Open Networks WS1A P7 Baseline Methodologies Interim Report

July 2021 │Version 1

ena
energy**networks**
association

Contents

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

1.3.1 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 with be defined and support tools developed.

1.3.2 Background

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.

1.3.4 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   P7 2020 Outcomes

2.1   Background

In 2020 P7 sought to undertake assessment of current work in the industry that relates to the development of a baselining methodology for measuring delivery of services through third party Distributed Energy Resources (DER) and recommend further actions DNOs could take to achieve a consistent approach.

To date each DNO has developed their capability in flexibility supporting differing methodologies to establish baselines. While DNOs experience operating flexibility is still in its infancy it is unpractical to establish good practice. However, it is agreed that any possible alignment in this area will benefit both providers and the DNO, therefore assessment of existing practices should be undertaken.

2.2   2020 Scope

To support the Products outputs, following a formal tender, the ENA appointed DNV GL Limited to carry out the scope illustrated below:

1. Mobilise phase

This stage focused on agreeing the work plan to govern the analysis required. We also facilitated online alignment workshop between DNV GL and ENA ONP product team where we further aligned our approach with ENA ONP product team and our common understanding on baselining methodologies.

2. ENA DNO products standardisation

In this stage we worked together with DNOs and ENA ONP to explore the current baselining practices which are used by the DNOs and agree the standardisation of GB DNO Flexibility product parameters.

3. Research of UK and International practices

At this stage we performed an analysis of existing UK and international practices. We reviewed 91 products across 9 countries, their product parameters and their baselines.

We then compared these products with ENA DNO flex. products to identify best practices

4. Consultation assessment and bilateral engagement

Following the ENA's consultation, we processed and analysed consultation responses. We also engaged directly with the relevant stakeholders to ensure that the project captures and benefits from stakeholders' expertise in full. We engaged bilaterally with four stakeholders and we also facilitated a workshop with the Association of Decentralised Energy (ADE) members.

5. Assessment of baselines

Based on baseline principles we developed the assessment criteria against which the baseline methodologies have been assessed. As a next step we prioritised the assessment criteria based on the priorities of DNOs, of stakeholders and our experience.

We then scored the baselines against the assessment criteria for each DNO flexibility product.

6. Final recommendations and reporting

This is the final stage of this exercise. Following iterative engagement with WS1A P7 team as well as with the WS1A group and ENA's advisory group we developed and reported the final recommendations on the baselining methodologies which are suitable for the DNO flexibility products.

2.3   2020 Stakeholder Engagement

The stakeholder engagement undertaken by DNV GL sought feedback on the key principles that should inform distribution baseline alignment and to rank their priority to Flexibility Service Providers (FSPs). These were concluded as follows:

Principles	Criteria	Description	Priority
Simplicity	DNO implementation costs	Are the costs for implementing and operating the administrative processes proportionate for the DNO?	High
Simplicity	FSP implementation costs	Are the costs for implementing and operating the administrative processes proportionate for the FSP?	Very High
Replicability	Replicability	Is the baseline reproducible by the DNO, FSP, and third-party validator for settlement (verification) purposes?	Medium
Design fit	Robustness to data	Are there high requirements on data to calculate the baseline? Do data quality issues undermine the baseline quality?	Low
Accuracy	Variance	Does the Baseline Methodology provide an accurate estimate of the flexibility load impact at a level expected by DNO and FSPs, or does it show a relatively high variance?	Medium
Accuracy	Bias	Does the Baseline Methodology provide an unbiased estimate of the flexibility load impact at a level expected, or does it show a relatively high bias?	Medium
Integrity	Integrity	Does the Baseline Methodology avoid or minimize the risk of gaming and strategic behaviour?	Medium
Inclusivity	Technology agnostic	Is the Baseline Methodology technology agnostic and not biased to a particular type of solution, technology and provider?	Very High
Design fit	Design fit - parameters	Can specific parameters of the service design be met?	Low
Additionality	Additionality	Does the Balancing Methodology allow the FSP to combine the delivery (Availability and/or Utilisation) of DNO products with other markets?	Medium

2.4   Assessment of compatibility with existing market baseline practices

Following DNV GLs assessment of UK and International markets, it was apparent that there were no comparable examples of distribution flexibility constraint management outside of the UK and while there were a large amount of balancing market to consider, GB DNO Flexibility Products involve some specific parameters that are not widely seen in the UK ESO markets or internationally, most notably long utilisation instruction periods due to requirement predictability.

