Request for Information Relating to Grid Code Modification “GC0139 – Enhanced Planning Data Exchange”

Resulting from Open Networks WS1B Product 4 “Data Exchange in Planning Timescales”

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# Purpose of Document and Rationale

### Introduction

The current format of network planning data exchange between DNOs/IDNOs and National Grid (most commonly via Microsoft Excel workbooks and spreadsheets) is workable, though suboptimal, as it relies heavily on manual manipulation and email transfer or the “External Data Exchange” SharePoint site.

With the intention of seeking to make better use of the energy system’s data, the Department for Business, Energy and Industrial Strategy (“BEIS”), Ofgem and Innovate UK created the “Energy Data Taskforce”, whose key objectives are to:

* Deliver greater competition
* Drive innovation in products, services and business models
* Produce a more efficient and cost-effective energy system[[1]](#footnote-1)

### Open Networks Project & Enhanced Planning Data Exchange

In 2019, the EDTF published “*A Strategy for a Modern Digitalised Energy System*”[[2]](#footnote-2) setting out a number of pertinent recommendations which have fed into the Open Networks Project (“ONP”)’s objectives.

With regards to exchange of planning data specifically, Product 4 of the ONP has resulted in Grid Code modification GC0139 “*Enhanced Planning-Data Exchange to Facilitate Whole System Planning*” which will expand the scope and detail of data exchanged (see “*Data Enhancement Detail*” section). The modification is currently at Work Group stage where it is being discussed by industry stakeholders ahead of review by Ofgem for final approval.

This will facilitate the shift towards a more digital age for total network planning, with improved coordination and efficiency throughout.

### Resource Implications

Discussions within ONP meetings, and the GC0139 industry Work Group, have established that implementation of the enhanced data for effective future network planning would require a greater investment in resource for all parties should the current data transfer format be retained. This is due to the necessary additional time required to process and manage the additional data.

Consequently, further assessment is being undertaken regarding the benefits of transitioning to the Common Information Model format (“CIM”)[[3]](#footnote-3), in order to further standardise the exchange process and reduce full-time equivalent (“FTE”) resourcing requirements. Several DNOs are already planning to incorporate CIM capability as part of wider system enhancements.[[4]](#footnote-4)

The CIM standard has already been adopted by the International Electrotechnical Commission (“IEC”) and is widely adopted at transmission level within Europe via the European Network of Transmission System Operators for Electricity[[5]](#footnote-5) (“ENTSO-E”). It is recognised that it facilitates the open and interoperable exchange of data (a key recommendation from the EDTF report), and would allow for standard, set data formats to be utilised.

### Estimating Costs – Existing Vs CIM Format

Estimated costs of implementation of CIM format industry-wide are outlined in the “*Proposals for Implementation of Electronic Exchange of Network Planning Data*” report (link below in “Reference Materials”) and do not form part of this RFI beyond requesting feedback on the numbers and methodology in the “Additional Considerations for Feedback” free-text section below. Note that sections 2.3 and 3 of the same report outline the CIM platform in greater detail.

The purpose of this exercise is to establish and contrast the estimated industry costs of managing and maintaining the enhanced data submissions required (as outlined in “Data Enhancement Detail” below) both with and without transitioning to the CIM format. It is thought that retaining the current baseline exchange format would not facilitate a cost-effective solution for managing the proposed new data scope and detail.

Additionally, Ofgem have expressed that regardless of format, all exchanged network data should be open moving forwards. Data exchange via CIM format will make open data exchange and publication inherently easier.

# Data Enhancement Detail

The data enhancements within the GC0139 proposal apply to the “Week 24”, “Week 42” and “Week 50” data submissions, via Schedules 5 and 11 of the Data Registration Code (part of the Grid Code – links below in “Reference Materials”).

The enhancements will:

* Provide the ESO with greater clarity on DER connected at distribution level, enabling more coordination and efficient planning of the Transmission System.
* Provide DNOs with a deeper understanding of Transmission System flows and fault contribution within a broader range of scenarios, enabling more coordination efficient planning of their Distribution Network.

## Additions to Existing Week 24 & Week 50 Data Exchange (DNO 🡪 NGESO 🡪 TOs)

* Details of any/all direct connections to the sub-transmission network
  + This will include detailed node, line and generator data.
* Details of all DER connections >1MW (connected/accepted) & expected impact on energy flows at the following cardinal demand points/specified network scenarios:
  + Peak demand
  + Summer minimum demand
  + Solar peak/daytime-minimum demand
* Details of all DER connections <1MW
  + Aggregated by fuel type
  + Disaggregated by substations

Given that this additional data would require consumption via spreadsheets under the existing format of data exchange, please refer to Annex B where some key challenges of this approach are outlined.

