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Sustain-H

Product Roadmap

November 2021

A paper prepared by Everoze in close conjunction with and on behalf of Western Power Distribution

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FOREWORD

"Today, we are publishing our roadmap of actions to shape the future of domestic demand side response for DSO constraint management."

Flexibility is a key policy initiative for the UK Government. The energy system needs to become more flexible to cater for the intermittency of renewables, increased electricity demand through the uptake of heat pumps and electric vehicles, and the vision that consumers will participate in this new energy system by "flexing" their demand.

That's why WPD commissioned Future Flex, a Network Innovation Allowance project delivered in partnership with Everoze and Smart Grid Consultancy (SGC). The project had a number of complementary aims and objectives, all focused around residential flexibility services.

As part of Future Flex, we developed a new service, Sustain-H, to help address barriers to domestic participation in flexibility services. We are grateful for the participation and vibrant feedback from flexibility providers Ecotricity, EDF, Octopus Energy, Kaluza, Stemy Energy, ev.energy and myenergi to make this happen.

Guided by your feedback, we are now closing down Sustain-H as an innovation project, and transitioning it to business-as-usual operations. This Product Roadmap represents the point of handover, with the service henceforth being owned by WPD's commercial Flexible Power team.

We will continue to listen to and respond to your feedback – ensuring that together we unlock the potential for domestic demand side response to address DSO constraints.

Stuart Fowler
Innovation Engineer, Western Power Distribution

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EXECUTIVE SUMMARY

Our electricity system is undergoing a period of unprecedented change. The sharp increase in uptake of electric vehicles and heat pumps over the next 10 years poses a significant challenge to the approach Distribution System Operators (DSOs) take to network planning and constraint management. Commercially procured flexibility services are a core part of the new and evolving approach. But unlocking enough capacity for a sufficiently liquid market is not easy. Domestic DSR has huge part to play here, but needs a service that can accommodate its unique characteristics. Sustain-H is designed to do exactly this.

Sustain-H is Western Power Distribution's (WPD) new DSO service designed for homes. It is an evolution of Sustain, the scheduled constraint management service being rolled out across all DSOs following standardisation work by the Energy Networks Association.

Sustain-H is a product of the Future Flex innovation project. During the project we have conducted a service trial involving over 310 homes and seven suppliers and aggregators, showing that a simple scheduled service like Sustain-H is effective at accessing flexibility from homes. The service unlocks a new flexibility asset class, one where customer behaviour is central to delivering changes in demand.

Sustain-H service summary

Scheduled delivery with 'drop-to' response	Sustain-H is a pre-fault service, with delivery scheduled months in advance. *Flexibility Providers* deliver a pre-agreed change in import or export (kW) over a defined period of time. *Flexibility Providers* reduce demand to a level at or below a pre-agreed *Target Demand*, maintaining this over the full duration of the 4-hour *Delivery Period*.
Delivery period and procurement	There are two 4-hour *Delivery Periods* each weekday, aligning with the times of peak network usage. The service is procured every 6 months via a new online procurement portal, and *Flexibility Providers* will be able to change portfolio composition and contracted volumes on a monthly basis.
Qualifying technologies and baselining	Each household must have at least one qualifying technology: EV chargepoints, electric heat pumps and home battery storage systems. Baselines are pre-defined for each qualifying technology, fixed for each contracting period, and determined from the asset-make up of the portfolio.
Metering and data submission	Two metering options are available to *Flexibility Providers*: asset-level and household-level; in both cases aggregated across the portfolio. Asset level metering takes data from the meters of qualifying assets only. Household-level metering is taken from smart meters, including the demand of the whole home. All meter data is submitted via APIs.
Remuneration and location	*Flexibility Providers* are paid a fixed tariff per kW demand reduction relative to the baseline. Only homes in the relevant part of the distribution network (i.e., within CMZs) will be eligible to participate. CMZs are grouped into high-medium-low value zones to provide a sharper price signal for the network zones where constraint alleviation is more valuable.

CMZ: Constraint Management Zone

EXECUTIVE SUMMARY

The proposed road to commercial roll out…

WPD is committed to the commercial procurement of Sustain-H.

This Product Roadmap is produced as part of the Future Flex innovation project, and marks the end of Everoze's role in transitioning Sustain-H into business-as-usual procurement. All works are handed-over to WPD to implement the minded-to proposals. A series of activities are planned to be completed by WPD in the run up to commercial launch.

November 2021

Sustain-H Product Roadmap (*NOW*)

This roadmap outlines the plan for commercial procurement of Sustain-H, taking trial participants' feedback on board. It covers service design, timelines for rollout, and the nature of feedback cycles for continuous improvement.

Nov 2021 – April 2022

Flexibility services consultation

WPD has launched a consultation on, amongst others, the development plan for the new procurement portal in November 2021. This will culminate in a development roadmap for the procurement portal in April 2022.

April – August 2022

Platform development

Significant platform development work will be needed to deliver end-to-end digitalisation of Sustain-H. The new procurement portal will be used for all Flexible Power services, including Sustain-H.

By March 2023

Commercial launch

WPD aims to launch Sustain-H as a business as usual commercial service by March 2023. Further details will be published closer to the time.

OUR AMBITION, JOURNEY AND PRINCIPLES

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Domestic flexibility can offer a low carbon alternative for constraint management at scale

Decarbonisation of heating and transport to reduce carbon emissions is a core priority for the next 10 years as reaffirmed in the Government's Ten Point Plan for a Green Industrial Revolution. The decarbonisation targets for heat and transport sectors will be met for the most part through electrification – electric vehicles replacing internal combustion powered cars and vans, and heat pumps replacing fossil fuel boilers. For example, WPD expects[1] a 4-fold increase to the number of electric vehicles and heat pumps by 2028, which translates to a significant increase in electricity demand over this period. A considerable portion of this increase in demand will be from residential homes.

