Primacy Rules

Use Case 1 Testing Report

Open Networks| Primacy Rules

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DOCUMENT CONTROL

Authorities

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1	15/02/2023	Open Networks Steering group	Final testing report draft for approval

Related documents

Reference 1	**Link to SPEN Fusion report when published**
Reference 2	**Link to Primacy Report**

Change history

Version	Description
1.0	First Testing Report for publication

Distribution

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Introduction

About ENA

Energy Networks Association represents the companies which operate the electricity wires, gas pipes and energy system in the UK and Ireland.

We help our members meet the challenge of delivering electricity and gas to communities across the UK and Ireland safely, sustainably and reliably.

Our members include every major electricity and gas network operator in the UK and Ireland, independent operators, National Grid ESO which operates the electricity system in Great Britain and National Grid which operates the gas system in Great Britain. Our affiliate membership also includes companies with an interest in energy, including Heathrow Airport and Network Rail.

We help our members to:

- Create smart grids, ensuring our networks are prepared for more renewable generation than ever before, decentralised sources of energy, more electric vehicles and heat pumps. Learn more about our Open Networks programme.
- Create the world's first zero-carbon gas grid, by speeding up the switch from natural gas to hydrogen. Learn more about our Gas Goes Green programme.
- Innovate. We're supporting over £450m of innovation investment to support customers, connections and more.
- Be safe. We bring our industry together to improve safety and reduce workforce and public injury.
- Manage our networks. We support our members manage, create and maintain a vast array of electricity codes, standards and regulations which supports the day-to-day operation of our energy networks.

Together, the energy networks are keeping your energy flowing, supporting our economy through jobs and investment and preparing for a net zero future.

About Open Networks

Britain's energy landscape is changing, and new smart technologies are changing the way we interact with the energy system. Our Open Networks programme is transforming the way our energy networks operate. New smart technologies are challenging the traditional way we generate, consume and manage electricity, and the energy networks are making sure that these changes benefit everyone.

ENA's Open Networks programme is key to enabling the delivery of Net Zero by:

- opening local flexibility markets to demand response, renewable energy and new low-carbon technology and removing barriers to participation
- opening data to allow these flexible resources to identify the best locations to invest
- delivering efficiencies between the network companies to plan and operate secure efficient networks

We're helping transition to a smart, flexible system that connects large-scale energy generation right down to the solar panels and electric vehicles installed in homes, businesses and communities right across the country. This is often referred to as the smart grid.

The Open Networks programme has brought together the nine electricity grid operators in the UK and Ireland to work together to standardise customer experiences and align processes to make connecting to the networks as easy as possible and bring record amounts of renewable distributed energy resources, like wind and solar panels, to the local electricity grid.

The pace of change Open Networks is delivering is unprecedented in the industry, and to make sure the transformation of the networks becomes a reality, we have created three workstreams under Open Networks to progress the delivery of the smart grid.

2023 Open Networks programme Workstreams

- Network Operation
- Market Development
- Planning and Network Development

Our members and associates

Membership of Energy Networks Association is open to all owners and operators of energy networks in the UK.

- Companies which operate smaller networks or are licence holders in the islands around the UK and Ireland can be associates of ENA too. This gives them access to the expertise and knowledge available through ENA.
- Companies and organisations with an interest in the UK transmission and distribution market are now able to directly benefit from the work of ENA through associate status.

ENA members

BUUK infrastructure, Cadent Your Gas Network, electricity north west Bringing energy to your door, ESB NETWORKS, nationalgrid, ESO, Northern Gas Networks, Northern Ireland Electricity Networks, NORTHERN POWERGRID, Scottish & Southern Electricity Networks, SGN Your gas. Our network., SP ENERGY NETWORKS, UK Power Networks Delivering your electricity, WALES&WEST UTILITIES

ENA associates

- Chubu
- EEA
- Guernsey Electricity Ltd
- Heathrow Airport
- Jersey Electricity
- Manx Electricity Authority
- Network Rail
- TEPCO

Executive Summary

This document details the approach taken to testing the rules developed associated with instances of agreed Primacy and in particular the Balancing Mechanism (BM) Use Case. The Use Case relies on the production of a Risk of Conflict Report and therefore means the agreed rules for the mitigation of conflict between Electricity System Operator (ESO) and Distribution Network Operator (DNO) actions.

The following rules have so far been agreed:

	DNO Primacy	
	a. Information Sharing ahead of time	b. Closer to real time information sharing
Voltage Management, Thermal Constraint & System Inertia Instructions in the Balancing Mechanism and DNO Active Power Flexibility Services except Restore	✔ A weekly unavailability report is shared by the DNO to the ESO.	In development with UKPN
ESO Transmission Constraint Management (GTD) Service and DNO Active Power Flexibility Services (GTU/DTD) except Restore	✔ A weekly unavailability report is shared by the DNO to the ESO.	In development with UKPN

This report details the approach taken to testing these Use Cases and the results.

Rules to be tested

What is Primacy?

The ESO and DNOs manage the respective transmission and distribution networks in accordance with applicable standards and licence conditions. Each organisation may require one or more services for this purpose. Conflicts between one or more of these services may lead to inefficiencies within the whole electricity system. This will in all likelihood increase given the rising procurement of services and limited coordination to date. Hence, in order to manage this potential service conflict and to enable networks to be optimised efficiently and transparently, there is a need to develop a set of clear principles and "primacy" rules. These will enable procurement, planning, scheduling and dispatch of services to be influenced by whole system value and ensure that the division between market/price-driven actions and the electricity system hierarchy of operational needs is clear and transparent.

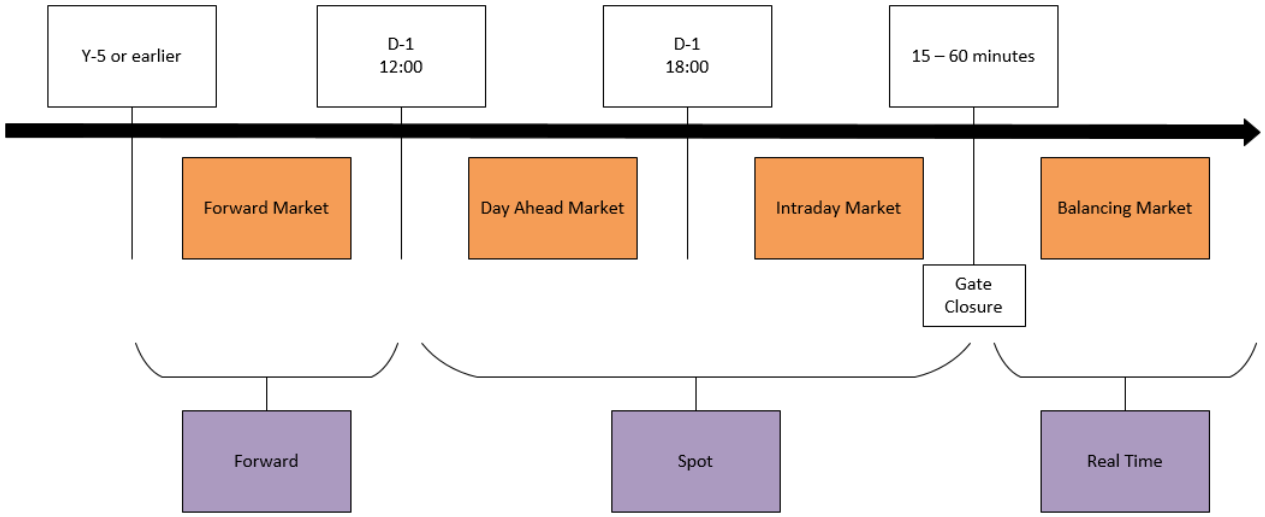
These rules will look to balance: the local networks' technical requirements; the risks to the overall operability of the whole system; the value for Service Providers through the facilitation of market / price driven actions; the needs of emerging market-based platform developers; and ultimately the overall cost impact on end consumers.

It should be noted that Primacy generally focusses on the conflict between different assets within the same electrical network. How participants can manage participation in multiple services at the same time is generally determined by Stackability rules.

Use Case considered

The core role of NGESO is to operate the GB electricity network to ensure that supply and demand are continually balanced, and that power is able to flow across the network reliably and safely.

In order to deliver the core elements of the ESO's role, there is a reliance on service providers to help balance the overall system and ensure specific operability challenges can be resolved. While Forward Markets resolve energy requirement in advance and to a half-hourly resolution, the Balancing Mechanism (BM) enables the ESO to balance the system in real time on a minute-by-minute basis – an illustration of current market timeframes is provided in Figure 1*:



[1]

Figure 1 – Illustration of Market timescales

The Balancing Mechanism is therefore used by NGESO to balance electricity supply and demand close to real-time. This is similar to market arrangements in other countries where comparable mechanisms are used to balance the system post gate closure.

The key operating parameters and requirements for Balancing Mechanism participants are highlighted across several industry codes, including the Balancing and Settlement Code (BSC) and the Grid Code (GC). These codes define the information and data that should be submitted to NGESO, across various timescales, to declare the Balancing Mechanism Unit's market position and its ability to deviate from this, following an instruction from NGESO. The operation of the BM is heavily reliant on the flow of defined data between NGESO and market participants and vice versa, with much of this data being exchanged close to real-time.

As part of the key information supplied through the BM, Balancing Mechanism Units (BMUs) are required to submit Final Physical Notifications (FPNs) ahead of gate closure – this indicates the final position of each BMU's output for each half hour period. In addition, the BMU must also submit further information that enables the ESO to instruct a unit to deviate from its FPN for the reasons noted above.

