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Submitted via email to: flexibility@ofgem.gov.uk

COMMENTS OF COLLABORATIVE UTILITY SOLUTIONS ON FLEXIBILITY MARKET ASSET REGISTRATION CONSULTATION

Collaborative Utility Solutions (“CUS”) appreciates the opportunity to respond to this Consultation. This response is non-confidential and may be published by Ofgem.

INFORMATION PROVIDED BY OFGEM

The PowerPoint titled, “**Flexibility Digital Infrastructure - Flexibility Market Asset Registration** - A common approach to ‘just once’ registration for consumer assets participating in flex markets”, contains a tremendous amount of very good information. To start our response, we want to reference the information provided on slide number four (4).

Policy aims

- Flexibility Digital Infrastructure (FDI) policy aims to maximise the participation of distributed assets in flexibility markets, by **addressing market barriers through coordinated digital infrastructure** across markets
- Identified market failures:
 1. lack of transparent information
 2. lack of coordinated access and operations
 3. lack of trusted governance
- We have identified a **range of potential FDI outcomes and their underpinning enablers** that stakeholders want

- **Flexibility Market Asset Registration and underpinning enablers** has been singled out as a priority first step for policy intervention

Our response starts with reference to this information as it is concise and outlines clearly why CUS built a non-profit DER Registry. These data are largely owned by the end use customers, and they desire for some of their data to be shared to allow their assets to participate in utility programs or deliver structured market services. This information must be accessible and maintained with a single point of truth for DERs to effectively participate in solutions for the grid and for markets that are fully realised. These data need to be correctly structured and maintained such that the necessary information can be provided to the utility and the market to allow for proper system planning, operational planning, operations, settlements, tracking, and regulatory oversight. It is important to understand that the ESO, the DSOs, and suppliers must have consistent access to a single point of truth. The CUS DER Registry was specifically constructed to create this common platform to allow dual registration in ESO and DSO programs without dual compensation or conflicting registrations. And, as the CUS DER Registry is built on the International Electrotechnical Commission (IEC) Common Information Model (CIM) structures, all ESO and DSO platforms have access to the data without customer interface development. And finally, the CUS DER Registry recognizes the data must be secured in a manner that allows regulatory oversight for fair access to the data for any stakeholder according to the rules that the regulatory authority has put in place to enable DERs.

These are the foundational principles the CUS DER Registry was built upon, and CUS will provide detail in the rest of this response to demonstrate support of these principles.

ABOUT CUS AND THE DER REGISTRY

CUS is a 501(c)(6) non-profit entity under the United States Tax Code that was formed to provide a collaborative Distributed Energy Resource (DER) Registry to the electric utility industry to save significant time and money in the administrative process of enabling DERs to participate in both retail and wholesale electric market programs in markets in the U.S., U.K., and across the globe.

There are two foundational barriers that must be overcome for the electric industry to integrate DERs efficiently and effectively into grid and market operations: lack of information and lack of collaboration. At present, there is no single system that enables the appropriate stakeholders in the energy value chain visibility into the appropriate set of information to know where DERs are, what they are, what they can do, or who owns them. While a distribution utility¹ interconnection process may expose this information to the utility and consumer, it does not provide this information to independent system operators (ISOs²), aggregators, regulators, or other stakeholders. Consumers are purchasing DERs, providers are installing them, distribution utilities are interconnecting them, and then grid operators are forced to deal with resources they cannot control, monitor, or even know where they are, and yet they are expected to continue to reliably operate the grid. Furthermore, few – if any – utilities have a plan to track the lifecycle of the DERs as they degrade and ultimately are retired, in short, no one in the energy value chain is operating with a “single point of truth” for a DER. This shortcoming severely limits the electric grid operators’ (both Distribution and ISO/Transmission) ability to effectively integrate DERs.

¹ In the UK, this would be comparable to a Distribution Network Operator (DNO) or Distribution System Operator (DSO).

² In the UK, this would be comparable to the National Grid Electric System Operator (ESO).

Second, collaboration in the electric industry faces daunting obstacles. The industry has fractured into completely different market structures. It has further fractured utility operations into separated generation, transmission, and distribution entities, thereby creating “silos” of operation that suboptimize decisions based on their structure rather than the overall needs of the national electric system. There must be more effective collaboration in the electric industry to effectively integrate DERs into the grid and markets and lower the cost of this significant effort for the entire industry.

To address these key problems that could stymie efficient and cost-effective integration of DERs, CUS was created, and as noted above, our initial focus is to provide a non-profit, pre-competitive platform for the industry to enable DERs to more efficiently and effectively support and interact with the grid and markets. Please see the CUS website for an overview of the [DER Registry](https://cusln.org/registry).³

Australia, the country with the highest penetration of DERs in the world, found that a central registry for DER information was essential for secure data sharing between the energy stakeholders to simplify the administrative process of registering DERs into programs. Other jurisdictions across the globe are now seeing a significant and steadily increasing penetration of DERs on their grids and will face significant challenges for utilities, customers, aggregators, competitive retail suppliers, scheduling coordinators, transmission providers, ISOs/ESOs/DNOs/DSOs, and potentially others to coordinate the registration and approval of a DER or aggregation of DERs. Integration of DERs will impact every aspect of the utility business and the core systems used by the industry, including the CIS, GIS, OMS, ADMS, EMS, planning systems, and potentially many more. The DER Registry has been designed using the

³ <https://cusln.org/resources>.

