

Open Networks WS1A
P7 Baseline
Methodologies

Final Report
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1 Introduction

1.1 About ENA

Energy Networks Association (ENA) represents the owners and operators of licenses for the transmission and/or distribution of energy in the UK and Ireland. Our members control and maintain the critical national infrastructure that delivers these vital services into customers' homes and businesses.

1.2 About Open Networks

Launched in January 2017, ENA's Open Networks Project (ONP) is a major energy industry initiative, run by the Energy Networks Association that will transform the way our energy networks work, underpinning the delivery of the smart grid. This project brings together 9 of UK and Ireland's electricity grid operators, respected academics, NGOs, Government departments and the energy regulator Ofgem. The 2019 Project Initiation Document outlines what the Open Networks Project will deliver in 2019, how it will be delivered and when. Workstream 1A is focused on Flexibility Services in the developing Flexibility Market and has three key objectives:

1. Develop and deliver good practice and convergence of directly contracted Distribution System Operation (DSO) services to customers across Distribution Network Operators (DNOs) to deliver a consistent experience for customers
2. Facilitate markets outside the direct procurement of service for DSO to allow third parties to develop effective and liquid market platforms for customers to realise value for flexibility, and
3. Support the wider use of DSO services by removing barriers and encouraging the consideration of flexibility solutions.

Product 7 is one of the nine products scoped for this year under the flexibility Workstream 1A, it is tasked with delivering a common baseline methodology and verification tool.

1.3 About Product 7

This product is a continuation of the 2020 WS1A P7 product which sought to assess existing UK and international baselining methodologies and recommend suitable methodologies for adoption by the UK distribution flexibility market. DNV GL were appointed as contractors within the P7 team to carry out this assessment and produce their recommendations for common baseline approaches for adoption by DNOs.

A copy of the 2020 P7 Report can be found [here](#).

2021 PID Extract – WS1A P7 Baseline Methodologies;

Description

Implementation of common baseline methodologies for adoption by all DNOs. This product will seek to further consult with stakeholders to refine and agree baseline approaches which will be adopted by DNOs for their operation of flexibility products, following which a robust implementation and governance plan will be defined and support tools developed.

Benefits

- Implementation of a common approach will address stakeholder concerns around inconsistencies between DNO baseline methodologies.
- Increase transparency and improve stakeholder confidence with a view to increase participation by:
 - Publishing a clear and adoptable common approach.
 - Development of a common verification tool to support both DNO and Provider with implementation of both prior and post event baseline verifications.
- Deliver a governance structure to ensure:
 - DNO standardisation e.g., through relevant code mod.
 - Ongoing monitoring of future changes that could be required as the distribution flexibility market evolves.
 - Identifying further alignment potential with wider markets.

2 Scope of the Product

2.1 Objective

The work undertaken by the P7 team throughout 2021 seeks to further consult with stakeholders to refine and agree baseline approaches which will be adopted by DNOs for their operation of flexibility products, following which an ongoing governance plan to support baseline evolution will be defined and supporting implementation tools will be developed.

2.2 Product deliverables and timeline

The following table details the P7 activities, deliverables and associated timeline that was published in the 2021 PID:

Table 1. Product Deliverables

Ref	Product Element	Activities	Duration	Timeline	Deliverables
A	Stakeholder Feedback	Conduct a webinar with relevant stakeholders to share baselines recommendation outcomes of WS1A 2020 P7 work.	2 months	Jan – Feb 21	Webinar and survey to ascertain broad agreement from stakeholders on recommended baselines. (Feb 21)

B	Refine and finalise baseline(s)	<p>Refine and finalise the recommended baselines.</p> <p>Agree DNO implementation strategy.</p> <p>Develop an appropriate governance strategy</p> <p>Produce verification tool specification.</p>	4 months	Jan – Apr 21	<p>Final baseline design. (Apr 21)</p> <p>Verification tool specification document. (Apr 21)</p> <p>Draft implementation plan. (Apr 21)</p> <p>Governance strategy proposal. (Apr 21)</p>
C	Appoint solution architect	Appoint provider to build the baseline verification tool.	1 month	May 21	
D	Build, test and confirm	<p>Build and test tool with historical data sets.</p> <p>Undertake analysis to ensure results meet baseline objectives.</p>	4 months	Jun – Sep 21	<p>Analysis results. (Sep 21)</p> <p>Final verification tool and associated algorithms. (Sep 21)</p>
E	Disseminate and implement	Publication and marketing of product outputs.	3 months	Oct – Dec 21	<p>Final report. (Dec 21)</p> <p>Implementation strategy/timeline. (Dec 21)</p> <p>Governance strategy. (Dec 21)</p> <p>Baseline verification tool and supporting documentation. (Dec 21)</p>

3 Product Outputs

This section provides detail on the outputs of each of the Product Elements as detailed in the product deliverables table in section 2 above.

