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Using LTDS CIM Data in Practice: Developer Use Cases and Early Insights

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Motivation

- Grid connection availability and curtailment risk are now primary factors to consider when **assessing project viability**

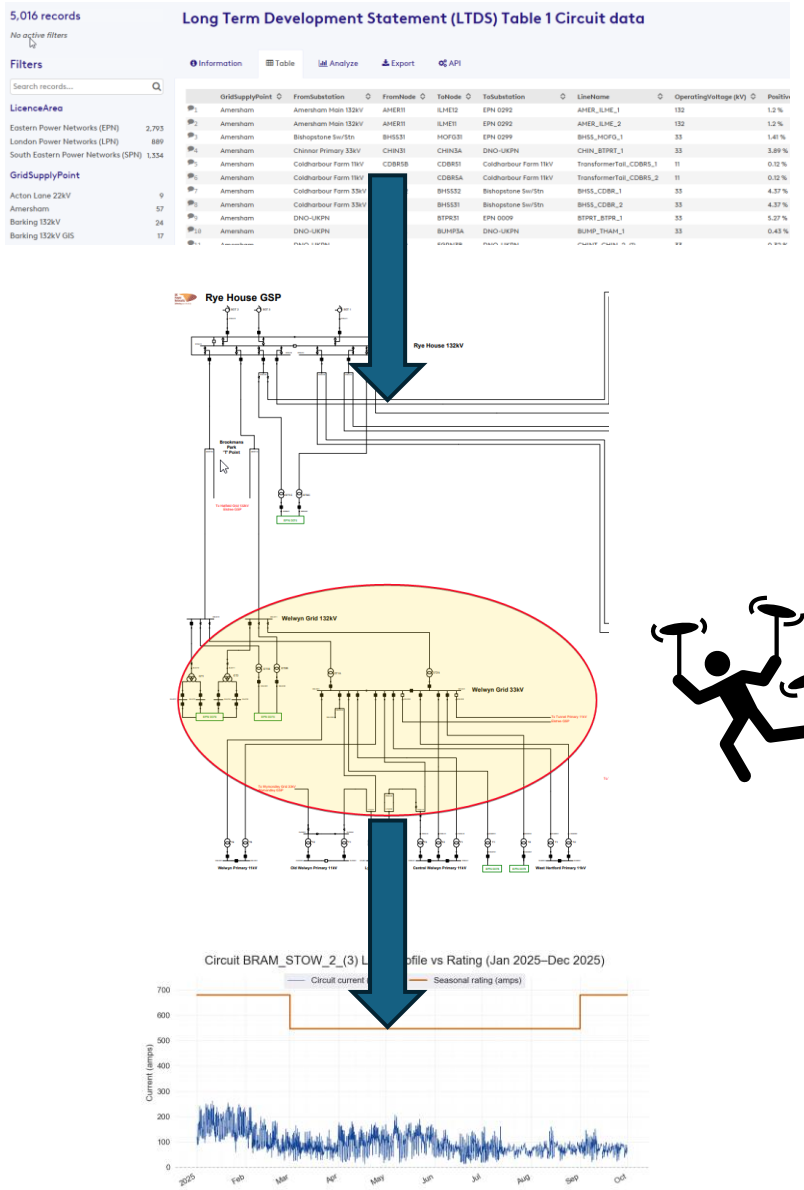
- Renewable developers need:
  - Access to up-to-date **network data** that is **aligned with network planning assumptions**
  - Access to **historical and operational power flow data** to estimate headroom

  This can result in more targeted, better-informed grid applications

- Traditional LTDS formats (Single Line Diagrams in PDF format and spreadsheets) are not user-friendly:
  - Require **manual tracing and interpretation**
  - Workflow is **time consuming** and **not scalable** across multiple sites
  - **Cannot be version controlled** (i.e., difficult to track changes in SLD)

- CIM provides a **machine-readable**, structured view of the network, which can be **ingested and handled using scripts**

- CIM makes it easier **to interpret network topology and connectivity**, enabling assessment of constraints earlier in the project viability assessment process



Why use CIM?

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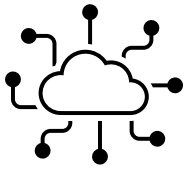
- **CIM** is a **standardised data model** (ontology) for representing electricity networks

- **Widely used** across **European transmission network operators** and increasingly at distribution level

- Enables **consistent data exchange** between Network operators and customers

- Avoids **vendor-specific** and proprietary file formats (e.g., PowerFactory, PSS/E)



- Can be **ingested by open-source software** and visualised in a **browser (HTML graph visualisations)** to facilitate initial analysis and sanity checks

CIM profiles

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CIM Profile	What it represents	Primary use	Available
EQ – Equipment	What assets exist (e.g., Lines, transformers)	Defines the physical network and individual assets	✓
TP – Topology	How assets are electrically connected (connectivity)	Enables reconstruction of electrical topology	✗
GL – Geographical Location	Spatial representation	Mapping, visualisation, and geographical analysis	✗
SSH – Steady State Hypothesis	Intended operating conditions (load/generator setpoints, tap positions)	Provides initial conditions for power flow studies	✗
SV – State Variables	Calculated electrical state	Represents solved results from network analysis	✗

- DNOs currently publish the **EQ profile only**; the rest of the profiles will be made available in stages
- From our perspective, the ones that would provide the **most value in the short term** are the **TP** and the **GL** profiles, enabling clearer interpretation of network connectivity, accurate asset mapping, and faster identification of the viable points of connection.

