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FUTURE FLEX PARTICIPANT FEEDBACK

A REPORT FOR WESTERN POWER DISTRIBUTION

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TABLE OF CONTENTS

VERSION HISTORY

A	Initial Draft	13 Feb 2020
B	Draft for Workshop	25 Feb 2020
C	Final	28 Feb 2020

1. INTRODUCTION

Summary

FutureFlex is a participant led trial of second-generation DSO services, deploying step change innovations for procurement, testing and delivery suitable for domestic scale assets. It is a joint project delivered by Western Power Distribution, Everoze and Smart Grid Consultancy (SGC), funded by the Network Innovation Allowance (NIA).

This document logs participant feedback received during two industry engagement workshops held in January and February 2020 in Bristol and London, respectively, on the design of the FutureFlex project – and subsequent feedback received. The document seeks primarily to *formally log* rather than *process* the participant feedback, and should be read in conjunction with the summary webinar, available here. The next stage under FutureFlex is further analysis and criteria-based assessment to down-select and refine ideas for a trial.

Structure of report

The document is structured by the three engagement methods deployed:

CHAPTER	METHOD	OBJECTIVE OF ENGAGEMENT
2	Workshops	To secure feedback in structured form from diverse group of industry experts – adopting co-creation approach
3	Interviews	To secure ad-hoc feedback on workshop outputs, particularly from those unable to attend To probe deeper on specific topics
4	Webinar	To disseminate workshop findings To invite informal feedback on ideas from the workshop

Acknowledgements

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2. WORKSHOP FEEDBACK

2.1 BARRIERS

This section logs the barriers to domestic flex providing DSO services as raised by the workshop participants. Participants were invited to log barriers on post-it notes in isolation, and then discuss and categorise them according to the DSO services lifecycle within subgroups. All participants were sent a 'Primer' document one week beforehand, so that they were activated on the themes and project, giving them time in advance to frame their ideas. Wider context on the workshops is provided in the FutureFlex webinar here.

242 post-it notes on barriers were written by participants, summarised by theme below. Everoze has chosen to present these by theme, since some topics cut across the DSO services lifecycle. A further 32 post-it notes not falling within natural themes were collated under 'Miscellaneous' grouping, not presented in the graph below.

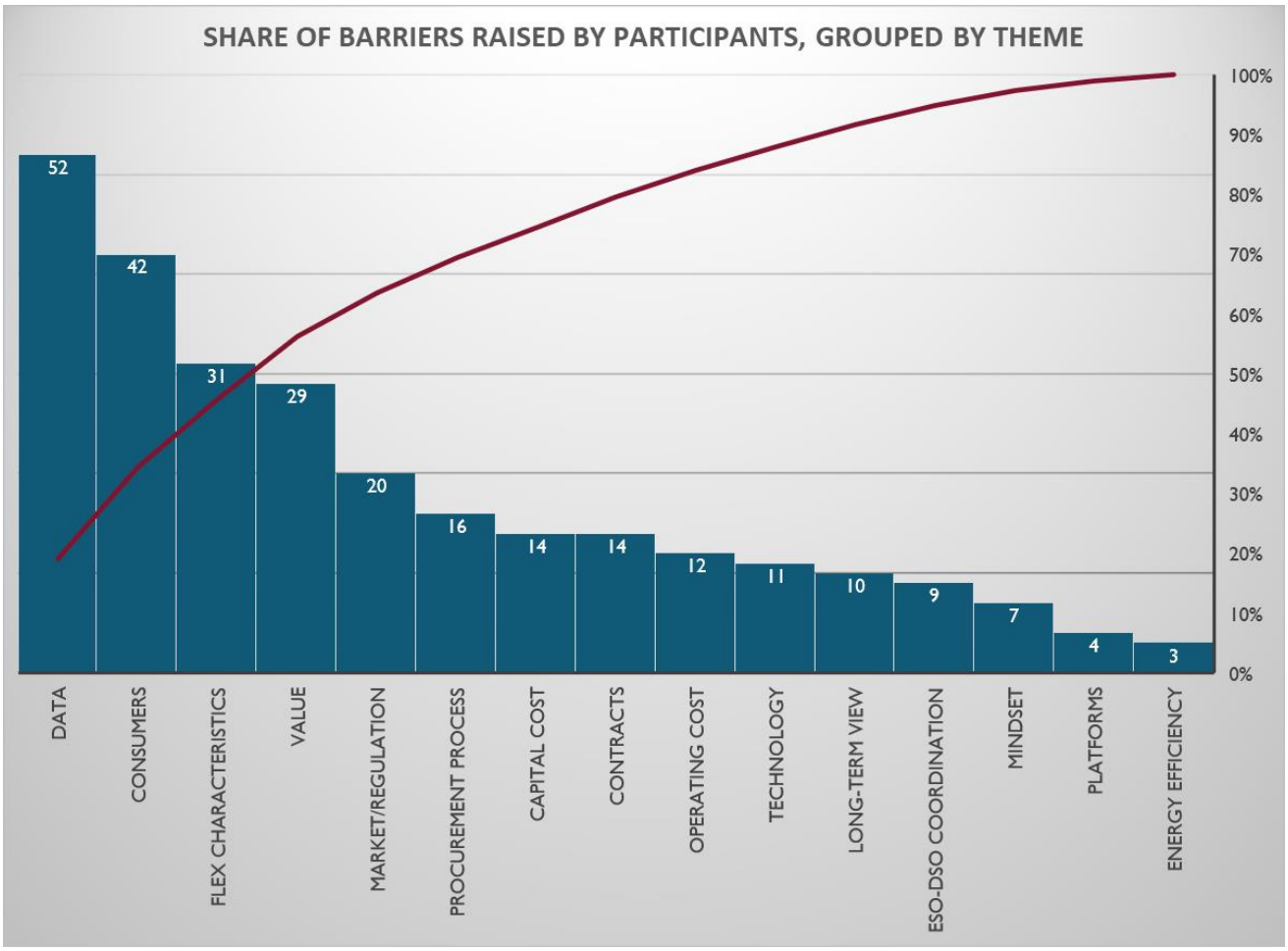

FIGURE 1 SUMMARY OF BARRIERS LOGGED DURING THE WORKSHOPS, GROUPED BY THEME

The text in the subsections below is captured verbatim, as written by participants on post-it notes – thus reflecting participant views/perceptions. Participants selected the phase of the DSO services lifecycle their barriers fall under. While the text itself has been reproduced word-for-word, in a small minority of cases they have been placed by Everoze in a different lifecycle phase from the one suggested by the participant, while taking care that this does not remove the context of the comment.