The P7 Team published an interim report¹ in June 2021, which detailed progress of Product Elements A and B along with some of the deliverables for Product Element C. Where this is the case, a summary has been provided here in section 3, however further detail can be sought within the report (see footnote 1).

3.1 Product Element A – Stakeholder Feedback

In February 2021, the P7 team conducted a webinar with stakeholders to share the 2020 baseline methodologies recommendations. Which was then followed by further targeted engagement with Stakeholders who had expressed concerns with the recommended approach.

Table 2 provides a summary of this targeted feedback and the P7 Team’s response.

Table 2. Stakeholder feedback summary

Summary of Stakeholder Feedback	P7 Team Response
<p>Concerns that the Historic Baselines could impact flexibility provision in other markets.</p>	<p>Historic baselines will exclude data from days where market events have taken place, ensuring the calculated baseline is not skewed by non-relevant market activity. Where historic data is unreliable the Nomination Baseline should be adopted. This allows providers to forecast their baseline within a reduced timescale to that of the Historic example and exclude non-relevant data from activity in other markets. It should be noted that the 2021 WS1A P5 Primacy Rules product is tasked with better understanding interaction between markets and market precedence. Findings from P5 should feed into the ongoing development of distribution flexibility baselines.</p>
<p>Concerns that the Historic baseline is not suitable for domestic demand response due to variability in household demand and weather conditions.</p>	<p>Where there is un-reliability of data accuracy the recommendations suggest a nomination baseline would be more appropriate. The ability to provide a forecast within a closer to real time timescale to that of the Historic example should allow providers with the ability to better forecast demand.</p>
<p>More analysis should be undertaken in relation to emerging low carbon technologies to better understand what baseline design can better support them.</p>	<p>It is an output of this product to establish ongoing governance of baseline standards that will inform the ongoing development of distribution market baselines</p>

¹ [https://www.energynetworks.org/assets/images/Resource%20library/ON21-WS1A-P7%20Baseline%20Methodologies%20Interim%20Report%20\(30%20Jul%202021\).pdf](https://www.energynetworks.org/assets/images/Resource%20library/ON21-WS1A-P7%20Baseline%20Methodologies%20Interim%20Report%20(30%20Jul%202021).pdf)

Following this engagement, it was concluded that changes to the recommendations were not required at this stage. While the distribution market is still in its infancy, it is important that we implement a simple approach which is inclusive of all flexible solution types.

As the market develops and DNO experience operating the baselines increases then the baselines should evolve and include, where appropriate, baselines to support individual technology types. Several DNO flexibility trials, which include emerging technologies, are underway and any learning gathered from these should be fed into future baseline design. Open Networks will continue to oversee baselining practices and take any necessary steps to progress baseline design evolution.

Further detail of the full stakeholder engagement activity undertaken is available in the 2021 P7 Interim Report.

3.2 Product Element B – Refine and finalise Baseline Design

A table detailing the finalised baseline approaches, as previously published in the 2021 P7 Interim Report, are provided in [Appendix A](#).

3.3 Product Element C – Appoint solution architect

3.3.1 Purpose

A key output from the 2021 Baseline Methodologies Product is to commission a tool to test and analyse the recommended baseline methodologies from the 2020 report.

The tool will also be developed to allow ongoing verification of baselines by DNOs, Flexibility Service Providers (FSPs) and Platforms to support them with their understanding and application of baselines.

3.3.2 Solution Provider

While it was initially considered that a tender to appoint a solution provider to build the tool would be issued, it became clear that the SSEN TRANSITION project, which is funded through Ofgem's Network Innovation Competition (NIC), were already developing a baseline tool which is informed by the 2020 P7 Baseline Methodology Recommendations. The tool is being delivered by TNEI who are a TRANSITION project partner.