As such, DNO constraint management products do not suitably compare against existing GB and international practices. Nevertheless, examples have been taken into account for the recommendations.

Recommendations do however focus on three types of baselining methodologies that are relatively simple, are known in GB markets, and which are currently in use by DNOs and/or in ESO balancing services and/or in the Balancing Mechanism.

2.5   Baseline Recommendations

Following the conclusion of the DNV GLs market and stakeholder assessment, they produced the following recommendations for a common baseline approach;

Product	Main recommendations
Sustain and Secure Scheduled	More experience needs to be gained by all DNOs before moving to the standardisation of the validation process (including baselines, if applicable). **Interim technology-specific validation mechanisms; a zero baseline or technology specific de-rating factors** have been recommended, these should be agreed between FSP and DNO at contract stage.
Secure Dispatched (week-ahead)	**Default - Historical baseline without SDA** Mid 8 of 10 for weekdays, mid 2 of 4 for weekends. Excludes prior event days and outliers. **Alternative – Nomination**. To be used for • dispatchable generation • connections with dominant dispatchable generation • if accuracy levels of historical baselines are (too) low • in case historical data is not available.
Secure Dispatched (real-time), Dynamic and Restore	**Default - Historical baseline with SDA** Mid 8 of 10 for weekdays, mid 2 of 4 for weekends. Excludes prior event days and outliers. **Alternative – Nomination.** To be used for • dispatchable generation • connections with dominant dispatchable generation • if accuracy levels of historical baselines are (too) low

In addition DNV GL provided the following notable recommendations;

1. For the Sustain and Secure Scheduled products, we recommend to further gain experience and standardise these products. Also, the other products and their use may evolve over time. This may also impact the performance of certain baseline methodologies.

2. We recommend to fine tune the baseline methodology against the product design, if the latter evolves over time. Also, product design may take the impact of certain parameters on the baseline effectiveness into account, based on the principles (e.g. move the notification closer to real-time)

A copy of the full DNV GL Baseline Recommendations Report[1] is available to view on the ENA Website.

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[1] https://www.energynetworks.org/assets/images/ON20-WS1A-P7%20Baselining%20Assessment-PUBLISHED.23.12.20.pdf

3   P7 2021 Key Deliverables

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 a robust implementation and governance plan will be defined and support tools developed.

3.1   2021 Product Delivery Timeline

Product Element	Activities	Timeline	Deliverables
Stakeholder Feedback	Conduct a webinar with relevant stakeholders to share baselines recommendation outcomes of WS1A 2020 P7 work.	Jan – Feb 21	Webinar and survey to ascertain broad agreement from stakeholders on recommended baselines.
Refine and finalise baseline(s)	Produce verification tool specification. Interim report on the outcomes of stakeholder engagement including a roadmap of future work Agree DNO implementation strategy. Refine and finalise the recommended baselines. Develop an appropriate governance strategy and feed into wider ONP Open Governance project.	Jan – Jun 21	Verification tool specification document. Stakeholder engagement outcomes & future work Final baseline design. Draft implementation roadmap and Governance strategy proposal.
Appoint solution architect	Appoint provider to build the baseline verification tool.	Jul 21	N/A
Build, test and confirm	Build and test tool with historical data sets. Undertake analysis to ensure results meet baseline objectives.	Jul – Oct 21	Analysis results. Final verification tool and associated algorithms.
Disseminate and implement	Publication and marketing of product outputs.	Nov – Dec 21	Final report. Implementation strategy/timeline.

			Governance strategy.
			Baseline verification tool and supporting documentation.