Existing HV and LV distribution network infrastructure is not built to accommodate such an increase in domestic demand. The sharp rise in the uptake of electric vehicles and heat pumps poses a significant challenge to Distribution System Operators (DSOs) for network planning and constraint management. WPD are responding to this through their strategy for the upcoming RIIO-ED2 price control period where commercially procured flexibility services will take centre stage to efficiently manage network capacity constraints until reinforcement needs are more certain.

Homes with electric vehicles, heat pumps and other low carbon technologies have huge untapped potential for flexibility. But existing DSO flexibility services are not suited to unlock this flexibility from homes, leaving a gap in the DSOs' tool kit for constraint management. Sustain-H responds to this network need by incentivising behaviour change and shifting electric vehicle, domestic battery and heat pump demand away from times of peak demand on the network.

Flexibility from electric vehicle chargepoints is the leading low-carbon performer.

Findings from the *Pro Low Carbon* project[2] (part of Future Flex) show that domestic demand side response has some of the lowest carbon impacts for all flexibility technologies providing DSO flexibility services. Electric vehicle chargepoints have the lowest impact at 7gCO_2e/kWh. Next in the order are heat pumps then domestic batteries, all with a lower carbon impact from providing DSO services than large scale and fuelled alternatives.

Domestic flexibility can offer significant volumes for DSOs at scale.

Based on the data in the Carbon Trust and Imperial College London's 'Flexibility in Great Britain' 2021 report, we estimate a total flexibility potential of 1.3 GW across WPD's four licensee zones by 2030. This is a potentially conservative estimate heat pumps were excluded due to insufficient data. Only a proportion of this estimated volume will fall within constraint zones so the effective market size will be lower.

1 WPD, DSO Strategy for RIIO-ED2, June 2021

2 Everoze, Pro Low Carbon: Carbon Impact of DSO Flexibility Services, October 2020

Our journey so far

Sustain-H is a product of the Future Flex innovation project, pioneering second generation DSO services for domestic scale assets.

We held two workshops with industry stakeholders in early 2020 to inform initial service design. In November of the same year we kicked off our real-world trial, involving over 310 homes and seven suppliers and aggregators, which concluded in July 2021.

The findings from the trial have helped shape the final design of the Sustain-H service which is targeting commercial roll-out by Q1 2023.

Future Flex is a Network Innovation Allowance funded project and was delivered by WPD, Everoze and Smart Grid Consultancy.

Further details on the Sustain-H trial can be found here.

Our learnings from the Sustain-H trial

Sustain-H unlocks an entirely new asset class and customer type	The trial demonstrated that a simple scheduled service is effective at leveraging flexibility from homes. The service unlocks a new asset class for flexibility, one where demand change relies primarily on customer behaviour change rather than dispatchable control. A scheduled service is capable of attracting a wider pool of service providers and access an asset class that is currently unavailable to existing dispatch-driven services.
Service remuneration based on an average CMZ value is not sufficient	There is high locational variability in value of constraint management for WPD, with a few high-value zones and large number of medium to low-value zones. Participant feedback from the trial showed that remuneration based on the value of an average Constraint Managed Zone (CMZ) is insufficient. More focussed procurement can provide sharper price signals. Scale is equally important, as per-home home costs of provision are significantly reduced by aggregating a large number of homes into a single portfolio.
Digitalisation and automation is needed to reduce participation costs	Procurement, validation, data delivery, assessment and payment should be digitalised and automated to reduce manual intervention to a bare minimum. End-to-end digitalisation and automation is needed to remove admin-intensive processes and keep costs down to both WPD and the flexibility provider.
Flexibility to change portfolios frequently is needed to boost participation	Learnings from the trial showed that participating portfolios will need to be able to account for a certain level of 'churn' in suppliers' and aggregators' domestic customers. Dynamic portfolios need to be able to change portfolio make-up and volumes on a monthly basis to reduce participation risk.

The Sustain-H service has three core design principles

1. Sustain-H is simple

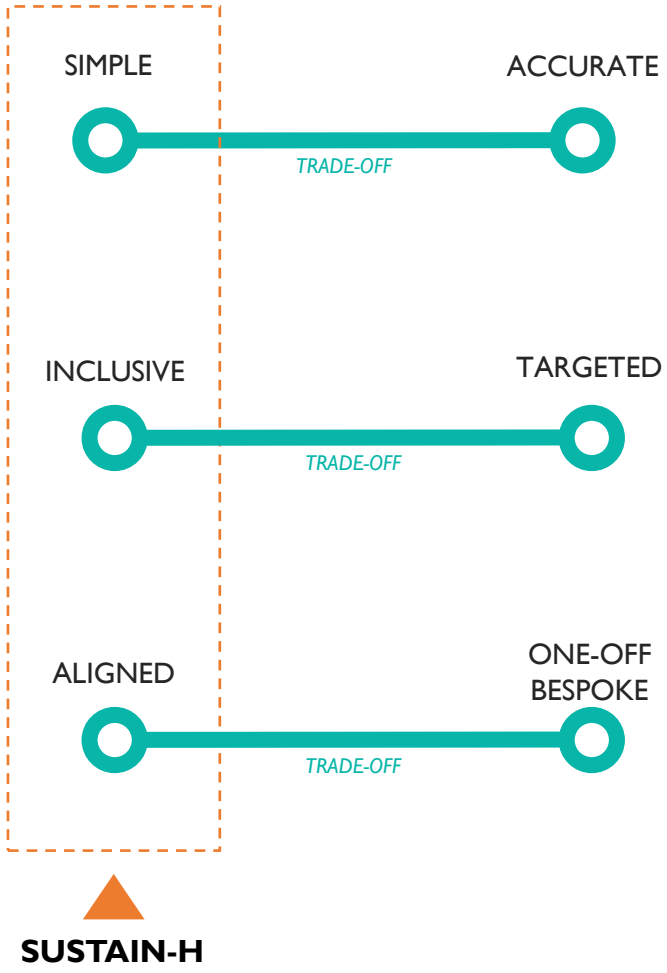
Rather than reflect WPD's precise network need (which varies substantially by location & time), we have radically standardised and simplified requirements.

