

**The Voice of the Networks**



# **Energy Networks Association**

## **Open Networks Project**

### **Whole System Electricity FES**

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# Document Control

## Version Control

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## Table of Contents

Introduction.....	1
1. Identify and implement tactical improvements to DNO/ESO/TO liaison to feed into 2019 FES .....	2
<b>1.1 Overview of sub-deliverable</b> .....	2
<b>1.2 Identification of current touchpoints with National Grid FES team</b> .....	2
<b>1.3 Tactical changes implemented for FES 2019</b> .....	2
<b>1.4 Scenario Production Timeline for 2019</b> .....	3
2. Finalise templates and processes for information exchange to support 2020 delivery of Whole Electricity System FES .....	4
<b>2.1 Overview of sub-deliverable</b> .....	4
<b>2.2 2020 Information Exchange Process Development</b> .....	4
<b>2.3 Building Blocks Development</b> .....	4
<b>2.4 Assumptions and Exceptions</b> .....	6
3. Identify and agree licence and code changes required to support data exchange and ongoing FES delivery .....	7
<b>3.1 Overview of sub-deliverable</b> .....	7
<b>3.2 Determining the need for licence and code changes</b> .....	7
4. Support delivery of Whole Electricity System FES .....	8
<b>4.1 Overview of sub-deliverable</b> .....	8
<b>4.2 On-going support of Whole Electricity System FES</b> .....	8
<b>4.3 Continued support for Whole Electricity System FES through 2020</b> .....	9
5. Support Whole Energy System workstream by providing input on potential whole energy system interactions for 2020 and beyond .....	10
<b>5.1 Overview of sub-deliverable</b> .....	10
Conclusions .....	11
Appendix 1: Glossary.....	12
Appendix 2: Scenario Publication Timeline for 2019.....	13
Appendix 3: Proposed 2020 Information Exchange Process .....	14
Appendix 4: Proposed Building Blocks .....	15
Appendix 5: Proposed Data Exchange Template .....	16
Appendix 6: FES Network Group – Terms of Reference .....	17

## Introduction

The Workstream 1B objective is to take a whole electricity system approach to optimise existing processes across the Transmission and Distribution boundary by identifying synergies and developing more efficient processes for key network operator activities such as investment planning, operational planning and forecasting. As part of the Open Networks Project's Workstream 1B (Whole Electricity System Planning & T-D Data Exchange), the Whole System Electricity Future Energy Scenarios (FES) product seeks to develop processes to coordinate National and Regional Future Energy Scenarios whilst providing improved clarity and transparency to stakeholders around the various scenarios being produced by the network companies.

Furthermore, by participating directly in the development of the ESO Future Energy Scenarios for GB, DNO's will bring improved local intelligence to inform regional aspects of the GB scenarios. This additional local intelligence will help improve both the starting positions used for scenarios and the future year forecasts.

The work is intended to align the GB FES and DFESs forecasts further to ensure the data presented gives an accurate reflection of the whole industries' best view of the future scenarios. This is achieved by increasing Distribution Network Operator (DNO) and Transmission Operator (TO) participation and by the utilisation of common building blocks. This will allow stakeholders to determine how the various scenario documents are constructed.

The common building blocks used to underpin the GB FES would also be used by DNOs when constructing and publishing their own regional scenarios to inform network development. This will enable the scenarios being used by different network companies to be more easily understood and compared by stakeholders.

The 2019 Whole System Electricity FES product is consisted of five sub-deliverables scheduled over the course of 2019. These sub-deliverables are as follows:

1. Identify and implement tactical improvements to DNO/ESO/TO liaison to feed into 2019 FES;
2. Finalise templates and processes for information exchange to support 2020 delivery of Whole Electricity System FES;
3. Identify and agree licence and code changes required to support data exchange and ongoing FES delivery;
4. Support delivery of Whole System Electricity FES; and
5. Support Whole Energy System workstream (Workstream 4) by providing input on potential whole energy system interactions for 2020 and beyond.

This report covers sub-deliverables 1 to 4 of Product 2. Sub-deliverable 5 has not been progressed during 2019 as Workstream 4 decided not to progress FES related work during 2019. Workstream 4 was established in 2019 to consider a more integrated approach to whole energy systems that extended to other energy vectors as well as electricity. After weighing it up its priorities for 2019, the Product 4 team decided to focus on Real Time Operations and Forecasting and Investment Planning during 2019.

The report details the work carried out to progress each of the sub-deliverables 1 to 4, describing new processes, templates and agreed approaches that will support data exchange and ongoing FES delivery by each of the network companies.

# 1. Identify and implement tactical improvements to DNO/ESO/TO liaison to feed into 2019 FES

## 1.1 Overview of sub-deliverable

The objective of this sub-deliverable was to identify and implement tactical improvements to DNO/ESO/TO liaison for the 2019 FES. This sub-deliverable was particularly focused on improving DNO input into the development of the ESO's 2019 FES to be published in July 2019. It was identified that the TO's input into the development of the FES was already well established as a result of the SO-TO Code (STC) which defines the relationship between the transmission system owners and the system operator. The STC currently enables greater cooperation between the ESO and the TOs. The reason for the TO engagement on FES is due to the annual requirement to produce the Electricity Ten Year Statement (ETYS) which is highly linked to the FES process.

The ETYS requirement does not exist for the DNOs and, as such, a number of different actions were taken to allow the DNOs to input into the development of the 2019 FES. The various actions are discussed further in the following sections.

## 1.2 Identification of current touchpoints with National Grid FES team

In order to determine the opportunity for tactical improvements, the ESO first reviewed all existing touchpoints with the TOs in relation to a full FES cycle. This included a number of touchpoints that were not unique to the TOs, such as the FES stakeholder workshops, the call for evidence and bilateral meetings. In addition, there were a number of touchpoints that were unique to the TOs, employed to facilitate the production of the FES data used within the ETYS.