Within the BM, there are a number of reasons why NGESO may need to alter the output of a BMU – these can broadly be split into 'System' and 'Energy' actions. The former seeks to instruct units to manage specific system needs (e.g., maintaining transmission network flows within pre-defined constraint limits) and the latter would issue an instruction to alter the active power output of a BMU to maintain overall energy balance.

NGESO generally carries out the role of 'residual energy balancer' for the GB market, with the vast majority of overall energy requirements being met by market activity ahead of real-time. Changes in the outturn of actual national demand, plant failure and weather-related events are some of the reasons why NGESO may need to intervene and re-balance the system.

NGESO publishes regular information (in addition to the close-to-real-time data published by Elexon) in the form of our Monthly Balancing Services Statement. This information covers some of the broad reasons why a BM

[1] Illustration of BM Market Timescales

instruction may be issued to a market participant and, as can be seen from Figure 2, highlights the total volume of instructions (by reason) for any given month.

In forming an approach for introducing Primacy Rules into the BM Use Case, the product team evaluated ways in which the Use Case could be broken down into manageable pieces – this is to ensure deliverability and consistency across GB as the BM is so fundamental to overall system operation today.

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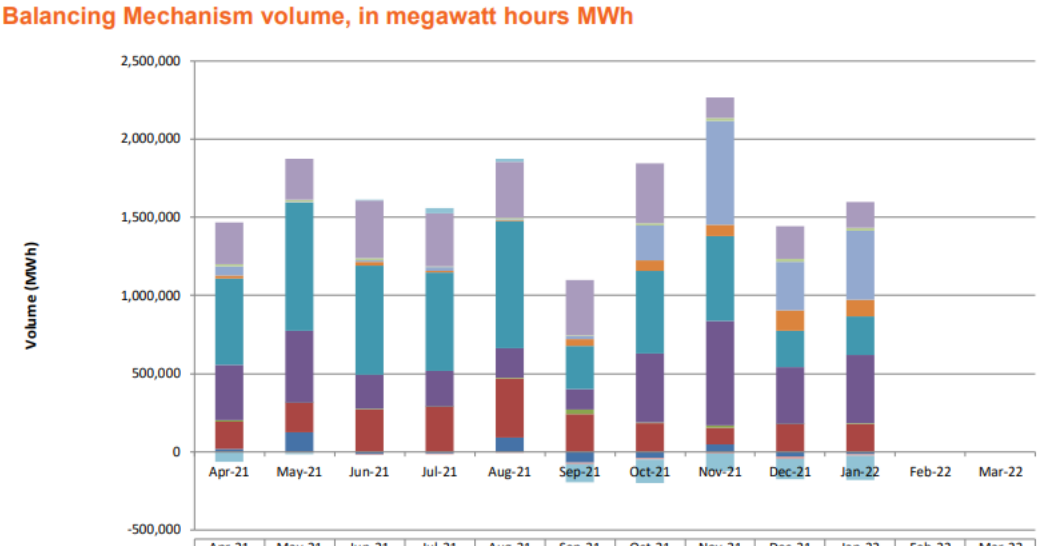


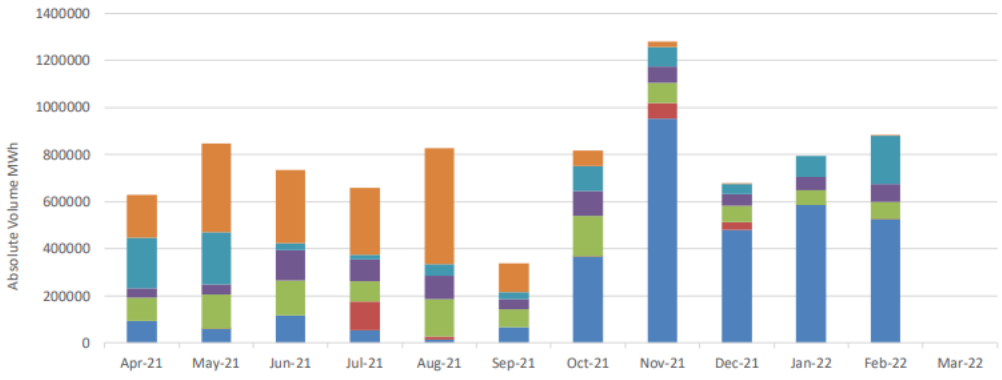
	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22
BM - Minor Components	-61,004	-11,079	3,786	33,833	18,018	-114,957	-148,607	-110,750	-130,594	-153,887	0	0
BM - Response	267,501	260,104	370,252	338,557	356,027	352,964	381,778	129,611	208,970	166,757	0	0
BM - Fast Reserve	14,346	14,212	11,800	8,436	11,145	8,451	13,224	20,975	14,976	18,039	0	0
BM - Negative Reserve	-4,227	-5,173	-2,452	-2,436	-3,865	-9,288	-13,037	-13,148	-13,215	-10,146	0	0
BM - Constraints Scotland	60,087	4,138	12,126	23,095	4,724	19,494	223,297	663,131	310,378	440,842	0	0
BM - Constraints Cheviot	19,396	0	21,379	8,041	5,478	43,788	68,452	75,729	134,599	107,130	0	0
BM - Constraints E&W	550,033	820,336	700,774	629,115	816,487	274,553	527,138	541,327	230,423	246,596	0	0
BM - Constrained Margin	355,013	462,049	219,209	228,318	189,633	130,012	442,818	669,255	363,864	434,717	0	0
BM - STOR	11,713	1,548	2,811	2,750	1,103	28,139	4,301	12,868	2,991	6,642	0	0
BM - Operating Reserve	171,008	187,909	270,403	288,031	380,875	242,540	183,536	106,722	175,355	178,181	0	0
BM - Energy balancing	19,705	123,734	-18,202	-11,565	89,447	-71,216	-39,535	48,061	-32,066	-15,293	0	0

Figure 2 - NGESO Monthly Balancing Service Statement (January 2022)

Figure 2 highlights that the bulk of instructions generally focus on the need to manage 'system' challenges, hence the product team has focused on breaking these down into sub-Use Cases relating to instructions required to manage specific system needs. With this data in mind, focussing on 'system' based instructions would allow for the higher volumes of instructions to be catered for under the initial roll-out of Primacy Rules. In addition, it will allow the DNOs and the ESO to learn from a simple implementation across some BM Use Cases, whilst seeking to deploy more sophisticated data exchange and decision making processes through future iterations.

The BM constraint costs are broken down by England and Wales, Scotland and Cheviot regions in the BM costs section of this report. ROCOF and Voltage costs are recorded in the England & Wales category.

Constraint volume, in megawatt hours (MWh)



	Apr-21	May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Nov-21	Dec-21	Jan-22	Feb-22	Mar-22
Trades - ROCOF	181463	376846	309717	286225	489998	123174	68045	23116	270	0	524	0
BM - ROCOF	214234	219148	30278	19477	50723	29599	104677	81624	43775	89994	205040	0
Trades - Voltage	40343	44944	130194	93873	99760	42290	105737	70716	47319	53938	75692	0
BM - Voltage	98750	143742	145961	85794	160001	76380	171994	84541	71549	63076	73725	0
Trades - Transmission	0	58	0	121035	10338	0	1147	66143	33040	1130	2267	0
BM - Transmission	94725	61500	118130	53848	15869	66392	367287	954042	479878	586431	525173	0

Figure 3 - BM areas of consideration, by instruction volume

Analysing the different types of 'system' instructions in more detail – as shown in Figure 3, the product team have proposed the following areas to investigate further with regard to the deployment of Primacy Rules:

- Voltage Management
- Thermal Constraints
- System Inertia Instructions

Further work has also been carried out to highlight some of the core elements of the ESO's processes that are currently carried out, in order to ascertain where the deployment of new Primacy Rules will ultimately slot in. Given the work completed already under the TCM Use Case, it is highly likely that similar Rules could apply however, the deliverability of changes to existing BM processes and systems will need to be considered throughout the next stage of work.

Rules and Processes to be tested

Rule

- The DNO flexibility services hold priority over the ESO BM service
- The Risk of Conflict report will be fed into the ESO's planning processes for the BM service, with the ESO rejecting BM sites where the DNO has identified such a risk of conflict.

Data Exchanges

To enable this rule, the following data exchanges were identified as being needed:

- Mapping of DNO CMZs to the zones in which BM is being procured- The location of DNO CMZs is publicly available.
- This rule involves the sharing of a Risk of Conflict report between the DNO and ESO. This will be shared on a weekly basis. The sharing of the Risk of Conflict report- This will be a CSV via email on Tuesday each week covering the following operational week (Saturday-Friday) and will contain the fields below. This will also be published for the wider market.
    - The BMU ID
    - The start and end time of the unavailability
    - An unavailability reason (this specifies if the asset will be constrained or not by the DNO)
    - An unavailability cause (to allow for further use cases to be added).
    - Conflict Direction (this allows ESO to understand whether the risk would result in generation / demand turn up or turn down).

UKPN are developing more complex data exchanges as part of their Regional Development Plan (RDP) with the ESO to allow for more bi-directional flows of information.

Supporting Processes

The following supporting processes were also identified:

- The development of DNO risk of conflict forecasts, and the collation of the report. This would reflect the DNOs approach to forecasting and translate it into the identification of risk of conflict. This may initially be quite simplistic but will evolve as DNO processes mature. Enhancing the required data elements from the ESO to the DNO may be necessary to improve this forecasting.
- A process for the ESO to ingest the forecast and feed into their BM planning process.
- The data sharing processes in this use case are relatively simple. As they are not near real time, they can rely on the upload and download of data from an online portal, or the sending of CSVs via Email. There is no current privacy concern associated with the sharing of this data.