2. Sustain-H is inclusive of participants and technology

We invite participation from both licensed suppliers and asset aggregators with a portfolio of households with flexibility solutions. For now, we are focusing on EVs, heat pumps and battery storage technologies.

3. Sustain-H is aligned with other services

Sustain-H is based on the Energy Networks Association's Sustain service and is also closely aligned with *Flexible Power* and WPD's existing commercial service suite.



We target simplicity to ensure that service requirements are commensurate with remuneration. Feedback from the Sustain-H trial repeatedly emphasised the challenge of low service remuneration. We have stripped out complexity to reduce the cost of participation.

We target inclusivity to embrace the diversity of solutions being developed by flexibility providers. By focusing on specific technologies, we target the higher impact demand technologies for initial commercial roll-out.

We target alignment to enable a clear pathway to commercialisation and to aid revenue stacking. Industry feedback also indicated preference for standardisation of procurement and contracting across services.

Scheduled services like Sustain-H have an important role to play

There is a role for scheduled services like Sustain-H	Sustain-H is designed to unlock flexibility from a completely new asset class: high-consumption domestic technologies, including those that are not remotely dispatchable. Electric vehicle chargers and heat pumps are the most common members of this group and reducing their peak time electricity demand requires us to get customers to change their behaviour. A simple, scheduled service is an effective way to achieve this change.
Scheduled and dispatch-based services complement rather than conflict	Assets and homes capable of sophisticated real-time control will likely target existing dispatch-driven Flexible Power services which feature more attractive tariffs and a lower opportunity cost. Sustain-H does not compete with these services, but sits alongside them. A key differentiator of Sustain-H is lack of remote dispatch control. Not all homes & assets will have the ability or the desire to give up control – Sustain-H is a service designed exactly for these groups.
A timely stepping stone to accelerate the domestic energy transition	We acknowledge that in the long run electric vehicle charging and heat pumps may gain the capability for remote dispatch, and customers may become more accepting of remote control of technologies in their homes. But until this happens, an alternative service is needed. Sustain-H offers this alternative and in doing so will help to accelerate the domestic energy transition today, precisely when the greatest impetus is needed.

"With the upcoming smart charging mandate, as most homes will have smart EV chargers and charge their EVs during off-peak hours, will there be a role for Sustain-H in 5 years?"

All private chargepoints sold in GB will be required to have smart capability and meet certain device-level requirements set out in PAS 1878 & 1879. This is following the Office for Zero Emission Vehicle's (OZEV) Electric Vehicle Smart Charging consultation and legislation to this effect is expected to be introduced later in 2021[3].

However, this legislation is not expected to mandate how smart EV chargepoints should be used. Industry feedback from the Sustain-H trial shows that, at this time, households will need some form of incentive to make use of the smart functionality and charge EVs during off-peak hours and deliver benefits to the network.

Sustain-H, as a simple scheduled service, can provide that incentive to support behavioural change.

3 Department for Transport, Government Response to the 2019 Consultation on Electric Vehicle Smart Charging, July 2021

SUSTAIN-H: A SCHEDULED SERVICE FOR HOMES

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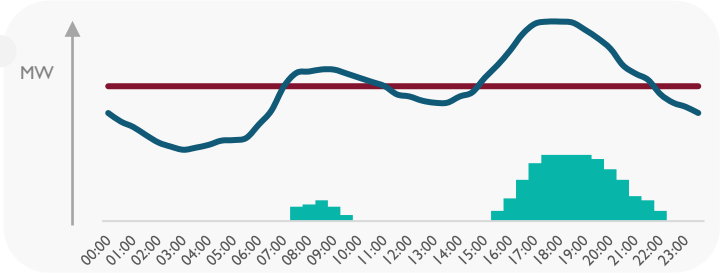
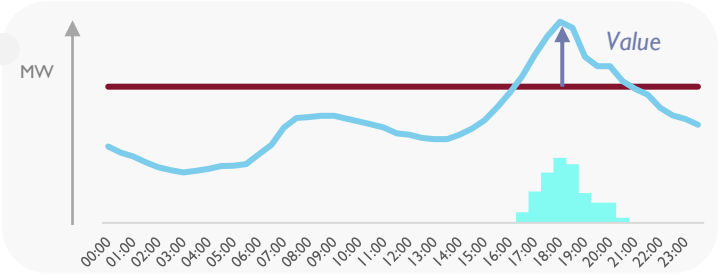
The role of Sustain-H in the Flexible Power service suite

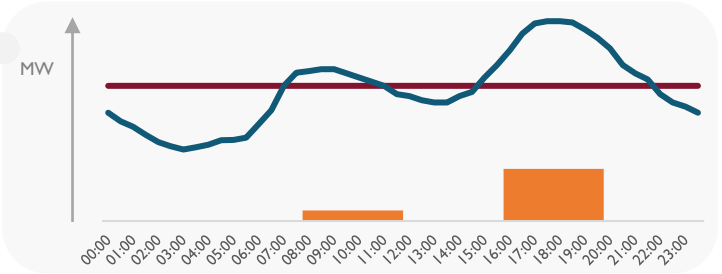
1. WPD procures flexibility services to protect the network against risk of demand exceeding network capacity.



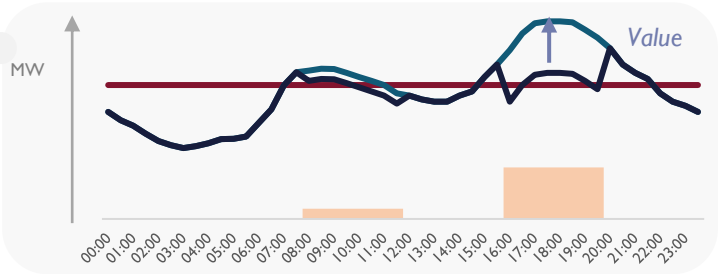
2. When demand does exceed network capacity, flexibility services are dispatched on a close to real-time basis. The value to WPD is the volume of flexibility services dispatched.