Everoze has clustered the barriers into themes, as follows: **THEME: Summary of barrier [number of comments].**

2.1.1 Phase 1: Advertise

VALUE: Value is too low, incomplete and uncertain to motivate investment [20]

1. Consumer – what value is there for me?
2. Lack of clarity on who can earn what? And when?
3. What's the value/drive?
4. Unless customers are getting something better, unlikely to sign up
5. Value of DSO flex contracts is too low to justify investment
6. How is value quantified and captured between stakeholders?
7. DSOs not putting enough value on the table: (<0.5% of domestic bill; could be 5 to 10 times this!)
8. Getting the fair value
9. Assets have different value within a CMZ (proximity to constraint)
10. Engagement – perception of ceding control/autonomy in return for scant reward
11. Is it worth the candle for consumers? [$n/yr]
12. Based on a value establish by I&C participants, the attributable value [p/kW] is very low per household
13. Value £££
14. Uncertainty of commercial benefits
15. Quantifying and monetising social benefit (e.g. carbon savings)
16. Uncertainty on long term revenues available in providing flex services in terms of building the business case.
17. Revenue uncertainty – links to investment
18. Avoided/lost business cases?
19. Insufficient constraint on value streams – high market and commercial risk
20. Incentives/money investment case

CONSUMERS: Consumer engagement and trust is low [14]

1. Customer engagement – knowledge, interest, time, complexity
2. Trust
3. Consumer perception (or suspicion) of suppliers
4. Smart Metering program driving mistrust
5. Energy suppliers mistrusted – who is retailing this to AHH?
6. Customer awareness and interest
7. Consumer suspicion of big energy motives
8. Consumer perception
9. Consumer buy-in (e.g. smart meter roll-out)
10. Trust issues – energy company/smart meter
11. Ease of signing up as consumer
12. Lack of engagement with the energy system
13. Consumer/homeowner control of energy use
14. Engaging consumers

CONSUMERS: Consumer knowledge and understanding of domestic flex is low [14]

1. Consumer knowledge – education and concerns
2. Residential understanding of flex concepts and householder requirements
3. Consumer understanding of benefits; leading to low uptake
4. Lack of awareness from public
5. Complexity for consumers
6. Lack of knowledge of problems and opportunities among domestic customers
7. Attracting consumers where flex is needed
8. Knowledge – educate so know why flex is needed
9. Domestic visibility of flex education
10. Awareness of community and domestic (aggregated level)
11. Customer take up/knowledge
12. Lack of knowledge
13. Yet to have prosuming popularized
14. Early adopters are far more demanding than the pioneers; Level of control; Level of service

PLATFORMS: Flexibility services are advertised via too many channels [4]

1. One platform

2. Competing platforms
3. Too many platforms in the market? Needs convergence?
4. Too many channels - Messaging/advertising

LONG-TERM VIEW: There is not a clear long-term (10+yr) view on where future services will be procured [3]

1. Long-term visibility of future system needs?
2. Flex forecasts: Visibility; Reason; Value
3. Market understanding of why

MINDSET: The location element of flex opportunities/assets is challenging to communicate & manage [3]

1. Existing CMZs need to align with flex opportunities
2. Advertise asset knowledge and location? Today's assets: Elec, heat, hot water, gas fuel for heat and hot water? Future assets: EVs, Batteries, PV
3. Technical requirements differ based on location; therefore, challenge to communicate consistently and clearly

Miscellaneous [2]

1. DLL/DCC [Data Communications Company] sufficiently engaged
2. Are schools, shops and restaurants the better households for this?

2.1.2 Phase 2: Qualify

FLEX CHARACTERISTICS: Limited domestic flex potential (kW) brings aggregation challenges [10]

1. How do we make a few kW users attractive to DSOs?
2. 1000s homes required to make worthwhile
3. Minimum threshold too high (except Western Power Distribution)
4. Few flexible assets in the home today
5. The proportion of load that is flexible in domestic properties is traditionally very low
6. Are there any flexible and profitable loads in the average home? (Heating mainly gas)
7. Routine (of public) constraining participation i.e no hardware to flex
8. Size of flexibility – by provider (what's too small kW?)
9. Finding a concentration of customers suitable for participation. E.g. NewBuild/Social/Council/Retail
10. High density/number of people needed in an area to deliver capacity i.e spread load over capacity

PROCUREMENT PROCESS: Qualification processes are onerous – and particularly unsuited to multiple assets [7]

1. If behaviour is inconsistent or assets mobile, how can they be qualified?
2. Assets with hugely different characteristics to power stations
3. Clunky way of registering individual assets
4. Asset prequalification: Name, address, etc
5. Resources – cost, time, equipment/technology
6. Ease of use to consumer
7. Lack of opportunity to pre-qualify assets? Not only when tender announced

CAPITAL COST: Cost to household of purchasing domestic flex kit can be prohibitive [3]

1. Cost of equipment for low income household i.e new heating and smart devices
2. Capital costs i.e batteries
3. Cost to householder

ESO-DSO COORDINATION: Qualification processes are poorly coordinated with the ESO [2]

1. Too many procurement platforms and procurement processes
2. Asset Registration, Asset identify and tracking unit comparison, Especially ESO/DSO interface

LONG-TERM VIEW: Future DSO service requirements are unclear/unknown [2]

1. Do we know enough about technology adoption trends to foresee service requirements?
2. Is the identification of the need identified far ahead enough to drive adoption of enabling technologies (i.e. to make the investment)

2.1.3 Phase 3: Procure

PROCUREMENT PROCESS: Procurement is too infrequent and too far in advance to suit domestic flex [5]

1. Does not account for asset seasonality (shorter term)
2. Flex contract procurement cycles too infrequent
3. More real-time procurement – move away from procurement processes
4. Hard to plan years in advance (customer base, predictability, etc)
5. **Different point of view:** Too few DSOs offer 12-18 months period between procurement and service start date

PROCUREMENT PROCESS: Tender processes and price signal pass-through are complex [4]

1. Liquidity – complexity of auction with multiple parameters
2. Pass-through of signals: Contracted Vs price signal. Differences in speed, agility
3. Flex value determination: Bidding or fix or cap. Carbon
4. Valuation could be more transparent

CAPITAL COST: Domestic flex options are not always cost-competitive [4]

1. Cost of battery technology (storage solution)
2. Cost of sales + installation + testing + operation > return value
3. Consumer – cost to implement?
4. Domestic will find itself in competition with already established I&C providers

VALUE: DSO service value is too low [3]

1. Insufficient value for small players
2. Value: difficult to ensure enough incentive to domestic householders and be profitable to aggregate
3. Value of the contract/service

ESO-DSO COORDINATION: Prioritisation of service requirements [1]

1. How are the service requirements prioritised to enable tender review?
2. Different approaches by different DNOs
3. Competition from other buyers (ESO/communities)

Miscellaneous [3]

1. Lack innovation from suppliers; still focused on status quo of supply model
2. Negative value of services to the system compared to [10 buses]
3. Market's wider motivation to enable customer mobility conflicts with ability to build a flex portfolio

2.1.4 Phase 4: Contract

VALUE: Pricing is too low, and does not reflect market nascency [6]

1. Pricing that doesn't value consumer engagement and market development
2. Pricing!
3. Commercial viability
4. Not enough profit to make a business case
5. Value @ aggregator and public/domestic levels

6. Value to public

CONSUMERS: The contractual relationship between the intermediary (e.g. supplier) and homeowner is challenging [6]

1. Legal/Contractual relationship with homeowner to access their assets to aggregate for flex services
2. Transparency/simplicity Vs Fairness for customer
3. Contracting with participants and suppliers
4. 'Aggregators of aggregators'
5. DSO/DNO doesn't really want to contact directly with domestic scale individually
6. DNO & households: time/effort needed to participate

CONTRACTS: Developing contracts with a suitable contract term and payment structure is challenging [6]

1. Is the timescale of a contract long enough to be feasible/cost effective to be put in place?
2. Different consumers will have different habits; therefore, contract between DSO and platform should acknowledge this. e.g. 6 month Vs dynamic
3. Procure -> Contracts. Static? Dynamic? = more complex for consumers, but bigger rewards?
4. Protecting consumers intent and not adding additional layers of administrative and technical complexity
5. Is the timescale of a contract too long to allow service value to change dynamically
6. Availability Vs Usage payments. How to get 'good balance' for consumer understanding?