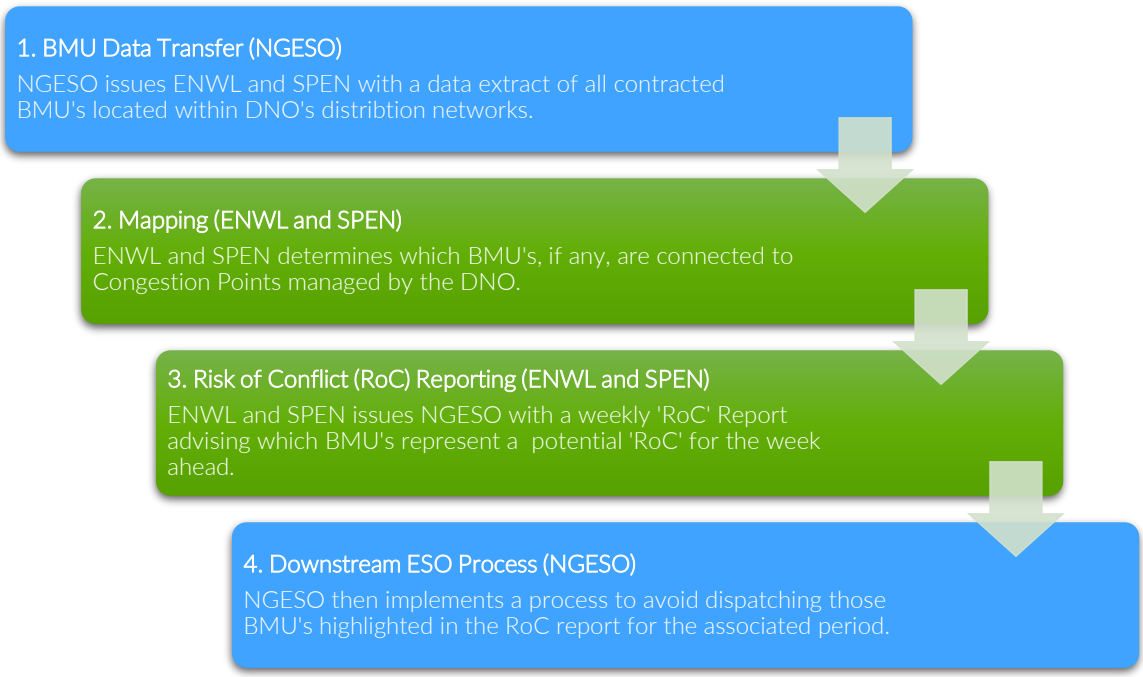
Testing of rules

Approach to testing

Testing was carried out with ENWL and the SPEN FUSION Team, and the ESO. Descriptions and analysis of this testing process is covered within this section of the report. The testing covered the supporting processes and the data exchange as per the descriptions above.

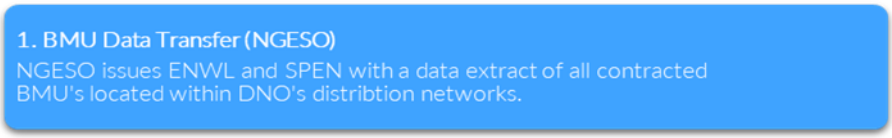
Approach to the trial

As part of the overarching Primacy approach ENWL, SPEN (under their Fusion project umbrella), and NGESO undertook a trial which followed the process as shown for the BMU Use Case:



The purpose of this section, Trial Delivery is to detail the procedures that were pioneered by the ESO and DNOs in delivering each of the 4 steps.

1. BMU Data Transfer (NGESO)



To allow the processes defined to take place then there is a dependency upon the DNO having a clear and accurate view of the BM Units that are embedded within their network; so, this became the starting point for the process and therefore the test. Under the test, this process and approach was common to both ENWL and SPEN.

The product group agreed a specification of data items they believed would be necessary or helpful in allowing the DNOs to identify embedded BMUs; thus allowing DNOs to generate a Risk of Conflict (RoC) report back to the ESO on a weekly basis. The data items initially deemed to be those required to allow DNOs to map BMUs were:

- Unique BMU ID identifier
- BM Unit Name
- GSP
- Wk24 Node
- Postcode
- Latitude (Optional)
- Longitude (Optional)
- Capacity (Optional)
- Fuel Type
- MPAN / MSID (Optional)

Initial investigations within ESO quickly showed that there is no single view or data source that allows them to simply, or quickly, extract and provide the relevant embedded BMU data needed. There were also some challenges / questions raised internally within ESO around whether they would be able to share this data with DNOs. These concerns were due to it relating to a contractual agreement between the ESO and generators

and not an agreement with the DNOs. As a result, ESO did undertake some internal assurance and also obtain confirmation from their own Legal and Compliance teams that the sharing of any BMU data was deemed to be appropriate and compliant. The outcome being that ESO assurance teams were comfortable that, as long as data is in the public domain, no data breaches would be made in the sharing of the above data.

An initial data extract was taken from an ESO data source through which all BMU registrations are made, the relevant fields in the extract being those included for extraction. The diagram below shows a sample of the initial extract (using the SPEN DNO data for the purposes of this example only, similar data was shared with ENWL).

AssetID	Effective From Da	GSP	GSP Group	Node	Postcod	Geo Location (Latitu	Geo Location (Longitude	DNO	Asset Type	BMRS Fuel Type	Fuel Type
BPGRD-2	31/03/2010	Others	Southern Scotland			50	0	SSEDT - SPEN	Demand	Other(Undefined)	Other
CAFAH-1	18/01/2014	Others	Southern Scotland			50	0	SSEDT - SPEN	Generator	NPSHYD (Non-Pumped Storage Hydro plant)	Non-Pump Storage Hydro
GLLEH-1	18/01/2014	Others	Southern Scotland			50	0	SSEDT - SPEN	Generator	NPSHYD (Non-Pumped Storage Hydro plant)	Non-Pump Storage Hydro
KEOCH-1	18/01/2014	Others	Southern Scotland			50	0	SSEDT - SPEN	Generator	NPSHYD (Non-Pumped Storage Hydro plant)	Non-Pump Storage Hydro
MEADD-1	01/11/2010	Others	Southern Scotland			50	0	SSEDT - SPEN	Demand	Other(Undefined)	Other
MOSED-1	31/03/2018	Others	Southern Scotland			50	0	SSEDT - SPEN	Demand	Other(Undefined)	Other
TONG-1	01/07/2021	Others	Southern Scotland			50	0	SSEDT - SPEN	Generator	NPSHYD (Non-Pumped Storage Hydro plant)	Non-Pump Storage Hydro
GABNE-1	28/05/2013	Others	Southern Scotland			50	0	SSEDT - SPEN	Generator		Wind
GARBR-1	13/06/2013	Others	Southern Scotland			50	0	SSEDT - SPEN	Generator		Wind
BURBW-1	31/03/2011	Others	Merseyside and Northern Wales			50	0	NWales - SPEN	Generator	Wind	Wind
BAGTD-1	30/09/2014	Others	Southern Scotland			50	0	SSEDT - SPEN	Demand	Other(Undefined)	Other
EARBW-1	16/06/2013	Others	Southern Scotland			50	0	SSEDT - SPEN	Generator	Wind	Wind
GCUMB-1	13/06/2013	Others	Southern Scotland			50	0	SSEDT - SPEN	Generator		Wind
TMWLW-1	11/06/2017	Others	Southern Scotland			50	0	SSEDT - SPEN	Generator	Wind	Wind
WINN-1	24/03/2014	Others	Merseyside and Northern Wales			50	0	NWales - SPEN	Generator	CCGT (Combined cycle Gas turbine)	Other
CRGTW-1	26/04/2018	Others	Southern Scotland			50	0	SSEDT - SPEN	Generator	Wind	Wind
GCHAP-1	13/06/2013	Others	Southern Scotland			50	0	SSEDT - SPEN	Generator		Wind
MINSW-1	28/06/2011	Others	Southern Scotland			50	0	SSEDT - SPEN	Generator	Wind	Wind
STOR-1	31/07/2017	Others	Southern Scotland			50	0	SSEDT - SPEN	Generator	BIOMASS P336	Biomass
SWBKW-1	05/03/2019	Others	Southern Scotland			50	0	SSEDT - SPEN	Generator	Wind	Wind

As can be seen from the above sample, there are a number of the data fields deemed necessary to allow the DNOs to complete the mapping exercise their own data against the ESO view of embedded BMUs. This task requires the cross referencing of the individual units that in some cases are either missing data or includes data that appears to be, or is clearly, incomplete or inaccurate. The process to ensure a complete data set and the accurate capture of such BMU registration data has recently been made more robust within ESO and it appears that the units where we see data availability or accuracy issues are historical.