3. Sustain-H also protects against this risk, but in a different way. Sustain-H reduces the predicted demand each day during constraint periods



4. The value of the service is the shift that it delivers in the predicted demand level



* *existing Flexible Power services – future arrangements subject to outcome of ongoing consultation*

Procurement horizon for Flexible Power suite of services

Sustain-H is a pre-fault service, with delivery scheduled months in advance.

Value to WPD lies in the *certainty* Sustain-H provides that a subset of homes and assets will have lower demand than that considered for network planning.

The reduced, 'adjusted' predicted demand, known months ahead of time, means WPD need to budget for less back up reinforcement than they otherwise would have. Flexible Power dispatchable services are procured to allow WPD to manage any residual risk of network capacity being exceeded on a close to real-time basis.

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Sustain-H is a scheduled 'drop-to' service

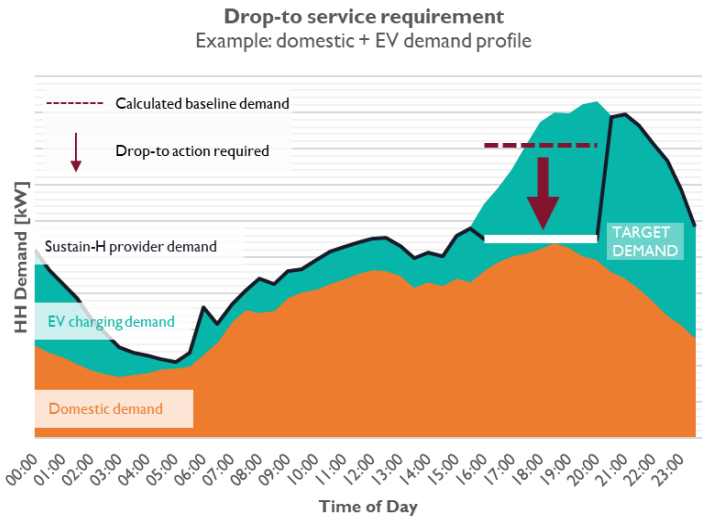
Flexibility Providers deliver a pre-agreed change in import or export (kW) over a defined period of time.

Flexibility Providers reduce demand to a level at or below a pre-agreed *Target Demand* and hold this for a 4-hour window. The *Flexibility Provider* defines a *Target Demand* that is suitable for their portfolio, contracting for a *Target Demand* of X kW, delivered by a portfolio of Y households. Remuneration is based on the reduction against a pre-established *Baseline Demand*.

Demand is measured and assessed on an aggregate portfolio basis. The *Flexibility Provider* manages the delivery risk of meeting the *Target Demand* that it defines.

We have prioritised simplicity to be inclusive of a broader range of market actors, and also to ensure service complexity is commensurate with service remuneration.

The drop-to design is technology agnostic and is inclusive of non-dispatchable solutions like energy efficiency. This removes much of the complexity and consequent cost of service provision that is a feature of 'drop-by' services.



Contracted for fixed periods

WPD contracts the service seasonally for all 6 months in that season. The *Flexibility Provider* can choose to participate in one or both seasons.

Flexibility Providers deliver the service for the defined 4-hour period in the morning, and/or the defined 4-hour period in the evening. *Flexibility Providers* can choose which *Delivery Periods* to target. The period is the same across summer and winter seasons.

The service is required during all weekdays in a month. Requirements remain the same across each weekday the service is required to be delivered.

We have made substantial simplifications to minimise barriers to entry: for instance standardising the requirement across WPD's CMZs to defined service windows.

Also, fixing volumes and periods in advance allows Flexibility Providers to plan for delivery well in advance.

FLEXIBILITY PROVIDER OPTIONS WEEKDAYS ONLY	**DAYTIME** 8AM-NOON	**EVENING** 4-8PM
WINTER [SEP-FEB]	DELIVERY PERIOD 1	DELIVERY PERIOD 2
SUMMER [MAR-AUG]	DELIVERY PERIOD 3	DELIVERY PERIOD 4

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Portfolio baselines are fixed at time of procurement

The baseline of a *Flexibility Provider's* portfolio is fixed at time of procurement at the start of each season.

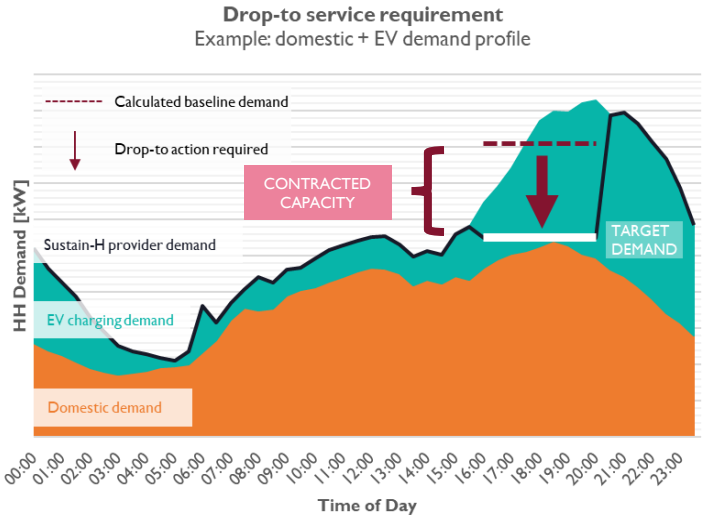
The established *Baseline Demand* is tied to i) the number of homes in the portfolio, and ii) the technology make-up of the portfolio. Any change with either of these during the season will mean a new portfolio baseline is needed.

Sustain-H uses fixed baselines for the household demand and the qualifying technologies, which vary by month of year. The current baselines used are included in Appendix A, together with a worked example for calculating the *Baseline Demand* for a domestic portfolio.