The touchpoints unique to the TOs ran from January through to the final delivery of the summer components of the ETYS dataset in June. They included the review of the list of electricity generation assets (both transmission and distribution connected) during January and February, and the review of GB wide demand component projections in late February and March. Following the production of the GB overall demand, the TOs are consulted on the process which produces the regional demand data for ETYS. This process commences in March and concludes in June.

For the FES 2019, touchpoints where DNO's could participate more directly were identified in relation to the production of the regional demand data beginning in March. Interventions in the earlier stages of the FES 2019 cycle were not possible as these dates had already passed. (See the 2020 Information Exchange Process section below for further information on how these will be included within FES 2020 and beyond.)

The first of these touchpoints for 2019 involved the provision by DNOs of geospatial data related to their Grid Supply Points (GSPs). The second occurred in April aligned to the draft production of the regional demand data for ETYS. These touchpoints are further described in the following section.

## 1.3 Tactical changes implemented for FES 2019

A key development of the 2018 FES was the ESO publication of key modelling outcomes such as the volume of generation and demand for each Grid Supply Point (GSP). This data sharing allowed the DNOs to review how the overall national view for each of the modelling assumptions had been disaggregated. This review highlighted that across a number of assumptions, there were issues with the assumed regional starting point and/or the disaggregation of the forecast data at a DNO level.

As a first step to improve the spatial disaggregation in the 2019 GB FES, a number of DNOs provided the ESO, on a bilateral basis, with a range of datasets at GSP level. These have included:

- Postcodes supplied by GSP
- Latest analysis of actual electric vehicle deployment by GSP; and
- Availability of industrial and commercial demand side response.

This information allowed the ESO to update its boundary definitions and apportionments for each GSP. DNOs provided this data throughout March. (Going forward, it is anticipated that this exercise will be repeated from time to time according to major network changes.)

As a second step in the 2019 FES cycle, the NGENSO published the proposed 'regional breakdown of FES data' at an earlier stage to allow feedback from DNOs. In previous years the regional breakdown of FES data by Grid Supply Point has been published alongside the launch of the FES document and accompanying documents. This has not allowed for DNOs to provide comments on the accuracy of the regional breakdown before final publication in the same way that TOs provide feedback under the provisions of the SO-TO Code.

ESO published a draft version of the 'regional breakdown of FES data' on 12th April 2019, with a two week deadline for DNOs to provide feedback. This occurred at the same time that the data was provided to the TOs (using the provisions of the STC). The regional data was reviewed, and concerns raised where DNO collated data and NGENSO produced data did not align. As an example, it was determined that large generators (those with BELLA and BEGA contracts) located within distribution networks were not being counted in the GSP generation totals, instead summated using a different process in the FES. This can lead to confusion when comparing the GSP generation totals that DNOs provide in regulatory submissions and in the FES breakdown. This was highlighted as an improvement to better allow DNOs to cross reference their data with that published in the FES.

The regional review has been further enhanced by development of the common "building block" approach. The building block approach facilitates easier comparison for stakeholders between the GB FES and the individual DFES produced by each DNO. The blocks have been split into three distinct categories; demand, generation and storage. For 2019, each DNO agreed to map, where possible, the data within its existing DFES to the building blocks and to provide the ESO both its baseline position and forecast for each building block at GSP level. The building blocks are discussed in more detail in Section 2.

## 1.4 Scenario Production Timeline for 2019

In addition to the tactical changes implemented to improve the ESO's GB FES in 2019, a document was produced to provide stakeholders with improved information about DNO FES publications.

Product member companies provided indicative timelines for publication of their 2019 FES documents and these timelines were combined into a single document and published on the ENA website. The purpose of this document is to outline the various scenarios being published by each of the network companies and the ESO during 2019. This has given stakeholders improved visibility of the various scenario publications being produced during the year.

<http://www.energynetworks.org/assets/files/WS1B%20Product%20%20Scenarios%20Publication%20Timeline.pdf>

A copy of the 2019 timeline is located in Appendix 2.

## 2. Finalise templates and processes for information exchange to support 2020 delivery of Whole Electricity System FES

### 2.1 Overview of sub-deliverable

The objective of this sub deliverable was to develop and agree templates and processes for the exchange of network information related to the development of Future Energy Scenarios.

This sub-deliverable builds upon the work carried out to make improvements to the 2019 FES and looks to develop an enduring process for collaboration across the various companies. This sub-deliverable reviewed the work carried out in 2018 to define the building blocks, levers and scoring methodologies and proposed changes to these to ensure they were fit for purpose. This sub-deliverable also looks at the blockers to data sharing including the Grid and Distribution codes.

### 2.2 2020 Information Exchange Process Development

The proposed data exchange process is presented in Appendix 3. The proposed process will facilitate the transfer of applicable relevant data between the ESO, TOs, and DNOs. Future Energy Scenarios are used to inform decisions including in relation to future network infrastructure. It is therefore in the interest of network companies and their stakeholders to ensure that the data presented gives an accurate reflection of the whole industries' best view of the future scenarios. This will be improved by the exchange and inclusion of regional insights.

The data exchange process is designed as a method to ensure that the GB FES and regional forecasts are aligned within the starting year, and that the most up to date thinking in regard to forecast years is shared. One example of where this approach may be of benefit is in forecasting trends of Low Carbon Technologies uptake. National forecasted trends of Low Carbon Technologies uptake could be applied equally across a region, however local governmental factors may result in a different uptake rates within a region. The regional network operator is more likely to be aware of these local factors and, through sharing its forecasts ahead of national publication, it can provide information to improve the national FES document.

The information exchange also ensures earlier provision of information from the ESO to the regional network operators. This will ensure that when a national policy change impacts the GB FES, or when the ESO updates the GB FES scenario framework based on its stakeholder engagement, these changes are more quickly shared with regional network operators. The results are then available to be used alongside the regional network operator's own data and engagement.

At boundaries where DNOs share common transmission and distribution assets there is often a limited flow of information relating to forecasted demand changes. The information exchange process provides a common template for exchange of enhanced data relating to forecasted demand changes and penetrations of low carbon technologies.