Use cases at PACE

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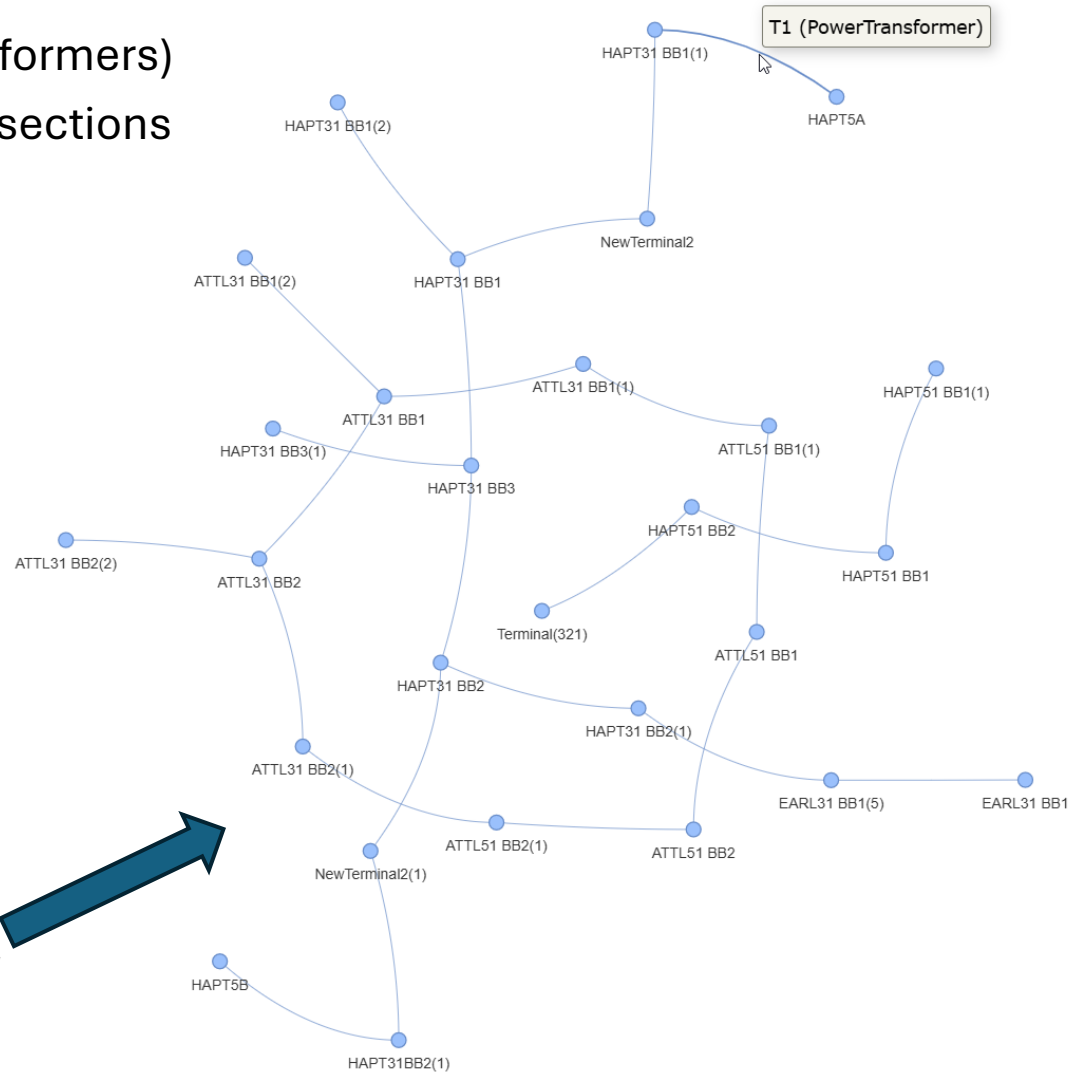
In the **short-term**, **CIM** models simplify the process of**:**

- Identify a project's point of connection (PoC)
- Filter for relevant terminals, and constraints (circuits and transformers)
- Request data extracts with additional information, e.g., circuit sections
- Query seasonal ratings and calculate asset headroom
- Reduce back and forth with network planning / connections

In the **long-term, CIM can allow users to:**

- Run load flow studies using the same network model as UKPN engineers
- Use historical data as input to understand network headroom
- Model the impact of new sites (generator/demand) on the existing flows
- Integrate different running arrangements into studies
- Track changes in the network topology and running arrangements
- Combine with GIS data to streamline overall project development process

Example network graph from the Bramford area created by parsing the CIM data in Python, building a connectivity graph, and exporting as an interactive HTML visualisation.



Conclusion

- LTDS CIM data represents a meaningful step towards digital, data-driven grid applications for developers

- The value of CIM will increase further with additional profiles (TP, GL, SSH, etc.)

- Additional value can be unlocked if DNOs improve the alignment of identifiers across LTDS, operational, and geospatial datasets.

Overall, CIM helps align developer proposals more closely with network planning assumptions, benefiting both developers and UKPN by reducing uncertainty and rework.

Thank you for your attention