Given the tool already aligns to the P7 recommendation, and the potential to develop this at minimal cost compared to building a new tool, the P7 product team and the TRANSITION team undertook gap analysis to assess its suitability.

Following the gap analysis, we confirmed that although the TRANSITION tool does require some additional development to ensure it meets the P7 Team Baseline Verification Tool Specification, the tool already meets around 70% of the required P7 Tool Specification. The cost to meet the additional 30% is deemed to be minimal and can be incorporated to the TRANSITION baseline tool scope at no further cost to the ENA Open Networks Project.

As the TRANSITION tool is funded through the NIC, the associated Intellectual Property is already owned by UK DNOs which will be easily transferable to the tool once it is adopted by the Open Networks Project.

3.3.4 Delivery Timeline & Specification

TIMELINE

TNEI's key deliverables have been identified against a timeline as shown in table 3. This sees TNEI's final deliverables in Feb 2022 which coincides with the conclusion of the P7 Project work.

Table 3. Delivery timeline

Date	Deliverables
24 th August 2021	<ul style="list-style-type: none"> • Draft Delivery Plan. • Scope/specification documentation for built, in delivery and planned.
23 rd September 2021	<ul style="list-style-type: none"> • Draft Delivery Plan
28 th September 2021	<ul style="list-style-type: none"> • Final Delivery Plan
7 th October 2021	<ul style="list-style-type: none"> • Draft Specification
2 nd December 2021	<ul style="list-style-type: none"> • Final Specification document
7 th December 2021	<ul style="list-style-type: none"> • Demonstrate-able Tool • Draft Baseline Mathematical Calculations document
13 th December 2021	<ul style="list-style-type: none"> • Draft Publication and handover plan, inc. timeline.
13 th January 2022	<ul style="list-style-type: none"> • Final Publication and handover plan, inc. timeline. • Final Baseline Calculations document • Draft Tool User Guide
10 th February 2022	<ul style="list-style-type: none"> • Final Tool User Guide Document
28 th February 2022	<ul style="list-style-type: none"> • Tool Finalised • Python Package for DNO system integration

SPECIFICATION

TNEI worked with the P7 team to establish a specification for delivery of the tool to meet the P7 team’s requirements. This included prioritisation of the tool functionality to ensure that aspects deemed essential, ‘Musts,’ were delivered ahead of any aspects that were prioritised less essential, ‘Shoulds’. This process also identified functionality that could be incorporated into future development of the tool but was not needed at this time, ‘Could’s’.

A copy of the full Specification document is included in [Appendix C](#).

Table 4 provides a summary of features agreed as ‘Must’ for delivery.

Table 4. Delivery Specification ‘Must’ features

Topic	Must
Methodologies	<p>The tool must allow for baselines to be calculated using several different choices of methodology:</p> <ul style="list-style-type: none"> • Historic/rolling baselines, with 8-in 10 days selected for events on weekdays (2-in-4 for weekends and bank holidays), with an option for a same-day adjustment (SDA) • Nomination baseline • Zero baseline
User-configurable parameters	<p>The tool must allow users to select whether their asset is in Scotland, England or Wales, for purpose of bank holidays.</p> <p>The tool must allow users to define whether the timestamps in their data refer to the start of the period, or the end of the period.</p>