LONG-TERM VIEW: Contracting occurs in a market landscape that is still evolving and uncertain [5]

1. Market instability – long-term certainty
2. Regular volatility promoting shift in supply market – causes issues with existing flex connections
3. Contracting in a nascent market, balancing risk and incentive
4. How is future demand increase factored into planning?
5. Efficient & agile contract management is challenging

CONTRACTS: Contracts are not well aligned across DNOs are ESOs [6]

1. Lack of standardisation across DNO processes, contracts, requirements
2. Lack of alignment across DNOs/ESO in the Advertise to Contract phases (value/data/contract formats)
3. Not a single unique framework contract for all DSOs
4. Exclusivity clauses
5. Making the business model stack up (exclusivities of multiple services)
6. Not easy to stack DSO and non-DSO value streams

CONTRACTS: Contracts are written with single assets, rather than with wider portfolios in mind [2]

1. Do I need a contract for every domestic asset? (that could be a lot!)
2. Portfolio asset aggregation [asset agnostic]. Types. Large or small

Miscellaneous [3]

1. CAD & SM interface
2. Is there a penalty for non-delivery and is this risk balanced with the value of the service?
3. Pay for what utilisation?

2.1.5 Phase 5: Test and Commission

OPERATING COST: Commissioning and compliance costs are too onerous and unclear [8]

1. Ensuring asset compliance with a large administrative burden
2. Cost to serve a solution, compared to benefits (ROI)
3. Burden of testing/qualifying many like assets. Can a type test be done?
4. Test and commissioning at individual asset/site?
5. Too much friction to connect assets; drains value: Administrative. Technical [asset i/£, DSO i/£]

6. Affordability of ways to participate (because of testing)
7. Not well defined qualification and resting requirements
8. Lack of opportunity to pre-test/commission assets

TECHNOLOGY: Technology is not interoperable [6]

1. Should housebuilders be made to specify interoperable equipment?
2. Should interoperability/PAS be mandatory?
3. Interoperability - platforms/API/technology etc. must be open source to capture full value for DSO, supply chain and consumer
4. Interoperability
5. Platform interoperability: Data; Service language; SLAs
6. Overlap/relationship between different software requirements: e.g. HEM, Flex management, Arbitrage/trading, P2P

ESO-DSO COORDINATION: Testing and commissioning processes are different across service procurers (DSO, ESO etc) [4]

1. Platform(s) integration: For assets; For flex providers
2. Can tests be standardised?
3. Bespoke software development requirements: Per DNO, per product, etc; ENA projects, etc
4. 'Smart' goods having an ability to control load in a standardised way

FLEX CHARACTERISTICS: Domestic flex is inherently challenging to test and commission – due to interface with consumer and maturity [3]

1. Interfacing to flex loads, especially heating (movable load solution)
2. EVs do not support export (EV solution)
3. EV lack of standards for chargers

Miscellaneous [1]

- Lack of infrastructure and controls

2.1.6 Phase 6: Dispatch

FLEX CHARACTERISTICS: Domestic flex cannot be reliably dispatched [10]

1. Reliability of comms. How can DSOs get comfortable with domestic/aggregator communication systems
2. Dispatch signals. Inconsistency
3. Reliability. Will they respond? Can I have direct control?
4. Can availability of the asset be confirmed for dispatch?
5. Reliability
6. Diversity Factor diminished – Will this make everyone behave the same?
7. Connectivity – piggyback on domestic wifi or install own 4G?
8. Impact of uncontrolled assets (consumer behaviour)
9. Domestic dwellings typical behaviour is not conducive to flexibility at the time its required
10. DSO – Guarantee the flex will actually be provided

FLEX CHARACTERISTICS: Response times of domestic flex assets may be too slow [4]

1. Are response times sufficiently fast?
2. Timing
3. Latency – lack of comms and additional layers
4. Dispatch signals – Time

CONSUMERS: Consumer concern on the impact of third party control of home-based assets [4]

1. Consumers – impact on my want to use power when I want to
2. Consumer concern about third party control of appliances and impact on service levels

3. Control (Consumers vs aggregators vs DSO?)
4. Ensuring balance between firmness of availability and consumer service

TECHNOLOGY: Technical dispatch considerations on metering, automation, optimisation and API interface [5]

1. Metering requirements not specific enough
2. Smart Meter dispatch via ALCS? And/or via internet? Connectivity, reliability, cybersecurity?
3. Non-existent API for most DSOs
4. Fully automated services needed
5. Complexity of optimisation – Expert knowledge to convert into algorithms

Miscellaneous [2]

1. How far?
2. Widespread technology – proliferation of smart devices

2.1.7 Phase 7: Measure

DATA: There are multiple data challenges around accuracy, granularity and availability [18]

1. Defining data requirements and how they should be measured
2. Is there too much noise in the data to pinpoint the delivery of the service?
3. Granularity of data
4. Data Accessibility
5. Who is verification data collected by? (consumer?)
6. Data Quality
7. Is my metering granular enough?
8. Smart Meter adequacy
9. Sufficient for all services except frequency?
10. Distributed data sets hold key information/duplication/inconsistent
11. Metering – minute by minute
12. Quality of data (demanding/expensive)
13. Validation of aggregate metering
14. Communications – how to get reliable data?
15. Data availability (smart meters, etc)
16. Data resolution Vs metering Vs quantity of data
17. Technical difficulties interfacing with SMETS 2 meters. DNO issues don't occur in 30minute windows
18. Data. Who owns it. How to access it. Smart meter requirements
19. Standards and APIs

DATA: Baselining methodologies are not appropriate for domestic flex [16]

1. Baselining requirements for assets. Mostly behind the meter assets: different metering setups
2. Baselining of assets with many uses
3. Baselining and stackability of revenues
4. Baselining benchmark: assets or portfolio
5. Too many baselining methodologies
6. Baselining still based on C&I despite domestic very different
7. Monitoring and verification – the baseline issue (define counterfactual)
8. Profile classes are not conducive to DSR. Requires smart meters
9. Data – how to know service was delivered?
10. Appropriate baseline methodology
11. Baselining/data
12. Baselining
13. What would they have done without my dispatch request?
14. Households/smart metering/baselining
15. Domestic baselining and measurement: Must be able to easily communicate/explain to households. Not ANOTHER golden rule
16. Defining baseline for assets with inertia and (are) constantly changing

DATA: It is unclear whether metering should be at house or asset level; this is complicated by the smart meter roll-out [8]

1. Metering Vs Sub-metering
2. Metering – house or asset?
3. Lots of individual metering
4. Smart meter roll-out
5. Communication with home
6. Smart/connected homes
7. Metering/data collection
8. Degree of available large domestic assets. Meters/DIG/API…

2.1.8 Phase 8: Assess and Pay

FLEX CHARACTERISTICS: Guaranteeing availability of domestic flex assets is challenging [4]

1. Classifying different flex services to match capabilities e.g. EVs vs ESA
2. Availability/Forecasting
3. Guarantee domestic availability
4. Availability uncertainty e.g. EVs: plugged in? charging schedule? Customer requirements?