Where different licensees are using different scenarios to inform their investment planning; the process which has been developed provides a common methodology to enable the comparison of scenarios by third parties. By reviewing different scenarios this allows the network companies to articulate similarities and differences in forecasting approaches and outputs.

Network company future funding is determined by the regulator, informed by the network company forecasts. Network company forecasts will be compared by the regulator in an attempt to understand and validate them. Standardisation of the forecasting presentation, therefore, helps the regulator to compare different network company forecasts to ensure market efficiency.

### 2.3 Building Blocks Development

The concept of Future Energy Scenario "Building Blocks" was introduced in the Phase 2 report for WS1 P5 in 2018:-

<http://www.energynetworks.org/assets/files/P5%20Whole%20System%20FES%20Report%20vPublic.pdf>

In this report, the key areas where network companies could improve co-ordination on a Whole System FES are recognised. These areas are as follows:

- Starting Point – The ESO and relevant network owners would agree the starting point for the levels of existing demand, generation and other DER positions.
- Building Blocks – Early in the GB FES process, the ESO and network owners would agree the building blocks that are needed to cover requirements for building both the national and regional scenarios.
- Stakeholder Interactions – The ESO and network owners would agree a strategy for stakeholder interactions to ensure that the information provided by specific stakeholders to network companies is used effectively.
- Regional Output Levels - The ESO and network owners would agree how national levels of demand, generation types etc. are best apportioned regionally. Effective liaison here will enable regional drivers to be taken into account to provide a more considered position on local levels of demand, generation and other DER. Generic templates have been developed to facilitate scenario output data exchange.

Furthermore, the Phase 2 report recognised that, as well as underpinning the Whole System FES, building blocks provide the basis for a common language that can be used to describe scenarios regardless of who produces them and how they are produced. A common language allows any set of scenarios to be seamlessly communicated to stakeholders in a language they expect and understand. Pitching the common language at the level of the component building blocks allows substantial flexibility and freedom in the choice of how the scenarios are presented in different years and to different audiences. Adopting a common language also serves to overcome problems of relativity because it is based on the national drivers being input into scenarios, not on the regional quantities in the outputs. Most importantly it accommodates the development of specialised regional scenarios or single common planning scenarios across utilities which are transparent and comparable because they are expressed in terms of the common building blocks used in the existing ESO GB scenarios.

Since publication of the Phase 2 report, gas and electricity network companies have, in an initiative building upon the initial product, met in a regulatory working group to develop a “Single Reference Energy Scenario” as part of development of the RIIO-2 Price Control. This work has provided a common reference point against which each individual network company’s RIIO 2 business plan can be assessed, with the drivers for any deviations in core assumptions explained (e.g. regional variations, or informed from stakeholder feedback). In developing this scenario, network companies have utilised the building block approach proposed, agreeing a view for each building block that has a material impact on network investment:-

<http://www.energynetworks.org/assets/files/ENA%20Common%20RIIO2%20Scenario%20report%20-%20September%202019%20FINAL.PDF>

The building blocks were revised following the ‘Single Reference Scenario for RIIO2’ building blocks as well as to align to the current Week 24 generation categories which are shared from DNOs to the ESO. The building blocks, as revised, continue to form a collection of data gathering points from which a forecast can be derived. The building blocks are designed to take account of different types of technologies which have a gross effect upon the demand and generation levels that are seen within an electricity network and in the revised form now additionally include the expectation from load management solutions. The product team discussed the existing week 24 generation categories and realised that these categories are often ambiguous. There are occasions where a generator can be defined under multiple categories within the week 24 submission and it is at the discretion of the

person completing the report to categorise the different technology types. An expanded list was devised which expanded upon these categories and provided guidance to reduce ambiguity. The product team also decided that it would be helpful to separate renewable and non-renewable generation sources to facilitate improved reporting to external stakeholders regarding the penetration of renewable generation.

The Building Blocks finally agreed by Product 2 are considered to be a good working compromise between the more highly aggregated single scenario categories and the much disaggregated Week 24 generation categories. They are pitched at a level that allows the network companies to ensure that technologies with different load profiles can be distinguished for the purpose of modelling the future trajectories whilst minimising the resource burden that more detailed disaggregation would entail. The templates developed in the previous Product 5 report have been updated to accommodate the Product 2 revisions. The proposed building blocks and the template to for the data exchange are presented in Appendix 4 and 5, respectively.

## 2.4 Assumptions and Exceptions

- DNOs and TOs are at different stages of development of their own regional FES documents. It should not be assumed therefore that every company will have or must produce a regional FES document.
- This process does not provide any specific recommendations about how often a regional FES should be updated.
- This process does not specify that businesses must use common Scenario frameworks. It is at the discretion of each business whether they wish to use common scenarios or if they prefer to map out different scenarios.
- This process does not specify the format or temple of any licensees FES document.
- All licensees have agreed to participate in the whole system FES process. However, this product does not look to mandate the participation by businesses in the proposed process.
- There are elements of data which either have not been recorded historically or it is known that the data may be of poor quality due to a lack of available information from 3rd party sources.
- The process has been designed to allow for information sharing between parties. It is up to each party how much they utilise the data shared and the feedback they receive. Each business is responsible for the data they choose to publish within their FES publications and as such it should not be assumed that all businesses agree with any published documents.
- When parties are sharing information using the common building blocks, they should provide their best estimate of the data, as opposed to just the data they have been informed about. E.g. Where a DNO estimates they have 30% more PV installations than they have been notified about they should send this 130% level.

### **3. Identify and agree licence and code changes required to support data exchange and ongoing FES delivery**

#### **3.1 Overview of sub-deliverable**

The objective of this sub-deliverable was to Identify and agree any licence and code changes required to support data exchange and ongoing FES delivery.

This sub-deliverable was focused on ensuring that DNO involvement in future FES cycles is enduring. As highlighted earlier, there is no formal process that allows for a two-way flow of information between the ESO and DNOs to enable involvement in the development of the FES. If this were to continue, then DNO involvement would remain discretionary which may not be beneficial for stakeholders.