Access / hosting / platform	The tool must be hosted online for users to upload data to and then perform baseline calculations. Limits on usage will be defined (these limits are to be agreed with the ENA).
Publication	The calculations/algorithms that underpin the calculations must be published as a private Python package, accessible by the DNOs and the ENA.
	The mathematical specification of the algorithms must be published, and will likely be included as an Annex to the ENA/Open Networks P7 Project Report.
Data storage	The tool must not store any data that is uploaded for baseline calculations.
Missing data	When data has been uploaded, the tool must report if there are any missing periods within the event window, and the total duration of these.
	For historic baselines, the tool must report for how many of the assessed and eligible days (e.g. 8 and 10) there is missing data, and the total (or average?) duration of missing data.
	For nomination baselines, the tool must report if there is missing data in the nomination baseline, and the total duration of missing data.
	For nomination baselines, the tool must report if there is an event window defined for which no nomination inputs have been uploaded.
Generation and demand	Users must be able to select whether their site is generation or demand. The tool must expect generation input to be positive, and demand input data to be negative.
	The tool should raise a warning if a generation asset has negative values, and similar for demand, prompting the user to review the input data.
	The tool should invert graphical values such that demand is still positive for an import constraint, and so on.
Input data	The tool must accept data with granularities of half-an-hour and-1 minute.
	The tool must allow users to upload a time-series of measured data for the asset. This data must consist of two columns: <ul style="list-style-type: none"> One column includes timestamps and is labelled either as "time" or "local_time". The time series should be in either UTC time zone or BST time zone respectively. The second column includes metering data, and is labelled either as W, kW, MW, Wh, kWh or MWh. Any of these labels will be accepted by the tool. This guidance must be given to users.
	The tool must allow users to upload a time-series of "required responses" that are defined in the same way as the measured data. This is the response that the asset is expected to provide during a flexibility event. This must always be positive, representing a contribution towards reducing a constraint.
	The tool must allow a user to select whether their baseline is being calculated for an import constraint or an export constraint.
	The tool must allow users to upload a data-set which defines the start- and finish- times of the flexibility events.

	For nomination baselines, the tool must allow users to upload a nominated baseline, which must be defined in the same way as the measured data.
Outputs	The tool must output baselines for every specified event window.
	It must calculate the <i>flexibility response</i> , as the difference between the measured data and the baseline.
	It must allow a user to select a specified day, for which the baseline will then be displayed. This will be done with a calendar heatmap.
	The baseline must be displayed graphically, with the option to export the output data, including the baseline, the measurement, the calculated response, and the contracted target capacity.
	The tool must report whether the flexibility response meets the required response, or is within a predefined % of that, for each event. If so, this event will be labelled “True”. If the response is less than this target %, in any part of the window, it will be labelled as “Partially True”. (The choice of labels can be updated prior to publication of the tool if required.) Note that this does not reflect a DNO’s <i>actual</i> measure of response, it only illustrates a comparison between the required response and the delivered flexibility response.
Event definitions	The tool must allow users to define event windows for which baselines will be calculated. This will be via a data upload, where the template specifies the event start date and time and end date and time.
	The tool must exclude data from previous events when calculating the baseline.

OUT OF SCOPE

APIs

The P7 Team did include in its initial specification for the baseline tool the requirement for an API link to be developed allowing FSPs and DNOs with the ability to automate access to the online baseline tool. Following discussion with the P7 team, TNEI and members of the TRANSITION Project it was concluded that while still potentially useful, DNOs are unlikely to use an API to access the tool for the large volume of flexibility events they will be operating and more benefit would come from instead prioritising the development of DNO accessible Python packages that can be readily integrated into DNOs’ existing or in development software.

We do still consider that the availability of an API or a Python package for FSP accessibility should also be considered, however we concluded that this would be more appropriate to develop after the tool has been launched and we have had the opportunity to gather feedback from users on their accessibility requirements.

De-rating Factors

The 2020 DNV GL baseline recommendations outlined that intermittent generation providing service to the Sustain Product should use a zero baseline with the addition of a capacity de-rating factor.

At the onset of the 2021 P7 work, it was noted that there are several associated complexities with applying a de-rating factor, including most notably the need for further DNO alignment on the use case for the Sustain Product and identifying appropriate existing or developing new de-rating values for application.

To address these complexities, the P7 team, TNEI and TRANSITION representatives carried out a focused workshop to discuss in detail and conclude on an approach.

A summary of the discussion point and conclusion is provided in table 5.

Table 5. De-rating factor workshop

TOPIC	DISCUSSION POINTS	CONCLUSIONS
Use Case	Which types of services each DNO would actually look to procure that would be best suited to using a de-rated baseline rather than any of the other baselining methodologies.	<p>The group could not identify at the time any examples of where a de-rated baseline would be beneficial to utilising an alternative baselining methodology.</p> <p>There was also an acknowledgement that individual intermittent generation is unlikely to provide services through the Sustain product due to the level of delivery commitment required at the contractual stage. Intermittent generation could still participate within sustain if aggregated with other intermittent generation sources (which utilise alternative fuel sources), demand response, or electrical energy storage.</p>
Additionality	Question relating to DNOs procuring services that would have been provided even if the DNO had not procured them e.g. paying a standalone wind farm to generate at peak times of the day.	<p>Additionality is a factor which applies to all flexibility products and has broad implications for DNO procurement practices and the flexibility market.</p> <p>We recommend that the principle of additionality should be discussed in more detail, including worked examples, through a WS1A product in 2022 with a view to agreeing a standard approach in procurement practices.</p>