There is no ongoing baselining needed, and no associated data and metering requirements – this helps keep costs down.

The fixed pre-defined baselines are at the heart of the 'drop-to' design of the Sustain-H service. Such radical simplification of service requirements makes a scheduled service viable.

WPD will review the fixed baselines on a periodic basis that is tied to the timings for the DFES updates. Where appropriate baselines will be updated to reflect the new data available.



Baselining is used to measure portfolio performance and calculate payments. Remuneration is based on the *Contracted Capacity* where

Contracted Capacity = Baseline Demand – Target Demand.

Baselines are derived from network models

WPD publishes the Distribution Future Energy Scenarios (DFES) on a rolling two year cycle, outlining the range of credible futures for the growth of the distribution network. WPD uses certain assumptions for customer behaviour and demand in their strategic network analysis. These include demand profiles for domestic household demand and various demand technologies connected to WPD's network.

The fixed baselines used for Sustain-H are tied to the diversified demand profiles used by WPD for Extra High Voltage (EHV) network modelling and planning. Linking the baseline to network models provides a clear link between the service provided and the network benefits to WPD.

The baselining approach used is consistent with the new ENA baselining guidance.

The baselining guidance published[4] by the ENA notes the Sustain product is not sufficiently established to standardise baselining methodologies across DSOs. Indicatively, the ENA recommends using historical data for baselining load assets. Sustain-H is consistent with this recommended approach where baselining is based on the diversified demand profiles which are established using historical demand data.

4 Open Networks Project, WS1A P7 Baseline Methodologies, version 1, December 2020

Each household must have at least one qualifying technology

EV chargepoints

All EV chargepoints are treated the same for baselining purposes – there is no distinction in the power rating of the charger. The fixed baselines for EV chargepoints are reflective of the current generation of EV chargers (7 kW) installed in homes.

Heat pumps

Both air and ground-source heat pumps are eligible to participate, and are treated the same for baselining purposes. Gas-electric hybrid heat pump systems are also eligible to participate.

We are addressing the baselining for hybrid heat pumps during winter where the fixed baseline is 0kW. This will be addressed in a future update to the service.

Home batteries

Home batteries have a fixed zero baseline and will be in discharge mode during the service *Delivery Periods* for remuneration. If asset metering is used for delivery assessment, then the *Target Demand* will be negative for a portfolio of home batteries.

When using asset metering for AC-coupled solar-storage, battery import from surplus solar generation is currently recorded as import from the gird, impacting performance scoring.

Home demand

Domestic household demand is taken into account when using smart meters for delivery assessment. Other technologies in the home that reduce peak-time electricity demand can support homes to achieve the *Target Demand*. Smart appliances, energy efficiency technologies, or other alternate heating sources can all contribute.

Energy efficiency and storage heaters are not standalone qualifying technologies.

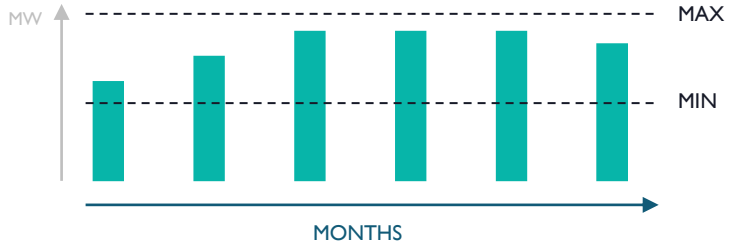
Energy efficiency is rewarded indirectly when using the smart metering option by contributing to meet the *Target Demand* set for other qualifying technologies. The *DSO Ready Homes* project[5] recommended 'beacon' energy efficiency schemes to explore appropriate commercial incentives for energy efficiency.

Homes with storage heaters already contribute less to network constraints than those with other forms of electrified heating. They have not been included as a qualifying technology for Sustain-H as an extra reward through this service is unlikely to incentivise any additional beneficial changes to customer behaviour.

5 Everoze, Whitepaper: Realising the value of domestic energy efficiency in GB electricity distribution, June 2021

The service is procured seasonally across a range of Constraint Management Zones

Seasonal procurement with flexibility to change volumes and portfolio monthly	Sustain-H is procured every 6 months, with *Flexibility Providers* agreeing their domestic portfolio and the *Contracted Capacity* at the start of the season. *Flexibility Providers* have the option to change the households and technologies that make up of the portfolio and the portfolio *Contracted Capacity* within a minimum/maximum band on a monthly basis. All contracting is caried out digitally, based on the latest ENA standard contract for flexibility services.
Digitalised procurement through a new online portal to keep participation costs down	WPD is developing more sophisticated procurement systems to manage increasing volumes of flexibility contracts. The online procurement portal automates many of the administratively onerous elements of service procurement and contracting. *Flexibility Providers* submit details on asset make-up, MPAN data and address data for the homes in in their portfolio via APIs. Assets are validated by cross-checking each home and asset against WPD records.
Homes and assets must be located within eligible CMZs for that season	Services are procured within areas of network need. The eligible constraint managed zones (CMZs) will change seasonally depending on the seasonal network requirements. CMZs are grouped into three tariff bands and *Flexibility Providers* can select one or more of the three tariff bands for service provision in accordance with their portfolio's geographic distribution. Homes are grouped as a single portfolio for each tariff band.



WPD adopts a trust but verify approach. WPD's record of domestic technologies at homes is not comprehensive. If assets cannot be verified through cross-checks, WPD will accept these assets and use the details submitted to update WPD's records. *Flexibility Providers* will therefore be required to ensure their portfolio declarations are accurate.

Supplier primacy rules are used to resolve asset double counting. If two or more *Flexibility Providers* include the same home/asset in their portfolio, the party who owns the customer relationship has primacy, meaning suppliers will get priority over asset aggregators. WPD will continue to review this following commercial roll-out.