OPERATING COST: Administering payments to individual flex providers is complex and expensive [4]

1. High transaction costs and viability of aggregator role
2. Challenges of aggregation administration -> cost, contracting, payment, etc
3. Not clear how settlement/payment works for portfolios (or process is too onerous for small assets)
4. DNOs do not have direct relationships with customers so settlement and account management are massive investments

2.1.9 Other Parameters

MARKET/REGULATION: Regulation is inadequate, onerous and/or changing [11]

1. Administrative burden of market access
2. Uncertainty in rules over time
3. Consumer/Ofgem/lease regulations around ongoing access to assets
4. Regulatory model will not allow DSO to take risk
5. Market access
6. Ofgem/BSC/etc – code and governance complexity
7. Accessibility
8. DSO vs ESO rules and priority of balancing and overall demand
9. Right constraint management
10. 'DSR' ready assets mandated
11. Legal restrictions

DATA: There are concerns on data control, privacy and cybersecurity [10]

1. Security issues for homeowner: wifi hacked = shows when house is empty
2. Data – privacy and willingness to share
3. Data privacy
4. Data/CIDPR/concerns with smart meters/data; Who holds/controls data
5. Privacy – visibility on behaviour
6. Cyber security – real/perceived
7. Internet of Things security/hacking
8. Data protection
9. Consumer concern about access to personal data
10. Cyber security

MARKET/REGULATION: The value and market are dispersed – it is not clear who is taking the lead in coordinating it [9]

1. Coordination and who needs to take the risk/business case
2. How to balance proactive and reactive approaches; [bid – plan]; [cf Heat Load]
3. Integrated approach
4. DSO flex + DNO tariffs (TCR/SCR]
5. The system – different veins of purpose and boundary
6. Payment via supplier or direct?
7. Price discovery and demonstrating cost effectiveness in DSO business plan
8. Social housing has a lot of potential with electric heating. But difficult to align provider and residents
9. Relationship of DNO/DSO and Elec supplier

CAPITAL COST: There is an investment challenge for capital-intensive domestic flex assets [7]

1. Lack of risk appetite in energy investors. If you can get safe return on traditional assets so why take the risk?
2. Novel investment models for flex assets are precluded by inability to write long contracts
3. Investment case – customer/supplier/DSO
4. Finance – who's paying for all this kit? Link to interoperability
5. Investment
6. Long-term asset paybacks
7. Commercial picture – payback

MINDSET: DSOs still adopt a DSO-centric rather than consumer-centric approach [4]

1. Mindset and consumer led business models? Implicit barriers?
2. Domestic flex should be bottom up; But also serves still top down. Need to rethink concept (long term)
3. Who is serving the consumer? Supplier/aggregator hybrid? TPSP?
4. End user consumer journey (or intermediary?); Direct contract or not?

CONSUMERS: There are complex questions of fairness and equity to address [4]

1. Fairness (thinking location): Ofgem don't see nodal pricing as 'fair' so are DSO services in the CMZ fair?
2. Social housing should be a priority
3. Rurality? Are constrained areas all urban? Issues with access to heating fuels, etc SMS for smart How to share the value across households nationally
4. Locational issues – Not everywhere is equal. Short term fixes?

ENERGY EFFICIENCY: There is a complex interface between flex and energy efficiency [3]

1. Interface of 'smart' and 'efficient' appliances -> ensuring markets work
2. Conflicts from other technology and efficiency – Efficiency eliminates flex
3. Route to market for energy efficient solutions

Miscellaneous [5]

1. Supplier advantage?
2. Matching new generation with DSR Convenience
3. Educating 'asset' manufacturers on Flex and the benefits
4. Exports effects on flex
5. ENW Smart Streets (WPD equivalent); Voltage Control can be achieved with a dimmer switch; (Class ENW project)

2.2 IDEAS FOR TRIAL

In the afternoon session of the workshops, participants formed subgroups (self-selected) to develop ideas for a trial targeted to address a down-selected list of barriers recorded during the morning sessions. The discussion and ideas are logged below.

2.2.1 Data

Barrier [Bristol]

Standards: Achievability of DSO data requirements for domestic aggregation

Analysis

CRITERIA	IDEAL SOLUTIONS	ROADBLOCKS	THOUGHTS FOR TRIALS
• **Affordability:** Requirements for data must be commensurate with the value of the service • **Accuracy:** Data have to be sufficiently accurate and reliable; ideally verifiable or auditable somehow • **Security:** Data are well secured to ensure trusted protection to households • **Neutrality:** Solutions should be technology, manufacturer and aggregator neutral. Householders should not be tied in.	DSOs (and potentially ESO) are able to accept lower-quality measurements / data accuracy on the basis that such loss of resolution, accuracy or reliability is compensated by aggregation over a wide number of separate assets	• Lack of DSO visibility of aggregation, notably; what assets are aggregated? Where are these assets connected to the DNO network? How is the aggregation performed? • Lack of DSO confidence in accuracy / reliability / validity of data	**Trial to demonstrate the adequacy of aggregated data sets:** Perform a test of an aggregated portfolio of domestic DSO assets with additional high-quality metering installed with local data recording alongside a lower-cost, basic metering solution. After the trial has run for a few months, compare the basic data as recorded remotely by the aggregator, against the high-quality data recorded locally at the premises. How do the datasets compare, has the aggregation improved accuracy overall and can any disparities be resolved by e.g. application of an offset or multiplier or other adjustment? **Trial to investigate supplementing low-grade metered data with data from other sources**: As part of the trial proposed in idea 1 above, look at improving accuracy and quality of data through other sources of data (e.g. OLEV EV usage etc.)
	Data is freely shared at household or even at appliance level directly with DSOs.	• Too much data for WPD (particularly if at appliance level) • Data security – what are the legalities of aggregators sharing data with the DSOs? • Cost: Implications for communications infrastructure, IT etc.	

Wider comments: Consistency between DSOs and additional data requirements for ESO services was not considered here, but may be worth considering if implementing above trials.

2.2.2 Standards

Barrier [London]

Standards: Lack of standards for communication, control and metering for current and future needs across asset OEMs, Aggregators, DSOs and ESO

Analysis

CRITERIA	IDEAL SOLUTIONS	ROADBLOCKS	THOUGHTS FOR TRIALS
• **Simple:** Simplicity and ease of understanding for equipment OEMs, aggregators, DSOs • **Consistent:** Need to provide consistent requirements for measurement and communication interfaces across all potential services • **Cost effective:** Need to be cost-aware (i.e. not requiring more hardware or complexity than reasonably necessary • **Device/manufacturer independence**. Need to avoid end users, aggregators or DSOs being trapped into particular manufacturer or tech system • **Future-proof:** Need to be set out with evolution / agility in mind for changing needs.	Common set of standards for communications and data requirements from smart devices (e.g. internet of things [IoT]) and domestic energy systems (e.g. meters)	• Influence of DSOs in IoT or smart device development is not realistic. • Interoperability of separate devices may be counter to commercial interests of some appliance manufacturers • Cyber security risks would need careful management	**Compile data requirements standard for provision of combined DSO/ESO services:** Research and list out data / measurement requirements from existing DSO/ESO service definitions. Identify what's common across them, what's not common and what new data are needed currently or likely to be in the future. Include review of requirements for resolution / accuracy (which should be considered in light of any benefits from mass data aggregation). Use this to compile comprehensive set of standards for data requirements. **Further refine above standard from existing comms standards:** Research and potentially test existing smart appliance / EV / metering standards / protocols and produce a league table of what works and what doesn't against DSO and ESO service requirements. Use this to further inform data requirements standards (extension to idea 1 above). **Set up interoperability lab**: Set up specialist lab to test devices and comms protocols at all levels between household and DSO / ESO. Compare interactions against simulations.
	DSOs + ESO implement a common set of interfaces / protocol for participation in flex markets (analogous to Skyscanner, CompareTheMarket etc.)	• Lack of coordination between DSOs and also with ESO • Recent area, so such standard has not yet emerged	
	Standard for data reporting (both between householders and aggregators and between aggregators and DSOs / ESO) which ensures a future-proof data provision compliant with needs of DSO and ESO services	• Inconsistent nomenclature and poor understanding of needs across different services • Gap between what DSOs want, what ESOs want and what flex-providers / aggregators have access to	

Wider comments: This analysis was deliberately seeking to avoid covering smart metering since this is a large topic in its own right already receiving much attention at the moment through other initiatives. In addition, outcomes are largely desk-based with minimal practical trial proposals at this stage.