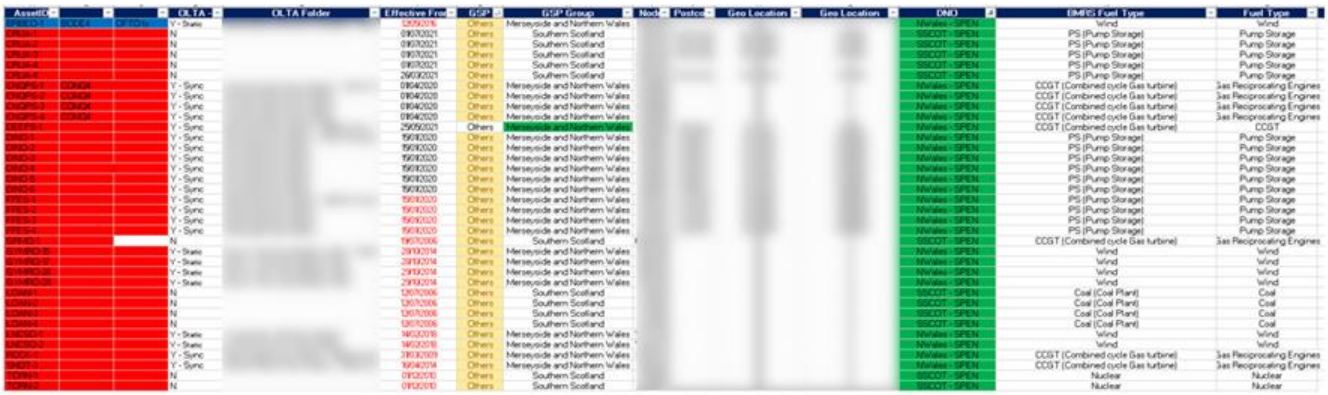
The data team within ESO did undertake a cleansing exercise which allowed them to clean up some postcode, geospatial and GSP / Node data, with some, albeit limited, success.

It also became apparent that whilst the data specified at the beginning of the exercise was believed to be appropriate and sufficient to allow the DNOs to establish which BMU units from the ESO view related to which units within the DNO view, deeper analysis of the data held in ESO revealed that in some cases items such as postcode or geospatial information held in the ESO dataset didn't in fact relate to the generation unit itself but could relate to other locations related to the unit (e.g. Head Office location details etc). Additionally, where generators were offshore wind farms on a number of occasions the geospatial data for the site referred to the wind farm location at sea, rather than the point of connection to the DNO network.

To summarise, this initial exercise at data sharing and mapping of BMUs across ESO and DNOs, utilising the data available did not allow us to complete the mapping exercise between ESO and DNO effectively.

ESO then investigated a number of alternative internal data sources as well initiating appropriate investigations and discussions with internal ESO SMEs (Subject Matter Experts) with a view to enhancing the data to obtain a more complete and meaningful dataset that DNOs could use to more effectively and efficiently identify

embedded BMU units in their network. In brief, the enhancement and refining of the initial data extract allowed ESO to exclude non-BMUs from the original dataset and also to get a better (but not complete view and understanding) of which BMUs from the extract are connected on the Transmission rather than the Distribution network. Detailed below is an example of the enhanced view of the data extract after those discussions and investigations had been undertaken within ESO.



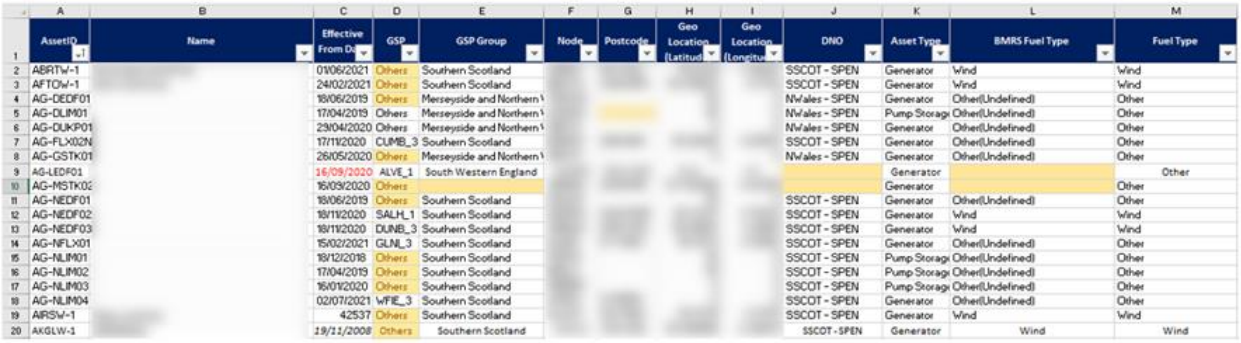
As can be seen from the above enhanced data extract (again using SPEN sample data), ESO has been able to add information relating to whether units are static or synchronous, whether they are believed to be transmission connected and also a unit name in some cases which it was hoped would be helpful to DNO in identifying the units. You can also see that some postcode and geospatial data has been enhanced also, notwithstanding the early point around some of the postcode data relating to locations other than the actual generating units.

The above datasets were then shared with ENWL and SPEN to try and allow them to map the ESO view of BMUs to their own view.

1.1. SPEN (fusion Project) – Stage 1 findings

Data transfer and format

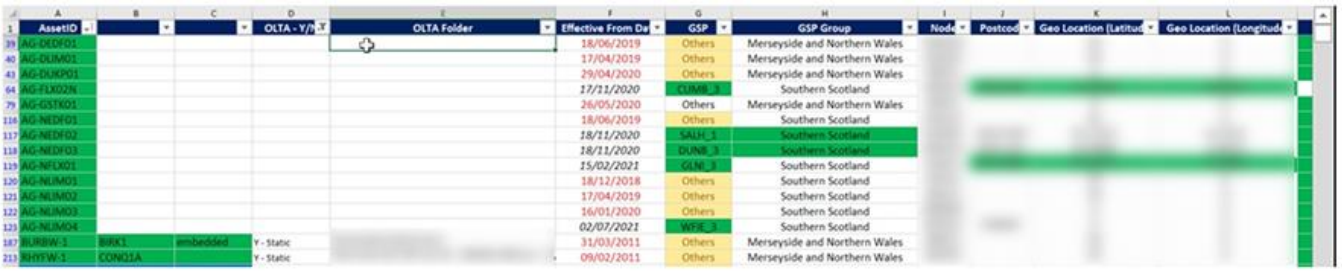
Initially the BMU data was sent via email and contained 196 entries in excel format (V1.0)



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	AssetID	Name	Effective From Da	GSP	GSP Group	Node	Postcode	Geo Location (Latitud	Geo Location (Longitu	DNO	Asset Type	BMRS Fuel Type	Fuel Type
2	ABRTW-1		01/06/2021	Others	Southern Scotland					SSCOT - SPEN	Generator	Wind	Wind
3	AFTOW-1		24/02/2021	Others	Southern Scotland					SSCOT - SPEN	Generator	Wind	Wind
4	AG-DEDF01		18/06/2019	Others	Merseyside and Northern \					NWales - SPEN	Generator	Other(Undefined)	Other
5	AG-DLIM01		17/04/2019	Others	Merseyside and Northern \					NWales - SPEN	Pump Storag	Other(Undefined)	Other
6	AG-DUKP01		29/04/2020	Others	Merseyside and Northern \					NWales - SPEN	Generator	Other(Undefined)	Other
7	AG-FLX02N		17/11/2020	CUMB_3	Southern Scotland					SSCOT - SPEN	Generator	Other(Undefined)	Other
8	AG-GSTK01		26/05/2020	Others	Merseyside and Northern \					NWales - SPEN	Generator	Other(Undefined)	Other
9	AG-LEDF01		16/09/2020	ALVE_1	South Western England						Generator		Other
10	AG-MSTK02		16/09/2020	Others							Generator		Other
11	AG-NEDF01		18/06/2019	Others	Southern Scotland					SSCOT - SPEN	Generator	Other(Undefined)	Other
12	AG-NEDF02		18/11/2020	SALH_1	Southern Scotland					SSCOT - SPEN	Generator	Wind	Wind
13	AG-NEDF03		18/11/2020	DUNB_3	Southern Scotland					SSCOT - SPEN	Generator	Wind	Wind
14	AG-NFLX01		15/02/2021	GLNI_3	Southern Scotland					SSCOT - SPEN	Generator	Other(Undefined)	Other
15	AG-NLIM01		18/12/2018	Others	Southern Scotland					SSCOT - SPEN	Pump Storag	Other(Undefined)	Other
16	AG-NLIM02		17/04/2019	Others	Southern Scotland					SSCOT - SPEN	Pump Storag	Other(Undefined)	Other
17	AG-NLIM03		16/01/2020	Others	Southern Scotland					SSCOT - SPEN	Pump Storag	Other(Undefined)	Other
18	AG-NLIM04		02/07/2021	WFIE_3	Southern Scotland					SSCOT - SPEN	Generator	Other(Undefined)	Other
19	AIRSW-1		42537	Others	Southern Scotland					SSCOT - SPEN	Generator	Wind	Wind
20	AKGLW-1		19/11/2008	Others	Southern Scotland					SSCOT - SPEN	Generator	Wind	Wind

Subsequently, a reduced version (V2.0) was shared containing just 15 of the original 196 entries. This followed NGESO having cleansed their original data, including the removal of the following entries:

- BMU participants that were inactive; and
- BMU participants connected to the transmission network, which is outside of scope for this primacy use case.