ENA: Energy Networks Association

MPAN: Metering Point Administration Number

Providers can choose between two different metering options for submission of aggregated portfolio level data

Asset-level metering

This option is for *Flexibility Providers* collecting demand data at an asset level. Asset-level metering does not provide a whole home view and so is less valuable to the DSO. This difference in value is reflected in the baseline calculations.

Home-level metering

This option is for suppliers and non-licensed parties with access to home smart meter data. Whole home meter data from metering other than SMETS smart meters will also be accepted if meeting the required minimum half-hourly resolution.

Flexibility Providers can use PAS 1878-compliant metering solutions.

The PAS 1878 standard for energy smart appliances sets out metering accuracy to not exceed 10%. Although this is less accurate than what WPD requires as a single metered asset, findings from the Aggregated Datasets project (part of Future Flex) show that assets aggregated to form large portfolios have an acceptable level of uncertainty at a whole portfolio level in line with that of MID-compliant metering, and so is suitable for Sustain-H.

Meter data is submitted for the portfolio as a whole

Flexibility Providers submit meter data monthly via APIs – data is submitted for the full calendar month, including days the service is not provided. Data resolution should be at least half-hourly resolution, and *Flexibility Providers* are encouraged to submit data at higher resolution where possible.

WPD desires higher resolution meter data in the long term. Higher resolution meter data means reduced uncertainties for the DSO in making network planning and flexibility decisions. In the future, WPD will consider mechanisms to incentivise higher resolution data. No data derating factor will be used for initial commercial roll-out.

The *Baseline Demand* for the portfolio depends on the metering option used

The home-level metering option measures the whole home demand – i.e., the household demand plus demand from qualifying assets. Therefore the *Baseline Demand* for the portfolio also takes account of household demand. The household demand is not considered in baseline calculations when using the asset-level metering option.

WPD will consider introducing suitable mechanisms in the future to incentivise data completeness. Missing meter data from one or more assets reduces the certainty to WPD of the overall portfolio demand and in turn devalues the service to WPD. WPD does not measure asset availability as part of initial commercial roll-out.

6 Everoze, Aggregated Datasets: Third Party & Sustain-H Datasets Analysis, November 2021

Providers are paid a fixed tariff per kW of demand reduction per month

Monthly payments based on demand reduction achieved relative to the baseline	Service delivery and payments are calculated separately for each *Delivery Period* the *Flexibility Provider* has contracted for in that month. Service delivery is assessed daily on a portfolio level based on the highest half-hourly demand during the corresponding *Delivery Period* – this is different to the current Flexible Power payment mechanism. If demand exceeds the *Target Demand*, daily remuneration is reduced on a payment score scale with a 5% grace allowance. This *Payment Score* is used to calculate the payment for the corresponding *Delivery Period*.
Digitalised delivery assessment, invoicing and payment	WPD is developing tools and systems to digitalise and automate the monthly delivery assessments through to invoicing and payments. This will include an online portal showing a portfolio's historical performance. Invoicing will also be caried out via the online portal. Standard WPD payment terms will be used, as is currently the case for other Flexible Power services.
Other flexibility services can be stacked with Sustain-H to maximise value	*Flexibility Providers* cannot contract for other Flexible Power services (Secure, Dynamic and Restore) for the same homes and assets for the same period but can contract for IntraFlex services and other ESO services. Any service stacking will take into account the primacy rules currently being developed by the ENA to resolve ESO-DSO service conflicts.

Monthly payment *(per Delivery Period)* = (**Sustain-H tariff** x **Contracted Capacity** x **Month's Payment Score** x **Availability & De-rating factor**)

No availability & derating factors are used for commercial roll-out. WPD may consider introducing such factors in the future to incentivise higher meter resolution and higher asset availability.

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Providers can be paid at a higher rate by providing the service in zones with more severe constraints

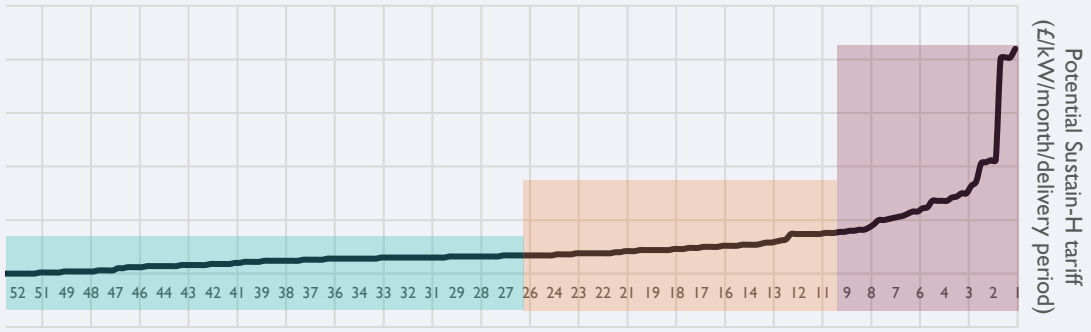
Providers can select one or more tariff bands, and have a separate portfolio for each band

If Sustain-H is procured only in zones where constraint alleviation is needed the most, the average value to WPD is higher and a higher tariff can be paid. There is a clear trade off between the value of the service and the areas over which it is available. The relationship is illustrated in the chart below. WPD offers three tariff bands with high to low average value – depending on your portfolio's geographic distribution, *Flexibility Providers* can select one or more of the three tariff bands for service provision; the CMZs will be grouped as a single portfolio across each chosen tariff band.

WPD will publish the CMZ grouping and tariff bands seasonally

The CMZ grouping is done based on WPD's constraint forecasts and its estimate of the value of constraint services in a CMZ. The high tariff band includes the top 20% of the CMZs that season in service value, the medium band the next 30% and the low band the bottom 50% of the CMZs. WPD will review the fixed tariff for the red-amber-green bands periodically and update as appropriate.