Through the latter part of 2019, in developing the 2020 Whole System FES arrangements, the product team have considered the need for licence and code changes to support data exchange and ongoing FES delivery.

#### **3.2 Determining the need for licence and code changes**

ESO currently provides opportunities to incorporate the stakeholders' inputs into FES development via call for evidence, workshops and bilateral meetings. However, through the development of sub-deliverable 2, the 2020 Information Exchange Process, it was highlighted that there was no codified process in place that allowed DNOs to input into the development of the ESO's FES. Initial discussions within the product team highlighted a hesitancy to propose licence and code changes for an untested process. The product team suggested that for the 2020 FES, replicating the process used by the TOs and ESO may allow the DNOs to utilise a proven process. (See Section 2 for more information on the timeline for the 2020 data exchange.)

For the 2020 FES, the ESO initially identified that they could facilitate the data exchange process without licence or code change, though they would require non-disclosure agreements (NDAs) to be put in place with all of the DNOs. Following network company review and responses to a draft NDA, and the ESO's maturing understanding of its new licence arrangements (legal separation from the NG TO), the ESO confirmed in November 2019 that NDAs would not be required to facilitate the data exchange proposed for the 2020 GB FES.

At this moment, no licence or code changes are being proposed to support data exchange and ongoing FES delivery. For 2020, the ESO, TO's and DNO's are co-ordinating closely on whole system FES work without formal processes or obligations being in place.

Whilst improvements to the Whole System FES have been made in 2019, and further improvements are being made in 2020, the product team recognises that future licence or code change may yet be helpful to consolidate whole system FES processes. Such a change could help ensure a consistency of approach, could support the governance of ongoing whole system FES arrangements and may also be beneficial for other reasons. A licence or code change might help rationalise the data exchanges between network companies and it might also help the DNO's to prioritise GB FES related activities against other demands being made on resources. The need for such a change will be reassessed in Q3 2020 after delivery of the 2020 GB FES.

The product team will continue to support data collection and exchange through early 2020. Following the GB FES launch in July 2020, the product team will carry out a lessons learned session, identifying what worked well and what changes are needed. At this stage, if it is clear that licence or code changes would be beneficial, proposals will be drafted.

## 4. Support delivery of Whole Electricity System FES

### 4.1 Overview of sub-deliverable

The objective of sub-deliverable 4 was to support delivery of the Whole System Electricity FES, primarily the ESO's 2020 GB FES, using the templates and process agreed through the work on sub-deliverable 2. Whilst the processes and templates could be developed by the Product 2 team during 2019, the inclusion of sub-deliverable 4 recognised that much of the support to deliver the GB FES in 2020 would take place over the period October 2019 to June 2020.

Following the work to support the 2019 GB FES, support of the Whole System Electricity FES has continued throughout the latter part of 2019. The product team has been involved in a number of industry events, hosted by the ESO, which have a direct impact on the product.

Examples of the different events attended by members of the product team are detailed in section 4.2 below. Attendance at these events has allowed the product team to continue to support the delivery of Whole System Electricity FES.

### 4.2 On-going support of Whole Electricity System FES

A number of events have been arranged by the ESO and supported by the product team. These included the 2019 GB FES Launch, Shaping FES 2020 and the FES Network Group.

#### Shaping FES 2020

With the continued focus on the impact of climate change and achieving net zero, the ESO used their Shaping FES 2020 events to gain stakeholder feedback on how it should tackle some of the major uncertainties in the energy industry. The first Shaping FES 2020 session on the 16<sup>th</sup> September 2019 was very informative and allowed stakeholders and members of the product team to provide feedback, particularly on the inclusion of Net Zero targets within the scenarios and the potential shape of the scenario framework.

The second Shaping FES 2020 held on the 7<sup>th</sup> October 2019 was used by the ESO to provide feedback on the Call for Evidence that had taken place, and gain feedback on six proposed scenario frameworks. Following discussion and feedback from stakeholders and members of the product team, there was a slight preference in the room for a scenario similar to the one below to be proposed to Ofgem and the Department for Business, Energy and Industrial Strategy (BEIS);

- Four scenarios, 2x2 framework with 'Degree of electrification (at point of use)' as the Y-axis and 'Speed of decarbonisation' as the X-axis.
- Two scenarios which meet the Net Zero 2050 target.
- Two scenarios which don't meet the Net Zero target;
  - One scenario will aim for an emissions reduction around 80% - therefore not 'Goal seeking' (i.e. not set to achieve previous emissions reduction target).
  - The other scenarios will aim for an emissions reduction >60% (i.e. greater than 58% emissions reduction of the Consumer Evolution and Steady Progression from last year).
- Inclusion of a scenario sensitivity to explore meeting an accelerated Net Zero target (i.e. for 2045 or 2040).

#### FES Network Group

In August 2019, the ESO proposed a new working group, called the FES Network Group, which would be a dual fuel group consisting of representatives from Gas and Electricity network companies. The purpose of the working group is as follows;

- Improve engagement and ensure that all parties have access to the most up-to-date views as FES progresses.
- Give all companies earlier insight into our scenarios to help us shape our respective GB FES / DFES / long term forecasts.
- Provide a forum to collaboratively address the challenges of producing scenarios / long term forecasts in an evolving landscape (e.g. to better understand key differences in modelling and assumptions and to highlight future modelling needs).
- Improve whole system thinking and allow this to shape GB FES/ DFES / long term forecasts.

The first meeting of the FES Network Group was on the 15th November 2019, where members from across the energy industry (gas and electricity) were invited to help shape the ESOs GB FES, and to collaboratively address the associated challenges of producing these scenarios, considering whole system planning. As part of this forum, the ESO presented an updated minded-to framework for FES 2020;

- Four scenarios, with the X-axis used to vary the amount and speed of decarbonisation and the Y-axis varying the extent to which society is engaged with, and adapts to, changes in the energy sector and other sectors as they decarbonise.
- One scenario which meets the Net Zero target before 2050.
- Two scenarios which meet the Net Zero 2050 target.
- One scenario which does not meet the Net Zero 2050 target.