	A	B	C	D	E	F	G	H	I	J	K	L
1	AssetID			OLTA - Y/N	OLTA Folder	Effective From Da	GSP	GSP Group	Node	Postcod	Geo Location (Latitud	Geo Location (Longitud
39	AG-DEDF01					18/06/2019	Others	Merseyside and Northern Wales				
40	AG-DLIM01					17/04/2019	Others	Merseyside and Northern Wales				
43	AG-DUKP01					29/04/2020	Others	Merseyside and Northern Wales				
64	AG-FLX02N					17/11/2020	CUMB_3	Southern Scotland				
79	AG-GSTK01					26/05/2020	Others	Merseyside and Northern Wales				
116	AG-NEDF01					18/06/2019	Others	Southern Scotland				
117	AG-NEDF02					18/11/2020	SALH_1	Southern Scotland				
118	AG-NEDF03					18/11/2020	DUNB_3	Southern Scotland				
119	AG-NFLX01					15/02/2021	GLNI_3	Southern Scotland				
120	AG-NLIM01					18/12/2018	Others	Southern Scotland				
121	AG-NLIM02					17/04/2019	Others	Southern Scotland				
122	AG-NLIM03					16/01/2020	Others	Southern Scotland				
123	AG-NLIM04					02/07/2021	WFIE_3	Southern Scotland				
187	EURBW-1	BIRK1	embedded	Y - Static		31/03/2011	Others	Merseyside and Northern Wales				
213	KHYW-1	CONQ1A		Y - Static		09/02/2011	Others	Merseyside and Northern Wales				

- The reduced volume of entries contained in V2.0 made the process of mapping and analysing the BMU data less onerous for the DSO.

Geospatial data attributes

The following geospatial attributes were included in the BMU dataset:

- Latitude and Longitude
  - 96 of the 196 entries received in the BMU source data had mappable coordinates
  - Unfortunately, their accuracy was questionable. Many of the coordinates were not within the SPD/SPM network geographies (some of them were in the sea).
  - We therefore could not rely on latitude/ longitude coordinates for mapping them.
- Post code
  - Less than 65 of the 196 entries in the BMU source data of the records had a postcode.
  - Whilst, in the majority of cases, these corresponded to the post codes in which the coordinates fell into, that was not always the case.

- Given that so few entries had post codes we could not rely on that attribute for mapping them.

- Node
  - 189 of the 196 entries in the BMU source data had 'node' data
  - Whilst they didn't match exactly, the names of these nodes often bore some semblance to the names of SPEN Grid Supply Point (GSP), which lead us to infer that, in those cases, the BMU was connected, albeit at a lower voltage, to the corresponding GSP.
  - NB: the location inferred from the node value was sometimes not corroborated by that obtained from the latitude/ longitude coordinates. Given the observations that had already lead us to question the accuracy of latitude/t longitude coordinates, it was decided that, in any instance of discordance, the Node value should take precedence.
- Asset ID
  - Sometimes the 'asset ID' (see columns A-C in table above) includes a reference to a place name

Of the four geospatial attributes provided in the BMU data, the 'node' attribute was the most consistently populated. It was also evaluated to be the most accurate, with the latitude/ longitude data in particular showing evidence of pervasive errors. Consequently, a decision was made to principally rely upon 'node' data in the mapping process, but with regard also to the other spatial attributes wherever they suggest a conflict. Further detail is provided below in Section **Error! Reference source not found.**.

ENWL followed a similar approach as SPEN in the mapping exercise.

1.2. ENWL – Stage 1 findings

Data transfer and format

The ESO initially shared a file in excel format with a total of 34 entries. These entries were compared using a manual process to ENWLs own database of embedded generators, as well as using geospatial data where the ESO had provided this. Initial results from the ESO data set showed some significant number disparities between the ESOs data and ENWLs. From this initial data set it was possible to generate the following matches in data:

- 6 that could be directly matched to ENWL sites
- 6 that were a partial match, however ENWL couldn't be certain about which generating unit each BMU ID referred to because of multiple generators in the same postcode.
- 12 entries were either out of area or fed directly from the transmission network
- 10 entries which had insufficient data provided to match the BM unit to an ENWL connected asset

Following an exercise by the ESO to carry out data collection from alternative data sources and a data cleanse, further sites were identified. The second version of the data provided by the ESO identified a total of 51 entries. Using the same manual process for data matching the second version of data provided by the ESO the following matches were made:

- 11 that could be directly matched to ENWL sites
- 6 that were a partial match, however ENWL couldn't be certain about which generating unit each BMU ID referred to because of multiple generators in the same postcode.
- 13 entries were either out of ENWLs operating licence region area/ fed directly from the transmission network
- 21 entries which had insufficient data provided to match the BM unit to an ENWL connected asset

Geospatial data attributes

The following geospatial attributes were included in the BMU dataset:

- Name
    - 13 of the 51 entries received in the BMU source data had a corresponding name field
    - In most cases where names were provided it was possible to find a full or partial match, or to identify the unit was out of ENWLs operating licence region/ fed directly from the transmission network.
    - The name field was generally more useful in instances where the sites were larger high-profile generation units which can also be matched using publicly accessible data such as internet search results e.g. Walney Windfarm.
    - The Name field was more useful in instances where the other geospatial data corresponded to Offshore wind turbine locations, or the postcode of the sites registered owner/operator.

- Latitude and Longitude
    - 26 of the 51 entries received in the BMU source data had mappable coordinates
    - In most cases where Latitude and Longitude were provided it was possible to find a full or partial match, or to identify the unit was out of ENWLs operating licence region/ fed directly from the transmission network.
    - In at least one instance the co-ordinates given were for an offshore windfarm and as such were in the sea, rather than the DNO connection point.
    - On some occasions it was the combination of postcode data, co-ordinates, and site name which were used to full identify a site.
- Post code
    - 24 of the 51 entries in the BMU source data of the records had a full postcode.
    - In all cases where postcodes were provided it was possible to find a full or partial match, or to identify the unit was out of ENWLs operating licence region/ fed directly from the transmission network.
    - On some occasions it was the combination of postcode data, co-ordinates, and site name which were used to full identify a site.

- Node
    - 50 of the 51 entries in the BMU source data had 'node' data
    - Whilst they didn't match exactly, the names of these nodes often bore some semblance to the names of Grid Supply Points (GSP). In some cases, this did help to identify where identify the unit was out of ENWLs operating licence region/ fed directly from the transmission network.
    - This data lacked the sufficient granularity to be able to positively identify any BMUs within ENWLs licence area.
- Asset ID
    - The asset ID did not contain sufficient information to be able to positively identify any BMUs within ENWLs licence area.

The key learning from this exercise was that for larger BM units that have easily recognisable names they are easy to identify simply from the name. However, for smaller and more deeply embedded units, as well as aggregated portfolios of assets; it was much more important to have data such as postcodes, MPANS, and co-ordinates.

1.3. Stage 1 - Scope for improvement

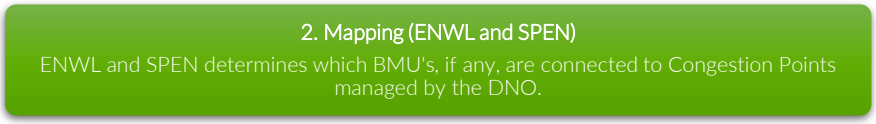
BMU data

- Improve data quality of latitude/ longitude and postcode data coordinates
- The inclusion of MPAN data will help identify individual BMUs, especially where these form part of an aggregated portfolio.
- Where the ESO have Postcodes, Co-ordinates, and MPAN data it may be possible for them to link the data using the Embedded capacity registers which the DNOs publish.

Mapping process

- The current method is very reliant on human input for matching which makes it hard to scale
- The data the ESO currently hold make is difficult for automated matching, improved data may facilitate some elements of automated matching in future.
- Using other metrics would facilitate automation

2. BMU Mapping to DNO congestion point data



Mapping BMU's to DNO CP's

A given BMU represents a potential conflict to the DNO when both of the following are true:

a) Location: It is connected to a CP that is being managed by a flexibility contract; and

b) Timing: The time period being considered falls within the period during which the associated flexibility contract applies.

Therefore, when analysing the BMU data for potential conflicts, the DNO needs to ascertain;

i. Timing: Do any DNO CP's have flexibility contracts in place to cover the reporting week in question?

ii. Location: Do any of those DNO CP's have BMU's connected to them?

2.1. SPEN (Fusion Project) – Stage 2 findings

Full details of the Congestion Points (CP) that SPEN manages through flexibility, including their name, location and periods during which they're managed, are all publicly available via the following links:

SPEN flexibility market	Associated Congestion Point Data
BaU	Project FUSION website
FUSION	SPEN Flexible Power website C31E Report Template (Ofgem) - v1.3 2022 (SPEN) FINAL (Anon).xlsx

c) This section describes the data analysis processes implemented by SPEN to identify potential conflicts between the BMU data received from NGESO (see section 0) and SPEN's own CP data.

Step 1: Source the CP data

Column D of the 'procurement' tab in the publicly available C31E Report Template (Ofgem) - v1.3 2022 (SPEN) FINAL (Anon).xlsx shows the 'Grid Supply Point' associated with every SPEN BaU congestion point.

	A	B	C	D	E
1	Tender reference	Product	Licence area	Service location (Grid Supply Point / Postcode)	Service Provider
2	Spring 2019	Dynamic	SP Manweb plc	Connah's Quay - Pentir - St Asaph	Conrad Energy Ltd
3	Spring 2019	Dynamic	SP Manweb plc	Connah's Quay - Pentir - St Asaph	Conrad Energy Ltd
4	Autumn 2019	Dynamic	SP Distribution plc	Berwick	Provider 1
5	Autumn 2019	Dynamic	SP Distribution plc	Berwick	Provider 1
6	Autumn 2019	Dynamic	SP Distribution plc	Leven	Provider 1
7	Autumn 2019	Dynamic	SP Distribution plc	Leven	Provider 1
8	Autumn 2019	Dynamic	SP Distribution plc	Broxburn	Provider 1
9	Autumn 2019	Dynamic	SP Distribution plc	Broxburn	Provider 1
10	Autumn 2019	Dynamic	SP Distribution plc	Bathgate	Provider 1
11	Autumn 2019	Dynamic	SP Distribution plc	Bathgate	Provider 1
12	Autumn 2019	Restore	SP Manweb plc	Connah's Quay - Pentir - St Asaph	Conrad Energy Ltd
13	Autumn 2019	Restore	SP Manweb plc	Connah's Quay - Pentir - St Asaph	Conrad Energy Ltd
14	Autumn 2019	Restore	SP Manweb plc	Connah's Quay - Pentir - St Asaph	Conrad Energy Ltd

That data set contains over 8000 entries.