3.2   2021 Stakeholder Engagement

In February 2021, the P7 team conducted a webinar with stakeholders to share the 2020 DNV GL recommendations. The event was attended by approximately 20 stakeholders which represented FSPs and aggregators, along with representatives from the wider industry. Stakeholders were asked for their feedback to specific questions, which are summarised below;

Questions	Response
Do you agree with the approach DNOs have taken to researching the applicability of common UK DNO baseline methodologies?	Yes*
Do you agree the research undertaken was well informed and sufficiently considered?	Yes*
Do you agree with the prioritisation of Simplicity and Inclusivity as identified through stakeholder engagement?	Yes*
Do you agree that the range of baselines proposed will support participation for all technology and provider types?	No (71%)
Do you feel that the proposed baseline could prevent or discourage you from participating in DNO flexibility?	Yes (77%)
Do you agree that the baselines proposed have been matched suitably to DNO flexibility products?	No (67%)
Do you think that the publication of a baseline tool will support FSPs and 3rd Parties with their understanding and application of DNO baselines?	Yes*
Do you agree with the proposed roadmap for baseline standardisation?	Yes*

*All responses had positive support of 75% or higher

We then sought further feedback post the webinar around the areas that had received amber responses so we could consider if any changes needed to be made to the baseline approach. In summary, the further feedback we received was;

Concerns that the Historic Baselines could impact flexibility provision in other markets.

The historic baseline has the ability to exclude data from days where market events have taken place. 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 the opportunity to exclude data from activity in other markets. It should be noted that the 2021 WS1A Primacy Rules Product 6 is tasked with better understanding the interaction between markets and market event precedence. Findings from this product should feed into the

ongoing development of distribution flexibility baselines under the framework described in section 4, Baseline Methodology Governance Strategy.

Concerns that the Historic baseline is not suitable for domestic demand response due to variability in household demands variability and weather conditions.

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.

More analysis should be undertaken in relation to emerging low carbon technologies to better understand what baseline design can better support them

It is an output of this product to establish ongoing governance of baseline standards that will inform the ongoing development of distribution market baselines.

3.4   Conclusions

The P7 team concluded that changes to the recommendations were not required at this stage, our conclusion was based as follows;

- Concerns were largely in relation to the Historic baselines applicability which is mitigated with the application of the alternative Nomination baseline.
- Further concerns around the inclusion of emergent technologies, while valid, are not easily quantifiable for resolution 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 while continuing to research baseline that could improve accuracy for emerging technologies.
- This conclusion was supported by the 2020 stakeholder engagement which supported a simplistic approach at this stage, providing a common foundation which can be built upon through ongoing research;
    - o As the market develops and DNO and FSP experience operating the baselines will increase, and it is an expectation that learning from this increase experience will feed into future baseline design.
    - o It is also important to note that several DNO flexibility innovation projects are underway which trialling alternative baseline approaches, learning gathered from these should be also fed into future baseline design.
    - o The governance arrangements for future baseline design development are detailed in the section 4 of this report, Baseline Methodology Governance Strategy.

3.4   2021 Baseline Design

3.4.1   Applicability to products

A mapped example of the baseline product applicability, based on the outcome of the 2020 DNV GL assessment, is included in Appendix A.

Additional parameters for the implementation of the baseline design do still need to be developed. These will be resolved through the development of the Baseline Verification Tool. Full details of all parameters and associated algorithms will be made publicly available on the conclusion of the product.

3.4.2   Applicability to Technology Types

As concluded following 2021 stakeholder feedback, see section ##, the P7 product team will proceed with the technology applicability recommendations produced by DNV GL following their 2020 assessment;

Technology	Recommendations
Generation: Both dispatchable and non-dispatchable, fossil-based and renewables	We recommend nomination baselines for both dispatchable and non-dispatchable generation. These recommendations do not apply to Sustain and Secure Scheduled products.
Demand (load): Electricity consumption **Storage**: Mainly batteries **Any combination of the above**	We recommend historical baselines if this provides sufficient accuracy. Otherwise nomination baselines can be used.

3.5 Development of the Baseline Verification Tool

3.5.1 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, FSPs and Platforms to support them with their understanding and application of baselines.

3.5.2 Delivery Timeline & Specification

The delivery of the tool is planned to begin at the end of July 2021 and expected to conclude in Nov 2021. Publication and marketing of Baseline verification tool and supporting documentation, including the final baseline design and associated algorithms, will follow throughout Dec 2021.

The Baseline Verification Tool Specification has been published on the ENA website[2].

3.5.3 Solution Provider

We initially considered issuing a tender to appoint a solution provider to build the tool. However the outputs of the SSEN TRANSITION [3]project, which is funded through Ofgem's Network Innovation Competition (NIC), have already developed a baseline tool which was built using the 2020 P7 Baseline Methodology Recommendations. The tool is being delivered by TNEI who are a specialist consultancy contracted to support the TRANSITION project delivery.