2.2.3 Baselining

Barrier [Bristol]

Baselining: Existing methodology is not appropriate for domestic flex.

Analysis

CRITERIA	IDEAL SOLUTIONS	ROADBLOCKS	THOUGHTS FOR TRIALS
Accurate: • Measure 'normal' behaviour based on measured data • Quantify 'DSR' response provided to operator • Arrive at accurate financial settlement **No gaming:** Reduce 'gaming' from service providers **Standardisation:** Create 'agreed/accepted' methodologies which can be adopted by industry	**Leveraging existing approaches:** Review of existing organisations who could already provide a solution: e.g. Elexon, Electrlink -> what could they improve (quick wins) **Unlocking third party approaches:** Can new/3rd parties 'play' in this space: provide new solutions, test new solutions, define contribute to regulation/standards **Open:** Open up dataflows between organisations that hold data to enable 'big data'	Visibility issue (asset behaviour) Low level data visibility Access to data (who owns equipment matters) Technology readiness Cost of compliance Unknown regulation Complexity to customer	Tech specific baselines (inc smart appliances) Historic v near time + hybrid Geographical baseline Calibrated site methodology testing Future visibility needs – ready for tomorrow Use existing installed technology (low integration cost) Trials for system to system integration Near real-time baseline around existing constraints Who should define 'the standards'? Who should operate and enforce the baselining methodologies?

2.2.4 Futureproofing home investments

Barrier [Bristol]

Futureproofing home investments: Housing developers/associations have insufficient information on (a) long-term location and (b) device requirements to futureproof for provision of DSO services. This causes challenges because housing providers make long-term (>10yr) investments on building infrastructure/flexibility. They lack certainty on whether DSO services will be a long-term opportunity in future in their area, and if so what decisions they need to make now on equipment required to provide the monitoring, metering and asset control signals. Retrofitting at a later date could prove prohibitively costly.

Analysis

CRITERIA	IDEAL SOLUTIONS	ROADBLOCKS	THOUGHTS FOR TRIALS
• **Customer-centric view:** Adopt the lens of a housing provider, rather than starting with DSO need • **DSO value for money:** Remember that ultimately DSO services are paid for by consumers. • **Certainty:** on both sides	**On location:** Clarity: Clearer guidance from the DSO as to what where we may require services in the future so that they can ensure that when they do new build developments or retrofit / refurbs they install technology that will enable them to participate in the future. Reliable price signal.	• Network uncertainty • Temporary signal/need • Duration of contracts • Full asset visibility • Strategic planning • Foresight (lack of)	**Flip location on its head:** focus on improving visibility of where flex exists, rather than where current DSO needs are. **DSO giving visibility** on grid needs in the future (certainty).
	On device requirements: Standardisation requirements (metering qualification)	• ESOs and DSOs may develop differing standards • Risk of duplicating/conflicting with existing activity on standards development (BSI, BEIS etc)	**Coordinate an industry level project to agree and test standards:** Bring together the different parties who may wish to connect to domestic dwellings and EVs and establish a set of standards that meet all their needs which could then be published so that we could do everything we can to enable revenue stacking at a domestic level, which in turn helps address the main concern expressed, that there needs to be increased value to attract widespread participation. **Build a single market to reduce overall costs**: metering, qualification, admin, stackability, revenue hopping

Wider comments: There was discussion amongst participants noting that perhaps instead of the DSOs beginning by identifying CMZs first, they could instead go out to market to see what flexible capacity may be available and in what areas of the network. DSOs would then identify all flexibility providers and have them set-up and ready wherever they are regardless of the DSO's current needs. This was informed by an assumption that the whole network will at some point experience constraints – but there was discussion on whether this assumption holds in reality.

2.2.5 Consumer engagement

Barrier [London]

Consumer engagement: Consumers interests are not well understood.

Analysis

CRITERIA	IDEAL SOLUTIONS	ROADBLOCKS	THOUGHTS FOR TRIALS
Lower bills Participation Simplicity – understanding Cyber/data security Shift mindset from kWh → kW Network visibility Trust and transparency	Smart homes Automated DSR, single payment, as communities, local Smart estates – community benefit Upfront incentives Education and engagement Charging/kW in consumer bills Open source asset location; map all available household asset today Tax carbon	Different consumers Lack of kit visibility Intermediary need?	**EPC data:** Connecting flex assets using EPC data to DNO CMZs – open platform **Reformed network charging:** Different approaches to network charging and consumer reaction. Pull together all work already done first (network charging signals) **Consumer testing:** • Consumer reaction to 'flexing' by tech type. • Consumer attitude to third party ownership and kit • Consumer attitude to what 'flex' is.

2.2.6 Value

Barrier [Bristol]

Value: Current DSO value/pricing for consumers is too low to motivate participation and/or installation of domestic flex assets. Related barrier: consumer engagement is low.

Analysis

CRITERIA	IDEAL SOLUTIONS	ROADBLOCKS	THOUGHTS FOR TRIALS
• Streamlined process • Low carbon mandated (not diesel gensets) • Users involved in design – and understandable • Long-term market, not just deferral • Start with the consumer • Housing-tenure blind • Transparency of network cost savings to DSR • Collaborative: engage all actors • Involve orgs that engage people – not just technocratic • Universal not exclusive • Price in pump-priming for new business modles not just near-term • Tech-agnostic	**Capture full value:** • Tap into other motivations – e.g. community or environment • Collaborative approach (inc gamification) • Enhanced service for homeowner – non-financial benefits • Stacking revenues outside WPD • Pass through DUoS to consumers to amplify value • Price in all value to WPD • Price in carbon savings of DSR • Focus on domestic flex that already exists **Reduce cost to participate** • Adequate transaction costs – costs of securing customer for DSR • One easy route for consumers • Standardization to reduce cost – ESO **Mechanism which helps manage supplier risk:** E.g. FiT or long-term contract.	• Trust in suppliers is low • Suppliers take an atomised approach to people – recruiting them as individuals rather than as a community	**Holistic, place-based value-stacking: helping flex providers stack in local value beyond the electricity sector.** • Unlike other flex assets, domestic flex can offer a range of local social benefits: this should be recognised. • E.g. top-ups to DSO payments from local authorities where domestic flex also supports fuel poverty or climate emergency initiatives. • DSO collaborates with local actors to pump-prime domestic flex market – holistically pricing in ALL externalities. • In addition to the value of network investment deferral, work with other actors to price in all externalities such as: - Long-term market development: [alongside ESO etc] - Low-carbon (local authority may offer premium? premium due by WPD due to RIIO-ED2 environment commitments??) - Value of community - Clean air. This framing of wider benefits should also engage consumers more fully too.

2.2.7 Value

Barrier [London]

Value: Value is insufficient and does not capture all value offered by domestic flex.