Note that this method is likely to require regular provision for all parties to develop tools to deal with ant new technology connecting to both transmission and sub-transmission systems.

## Additions to Existing Week 42 Data (NGESO 🡪 DNO)

A significant enhancement in that transmission system model data will be specified in a switch level, single boundary format model per DNO area, together with equivalent networks at agreed boundary points.

Models will be provided for the following cardinal demand points:

* + Maximum fault level
  + Peak demand (likely to cover the High Flow South scenario initially but may expand in future)
  + Summer minimum demand
  + Solar-peak/daytime-minimum demand
  + National high-power transfer dispatch scenario and national low-power transfer dispatch scenarios

It is vital for all parties to consider the additional resource required to manage and utilise this additional data compared with the current baseline.

# Request

As part of the GC0139 modification process, the Work Group is seeking to establish the potential cost impact resulting from these changes as opposed to managing the enhanced data using current formats.

While some DNO representatives have confirmed that it is feasible to assimilate single boundary, switch-level National Grid models into their software, the cost of doing so via utilisation of current formats and processes needs consideration in contrast with the cost of doing so via CIM format.

As such, we would be grateful if you could complete the details requested in Appendix A to the best of your ability. This will facilitate a high-level value-judgement in terms of FTE resource requirements and will ensure the appropriate direction of travel for this modification.

# Additional Considerations for Feedback

### Implementation Timescale for CIM

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| --- |
| Please estimate CIM implementation timescale within your company in months, with any accompanying comments of note. Please also comment on the implementation timescale and methodology in the “Proposals for Implementation of Electronic Exchange of Network Planning Data” Report (section 4.6) |
|  |

### Estimated Industry Setup Costs for CIM Implementation

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| --- |
| Please provide any feedback on the estimated **setup** costs and associated methodology for CIM implementation in the “Proposals for Implementation of Electronic Exchange of Network Planning Data” Report (Section 4). |
|  |

### Alternative Solutions

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| Are you of the opinion that an alternative solution would be more appropriate than the proposed move to CIM format? For example, use of a specific software solution industry wide. If so, please detail below with your rationale. |
|  |

### Wider Benefits of CIM

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| --- |
| What other benefits has your company identified in association with a move to the CIM data platform? For example, implications for other projects or long-term business need and process efficiencies. |
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### Data Exchange via Secure Portal

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| Given the volume of data proposed to be exchanged under this modification, and to ensure sensitive data is communicated securely, a solution other than email exchange would likely be necessary. What suggestions do you have in order to meet this need e.g. a particular software solution, a dedicated transfer server hosted by a party to-be-confirmed, or a solution similar to the European Common Grid Model Exchange Specification OPDE\* platform?  Note that Ofgem’s intention is that such data will be made publicly available (or to third parties on request) so this should be factored in to your consideration. |
|  |

\*The OPDE platform is a digital platform connecting European TSOs centrally, and is based on the CIM standard.[[6]](#footnote-6)

### Other Comments

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| --- |
| Please outline any other pertinent comments relating to this RFI. |
|  |

# Reference Materials

* [Data Exchange in Planning Timescales; Data Scope - Final Report](https://www.energynetworks.org/assets/files/ONP-WS1B-P4%20Data%20Scope%20-%20Final%20Report-PUBLISHED.pdf)
* [Proposals for Implementation of Electronic Exchange of Network Planning Data](https://www.energynetworks.org/assets/files/ONP-WS1B-P4%20Data%20Exchange%20Report-PUBLISHED.pdf)
* [GC0139: Enhanced Planning-Data Exchange to Facilitate Whole System Planning](GC0139:%20Enhanced%20Planning-Data%20Exchange%20to%20Facilitate%20Whole%20System%20Planning)
* [Data Registration Code](https://www.nationalgrideso.com/document/33861/download)
* [Schedule 5: Enhanced Node Data](https://www.nationalgrideso.com/document/164066/download)
* [Enhanced Schedule 11](https://www.nationalgrideso.com/document/164056/download)