Focusing procurement on higher-value CMZs allows a higher service tariff.
The number of eligible CMZs in WPD's license area against the potential Sustain-H tariff, £/ kW



Note: The graph includes data from 52 CMZs from 2019 to 2022.

CMZ-level procurement is the long term ambition. CMZ-grouping across the tariff bands will be used for the foreseeable future. Aggregating homes is important to keep costs down, so WPD will not consider making any changes here until sufficient liquidity is established at a single CMZ level.

Flexibility Providers can select one of three tariff bands offered every procurement season. Tariffs (tentative) based on the 2022 CMZ data are as follows:

- Red / high value band: £8 /kW
- Amber / medium value band: £2.50 /kW
- Green / low value band: £1 /kW

These tariffs are tentative and WPD will confirm the actual tariffs in the first procurement notice issued at time of commercial rollout

OUR DEVELOPMENT ROADMAP

WESTERN POWER DISTRIBUTION
Serving the Midlands, South West and Wales

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Flexibility Providers interact with Sustain-H via a new online procurement portal and the existing Flexible Power portal

All *Flexibility Provider* interactions with Sustain-H including new provider registration, portfolio validation, notification of upcoming procurement rounds, and procurement submissions will be via a new procurement portal.

All service delivery, invoicing and payment interactions for Sustain-H will be through WPD's existing Flexible Power portal.

The procurement portal and the Flexible Power portal together will deliver the end-to-end digitalisation and automation across the whole service.

Home and asset validation: *Flexibility Providers* submit details on asset make-up, MPAN data and address data for the homes in in their portfolio via APIs	• *Flexibility Providers* upload their portfolio data to the procurement portal. Suitable data encryption measures for sharing private data will be used. • Homes uploaded will be subject to automated on-demand validation checks and the results shown via the procurement portal immediately. • If assets cannot be verified against WPD records, WPD will accept these assets and use the details submitted to update its records.	• For homes uploaded without MPAN data, WPD will back-fill this data using its existing records; however, this functionality may not be available at the point of initial commercial roll-out. • WPD will maintain a database of validated homes and assets so that homes need not be re-validated every procurement season. WPD will hold a record of homes and assets after a procurement season, unless *Flexibility Providers* request this data be deleted.
Procurement and contracting: *Flexibility Providers* agree their domestic portfolio and the *Contracted Capacity* at the start of each 6-monthly procurement season	• The procurement portal shows a list of homes, assets and their validation status, as well as which of these validated homes fall within the CMZ grouping and the tariff bands for that season. *Flexibility Providers* can select the homes to include in their portfolio for the upcoming season. • The procurement portal calculates the *Baseline Demand* for the selected portfolio, and the	*Flexibility Provider* can set their portfolio *Target Demand* and min/max *Contracted Capacity* for that season. A digital contract is issued once the portfolio submission is accepted by WPD. • Mid-season changes to the portfolio make-up and *Target Demand*/*Contracted Capacity* are made through the procurement portal. The portal can also be used to remove homes no longer part of a *Flexibility Provider's* customer base.
Delivery and payment: *Flexibility Providers* submit meter data monthly via APIs. Service delivery and payments are calculated monthly	• All meter data submitted will be subject to automated delivery assessment and payment calculations at the end of the month, and a Performance Report will be issued via the Flexible Power portal. • Self-billing invoices will be used to keep admin	to a minimum. Standard WPD payment terms similar to that used for existing services will be used. • All historical performance reports, invoices and other performance details will be able to be downloaded from the Flexible Power portal.

WPD will be undertaking consultation and platform development work to commence service procurement by Q1 2023

Consult on major features planned for the procurement portal	
Publish development roadmap for the procurement portal	
Undertake platform development work on the procurement portal	
Undertake platform development work to include Sustain-H in the Flexible Power portal	
Sustain-H commercial launch	
Introduce MPAN look-up tool to back-fill MPAN data	*No firm timeframes at this time*

The new procurement portal will be for all Flexible Power services, including Sustain-H. WPD has commenced development work on some elements of the portal. WPD has also launched a consultation on the development plan in November 2021 which includes design recommendations specific to the Sustain-H service.

Sustain-H will be included in WPD's first procurement round for 2023. WPD aims to launch its first procurement round for 2023 in March of that year, and Sustain-H will be launched in that procurement round. All core platform development work to make the launch possible is planned to be completed by Q4 2022.

Although the MPAN look-up tool may not be ready in time for commercial launch, *Flexibility Providers* that do not have access to MPAN data will still be able to participate from day-1 as long as they can provide home address data.

WPD will continue to develop and improve the service following commercial roll-out

Going forward, WPD will take on product owner role to deliver Sustain-H.

This Product Roadmap is produced as part of the Future Flex innovation project, and marks the end of Everoze's role in transitioning Sustain-H into business-as-usual procurement. All works are handed-over to WPD and the Flexible Power team to implement the minded-to proposals and recommendations.

We are taking an agile approach to commercial roll-out	We acknowledge that the service will not be perfect at time of commercial roll-out. We have aimed to resolve only the high-priority learnings emerging from the Sustain-H trial before launch. Some other points remain unaddressed at this time. Taking industry feedback into account, and acknowledging the requirement for continual service evolution, WPD endeavours to launch the service by Q1 2023 and iteratively improve it post-commercial roll-out.
We are eager to hear your feedback on how we can improve the service	We strive to work collaboratively with you, co-creating and evolving the service together, and actively seeking out your feedback. In any case, you can share your feedback and concerns with WPD via the procurement portal (when online) or send any comments to the Flexible Power mailbox. WPD will have a periodic review of all open issues, taking your feedback into account, to inform ongoing development plans.

We welcome your comments and feedback on this Product Roadmap for Sustain-H.