Analysis

CRITERIA	IDEAL SOLUTIONS	ROADBLOCKS	THOUGHTS FOR TRIALS
• **Agile:** adaptable (no lock-in) • **Place-based:** tailored to place • **Transparent** • **Price signal reflects future benefits not just today** (e.g. case study of offshore wind – where GB successfully developed a market) • **GRID:** Value of lost load and cost of reinforcements needs to be captured. Capture the value of avoidance not just deferral. Service quality parameters captured • **Fair** to consumers • **Capture all externalities:** carbon, air quality, council benefits? Infra economy, jobs • **Holistic:** accessible to both flex and energy efficiency	Flexible place not flexible home: needs to be place-based with local stakeholders Value-stacking in the holistic sense How will this place change over time? Network TouT Secondary market for DNUoS – sell a future option? Market for what you will pay in a few year's time. Suppliers not passing through red band to consumers. Infrastructure costs separate from usage costs for consumer NOT a grant: because want to address long-term issues for the system.	Local authority drives domestic flex because they can capture the externality. Supplier variety	**Reboot ECO to include domestic flex:** • ECO money for electric heating controls for local flex • Make it open-to-all **Local authority collaboration.** • Support vulnerable consumers and electric heating. • Develop flexible places not constraint zones. • Make this proactive and planning-based not cost-based (local authorities can take the risk) • View homes within the community, not as atomised buildings.

2.2.8 Procurement standardisation

Barrier [London]

Standards for procurement: DSOs and ESOs have different requirements – which makes participation onerous.

Analysis

CRITERIA	IDEAL SOLUTIONS	ROADBLOCKS	THOUGHTS FOR TRIALS
Tech agnostic Unlocking high volume of assets Ease of procurement Time length of procurement (clear definition) Promote ease of stacking of values	Single framework contract Framework to allow multi asset and control partners Across DSOs and even ESOs – coupled with smart contracts	Lack of framework consistency in software controls No platform/tool to update (dynamically) the portfolio make-up Contract lengths/procurement timescales → need suite of procurement timescales: longer-term 3 years-months; day-ahead; real-time → data challenges/IT: platform to trade services across the procurement horizons. More than one platform. No standardisatio of platforms. No standardisation of services. Floor/min-entry threshold preventing. Lack of consistency in service and procurement require of different DSOs and ESO. VPPs for flexibility – virtual aggregation/qualification	**Allow aggregators to bid without portfolio in place.** Rely upon incentive/penalty structures to provide commercial comfort to DSO. Adopt a de-rating factor for reliability, applying a lower reliability weighting to virtual portfolios. E.g. portfolios with high levels of physical assets, rather than virtual ones, are chosen first. **Run a procurement trial mirroring the wholesale market:** More options for procurement horizon, giving a level of optionality analogous to wholesale market. Long-term/medium/close-to-real-time procurement horizons **Create a market for 11kV:** Provide visibility of service need and later manifestation into a market and price signal for active power services across lower voltage levels. At the moment, WPD only procuring services at 33kV level; if needed at 11kV level, have the option to provide this, creating a market for those services. **Develop multiple modular products.** Analogous to DS3 products in Island of Ireland. WPD services currently require min 1hr duration requirements. But domestic flex wants more modular durations, e.g. fheat pumps might not be able to provide 1hr duration. Bring it down to 5 min granularity [aligned with ESO]. **Develop Framework/smart contracts:** Including secondary trading) with standard terms. Common framework across DSOs & ESO – entirely standardised.

2.3 PARTICIPANT FEEDBACK

Participant feedback of the workshop sessions gathered via feedback forms are collated in the table below. The feedback has been quoted verbatim and Everoze has clustered the feedback into themes, shown in bold text.

	BRISTOL	LONDON
STAR (best bit from today)	**1. Workshop format – being stakeholder led** • The range of viewpoints and expertise assembled was very effective in defining the problems • Interactive and ambitious approach to workshop • Participation – hearing everyone's professional advice • Good focus on 'problem definition' in the AM session • Roundtable discussion to develop solutions • Well structured groups/workshops • Makeup of the mixed group first session allowed for a very interesting discussion • Overview of domestic flex, based on stakeholders • More just on gathering others' perspectives/take on different priorities **2. Mix of participants** • The diversity of participants • The variation of people from all different backgrounds and differing opinions • Great range of participants • Good mix of people • Participants came up with more ideas and demonstrated a greater knowledge than expected **3. Misc** • Discussion on WPD's role in market creation ahead of efficient operation: i.e. front-loaded pricing • Coming up with valuable, tractable trial idea (accurate v inaccurate metering) • It was great to have 1:1 time with WPD	**1. Workshop format – being interactive and collaboration focused** • Workshop style discussion • Felicity Jones and the way she managed/led the day – v impressive • Really liked the structure of the day and collaboration • Dynamic/efficient • Good event structure that made people involved • Knowledge sharing • Broad discussions with specific conclusions • Collaboration and discussion from lots of different players in the industry • Collection of thoughts from others in industry on issues/barriers with current local flex offering • Good to see possible actions coming out, rather than for feedback only • Learning other perspectives for other participant in ecosystem **2. Mix of participants** • Variety of discussions and people • Excellent scope of people • Good mix of attendee backgrounds and knowledge • Varied audience **3. Misc** • 1st session • Here 'n' now topics • 2nd workshop session, solutions → trials • 'Futurecheap' [this is a reference to one of the second sessions] • Opportunity to discuss potential solutions/trial options (afternoon session) • Getting a good picture of the landscape – saves reading hundreds of pdfs • Testing current 'state of play' on small customer
WINDOW (top insight)	**1. Daring to be bold** • You've started to push against the 'linear' R&D approach to network innovation – a more open/agile approach • There is more appetite than expected for participants to take on some risk or workload to move things forward • More happening than thought but don't let WPD be too prescriptive – challenge them **2. Baselining** • Baselining is so central to cracking this nut • Baselining challenges • The challenges of baselining **3. Misc** • Future network signposting • How early WPD are in the process of defining standards for DSO flexibility • A great point that somebody made about the major value of flex being in offtaking from excess national generation	**1. Community/council angle** • Community based models interest • It's all about place • Need to consider how DNOs can work with councils/communities to bring new flex forward (in addition to tenders) • Interesting thoughts from a few groups on role of councils and communities **2. Extracting full value from DSO services** • Interesting views esp environmental value of services • Value and who best to manage risk • Observations from the discussion value and retaining it within a specific locale • CMZ→ DSRZ – collective and co-benefits • Revenues still too uncertain/low **3. Novel market ideas** • Willingness of participants to participate in secondary markets • Big appetite for within day and day ahead flex procurement

	• Finding out it's not all about flex load – fault thing • Clear market need/requirement of standards • Range of opportunities for increasing value in market and importance of involving multiple actors in value creation – particularly around carbon	• Liked the secondary trading idea **4. Interoperability** • Interoperability could be tested at a 'lab' with multiple asset types in the home • Interoperability question **5. Market complexity** • Good insight into complexities in the energy market • That others are indeed seeing same barriers as us! • It's complicated! **6. Misc** • Benefits are all in the future • At CMZ level: collective critical peak solutions would be 'good enough' (incl ENWL Smart Streets = £70 rebate per annum/customer!) • Cost and benefits of DSR • There are some very good people working on this.
WISH (one thing we could improve on)	**1. General positive feedback** • Well done – you did so well thinking on your feet to bring it all together • Please keep me in the loop with any other workshops that you are running. **2. Longer sessions needed** • Longer time to allow for further discussion • Sessions felt quite short to cover the subject matter • More time allowed for the solutions – we were just scratching the surface of data issues • More time or follow-up session **3. Gender balance** • Gender balance • Gender balance / more diverse perspectives **4. Misc** • Knowing about the post event information-sharing plans • Online portal for these innovation/trial ideas so that more could be added following the event • Find more ways of helping group think outside current orthodoxy …i.e. DNOs pushing boundaries of their role to provide value to consumers/system • Sharing contact details of participants with participants • Scene-setting: what DSR domestic opportunities there are and how much they are worth • Perhaps next time a rep from the Citizens Advice Bureau or similar may have an interesting take on it. • Let the market lead the DSR trials and implementation **5. Venue** • Coffee?! • The coffee	**1. General positive feedback** • I thought the format worked great! Stayed focused and people stayed engaged • Not a lot! 😊 **2. Objectives could have been clearer** • Just a bit more clarity on trial to focus the final session (although this might then hinder ideas!) • Spend more time focused on aim/output of trial • Clearer objectives for some of the sessions **3. Need to develop ideas further** • Time to go even deeper on specific insights • If everyone agrees in group, then pre-discussions on closed group • Fleshing out potential trials in more detail (although many options was good) • More concrete on proposals for trial – but I guess that will come later **4. Workshop facilitation** • Ensure that everyone gets a chance to speak/prevent some stakeholders dominating • Ensure all ideas are accepted • Was a bit of discussion drift in groups, but hard to design that out 😊 • The discussion on getting consumers on the journey became a little fractious – a little more mediation could have helped **5. Framing** • Start at the customer end – and perhaps work towards DNO need! • Applies to place…i.e. how to move from theory to deploy **6. Misc** • (Short) tutorials on current practices (industry)

