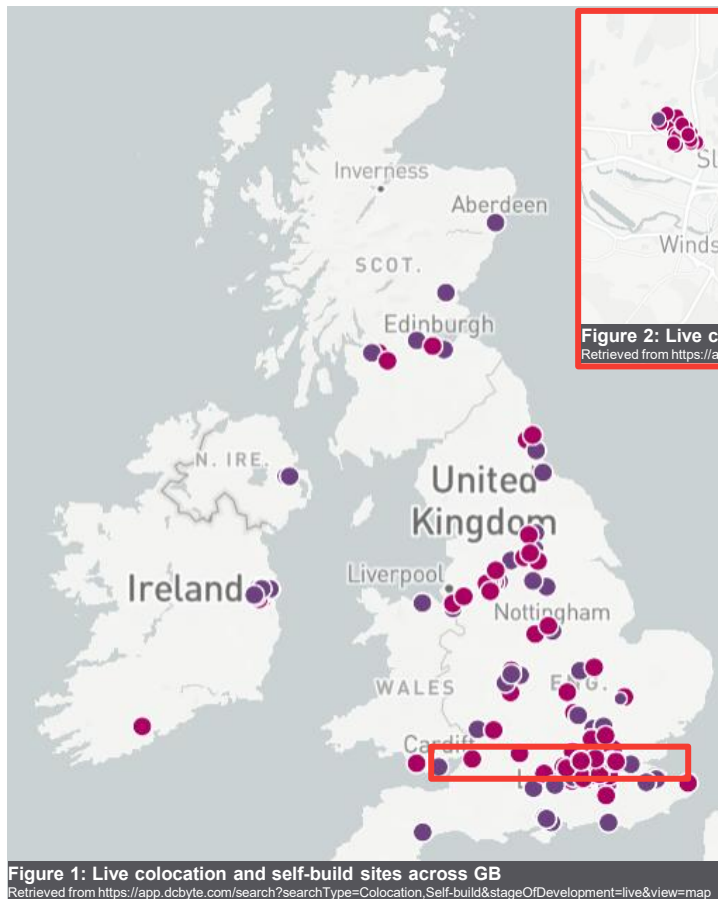


Figure 2: Live colocation and self-build sites in London
 Retrieved from <https://app.dcbite.com/search?searchType=Colocation,Self-build&stageOfDevelopment=live&view=map>



- West London is an example of misaligned temporal and spatial planning horizons
 - 22 known data centres with a total of 273MW of IT load distributed across Brent, Ealing, Hillingdon and Hounslow where network capacity constraints exist.
 - Colt DCS expansion: This hyperscale campus in Hayes is being expanded in 3 phases adding 98MW (total of 160MW).
 - Triggers for new substations in Uxbridge Moor to support ~1.8GW of additional capacity (equivalent of a mid-sized city).
- Need for: Strategic spatial coordination, better data transparency, new grid-side and non-grid-side strategies

Other Activities at National Grid

- Connections Reform – Gate 2 to Whole Queue (G2tWQ)
 - Evaluation of readiness and strategic alignment
- Connection Accelerator Service (CAS) driven by Government and DESNZ
 - Long wait times currently delay billions in investment
- National Grid x Emerald.AI partnership
 - First data-centre flexibility trial in the UK
- AI Growth Zones (AIGZ)
 - Preparing for AIGZ in Blyth with up to £30b investment
- Engagements with Data Centres
 - *“Anything that would quicken time to market would be considered very seriously” – Hyperscaler*



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