By participating in these event's, the product team have been able to influence and provide feedback on how the GB FES will be shaped for the future. These interactions will provide benefit to both the ESO and network companies and positively impact the quality of the GB FES.

### 4.3 Continued support for Whole Electricity System FES through 2020

The network companies have agreed to continue to support the development of the GB FES into 2020. This support will comprise the elements identified in the timeline introduced in section 2 and shown in Appendix 3.

The GB FES timeline includes a number of points at which information will be exchanged between the ESO, TO's and DNO's to improve baseline information and regional forecasts. These include the provision of regional generation, demand and storage baselines and forecasts by end-December 2019, a review of the GB FES distributed generation assumptions by February 2020, and a review of spatial demand datasets through April and May 2020.

As far as practicable, the Building Blocks agreed as part of sub-deliverable 2 will be used to share information between network companies. Each of the DNO's has committed to using the Building Blocks going forward albeit, in some cases, they will not be fully in place in time for the 2020 GB FES information exchanges.

## **5. Support Whole Energy System workstream by providing input on potential whole energy system interactions for 2020 and beyond**

### **5.1 Overview of sub-deliverable**

The objective of sub-deliverable 5 was to support Workstream 4, the Whole Energy System workstream, by providing input on Whole Energy System FES interactions for 2020 and beyond.

Workstream 4 was included in the ON project from 2019 to consider how some of the improvements being developed for whole electricity system interactions might be extended to other energy vectors particularly gas. The Workstream 4 team was established in early 2019 and initially considered the different areas of work that it would focus on through 2019.

A shortlist of potential areas for development was initially identified for Workstream 4. This included the improvement of whole energy system FES processes. As Workstream 4's bandwidth was limited, the ON Steering Group agreed that the priority areas to be worked on during 2019 for Workstream 4 were Investment Planning and Real Time Operations and Forecasting. These 2 areas have subsequently formed the scope of Workstream 4's work during 2019.

As a result of a Whole System FES element not being included in the Workstream 4 scope for 2019, it was confirmed to Workstream 1B and the Product 2 team that sub-deliverable 5 was no longer included in the product team's 2019 objectives.

No further work has been carried out in relation to this sub-deliverable during 2019.

## Conclusions

The work carried out by the product team this year for the Whole System Electricity Future Energy Scenarios (FES) product has delivered against the objectives set out at the beginning of 2019. Below is a summary of the outcomes for each of the sub-deliverables tackled during 2019.

1. Identify and implement tactical improvements to DNO/ESO/TO liaison to feed into 2019 FES

The product team made a number of valuable contributions during Q1 and Q2 of 2019 which allowed them to input and provide feedback on the FES 2019. Whilst time was against the product team, their contribution led to more accurate data being provided to the ESO which in turn will have improved the quality of the outputs from FES 2019.

2. Finalise templates and processes for information exchange to support 2020 delivery of Whole Electricity System FES

Two of the main areas of work for this sub-deliverable related to the development of the 2020 Information Exchange Process and the Building Blocks. A new process has been proposed for 2020 which sets out when DNOs would be involved in the creation of the FES and stipulates when their feedback would be sought. Additionally, the product team have agreed the technologies and units of measurements which make up the building blocks. The majority of DNOs are fully supportive of the agreed approach and will utilise the building blocks when appropriate for their respective company.

3. Identify and agree licence and code changes required to support data exchange and ongoing FES delivery

At this moment, no licence or code changes are being proposed to support data exchange and ongoing FES delivery. The product team will continue to support data collection and exchange through early 2020. Following the GB FES launch in July 2020, the product team will carry out a lesson learned session, identifying what worked well and if changes are needed. If it is clear that licence or code changes would be beneficial, a proposal will be drafted.

4. Support delivery of Whole System Electricity FES

Finally, DNO's are supporting the delivery of the 2020 GB FES using the processes and templates agreed under sub-deliverable 2. Attendance at a number of FES related events through the year and participation in the newly establish FES Network Group has allowed the product team to continue to support the delivery of Whole System Electricity FES. It is believed that such participation will positively impact the quality of the GB FES for future years.

## **Appendix 1: Glossary**

The following terms are used throughout this document:

BEIS – Department for Business, Energy and Industrial Strategy

DNO – Distribution Network Operator

ESO – Electricity System Operator

ETYS – Electricity Ten Year Statement

FES – Future Energy Scenarios

GSP – Grid Supply Points

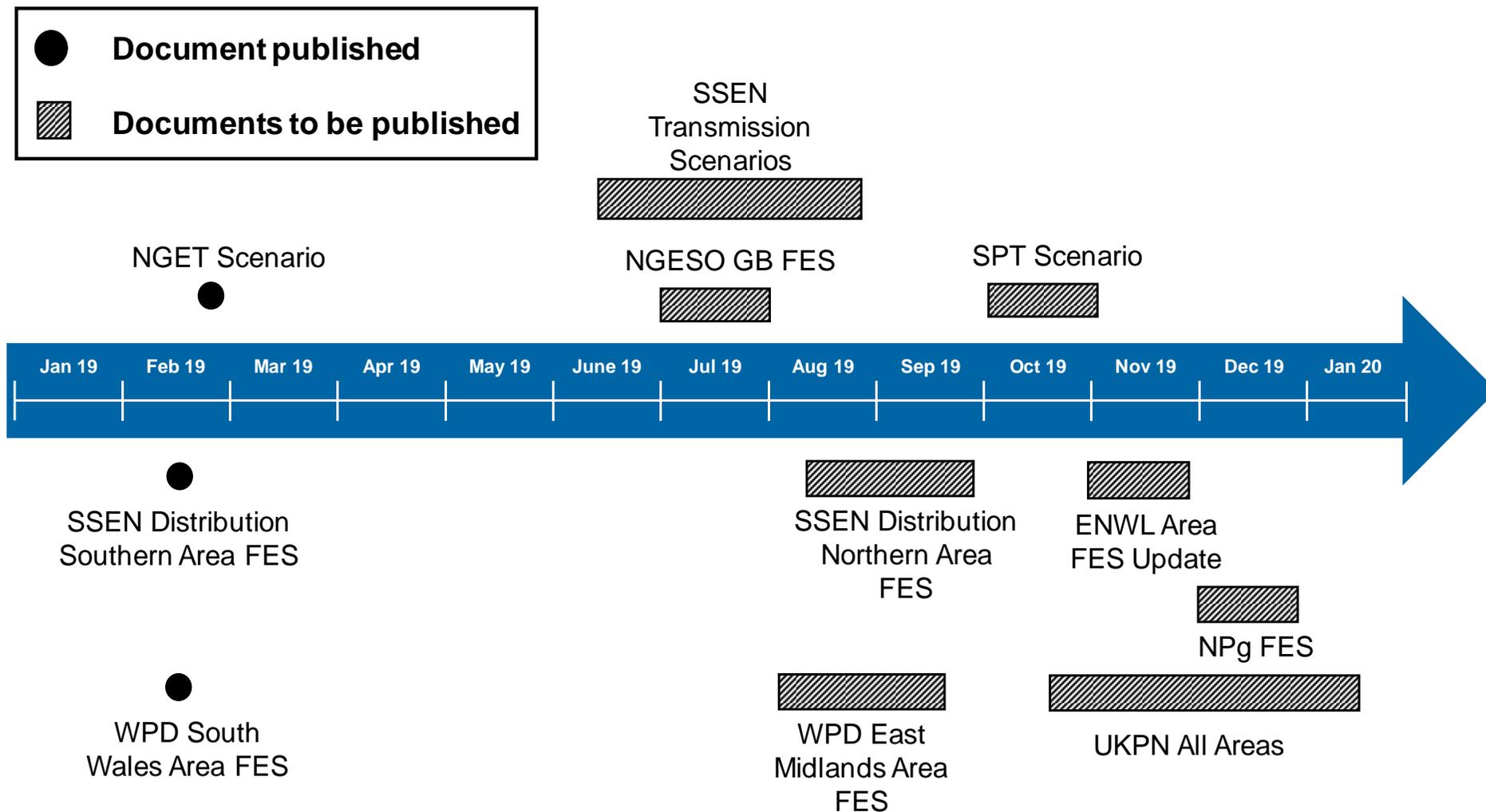
NDA - Non-disclosure Agreement

STC – SO-TO Code

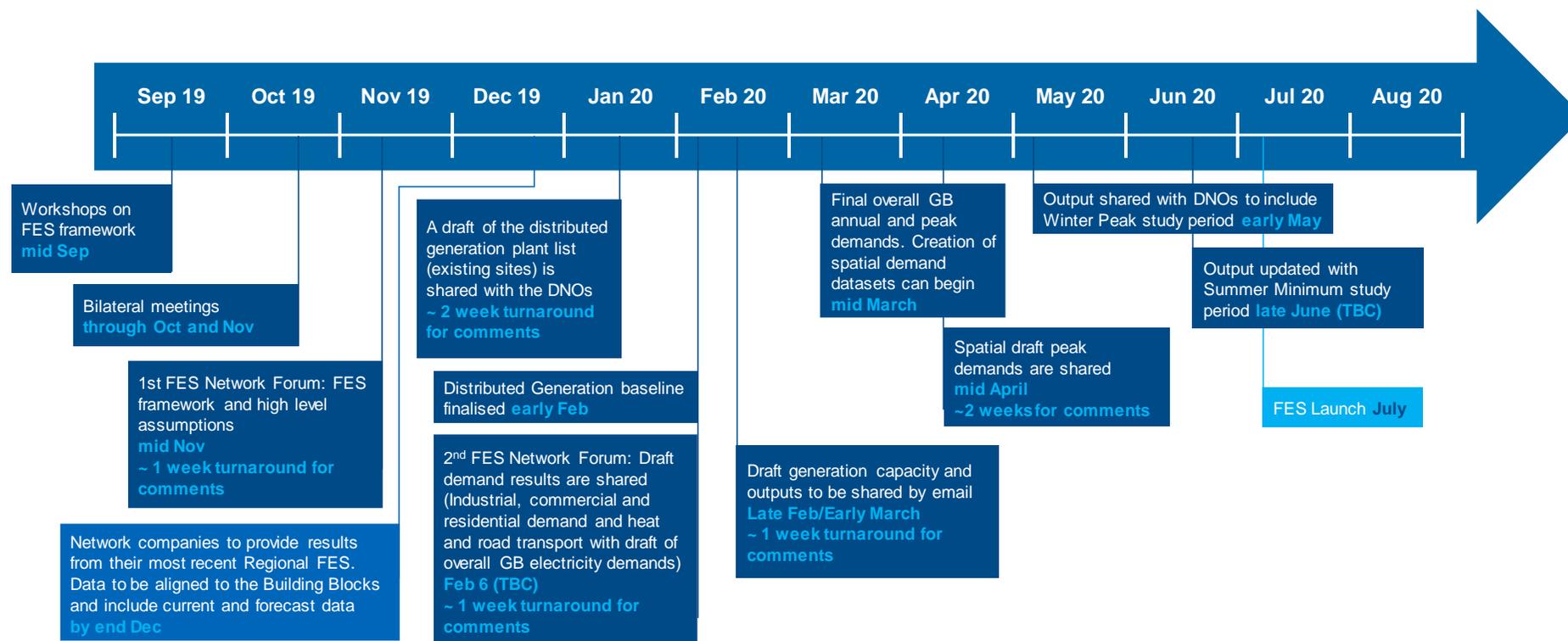
TO – Transmission Operator

## Appendix 2: Scenario Publication Timeline for 2019

Throughout 2019, the network companies and the ESO published their respective scenario documents which are shown below;