3. INTERVIEWS

Semi-structured interviews were conducted with 6 participants throughout February 2020 – exploring some of the workshop findings. In addition, FutureFlex was presented at a Trade association working group. Participant comments are documented below.

3.1 METER PROVIDER

BARRIERS

- **Potential double benefit from energy efficiency and DSR:** improved building fabric enables more flex.
- **Baselining is an issue – but the challenge is choosing which approach:** There are lots of solutions out there; the problem is a lack of coordination, and knowing which one to use. We need to decide as an industry.
- **Recruitment of customers is a big challenge:**
    - **Installation cost is a real challenge:** do not underestimate! The more innovative part (the software) is running reliably!
    - **Not having the funding for capital intense assets is a major barrier.**
    - **Most properties are not in constraint areas**
- **Who is benefiting from flex is diverse.** DSOs however are regulated entities who have a responsibility to deliver a long-term service.
- **A big challenge is smart meters:** getting them into homes, with the right functionality, and installation engineers being trained on installed in-home displays (IHD). 10 second readings on metering is standard: but it is only broadcast to the IHC.
- **Need more clarity from BEIS/Ofgem on when the domestic flex market will kick off.** Need to know when to invest. Need comfort as a company to invest; market seems nascent.
- **DSO services are top-up value only:** and transient. A FiT/RHI would kickstart the market, similar to solar – but ambivalent about this as a mechanism because want technologies to stand on their own two feet.

RECOMMENDATION

Produce a table of the requirements of ALL different services (including ESO services): spanning all requirements, including metering, and making it clear to all participants in one place.

Provide a sufficient and robust evidence base to BEIS on domestic flex being viable and cost-effective, so that the premium value of grid-edge flex to households is clear to all. [But perhaps not the DSO's role to do this].

3.2 ACADEMIC

There is currently a trial in Northern Ireland that may be relevant to FutureFlex

- Interesting existing trial to address constraints in the west of N. Ireland (caused by curtailed and constrained wind).
- Working with Housing Executive, retailers and wind farm owners to see how building fabric upgrade can help people and the grid.
- Specifically helping those in fuel poverty who are currently dependent on oil for heating (want no one left behind).
- Supported by government funding.

In NI, baselining methodologies are not the issue currently – there is a more fundamental challenge of securing the basic data first. This reflects market nascency.

Advocate a study of locational benefit: recommend using FutureFlex to develop a tool to measure the value of providing DSO services at low voltages – which is the first step to then remunerating it. This tool would help demonstrate and quantify that most of the value is local. The flex markets should as a result be locally managed and locally led. The lower the voltage, the greater the value to the DSO.

3.3 CONSULTANCY

CONTEXT

Challenge our methodology of framing domestic flex as an electricity problem: This is about homes, not kWh and kW.

The market dynamic is different in Wales: additional regulation due to devolution; local authorities have less autonomy.

Energy suppliers are not trusted: this is an issue.

RECOMMENDATIONS

Strongly advocate segmenting the market: e.g.

- Big employers with EV fleets, which will need to be charged at times at people's homes, hence influencing domestic consumption
- Social housing providers: benefit to DSO of being geographically concentrated; also benefits efforts combating fuel poverty
- Private landlords
- Affluent consumers: these are who energy suppliers are currently catering their innovations for
- *Note that consumer motivations are not just about money, so we are wrong to focus narrowly on value as a pound sign.*

Baselining is not so hard, it is not the issue: You just need the tools; it is not fundamentally innovative. Do not focus on baselining.

Trial a joined-up value proposition where grid services play a part but are not dominant: Grid services as the icing on the cake. But the question is: does a DSO have the right capability, culture and experience to frame things this way?

Approach this like software development, with agile approach, prototypes, epics and continual feedback. Use focus groups with real customers (ie., householders). Develop an agile forum to shape the concept further, with someone who *really* understands the customer.

3.4 TRADE ASSOCIATION

There is a need to view retrofit market (energy efficiency) and DSR community together. These two segments of the market are currently separate, but there is a technical interaction and both can support the DSO. How can we achieve a joined-up view through a trial? How do we link up building fabric with DSR?

On premium payments for low carbon flex – supportive in principle, but concerns about implementation

- Supportive in principle: key question is HOW to do this in a way that does not intentionally pick winners.
- How to influence flex provider payments: Could consider introducing a 'carbon de-rating factor', analogous to de-rating factors in the Capacity Market, but for low carbon. Take care to ensure the mechanism is economically rigorous and not creating unintended effects.
- How to pay for it:
    - Giving motivated green consumers a choice: take care over this. Only acceptable if it is construed as a stepping-stone to something more sustainable longer-term.
    - Local authorities: interesting, but do they have budgets to pay for it?

On creating more modular markets – generally supportive

- Generally agree with this as a direction of travel from a flex provider perspective, even if secondary trading is a little premature at this stage. DSR providers are pushing for close to real-time procurement. Some parallels with ESO developments.
- However, question whether a DSO needs more certainty.

Standardisation – supportive. Agree with it rhetorically; the question is HOW.

Exploring aggregated datasets and portfolio benefits – very strongly supportive

- Aggregation is the paradigm shift of domestic flex – this is absolutely an area to explore
- Less concerned about interface with Elexon and Cop11 meters (because it may not be realistic for such metering to go in at domestic level), but agree it's worth probing to check.

Substantial parallels between I&C flex and domestic flex (except consumer protection). So worth considering them together.

3.5 TECHNOLOGY PROVIDER – EDGE COMPUTING

Technology provider who provides edge-computing – deep learning at the edge, suitable for power-hungry algorithms in mobile settings. Suitable for environments that are off-cloud, low power environment, requiring real-time decision-making.

Discussed whether this technology might be a solution to the problem of low/unreliable connectivity in the home, which was a barrier raised in the workshop. Concluded after short conversation that the technology was unsuitable as the complexity level of domestic flex is too low.

3.6 AGGREGATOR

Take care to incentivise the right behaviour: Requesting *fixed MW delivery* is harder than a *get below/above* dispatch. The latter approach helps ensure that *all* DSR action is recognised; for instance, what if an actor never reacted because it was already not available? The latter approach is also more inclusive of more participants. ESO and DSO services are solving fundamentally different problems – a *get below* signal may be more appropriate (and inclusive) at DSO level. This topic links to how DSOs might be able to better predict loading on their network.

Happy to adopt FPN approach (even though this currently only has currency in the BM). Ideally flex providers would declare own baseline.

Comfortable with an 'ad hoc' market, where prices change dynamically, with short-term markets close to real time. Believe that having clear historic market track record can be sufficient to give customers 'invest' signals; long-term forward availability-based contracts are not always necessary.