<p>Comparability</p>	<p>Comparison (and differences) with implementation of baselines in the capacity market was discussed.</p> <p>At a more fundamental level, there was also a discussion about the differences between a capacity product vs. a flexibility product. While a capacity product is interested in paying for an absolute capacity in order to incentivise that capacity to be/remain there (current CM pays for capacity even though it is already there), a distribution flexibility product is mainly concerned with paying for the change in capacity relative to its counterfactual (additional capacity).</p>	<p>While the use case for the Sustain Product as defined in the ENA service definitions is clear, DNOs still lack experience in implementing and operating Sustain.</p> <p>As a result the market design of this product is not yet fully established. The market design of the Sustain Product will be fundamental to determining the most appropriate baseline methodologies.</p> <p>We agree, that the market design for Sustain needs to be better understood and that the most appropriate place for this work to be carried out is through the ENA Open Networks Project WS1A. The 2022 P6 Product includes work to establish the Sustain Market Design. Outcomes of this product should feed into baseline design evolution.</p>
<p>Suitable de-rating values</p>	<p>Given the differences in use cases between existing ESO service that use de-rating factors and the use case for DNO service, as discussed above, the suitability of CM de-rating factors values for use within DNO markets is not clear.</p>	<p>Existing CM de-rating factors and F-Factors may not be appropriate/consistent with the Zero with de-rating methodology recommendation. The suitability of de-rating factor methodologies and values should be considered as part of the Sustain market design in 2022.</p>

The product team concluded that de-rating baselines should be de-scoped until such time as a valid usage for them is identified, or when a baseline use case is identified that could not be satisfied by at least one of the other possible baseline methods.

As a result, the following items have been deemed out of scope of P7 in 2021 we recommend they are incorporated into future Open Networks programmes:

- Additionality in flexibility procurement,
- Sustain market design,
- The application of de-rating factors for baselining the Sustain product.

Configurable Parameters

The initial scope of works included the possibility of DNO level configurable parameters for the tool/baselining calculations. However, during the discussions it was agreed that there should be alignment between DNOs on the available methodologies for baselining.

A configurable historic method of x in y days has been included in the final functional specification and will be available for all users. This method allows the user to decide the number of assessed days and the number of eligible days from which the assessed days are selected for performing the baselining calculation. No limits

have yet been set on the range of possible values here, but this should be considered in future. However, it was decided that the number of hours used in the same day adjustment would not be included as a configurable parameter at this stage. Instead, when a same day adjustment is applied it is fixed at 2 hours. It was agreed that further consideration of how and when this would be used, in addition to any further data requirements such as the time of instruction as well as the time of the flexibility event, should be discussed in order to determine what is appropriate for this. Both the limits on x in y days, and the range and additional data required for configurable same day adjustment parameters will be carried over to future work and therefore are no longer within scope for this version of the flexibility baselining tool.

3.4 Product Element D – Build, Test and confirm

3.4.1 Build progress

Progress to date on the baselining flexibility tool is summarised in Table 6 below.

Ongoing development during January and February 2022 will cover the final “must” elements that are in development, as well as the user-configurable historic method which is included as a “should” in the specification.

A copy of the full specification is included in [Appendix C](#).