## Appendix 3: Proposed 2020 Information Exchange Process



## Appendix 4: Proposed Building Blocks

Template	Technology	Building Block ID Number	Technology Detail	Units	Detail
Generation	Non-renewable CHP	Gen_BB001	>=1MW	MW	Installed capacity
		Gen_BB002	<1MW	MW	Installed capacity
	Micro CHP	Gen_BB003	Domestic (G98/G83)	MW	Installed capacity
	Renewable Engines (Landfill Gas, Sewage Gas, Biogas)	Gen_BB004		MW	Installed capacity
	Non-renewable Engines (Diesel) (non CHP)	Gen_BB005		MW	Installed capacity
	Non-renewable Engines (Gas) (non CHP)	Gen_BB006		MW	Installed capacity
	Fuel Cells	Gen_BB007		MW	Installed capacity
	OCGTs (non CHP)	Gen_BB008		MW	Installed capacity
	CCGTs (non CHP)	Gen_BB009		MW	Installed capacity
	Biomass & Energy Crops (including CHP)	Gen_BB010	Includes Biomass Conversions	MW	Installed capacity
	Waste Incineration (including CHP)	Gen_BB011		MW	Installed capacity
	Solar Generation	Gen_BB012	Large (G99)	MW	Installed capacity
		Gen_BB013	Small (G98/G83)	MW	Installed capacity
	Wind	Gen_BB014	Offshore Wind	MW	Installed capacity
		Gen_BB015	Onshore Wind >=1MW	MW	Installed capacity
		Gen_BB016	Onshore Wind <1MW	MW	Installed capacity
	Marine	Gen_BB017	Tidal Stream, Wave Power, Tidal Lagoon	MW	Installed capacity
	Hydro	Gen_BB018	Not pumped hydro	MW	Installed capacity
	Geothermal	Gen_BB019		MW	Installed capacity
	Nuclear	Gen_BB020		MW	Installed capacity
Demand		Dem_BB001	Domestic	Number of, MW	Number of domestic customers Annualised Peak
		Dem_BB002	I&C	Number of or Metres squared, MW	Number of I&C customers Annualised Peak Demand MW (TBC)
Demand Low Carbon Technologies	Electric Vehicles	Lct_BB001	Pure Electric (cars & motorbikes)	Number of	Number of EVs registered in the specific geographical area
		Lct_BB002	Plug-in-hybrid (cars and motorbikes)	Number of	Number of EVs registered in the specific geographical area
		Lct_BB003	Pure Electric (road vehicles other than cars and motorbikes)	Number of	Number of EVs registered in the specific geographical area
		Lct_BB004	Plug-in-hybrid (road vehicles other than cars and motorbikes)	Number of	Number of EVs registered in the specific geographical area
	Heat Pumps	Lct_BB005	Domestic - Non-hybrid	Number of	Number of Heat Pumps registered in the specific geographical area
		Lct_BB006	Domestic - Hybrid	Number of	Number of Heat Pumps registered in the specific geographical area
		Lct_BB007	I&C - Non-hybrid	Number of	Number of Heat Pumps registered in the specific geographical area
		Lct_BB008	I&C - Hybrid	Number of	Number of Heat Pumps registered in the specific geographical area
	District Heating	Lct_BB009		Number of properties connected to DH	
Storage & DSR	Storage	Srg_BB001	Batteries	MW	Installed capacity
		Srg_BB002	Domestic Batteries (G98)	MW	Installed capacity
		Srg_BB003	Pumped Hydro	MW	Installed capacity
		Srg_BB004	Other	MW	Installed capacity
		Srg_BB005	V2G	MW	Installed capacity
	I&C DSR	Srg_BB006	Load shifting (Increase / Decrease of load)	MW availability	Potential MW available to participate in DSR
		Srg_BB007	Electric Vehicle Smart Charging	MW availability	Potential MW available to participate in DSR
		Srg_BB008	I&C Batteries	MW availability	Potential MW available to participate in DSR
	Domestic DSR	Srg_BB009	Electric Vehicle Smart Charging	MW availability	Potential MW available to participate in DSR
		Srg_BB010	Smart Appliances (TOUT)	MW availability	Potential MW available to participate in DSR
		Srg_BB011	Domestic Batteries (G98)	MW availability	Potential MW available to participate in DSR

## Appendix 5: Proposed Data Exchange Template

The template will be a Microsoft excel file (only one sheet) which includes all building blocks outlined in Appendix 4 with available volumes at a specific license area. The template includes all volumes (based on unit presented in Appendix 4) for the baseline year (current/past year) and all available forecasting years.

Building Block ID Number	Unit	DNO License Area	DFES Scenario	GSP	Baseline (2019)	2020	2021	...	Comment
Gen_BB001									
Gen_BB002									
Gen_BB003									
Gen_BB004									
Gen_BB005									
Gen_BB006									
Gen_BB007									
Gen_BB008									
Gen_BB009									
Gen_BB010									
Gen_BB011									
Gen_BB012									
Gen_BB013									
Gen_BB014									
Gen_BB015									
Gen_BB016									
Gen_BB017									
Gen_BB018									
Gen_BB019									
Gen_BB020									
Dem_BB001									
Dem_BB002									
Lct_BB001									
Lct_BB002									
Lct_BB003									
Lct_BB004									
Lct_BB005									
Lct_BB006									
Lct_BB007									
Lct_BB008									
Lct_BB009									
Srg_BB001									
Srg_BB002									
Srg_BB003									
Srg_BB004									
Srg_BB005									
Srg_BB006									
Srg_BB007									
Srg_BB008									
Srg_BB009									
Srg_BB010									

## Appendix 6: FES Network Group – Terms of Reference

### Introduction

GB Future Energy Scenarios (FES) is undertaken by the Electricity System Operator to gain an understanding of potential energy futures and to support network planning. Similar long term forecasting is also undertaken by Network companies and is sometimes referred to as Distribution FES/DFES. As part of developing the GB FES we engage a wide stakeholder community. Likewise, Network companies undertake their own stakeholder engagement as part of their DFES or forecasting activities.