# Appendix A – Cost Estimates

**Enhanced Data Exchange Utilising Current Format**

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| --- | --- | --- |
| **Item** | **Cost Frequency** | **Cost Estimate** |
| Systems development for handling of enhanced data detail & assimilation of switch-level models | Once only |  |
| Gathering, compiling & submitting Week 24 Data | Annual |  |
| Gathering, compiling & submitting Week 50 Data | Annual |  |
| Loading, processing and analysing Week 42 Data | Annual |  |
| Sense-checking | Annual |  |
|  |  |  |

**Enhanced Data Exchange Utilising CIM Format**

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| --- | --- | --- |
|  |  |  |
| **Item** | **Cost Frequency** | **Cost Estimate** |
| Implementation of CIM Systems Capability | Once Only | £1.3m (per DNO)\*\* |
| Gathering, compiling & submitting Week 24 Data | Annual |  |
| Gathering, compiling & submitting Week 50 Data | Annual |  |
| Loading, processing and analysing Week 42 Data | Annual |  |
| Management of CIM interface points | Annual |  |
| Management/awareness of CIM GB Governance | Annual |  |
| Administration (e.g. of data portal, staffing changes, system maintenance, sense checking, rule control) | Annual |  |
| Maintenance of CIM platform updates\* | Bi-annual (per 24 months) |  |

\*Assumed cycle of 24 months for CIM software updates

\*\* Inclusive of costs associated with development of Grid Code solution, establishment of CIM profiles, CIM implication assessment, establishment and agreement of triggers for and method of data exchange. Total industry cost estimated at £10.5m as per calculations within “Proposals for Implementation of Electronic Exchange of Network Planning Data” section 4, ONP report (see Reference Materials section).

# Appendix B – Challenges of Defining a Switch Level Representation of The Transmission System Model Using Spreadsheets

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Listed below are some considerations which are required when attempting to define switch-level representations of the transmission system using the current format of data exchange (spreadsheets). The considerations highlight the inherent challenges associated with this approach, as opposed to utilising a CIM format.

* Trying to define enough detail of each plant item to make the model functional for any kind of analysis
* For plant items, which have tap ranges an additional item is needed so that the tap position for the scenario being delivered can be provided (Transformers, QBs, Reactors & Caps)
* For switches to define the connectivity as well as capability need to be included, as well as a method to define the open/closed status of switches, to make it machine readable
* Thyristor controlled devices - while there is no tap position to be provided, a method to define the relevant value as used in the scenario being provided (would this be machine readable?)
* Devices like QBs which have tables as well as basic parameters would have to be read into the receiving machine. The tap position would have to be identified
* Series Compensation devices like those at Hutton 400kV, which have bypass reactors but which are dependent on the pre-fault loading of the device - would this data be needed?
* Generator MVar curves - these are multi co-ordinate values to develop the basic curve (a method to define the MVar set-point for the Generator in the scenario is needed)
* Definition of the Generator AVR, GOV or Frame – these are the controllers for Gens which depending on type would be needed. (If only doing load flow or Thermal studies these would not be needed, however if any stability analysis is to be done, they would be needed)
* Addition of new technology plant items in the future (development of spreadsheet and systems to populate and consume this data would be needed)
* HVDC systems - would this data be needed by DNOs who are affected by their flows (ManWeb, SPD & SHE-D) once Eastern Boot Strap is commissioned Northern?
* Would DNOs need to know what embedded Generation was dispatched in their network and/or neighbouring networks?
* How to define the receiving DNO network configuration used by the ESO as part of the scenario when this network would have been reduced out of the model?
* Transmission Constraints – would data on any of these be needed particularly if the constraint boundary crossed the DNO area?
* Energy Market participation – would DNOs need to know if embedded Generators were taking part in particular European generation markets?

1. <https://es.catapult.org.uk/impact/specialisms/energy-data-taskforce> [↑](#footnote-ref-1)
2. <https://es.catapult.org.uk/reports/energy-data-taskforce-report/> [↑](#footnote-ref-2)
3. <https://webstore.iec.ch/publication/62698> [↑](#footnote-ref-3)
4. <https://www.energynetworks.org/assets/files/ONP-WS1B-P4%20Data%20Exchange%20Report-PUBLISHED.pdf> (2.2) [↑](#footnote-ref-4)
5. <https://www.entsoe.eu/digital/common-information-model/> [↑](#footnote-ref-5)
6. <http://maplesotho.cbroderick.me/it-and-data/> [↑](#footnote-ref-6)