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[2] https://www.energynetworks.org/industry-hub/resource-library/on21-ws1a-p7-technical-specification-for-a-baseline-methodology-verification-tool.pdf
[3] https://ssen-transition.com/

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. The ENA will however fund the activities specific to delivering the tool for Open Networks, such as the required reporting and meetings with the P7 product team.

As the TRANSITION tool is funded through Ofgem's Network Innovation Competition (NIC), the associated IP is already owned by UK DNOs which will be easily transferable to the tool once it is adopted by the Open Networks Project.

Ongoing discussions with TNEI to finalise the scope and implement the contract will conclude in late July, after which the development of the required additions to the tool will begin.

4   Baseline Methodology 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
- Continued alignment with UK ESO markets.

To facilitate the required future development, it is agreed that Baseline Methodologies will be set-up established within the ENAs Open Governance Framework which is being developed through Open Networks this year. This will see the creation of a User Forum[4], attended by FSPs, DNOs and wider stakeholders. This group will be responsible for:

- Gathering and assessing baseline developments.
- Recommending and approving baseline design change.
- Ensuring approved design changes are implemented.

A timeline for Baseline Methodology Open Governance Implementation and Ongoing Change management is included in Appendix B.

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[4] This User Forum would follow a similar process to the CEM User Forums proposed for 2021. See Terms of Reference
https://www.energynetworks.org/assets/images/Resource%20library/ON21-WS1A-P1%20CEM%20User%20Forum%20Terms%20of%20Reference%20(13%20May%202021).pdf and participation process
https://www.energynetworks.org/assets/images/Resource%20library/ON21-WS1A-P1%20Process%20for%20participating%20in%20the%20Common%20Evaluation%20Methodology%20User%20Forum%20(30%20Jul%202021).pdf

5 Product Roadmap & Proposed Implementation Timeline

Appendix B of this document is the roadmap produced by the P7 team to demonstrate:

- **The P7 team 2021 outputs** – anticipated to conclude this year with the publication of the Verification Tool.
- **The timeline for DNO Baseline Methodology Implementation** – implementation will vary from DNO to DNO dependent upon their flexibility procurement timelines, however all DNOs anticipate having implemented by August 2022.
- The timeline for Baseline Methodology Open Governance Implementation and Ongoing Change management – anticipated to begin in 2022.

6 P7 Ongoing 2021 activities

The P7 Team have a continued programme f work throughout the remainder of 2021 to support;

- Continuation of work to develop and build the Verification tool
- Produce further documentation around the baseline design, including all associated algorithms
- Publish and disseminate the Verification Tool and associated documentation

Appendix A – Baseline Design

Baseline	Description	Product Applicability
Historic – Scheduled Utilisation Instruction Period	**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.**	**Sustain (flexible demand)** **Secure** **Dynamic** **Restore**
Historic with SDAs - Closer to real time Utilisation Instruction Period	**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.**	**Sustain (flexible demand)** **Secure** **Dynamic** **Restore**
Nomination - Alternative for Secure, Dynamic & Restore	**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.**	**Secure** **Dynamic** **Restore**
Zero - Alternative for Sustain services	**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.**	**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 – Baseline Implementation Roadmap

| Dec 20 | Feb 21 | Apr 21 | Jun 21 | Aug 21 | Oct 21 | Dec 21 | Feb 22 | Apr 22 | Jun 22 | Aug 22 | Oct 22 | Dec 22 | Feb 23 | Apr 23 | Jun 23 |

DNO window for Common Baseline Implementation

Nov-Dec; Window for User Forum Change Recommen-dations to Baseline Design & Tooling

Jan-Feb; DNO window for Baseline Change Implemen-tation

Publication of Baseline Methodology Recommen-dations

Recommendation Dissemination for Stakeholder Feedback

Final Baseline Design

Appoint Baseline Verification Tool Solution Provider

Baseline Verification Tool Build and Testing

Publication & Dissemination of Verification Tool, baseline algorithms and supporting documentation

Open Governance; Call for User Forum members

Jul; User Forum Q3 Meeting

Oct; User Forum Q4 Meeting

Jan; User Forum Q1 Meeting. Annual Call for user Forum members

Apr; User Forum Q2 Meeting

P7 2021 Outputs

DNO implementation milestones

Open Governance timeline