Step 2: Filter to focus on the period in question

Filters were then applied to the CP data to focus only on those CP's which had flexibility service agreements in place which covered the period being investigated.

E.g. When conducting the trial in December, the following filters were applied to the CP data:

i. Column W: remove all rows with contracts *ending* prior to December 2022
ii. Column V: remove all rows with contracts *starting* after Dec 2022

That left just congestion points to be taken to the next stage of analysis.

	A	B	C	D	E
1	Tender reference	Product	Licence area	Service location (Grid Supply Point / Postcode)	Service Provider
4	Autumn 2019	Dynamic	SP Distribution plc	Berwick	Provider 1
7	Autumn 2019	Dynamic	SP Distribution plc	Leven	Provider 1
8	Autumn 2019	Dynamic	SP Distribution plc	Broxburn	Provider 1
10	Autumn 2019	Dynamic	SP Distribution plc	Bathgate	Provider 1
15	Autumn 2019	Dynamic	SP Manweb plc	Connah's Quay - Pentir - St Asaph	Provider 1
16	Autumn 2019	Dynamic	SP Manweb plc	Connah's Quay - Pentir - St Asaph	Conrad Energy Ltd
17	Autumn 2019	Dynamic	SP Manweb plc	Connah's Quay - Pentir - St Asaph	Conrad Energy Ltd
36	Autumn 2019	Dynamic	SP Manweb plc	Legacy	Provider 4

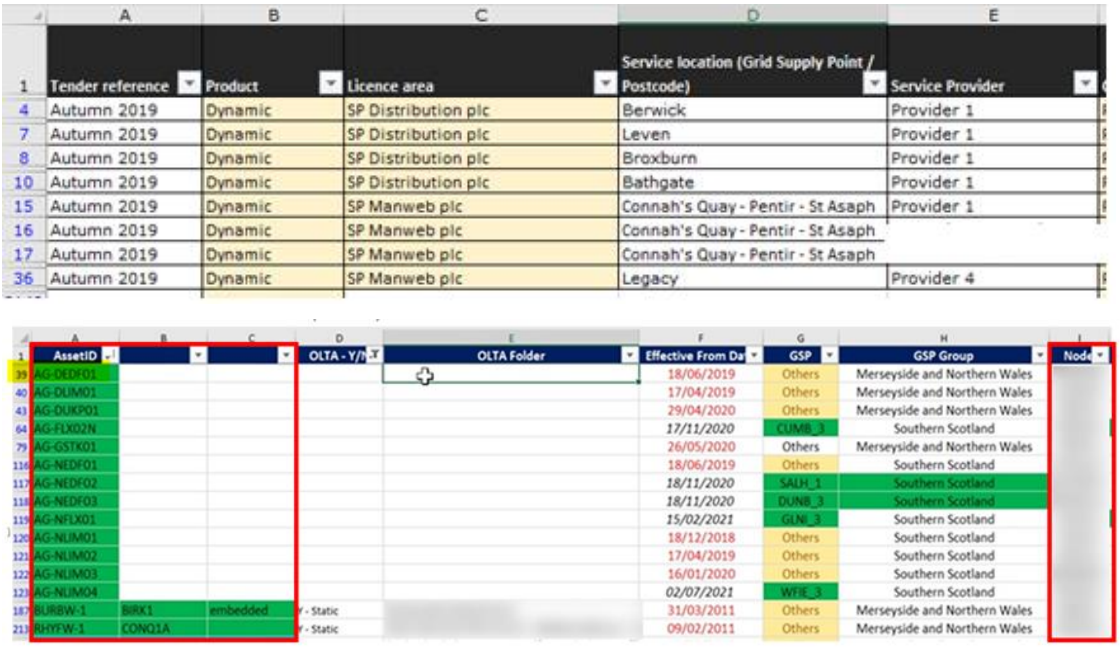
Step 3: Identify potential conflicts by naming association

As mentioned already in Section 0, the similarity in their names can often allow the 'Nodes' in the BMU data to be associated with the 'GSPs' in SPEN CP data.

Also, the asset ID in the BMU data sometimes contains references to place names, which can be (albeit with less confidence) associated with GSP's names that represent places that are geographically nearby.

In this step, the following data was compared in order to establish potential location matches:

- The GSP names for those 8 entries in the filtered SPEN CP data (column 'D')
- The Node names (Column 'I') and Asset ID's (Columns 'A-C') for those 15 entries in the NGESO BMU data (V2.0).



	A	B	C	D	E
1	Tender reference	Product	Licence area	Service location (Grid Supply Point / Postcode)	Service Provider
4	Autumn 2019	Dynamic	SP Distribution plc	Berwick	Provider 1
7	Autumn 2019	Dynamic	SP Distribution plc	Leven	Provider 1
8	Autumn 2019	Dynamic	SP Distribution plc	Broxburn	Provider 1
10	Autumn 2019	Dynamic	SP Distribution plc	Bathgate	Provider 1
15	Autumn 2019	Dynamic	SP Manweb plc	Connah's Quay - Pentir - St Asaph	Provider 1
16	Autumn 2019	Dynamic	SP Manweb plc	Connah's Quay - Pentir - St Asaph	
17	Autumn 2019	Dynamic	SP Manweb plc	Connah's Quay - Pentir - St Asaph	
36	Autumn 2019	Dynamic	SP Manweb plc	Legacy	Provider 4

	A	B	C	D	E	F	G	H	I
1	AssetID			OLTA - Y/N	OLTA Folder	Effective From Da	GSP	GSP Group	Node
39	AG-DEDF01					18/06/2019	Others	Merseyside and Northern Wales	
40	AG-DUM01					17/04/2019	Others	Merseyside and Northern Wales	
43	AG-DUKP01					29/04/2020	Others	Merseyside and Northern Wales	
64	AG-FLX02N					17/11/2020	CUMB_3	Southern Scotland	
79	AG-GSTK01					26/05/2020	Others	Merseyside and Northern Wales	
116	AG-NEDF01					18/06/2019	Others	Southern Scotland	
117	AG-NEDF02					18/11/2020	SALH_1	Southern Scotland	
118	AG-NEDF03					18/11/2020	DUNB_3	Southern Scotland	
119	AG-NFLX01					15/02/2021	GLNI_3	Southern Scotland	
120	AG-NUM01					18/12/2018	Others	Southern Scotland	
121	AG-NUM02					17/04/2019	Others	Southern Scotland	
122	AG-NUM03					16/01/2020	Others	Southern Scotland	
123	AG-NUM04					02/07/2021	WFIE_3	Southern Scotland	
187	BURBW-1	BIRK1	embedded	V - Static		31/03/2011	Others	Merseyside and Northern Wales	
213	RHYFW-1	CONQ1A		V - Static		09/02/2011	Others	Merseyside and Northern Wales	

The findings of that comparison exercise are presented below, showing the identification of 2 x potential conflicts (highlighting added to indicate apparent similarities observed):

BMU data		SPEN BaU data		Confidence of conflict
Asset ID	Node	GSP / post code	Service provider	
AG-DUM01	LEGA	LEGACY	Provider 4	High
RHYFW-1 (CONQ1A)		XXXXXX - Pentir - St. Asaph	Provider 1	Low
		XXXXX - Pentir - St. Asaph	Conrad Energy	Low
		XXXXXX - Pentir - St. Asaph	Conrad Energy	Low

This process was repeated on a weekly basis, each time adjusting the filter in column V of the CP dataset to consider only those CP's that had active flexibility contracts in place during the week in question.

2.2. ENWL – Stage 2 findings

Currently ENWL do not have any areas of the network which are defined as constraint management zones. In order to be able to test the primacy rule, and data transfer process ENWL offered to carry out simulated trials of the primacy process. ENWL created simulated network constraints for the BMU assets which had successfully been matched in the first stage of the process. A risk of conflict report was subsequently issued to the ESO.

3. Risk of Conflict Reporting

3. Risk of Conflict (RoC) Reporting (ENWL and SPEN)
ENWL and SPEN issues NGESO with a weekly 'RoC' Report advising which BMU's represent a potential 'RoC' for the week ahead.

An agreed template of conflict reporting has been established based upon the already ongoing trials of the TCM vs DNO flexibility services use case. The data fields required are defined in the Data Exchanges section of this document.

Originally the process for the RoC report only required DNOs to identify if there were risk of conflict where the ESO were curtailing generation export. During the course of the simulated trials it was identified that there was also a requirement to highlight risks of conflict if the ESO were to alter sources of demand connected to the DNO networks i.e demand turn down, and demand turn up services; as well as being able to turn up generation. With this new requirement it became necessary to include a “conflict direction” field so that it included provisions for demand turn down, demand, turn up, generation turn down, generation turn up, and Both. This inclusion of all possible combinations of ESO services allows for the RoC report to be more adaptable for other future use cases.

3.1. Risk of Conflict Reporting (SPEN) - Stage 3 findings

The RoC report was successfully issued to the NGESO each Tuesday for four consecutive weeks commencing October 19th 2022.

Those RoC reports contained several instances of conflicts having been identified, and their successful communication to NGESO demonstrates the efficacy of process contained within the BM1a rule.