Look at the ESO's BM for a potential model: The structure of Bids and Offers is instructive.

Trial idea: Place bids and offers for different numbers of MWs at different price levels, 1 hour ahead of settlement period (close to real time). This however may be better probed in WPD's IntraFlex project than within FutureFlex.

Interested in temperature drop in buildings using smart heating: And probing the technical aspects of how heat pumps and smart heating interface with energy efficiency and building fabric.

Recommend alignment with P375 (Elexon).

Any complexity needs to be properly communicated to consumers:

- Who 'owns' this communication challenge? Options:
  - Chargepoint provider
  - EV manufacturers
  - Asset manufacturers
  - Suppliers.aggregators
- The DSO's role is to approach third parties and evangelise, to help *build trust*, for instance, through information and engagement. Possible third parties could be Regen, Consumer Council or Community Energy England.

3.7 TRADE ASSOCIATION WORKING GROUP

Presented early findings from FutureFlex to joint session, where attendees spanned both energy efficiency and DSR backgrounds. Feedback received:

Interested in taking a holistic view of energy efficiency and flexibility:

- This is because heat flexibility is optimised through fabric efficiency, and they should be seen as complementary actions. Interest in trialling a methodology for baselining for energy efficiency.
- Energy efficiency should benefit from DSO revenue, given that it contributes to addressing local grid constraints.
- Energy efficiency DSO contracts are possible.

Interested in monitoring the carbon effect of different flex actions: Suggestion that the first step is *monitoring/measuring* carbon impact, before incorporating it into payment mechanisms.

Warn against taking a 'perfect' approach to standardisation, which then would slow thing down. Speed is key.

3.8 TRIAL IDEAS

SUMMARY OF NEW TRIAL IDEAS STEMMING FROM INTERVIEWS

Find existing/planned activity for retrofit and heating electrification, and intervene to ensure that this is futureproofed for DSO services:

- Develop a joined-up value proposition where grid services play a part but are not dominant: exploring how the DSO can fit its services into existing social/environmental initiatives.
- Find the market segments which are already committed to major home upgrades due to other reasons, unrelated to the DSO. For instance, homes planning deep retrofit, oil-heating replacement, or which are yet to be built and so are open to different designs. These are the DSO's intervention points.
- For these segments, provide targeted advice and/or incentive, so that those major home activities to be implemented in a way that is DSO-ready. Trial providing this advice/incentive to multiple audiences (e.g. new build housing, different homeowner archetypes, social housing providers etc).
- This is an appropriate approach because the DSO is 'piggybacking' on existing activity in the home, providing targeted interventions that leverage opportunities that occur once-in-a-few-decades per household.

Develop a combined approach to retrofit (energy efficiency) and DSR in providing DSO services. An incentive mechanism that promotes a holistic view on both.

Develop a tool to assess locational benefit at low voltages. This is the first step to then remunerating it. Most of the value is local.

Produce a table summarising the technical requirements of all different services: including ESO

Trial a baselining methodology for energy efficiency: So that energy efficiency can participate in DSO markets, potentially via long-term contract.

Mimic ESO's BM, tailoring this for DSO services: A trial whereby participants place bids and offers for varying levels of MWs at different price levels, 1 hour ahead of settlement period (close to real-time). However this may be better probed in WPD's IntraFlex project.

4. WEBINAR FEEDBACK

A webinar was conducted in February 2020 to present the findings from the workshops. Feedback received as part of the webinar is logged below, clustered in Everoze defined themes in **bold** text.

4.1 DURING WEBINAR

Three questions were submitted by participants during the webinar, which provides an indication of the topics which were of interest to participants.

- **Cost to consumers:** Do you expect this to increase or reduce customer prices overall?
- **Consumer understanding:** Do domestic customers understand what their home is going to look like energy wise (generation, storage, change in major consumers of water, heat, vehicle) and the potential benefits of taking advantage of pricing that may vary with supply and demand plus offering flexibility services?
- **Green flex billing:** On the green flex billing for consumers option to create value, can we expect a discreet number of super green consumers to fund a DSR income for other consumers? Is this fair? Or have I misunderstood the proposal?

4.2 AFTER WEBINAR – IN RESPONSE TO POLL

We asked the following question to the participants during the webinar: What one thing do you recommend for us in framing our trial(s)?

Feedback was received from four parties – representing an aggregator, consultancies and individual, and this has been reproduced here verbatim:

- **Value:** 'A focus on value and benefits'
- **Consumer mindset:** 'I agree with comments about understanding the consumer side - will lead to some interesting understanding. Suspect: 1. consumers think about what they consume today & not tomorrow - move to EV & away from gas heating/water/cooking changes a lot! 2. that more educated consumers will understand the compromises to getting lower costs (ref some of the behav. changes seen on EV/V2G trials helping daily peak demand smoothing), 3. There are great opps with new estates/large buildings (majority of new residences?)'
- **Consumer engagement:** 'It's important to come up with something end customers can engage with - and that probably means having it integrated in a normal supply contract. Stacking different contracts in a market with such high levels of apathy may well work in trial with engaged customers, but not in the real world'
- **Elexon and BSI:** 'Speak to Elexon about P375: Metering Behind the Boundary Point. The CoP11 metering standard being developed as part of this will go down to domestic/EV level. Also speak to British Standards Institute about BEIS-funded PAS 1879.'

4.3 AFTER WEBINAR – UNSTRUCTURED

Ad hoc, unstructured feedback was received via email and LinkedIn after the webinar from six parties – representing aggregators, academics and community energy groups, reproduced here verbatim:

- **Consumer engagement:** 'I think the consumer side is really interesting. One of our challenges in engaging consumers is that they simply do not understand what is coming at them! Massive changes to how they consume energy - with electrification of their car and their heating being to two big ones. Also a massive change in new build with the population increase being in towns, in apartments not houses, and the return of local authorities to building homes.'
- **Consumer perceptions:** 'I'm interested in the issues raised around value/perceptions of value for consumers'.
- **Customer focus & barriers:** 'I appreciated the customer focus and the effort to pin down barriers, both perceived and concrete.'
- **Consumer understanding:** 'I can definitely relate to the conclusion that most customers – at least domestic customers – are not aware of flexibility services or how they might benefit from them.

- **Customer focus:** '[WPD] are cost driven and the customer is secondary…So starting from that base the trials will probably fail or find it very difficult if they truly involve customers and that would be a shame.'
- **Elexon and aggregated data:** 'we think that BM Wider Access, and the P375 solution/CoP11 metering standard flowing from it, is largely sufficient to get early adopters in to domestic flexibility. We'd be keen to speak with you about this to ensure that the proposed trial doesn't set an unintended precedent that aggregated data sets are inherently inadequate unless double-metered. CoP11 metering will be installed 'out of the box' in EV chargepoints and other flexible assets so that should overcome the concerns about "low-grade" metered data from new assets.'
- **Policy responsibility (rather than DSO responsibility):** 'If I were to tackle this, I would ask the Government for a trial subsidy, allowing the customer to have a secure income for taking part over a specific timescale – similar to a FiT. …BUT crucially the focus would be on the customer and moving to a low carbon economy.'
- **Link with fuel poverty: '**I was particularly interested in the value proposition and conflicting aims with fuel poverty etc'
- **New build:** 'a massive change in new build with the population increase being in towns, in apartments not houses, and the return of local authorities to building homes'
- **Local balancing to reduce grid constraint:** 'Is there room to explore tariffs and mechanisms that will encourage local consumption of locally generated renewable energy'