As the energy industry continues to transform via greater decentralisation and decarbonisation the potential interactions between gas and electricity and between transmission and distribution has grown. To deliver the best outcomes for the public consideration of Whole System outcomes is required at all stages of forecasting and planning. This is recognised across the industry, for example via the ENA Open Networks project, the Gas Futures Group FES forum and via National Grid ESO's seven principles – specifically Principle 5 and 6 ([link](#)).

To support Whole System outcomes, we welcome Network companies to join us within our GB FES development as part of a dual fuel FES Network Group. This is supplementary to any existing engagement and code requirements.

### Purpose

The purpose of the dual fuel FES Network Group is to:

- Improve engagement and ensure that all parties have access to the most up-to-date views as FES progresses.
- Give Network companies earlier insight into our scenarios to help them shape their DFES / long term forecasts.
- Provide a forum to collaboratively address the challenges of producing scenarios / long term forecasts in an evolving landscape (e.g. to better understand key differences in modelling and assumptions and to highlight future modelling needs).
- Improve whole system thinking and allow this to shape GB FES / DFES / long term forecasts.

### Term

This Terms of Reference is effective from August 2019 and continues until the date of publication of National Grid ESO's Future Energy Scenarios (mid-July 2020). Following an assessment new Terms of Reference for the GB FES 2021 will be agreed.

### Membership & logistics

The FES Network Group will comprise National Grid ESO and holders of licences for transmission and/or distribution of electricity and/or gas within Great Britain. Specifically:

- National Grid ESO
- National Grid (ETO)
- SP Energy Networks (TO)
- Scottish Hydro Electric Transmission
- Electricity North West
- Northern Powergrid
- SP Energy Networks (DNO)
- Scottish and Southern Energy Power Distribution
- UK Power Networks

### Energy Networks Association

- Western Power Distribution
- National Grid Gas (GSO & GTO)
- Cadent
- Northern Gas Networks
- SGN
- Wales & West Utilities

Each member may appoint one representative and one alternate to sit on the group. Both will require sufficient experience of long term forecasts and industry knowledge to be able to input and shape the conversation, however you may wish to appoint one person with a more strategic background and other with a more technical background. Who attends the meetings can then be determined by the nature of the topics on the agenda.

The secretariat for the Group will be provided by National Grid ESO and meetings will be held and Chaired by National Grid ESO.

Meetings will be based at National Grid ESO's Warwick office unless otherwise specified and group members can join in person or via WebEx conferencing facility.

## Scope

The establishment of the FES Network Group does not remove any existing opportunities for engagement, for example all industry stakeholders will have an opportunity to discuss the FES 2020 scenario framework (number of scenarios, 2x2 grid) via consultation and/or an external meeting planned for 16<sup>th</sup> September.

The group will meet twice for the following purposes:

### 1. FES framework and high-level assumptions (December)

After we have undertaken stakeholder engagement on the scenario framework we will develop this in to a proposal including the underlying scenario levers (blocks). Our analysts will determine the modelling steps required to deliver against these and set out our modelling intent. The group is invited to meet to discuss the proposals and modelling intent.

At the meeting we will share the results of our wider stakeholder engagement (anonymised) and our proposals. The meeting will not include any votes or design by committee. It will however provide an opportunity to help test our thinking and provide feedback on any concerns raised. We will consider your feedback against the evidence we have, and wider stakeholder feedback.

Presentation content and minutes will be circulated after the meeting to members of the FES Network Group to allow continued discussion and feedback. To allow National Grid ESO the best opportunity to incorporate this feedback is required within 1 week.

Purpose: to ensure that network companies help shape the scenario framework. To understand how the scenario framework fits with other FES being created. To give further early insight to the scenario backgrounds to stakeholders.

### 2. Challenge and review of draft results (February)

Internally we already run "challenge and review" meetings when we have draft results from our modelling. Due to the staging of our analysis it is possible for several Challenge and review meetings to occur.

To reduce the burden of excess meetings we invite the FES Network Group members to one challenge and review meeting selected to be of highest value to most members (likely to be an Energy Demand session). Slide packs from the other relevant challenge and review sessions will be shared with group members by email.

Presentation content and minutes will be circulated after the meeting to members of the FES Network Group to allow continued discussion and feedback. To allow National Grid ESO the best opportunity to incorporate this feedback is required within 1 week.

Whilst all feedback is welcome, we cannot guarantee to enact on it. This is particularly true if we receive opposing feedback from different group members. As above, final decisions on GB FES are the responsibility of National Grid ESO and the meeting will not include any votes or design by committee.

It is not anticipated that feedback taken on board will result in further challenge and review meetings. Purpose: to allow early sight of how the scenario framework has shaped the FES outputs. This allows for challenge on the outputs for example where the assumptions have created results that are not feasible or could not be assumed over the different distribution areas.

All information presented in these meetings is confidential and not for disclosure beyond the regulated element of each business and the compliance matters set out below.

There are currently no additional meetings planned although there may be scope for an ad-hoc meeting (e.g. to discuss a proposed new model) from time to time. Members may be invited to other events as part of our wider stakeholder engagement or code obligations.

## Compliance

Members must always comply with the requirements of Competition Law (the Competition Act 1998, the Enterprise Act 2002 and Articles 81 and 82 of the EC Treaty) and must not engage in any practice which will or may prevent, restrict or distort competition or constitute an abuse of a dominant position.

Licence obligations will differ by organisation and it is each organisations responsibility to ensure that they remain compliant with their own obligations. In particular we would like to draw attention to the following:

- For Electricity TOs:
  - SO TO Code, in particular Section “D”: Planning Coordination and Procedures STCP-22-1, STCP-21-1, STCP-20-1 and STCP-16-1.
- For Electricity DNOs:
  - Electricity Distribution Standard Licence Conditions, Standard Condition 42 prohibits DNOs from sharing information with unregulated businesses.
- For Gas TO:
  - Uniform Network Code – Offtake Arrangements Document, Section H.
  - General Services Agreement between NGESO and NGG.
- For Gas DNs:
  - Uniform Network Code – Offtake Arrangements Document, Section H.