Communication Protocol

Each week the DNO emailed a completed RoC report to the NGESO, communicating the perceived risk of conflict for the week ahead associated with each of the BMU data entries provided by NGESO.

In order to standardise the RoC reporting process, the ENA specified the protocol for implementing that weekly communication, full details of which are provided in Appendix 3 – Roc Reporting Protocol.

A summary of the weekly RoC reporting process is provided below.

- Communication Mode: Email containing RoC attachment
- Frequency: Weekly
- Timing: By 5PM each Tuesday

- Origin: xxxx@spenergynetworks.co.uk
- Destination: xxxx@nationalgrideso.com
- RoC File Type: .csv
- RoC Format & Content: See Section 5.3.2
- RoC Reporting Period: The coming Saturday to Friday, inclusive.
- RoC file name: SP ENERGY NETWORKS-BM-CONFLICT-<start date,ddmmyyyy>-<end date,ddmmyyyy>.csv

RoC reporting format

The RoC report was sent weekly, as an email attachment, to NGESO (see Section 5.3.1 for details).

For consistency of approach, the ENA produced a template RoC Report for the purposes of this trial, a copy of which is provided for reference in Appendix 4 – Roc Reporting Template.

For illustration of how this template was applied in the trial, a screenshot is provided below showing the completed RoC report that was issued to NGESO on Dec 13th.

	A	B	C	D	E	F	G	H	I
1	Data row	BMU ID	BMU Name	Unavailability		Conflict Status	Conflict re	Conflict Direction	
2				Start	End				
3	1	AG-DEDF01		YYYY-MM-DDTHH:MM:SSZ	YYYY-MM-DDTHH:MM:SSZ	(0 – No Conflict Risk	F - Flex	2 - Gen Turn Down	
4	2	AG-DLIM01		2022-12-17T06:00:00Z	2022-12-17T20:30:00Z	1 - Conflict Risk (Ass	F - Flex	2 - Gen Turn Down	
5	3	AG-DUKP01		YYYY-MM-DDTHH:MM:SSZ	YYYY-MM-DDTHH:MM:SSZ	(0 – No Conflict Risk	F - Flex	2 - Gen Turn Down	
6	4	AG-FLX02N		YYYY-MM-DDTHH:MM:SSZ	YYYY-MM-DDTHH:MM:SSZ	(0 – No Conflict Risk	F - Flex	2 - Gen Turn Down	
7	5	AG-GSTK01		YYYY-MM-DDTHH:MM:SSZ	YYYY-MM-DDTHH:MM:SSZ	(0 – No Conflict Risk	F - Flex	2 - Gen Turn Down	
8	6	AG-NEDF01		YYYY-MM-DDTHH:MM:SSZ	YYYY-MM-DDTHH:MM:SSZ	(0 – No Conflict Risk	F - Flex	2 - Gen Turn Down	
9	7	AG-NEDF02		YYYY-MM-DDTHH:MM:SSZ	YYYY-MM-DDTHH:MM:SSZ	(0 – No Conflict Risk	F - Flex	2 - Gen Turn Down	
10	8	AG-NEDF03		YYYY-MM-DDTHH:MM:SSZ	YYYY-MM-DDTHH:MM:SSZ	(0 – No Conflict Risk	F - Flex	2 - Gen Turn Down	
11	9	AG-NFLX01		YYYY-MM-DDTHH:MM:SSZ	YYYY-MM-DDTHH:MM:SSZ	(0 – No Conflict Risk	F - Flex	2 - Gen Turn Down	
12	10	AG-NLIM01		YYYY-MM-DDTHH:MM:SSZ	YYYY-MM-DDTHH:MM:SSZ	(0 – No Conflict Risk	F - Flex	2 - Gen Turn Down	
13	11	AG-NLIM02		YYYY-MM-DDTHH:MM:SSZ	YYYY-MM-DDTHH:MM:SSZ	(0 – No Conflict Risk	F - Flex	2 - Gen Turn Down	
14	12	AG-NLIM03		YYYY-MM-DDTHH:MM:SSZ	YYYY-MM-DDTHH:MM:SSZ	(0 – No Conflict Risk	F - Flex	2 - Gen Turn Down	
15	13	AG-NLIM04		YYYY-MM-DDTHH:MM:SSZ	YYYY-MM-DDTHH:MM:SSZ	(0 – No Conflict Risk	F - Flex	2 - Gen Turn Down	
16	14	BURBW-1	Burbo Bank Wind Farm	YYYY-MM-DDTHH:MM:SSZ	YYYY-MM-DDTHH:MM:SSZ	(0 – No Conflict Risk	F - Flex	2 - Gen Turn Down	
17	15	RHYFW-1	Rhyl Flats WF Off 132 KV - 90MW offshore. Tx	2022-12-17T09:30:00Z	2022-12-17T19:30:00Z	1 - Conflict Risk (Ass	F - Flex	2 - Gen Turn Down	
18									
19	Data rows within file		15						

Figure: SPEN Roc Report, Dec 13th 2022

Table below summarises the fields contained within the RoC reporting template and how they were populated during the trial.

Roc Field	Source data for populating
BMU ID	• NGESO BMU Data.

BMU Name	
Unavailability Start Date and Time.	• Columns Y & Z of the C31E Report Template (Ofgem) - v1.3 2022 (SP ENERGY NETWORKS) FINAL (Anon).xlsx
Unavailability End Date and Time	
Conflict (availability) Status 0 – No Conflict Risk (Asset Available), 1 – Conflict Risk (Asset Unavailable),	• Columns A, C & I of the NGESO BMU Data. • Column D of the C31E Report Template (Ofgem) - v1.3 2022 (SP ENERGY NETWORKS) FINAL (Anon).xlsx
Conflict Reasons A – ANM, F – Flex, O - DNO Outage	• Given the scope of this trial, we were only concerned with those conflicts arising from 'Flex' activities.
Conflict Direction 1 – Generation turn-up / Demand turn-down, 2 – Generation turn-down / Demand turn-up, 3 – Demand turn-up and turn-down)	• Columns F & P of the C31E Report Template (Ofgem) - v1.3 2022 (SP ENERGY NETWORKS) FINAL (Anon).xlsx

Table 5: RoC report fields and how to populate each

Scope for Improvement

a) Roc Reporting template
   i. This trial revealed that, without there is potential for confusion when populating the RoC reporting template, and recommends that guidance be provided to DNO's to avoid them making the same mistake that SP Energy Networks made, which is described in detail below.

   SPEN mistakenly understood that the weekly RoC report format limited users to populating a single line item (max) per BMU. In fact the format allows for multiple line items to be populated per BMU. SPEN's incorrect interpretation of the formatting rules meant that they felt precluded from being able to record conflicts that occurred for only part of each day (e.g. instead of being able to report conflicts that existed between 09:00-10:00 each morning for each of the 6 days of the reporting period, SPEN understood that it had to declare a 'monolithic' conflict extending from 09:00 on day-1 right through until 10:00 on day-6). This was an incorrect interpretation,

and if employed it results in excessive conflict durations being reported, which would be detrimental to the BM and its participants. This report therefore recommends that, in order to prevent the impact of this mistake being made again (at scale), training be provided to DNO users of the RoC report to expressly warn them of the risk of this erroneous interpretation and its consequences.

ii. The cells in column F allow for two drop down options, one of which is as follows:
(0– No Conflict Risk (Asset Available – record not included in the file)

The inclusion of the text 'record not included in the file' in the above drop down menu option creates ambiguity as to whether instances of No conflict should be recorded within the report, or not. This report suggests that, in order to ensure consistency of approach, the drop-down menu options be edited to avoid this ambiguity.

If 'No conflict' BMU's are to be included in the RoC report then we suggest introducing the dropdown option 'N/A' in columns G & H.

b) RoC Guidance:
   i. The attached guidance specifies the following file name convention: SP ENERGY NETWORKS-BM-CONFLICT-<start date, ddmmyyyy>-<end date, ddmmyyyy>.csv

   However, the <> characters are not permitted characters in the file name, and so this report recommends that the specified naming convention be adjusted accordingly.

   ii. During the trial, the following step in the guidance was not observed:
      - On receipt of the Risk of Conflict report the ESO will return an email handshake back to SP ENERGY NETWORKS to confirm receipt – this email will originate from an agreed ESO email account and sent to SP Energy Networks nominated recipient and will be issued by 9am each Wednesday morning following receipt of the report on the Tuesday at 5pm.

   This report suggests that this step could be automated by specifying that, when the DNO issues the RoC report each week, they activate 'read reports' in the sending email.

c) Communication process
   i. In the future, we should look to incorporate data exchange into the scheduling and dispatch tools, albeit that they presently still need to be developed.

3.2. Risk of Conflict Reporting (ENWL) - Stage 3 findings

Currently ENWL do not have any areas of the network which are defined as constraint management zones. In order to be able to test the primacy rule, and data transfer process ENWL offered to carry out simulated trials of the primacy process. ENWL created simulated network constraints for the BMU assets which had successfully been matched in the first stage of the process. Based upon simulated data ENWL provided the ESO with a risk of conflict report.

Due to the ESO still needing to create processes to analyse and act upon this risk of conflict report the simulated trials ended after confirming that the data transfers for the risk of conflict report worked correctly.