Table 6. ‘Must’ build progress

Topic	Must	
Methodologies	<p>The tool must allow for baselines to be calculated using several different choices of methodology:</p> <ul style="list-style-type: none"> • Historic/rolling baselines, with 8-in 10 days selected for events on weekdays (2-in-4 for weekends and bank holidays), with an option for a same-day adjustment (SDA) • Nomination baseline • Zero baseline 	Complete
User-configurable parameters	The tool must allow users to select whether their asset is in Scotland, England or Wales, for the purpose of bank holidays.	Complete
	The tool must allow users to define whether the timestamps in their data refer to the start of the period, or the end of the period.	Complete
Access / hosting / platform	The tool must be hosted online for users to upload data to and then perform baseline calculations. Limits on usage will be defined. (these limits are to be agreed with the ENA as part of the handover plan, see section 4.2.3).	Complete
Publication	The calculations/algorithms that underpin the calculations must be published as a private Python package, accessible by the DNOs and the ENA.	Due Feb 22
	The mathematical specification of the algorithms must be published, and will likely be included as an Annex to the ENA/Open Networks P7 Project Report.	Complete
Data storage	The tool must not store any data that is uploaded for baseline calculations.	Complete
Missing data	When data has been uploaded, the tool must report if there are any missing periods within the event window, and the total duration of these.	Due Feb 22
	For historic baselines, the tool must report for how many of the assessed and eligible days (e.g. 8 and 10) there is missing data, and the total (or average?) duration of missing data.	Due Feb 22

	For nomination baselines, the tool must report if there is missing data in the nomination baseline, and the total duration of missing data.	Due Feb 22
	For nomination baselines, the tool must report if there is an event window defined for which no nomination inputs have been uploaded.	Due Feb 22
Generation and demand	Users must be able to select whether their site is generation or demand. The tool must expect generation input to be positive, and demand input data to be negative.	Complete
	The tool should raise a warning if a generation asset has negative values, and similar for demand, prompting the user to review the input data.	Complete
	The tool should invert graphical values such that demand is still positive for an import constraint, and so on.	Complete
Input data	The tool must accept data with granularities of half-an-hour and-1 minute.	Complete
	The tool must allow users to upload a time-series of measured data for the asset. This data must consist of two columns: <ul style="list-style-type: none"> One column includes timestamps and is labelled either as “time” or “local_time”. The time series should be in either UTC time zone or BST time zone respectively. The second column includes metering data, and is labelled either as W, kW, MW, Wh, kWh or MWh. Any of these labels will be accepted by the tool. This guidance must be given to users.	Complete
	The tool must allow users to upload a time-series of “required responses” that are defined in the same way as the measured data. This is the response that the asset is expected to provide during a flexibility event. This must always be positive, representing a contribution towards reducing a constraint.	Complete
	The tool must allow a user to select whether their baseline is being calculated for an import constraint or an export constraint.	Complete
	The tool must allow users to upload a data-set which defines the start- and finish- times of the flexibility events.	Complete
	For nomination baselines, the tool must allow users to upload a nominated baseline, which must be defined in the same way as the measured data.	Complete
Outputs	The tool must output baselines for every specified event window.	Complete
	It must calculate the <i>flexibility response</i> , as the difference between the measured data and the baseline.	Complete
	It must allow a user to select a specified day, for which the baseline will then be displayed. This will be done with a calendar heatmap.	Complete
	The baseline must be displayed graphically, with the option to export the output data, including the baseline, the measurement, the calculated response, and the contracted target capacity.	Complete

	<p>The tool must report whether the flexibility response meets the required response, or is within a predefined % of that, for each event. If so, this event will be labelled “True”.</p> <p>If the response is less than this target %, in any part of the window, it will be labelled as “Partially True”. (The choice of labels can be updated prior to publication of the tool if required.)</p> <p>Note that this does not reflect a DNO’s <i>actual</i> measure of response, it only illustrates a comparison between the required response and the delivered flexibility response.</p>	Complete
Event definitions	The tool must allow users to define event windows for which baselines will be calculated. This will be via a data upload, where the template specifies the event start date and time and end date and time.	Complete
	The tool must exclude data from previous events when calculating the baseline.	Complete

3.4.2 Testing outcomes

BASELINE ANALYSIS

Through TRANSITION, TNEI are conducting detailed analysis of errors for the historic baselining methodologies. This is looking at the accuracy of the methods, as well as the impact of missing data. Reporting on this work will be completed and published through the TRANSITION Project. Any relevant outcomes will be shared with the ENA Project 0; Overarching Flexibility Framework, to ensure it informs future baseline development.

ACCEPTANCE TESTING

Members of the P7 team have been involved in each stage of development, for both the tool and the supporting documentation. The P7 team have access to the in-development version of the tool and have provided feedback on its use as well as on the UI design. This has helped to shape both the content and the prioritisation of the functional specification.

Further acceptance testing of the tool will be carried out by the P7 team throughout February 2022.