Please send your feedback to WPDflexiblepower@westernpower.co.uk

The Baseline Demand used for each qualifying technology is shown in the table below

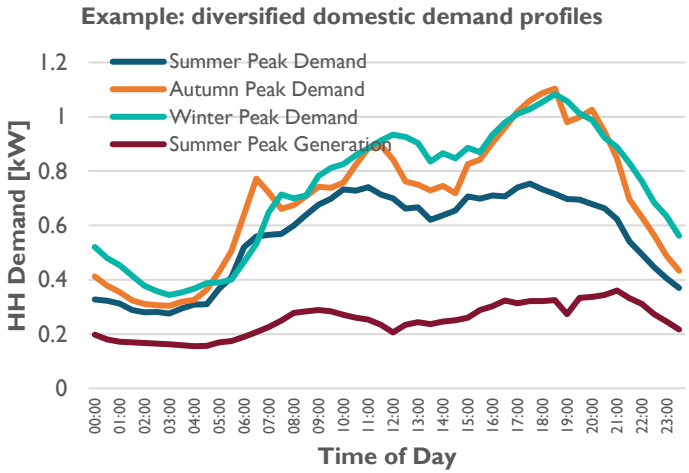
WPD uses diversified demand profiles for Extra High Voltage (EHV) network planning. Distribution network planning is based on 'edge-case' modelling for five different cases: i) winter peak demand, ii) summer peak demand, iii) intermediate warm peak demand, iv) intermediate cool peak demand, and iv) summer peak generation. Only the four demand profiles are relevant for Sustain-H as it is a demand turn-down service, and so the 'summer peak generation' case is not used here.

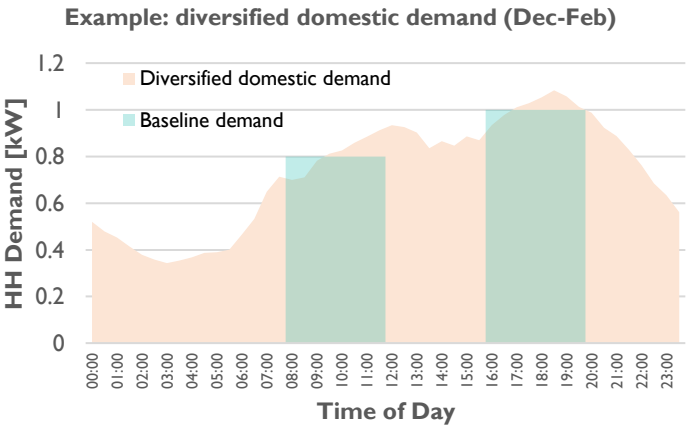
The diversified demand profiles change over the year as shown in the figure to the right, and the months for which these network cases apply are as follows:

1. Winter peak demand: December to February
2. Summer peak demand: June to August
3. Intermediate warm peak demand: May, September & October
4. Intermediate cool peak demand: March, April & November

The averaged demand of the diversified demand profiles over the two *Delivery Periods* – the daytime and evening periods – are used as the fixed baselines for Sustain-H.

For the values marked as TBC in the table below, WPD will publish the technology baselines closer to the time of commercial launch and issue of the procurement notice.





TECHNOLOGY	DELIVERY PERIOD	WINTER [SEP-FEB]			SUMMER [MAR-AUG]		
		SEP-OCT	NOV	DEC-FEB	MAR-APR	MAY	JUN-AUG
Domestic	Daytime	*[TBC]*	*[TBC]*	0.8	*[TBC]*	*[TBC]*	0.7
	Evening	*[TBC]*	*[TBC]*	1.0	*[TBC]*	*[TBC]*	0.7
EV chargepoint	Daytime	*[TBC]*	*[TBC]*	0.4	*[TBC]*	*[TBC]*	0.3
	Evening	*[TBC]*	*[TBC]*	1.6	*[TBC]*	*[TBC]*	1.1
Heat pump with electric back-up	Daytime	*[TBC]*	*[TBC]*	1.7	*[TBC]*	*[TBC]*	0.2
	Evening	*[TBC]*	*[TBC]*	5.6	*[TBC]*	*[TBC]*	1.0
Hybrid with gas back-up	Daytime	*[TBC]*	*[TBC]*	0	*[TBC]*	*[TBC]*	0.1
	Evening	*[TBC]*	*[TBC]*	0	*[TBC]*	*[TBC]*	0.6
Battery storage	Daytime & Evening	*[TBC]*	*[TBC]*	0	*[TBC]*	*[TBC]*	0

Units are in kW

Here is a worked example to calculate the baseline for a hypothetical mixed-technology domestic portfolio

Number of homes in portfolio	100 homes
Asset make-up of portfolio	60 homes with EV home chargers and 50 homes with heat pumps (with electric back-up). Each home is equipped with at least one of these demand technologies, with some homes equipped with both EV chargers and heat pumps
Metering option	Home-level metering using smart meter data
Delivery Period targeted	Winter evenings 4-8pm
Target Demand defined	300 kW

The *Baseline Demand* for the portfolio is calculated as follows. The domestic demand is also used in the baseline calculations as the home-level metering option has been selected.

> *Baseline Demand* = 100 x baseline domestic demand + 60 x baseline EV charger demand + 50 x baseline heat pump (with electric back-up) demand

Using the values from the corresponding diversified demand profiles, averaged for the corresponding Sustain-H service period (4-8pm in this example), we calculate the *Baseline Demand* for the Winter season as:

> *Baseline Demand* (Winter, evening *Delivery Period*) = 100 x 1.0 kW + 60 x 1.6 kW + 50 x 5.6 kW
>
> *Baseline Demand* (Winter, evening *Delivery Period*) = 476 kW

The *Baselined Demand* for the Flexibility Provider's domestic portfolio for the Winter evening Delivery Period is calculated as 476 kW.

From this we can calculate the *Contracted Capacity*:

> *Contracted Capacity* (Winter, evening *Delivery Period*) = *Baseline Demand* – *Target Demand*
>
> *Contracted Capacity* (Winter, evening *Delivery Period*) = 476 kW – 300 kW = 176 kW

A Future Flex project deliverable produced by Everoze in conjunction with Western Power Distribution

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