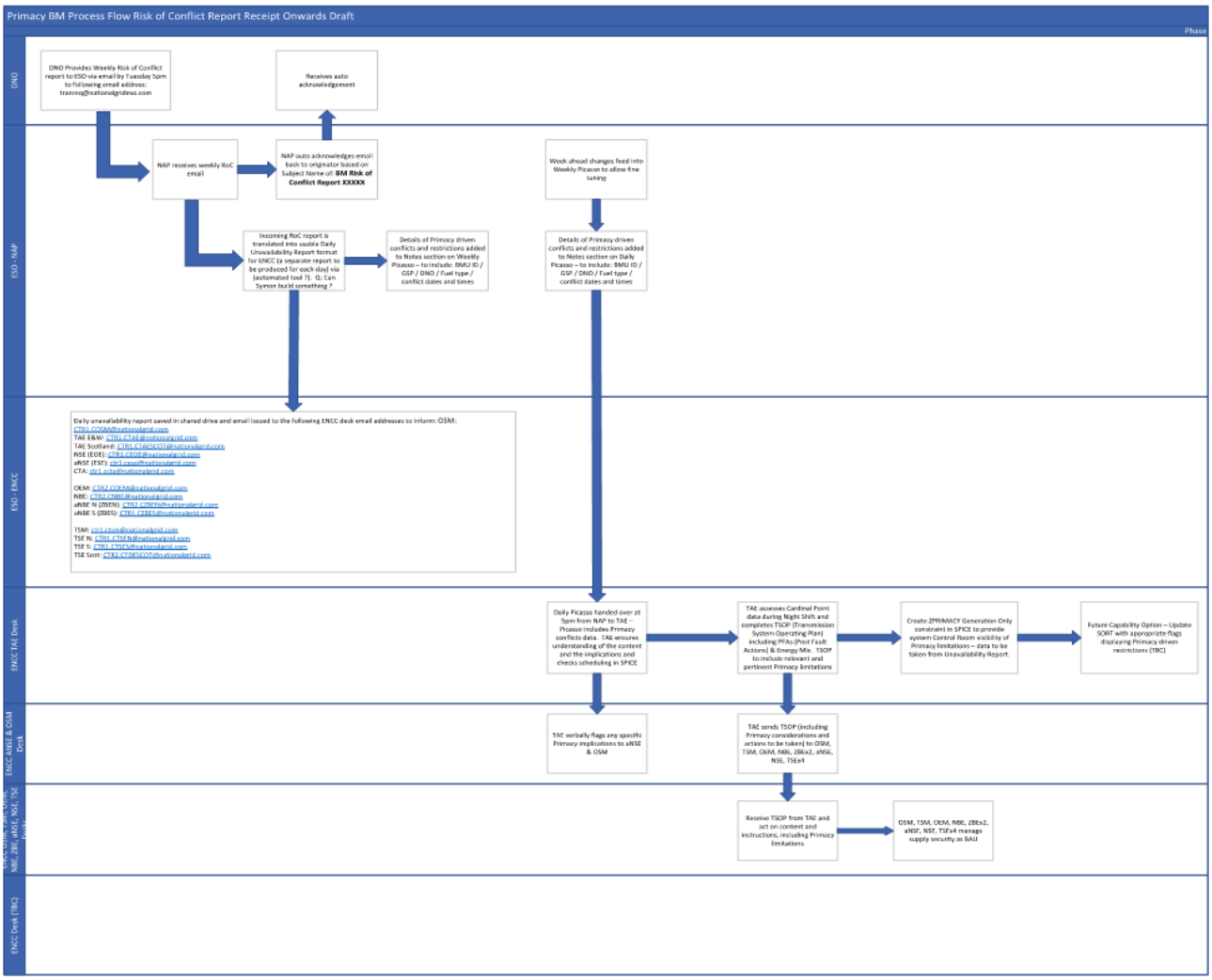
Currently the ENWL risk of conflict report would be manually generated. Currently the number of anticipated conflicts between DNO flexibility services and ESO BM services means that it is efficient to manage this process manually. The low number of anticipated conflicts is a result of the following factors:

- Low volume of DNO flexibility services in operation within ENWLs licence area
- Low number of ESO BMUs which were successfully matched to ENWL data during the trial
- The majority of ESO BMUs connected to ENWLs network were connected at the higher voltage levels where conflicts are less likely to occur due to requirements for security of supply
- Historical planning policies adopted by ENWL that model for maximum demand coinciding with minimum generation outputs, and vis-versa
- Currently ENWL manually schedule availability of flexible services contracts a week ahead, it is anticipated that the RoC process would be carried out at the same time by the same team.

If in future the volume of conflicts were to increase to a level which was inefficient to manage via manual process ENWL would look to develop tools to automate these processes.

4. Downstream ESO process (NGESO)

The purpose of the DNO sending the Risk of Conflict (RoC) report to the ESO is to allow the ESO to have visibility of which embedded BMUs may not achieve the desired outcome should the ESO choose to instruct them to turn up or down their demand or generation, in order to maintain system balance and stability. From the outset, ESO was keen to try and utilise existing processes within the Planning and Control Room teams to allow quick, effective and successful outcomes to be achieved in the implementation of any Primacy rules. Good collaborative working across the various ESO teams allowed them to define a process that builds on the existing framework and therefore should be able to be implemented with minimum of change across the various ESO teams. Shown below is the high level process defined for implementation within ESO.



The successful receipt of the RoC report from ENWL and SPEN has been proven and tested to ensure correct report format, successful report transfer into ESO (via email) and also successful positive confirmation of receipt is returned back to ENWL and SPEN (also via email).

Once received the report was then passed through the normal ESO planning process as defined in the above diagram to ensure that any BM Units showing a risk of conflict as detailed in the RoC are removed from the ESO BM Control Room desks options as units available to be used to implement corrective actions in the event of a system imbalance. This proves the ESO internal process, and that any BMUs identified as having a potential risk of conflict, are removed from the ESO ENCC mitigation options via the daily document handed between planning and Control Room teams (this document is referred to as a daily Picasso document).

On receipt of the weekly RoC report, the ESO planning teams are able to manually interpret the data, understand the impacts and subsequently ensure that these impacts are built into the daily handover via

Picasso (ESO process used to document anticipated constraints and impacts). However, the ESO team quickly concluded that, although this manual process is manageable potentially for a single DNO it is not scalable or sustainable for multiple DNOs passing RoC data in to ESO, nor would it support the Primacy Rule 1b of ESO receiving more frequent RoC reports than weekly. As a result, the ESO is currently developing a tool that will be able to receive multiple RoC reports (all in the same format) from multiple DNO sources and consolidate into a single internal view that ESO planning and control teams will have access to – this to be termed the Daily Unavailability Report within ESO. This consolidation tool is currently under development and is anticipated for delivery sometime before the end of March 2023, allowing a potential wider rollout of the BMU Primacy process across multiple DNOs as well as a potential to consider more frequent DNO RoC reporting as aspired to in Rule 1b.

The format of the incoming RoC report to ESO from DNOs has been defined, tested and issued as part of this trial process – for information, below is an example of the format of the report which is to be transferred weekly via email from DNO to ESO. As the participating parties are expanded wider, all DNOs will be expected to use the same format for their RoC report so that the ESO consolidation tool can combine into the consolidated Daily Unavailability Report as detailed earlier.

Data row	BMU ID	BMU Name	Unavailability		Conflict Status	Conflict reason	Conflict Direction
			Start	End			
1	BMUID1	ILD-PWMR1	DD/MM/YYYY/HH/MM	DD/MM/YYYY/HH/MM	1 - Conflict Risk (Asset Unavailable)	F - Flex	1 - Gen Turn Up
2	BMUID2	SAKNW-1	DD/MM/YYYY/HH/MM	DD/MM/YYYY/HH/MM	1 - Conflict Risk (Asset Unavailable)	F - Flex	2 - Gen Turn Down
3	BMUID3	ILG-PWMR1	28/06/2022/09/00	28/06/2022/11/30	1 - Conflict Risk (Asset Unavailable)	F - Flex	3 - Demand Decrease and Increase
4	BMUID3	ILG-PWMR1	28/06/2022/14/00	28/06/2022/14/30	1 - Conflict Risk (Asset Unavailable)	F - Flex	1 - Gen Turn Up
5	BMUID3	ILG-PWMR1	28/06/2022/18/30	28/06/2022/20/30	1 - Conflict Risk (Asset Unavailable)	F - Flex	2 - Gen Turn Down
6	BMUID4	ILG-NTPL1	DD/MM/YYYY/HH/MM	DD/MM/YYYY/HH/MM	1 - Conflict Risk (Asset Unavailable)	F - Flex	3 - Demand Decrease and Increase
7	BMUID5	AG-FSTK03	DD/MM/YYYY/HH/MM	DD/MM/YYYY/HH/MM	1 - Conflict Risk (Asset Unavailable)	F - Flex	1 - Gen Turn Up
Data rows within file		7					

This will give a consistent and scalable process for DNOs to submit regular RoC reports which will then be fed into the defined ESO process as captured and detailed earlier in this section.

Learning and next steps

From the tests we have learnt that:

- Currently data quality from historical agreements is a challenge
- There are concerns about shareability of data generally and as the Use Cases increase the risk of sharing data and privacy may increase.
- The ESO needs to develop a greater suit of tools to in order to process the data

As such the next steps are:

- Proceed to roll out of the proposed rule utilising the current data which is available
- Explore the potential for developing improved and enduring data matching processes

- Development of an ESO tool to ingest the RoC data to create the Daily Unavailability Report.

Glossary

Term	Meaning
BMU	Balancing Mechanism Unit
CP	Congestion Point
ENWL	Electricity North West Ltd
MPAN	Meter Point Administration Number
NGESO	National Grid ESO
RoC	Risk of Conflict
SPEN	SP Energy Networks

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