3.4 Product Element E - Disseminate and implement

3.4.1 Tool Implementation strategy/timeline.

A timeline for implementation of the P7 outputs has been agreed by the project team, this include;

- **DNO baseline methodology implementation** – implementation will vary from DNO to DNO dependent upon their flexibility procurement timelines, however all DNOs anticipate having implemented from August 2022.
- Dissemination activities – to include a webinar
- **Baseline methodology review** - to be carried out by the Open Networks Project through Project 0; Overarching Flexibility Framework.

Image 1; Implementation timeline

P7 - Implementation Timeline	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Tool Development Complete												
Handover Arrangements												
Tool Publication on ENA Website												
Dissemination Webinar												
DNO Implementation Readiness; Trial/test												
DNO Implementation; BAU												
P0 - Revisit; DNO implementation feedback and assess next steps												

3.4.2 Publications

The **baseline tool** will be published on the ENA website in March 2022. This will coincide with the planned dissemination activities also happening in March 2022.

In addition to the publication of the tool, the ENA website will also publish the tools supporting documentation which will include a **user guide**, a simple guide to support users of the tool through the steps necessary to calculate a range of baselines. And, **the baseline mathematical algorithms**, a detailed description of the underlying core algorithms used to implement the baseline methodologies with the tool. This document is also provided in [Appendix B](#) of this document.

4 Next steps

4.2.1 Governance strategy

It is recognised by DNOs, the ENA and Stakeholders that the current baseline design will require future development as a result of:

- Increased DNO operational experience.
- FSPs and stakeholder feedback.
- Learning becoming available from ongoing and new innovation trials.

To facilitate the required future development, it is agreed that the 2022 Open Networks Project 0 – Overarching Flexibility Framework, will continue to monitor the baseline implementation and assess feedback from DNOs and stakeholders to ascertain if further development is needed in future years as experience increases. As per the timeline detailed in Section 3.4.1.

4.2.2 Handover Plan

Upon completion of the tool development in February 2022 handover arrangements will begin to ensure the tool and all necessary supporting documents are available to view on the ENA website in line with the dissemination activities planned for March 2022. As shown in Section 3.4.1.

These handover arrangements include;

- Finalisation of contract between TNEI & ENA for ongoing tool hosting and support
- Development to the ENA website in order to publish the tool
- Marketing plan for the planned dissemination of the tool and product outcomes

Appendix A – Baseline Design

Baseline	Description	Product Applicability
Historic – Scheduled Utilisation Instruction Period	<p>Calculated using asset data from the most recent 'non active days'. Separate calculation for Weekdays and Weekends. Excludes Outliers - highest and lowest day is excluded. Mid 8 of 10 (weekdays), mid 2 of 4 (weekends). Some DNOs could calculate and communicate to FSP ahead of operational week. *Non active days are days where no market event delivery has occurred.</p>	Sustain (flexible demand)
		Secure
		Dynamic
		Restore
Historic with SDAs - Closer to real time Utilisation Instruction Period	<p>Calculated using asset data from the most recent 'non active days'. Allows for FSP to make Same Day Adjustments. Separate calculation for Weekdays and Weekends. Excludes Outliers - highest and lowest day is excluded. Mid 8 of 10 (weekdays), mid 2 of 4 (weekends). Some DNOs could calculate and communicate to FSP ahead of operational week. *Non active days are days where no market event delivery has occurred.</p>	Sustain (flexible demand)
		Secure
		Dynamic
		Restore
Nomination - Alternative for Secure, Dynamic & Restore	<p>Where accuracy levels of historical baselines are (too) low & where historical data is not available. For accuracy, most suitable where sub-metering is available. Must be submitted by the FSP in advance of operation, fixed time to be prescribed by the DNO.</p>	Secure
		Dynamic
		Restore

Zero - Alternative for Sustain services	<p>Most applicable where assets are not intended to stack. Or in the short term, where no historic data is available. In the instance of short-term use, will be replaced by appropriate method when data is available.</p>	Sustain (Dispatchable Generation) (also applicable to some scheduled Secure services)
Zero with capacity de-rating - Alternative for Sustain services		Sustain (Non- dispatchable Generation) (also applicable to some scheduled Secure services)

Appendix B – Mathematical Calculations

Appendix C – Functional Specification



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