International Electrotechnical Commission (IEC) Common Information Model (CIM) to allow each of these systems to be able to exchange data with the Registry via this protocol at the lowest cost possible.

RESPONSES TO SELECT CONSULTATION QUESTIONS

Q1. Do you agree that policy intervention is needed to deliver common Flexibility Market Asset Registration?

Yes, policy intervention to include adoption of the DER Registry would deliver common Flexibility Market Asset Registration in an expeditious and cost-effective manner. The DER Registry will facilitate the inclusion of the full range of DERs, avoiding issues such as potential “over-registration,” and provide a single source of truth for DER data while accommodating a variety of potential implementations.

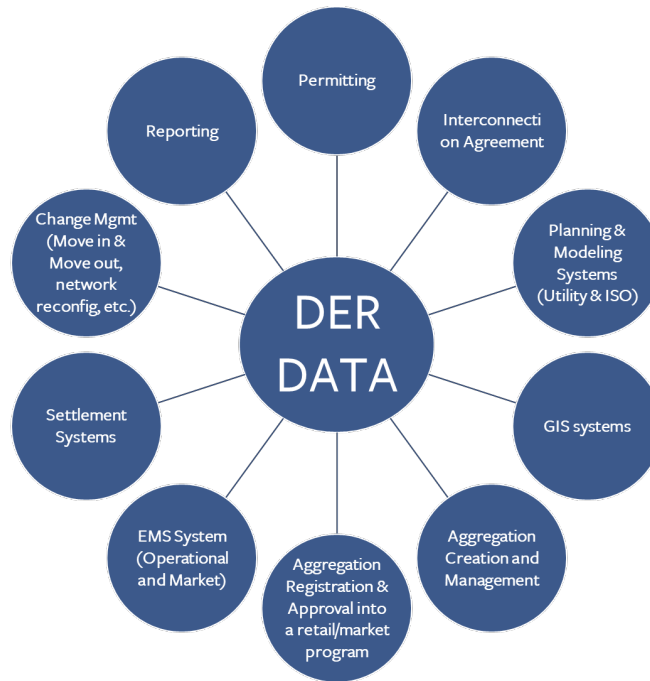
Having multiple entities forge their own unique implementation paths, such as through creating separate DER information databases, would be a highly inefficient and costly way to address the problem of data-sharing among the numerous stakeholders who need a “single source of truth” data set for DER management, and could result in wasted effort and substantial implementation delays. Wholesale grid operators need access to data regarding DERs for a variety of purposes to support wholesale market products and settlement, while distribution utilities and DER providers will also need access to DER data. As such, the collaborative approach as proposed by CUS could save all stakeholders substantial costs.

It is critical for the efficient and cost-effective integration of DERs that CIM data structures be used for data management and sharing among relevant stakeholders. As noted above, implementation of DERs will impact every aspect of the utility business and the core systems used by the industry, including the CIS, GIS, OMS, ADMS, EMS, planning systems,

and potentially many more. The CUS DER Registry has been designed using the CIM to allow each of these systems to be able to exchange data with the Registry via this protocol to reduce every utility's cost of integrating DERs. Ofgem has already taken steps to mandate the use of the CIM for network data exchanges under Ofgem managed standard network licenses,⁴ and CUS recommends that Ofgem require utility systems to utilize CIM data exchanges for DER data as well to minimize software interface costs. A data-centric approach that is compatible with CIM principles will ensure the most cost effective and efficient implementation for DER data collection and sharing that will support grid reliability as well as any other digital systems in the utility enterprise and serve to continue to reduce IT costs for utilities while supporting more effective, secure and efficient data interchange.

In addition to a CIM, it is critical to incorporate a comprehensive and holistic data collection and secure sharing strategy. The following diagram illustrates this need for multiple entities to access a common source of DER data:

⁴ *The Common Information Model (CIM) regulatory approach and the Long Term Development Statement*, January 10, 2022 (available at <https://www.ofgem.gov.uk/sites/default/files/2022-01/The%20Common%20Information%20Model%20%28CIM%29%20regulatory%20approach%20and%20the%20Long%20Term%20Development%20Statement.pdf>).



Starting at the top of the chart, DER data is created for the first time in the permitting process. Proceeding clockwise, a portion of this data is then needed in the interconnection process. Utilities (DNOs and DSOs) and ISOs/ESOs use the submitted data for planning and modelling in their systems to approve or reject the interconnection request. If approved, Geographic Information Systems (GIS) systems need the DER data to show where these resources are both geographically and electrically on their system. Once a utility (DNO or DSO) and/or the ISO/ESO establishes a DER program or market, an aggregator (utility or competitive entity) needs the data to create their aggregations and submit them for review and approval to a retail program or wholesale market. At this point, each retail program or market will have established rules for the appropriate stakeholders to review and approve the aggregation. This process will include the DER owner, aggregator, utility (DNO or DSO), competitive retail supplier, scheduling coordinator, and ISO/ESO, all with appropriate regulatory oversight. All these stakeholders will need access to appropriate portions of the DER data. Customers that agree to participate in a retail program or market will need to assign the DER to an aggregator to

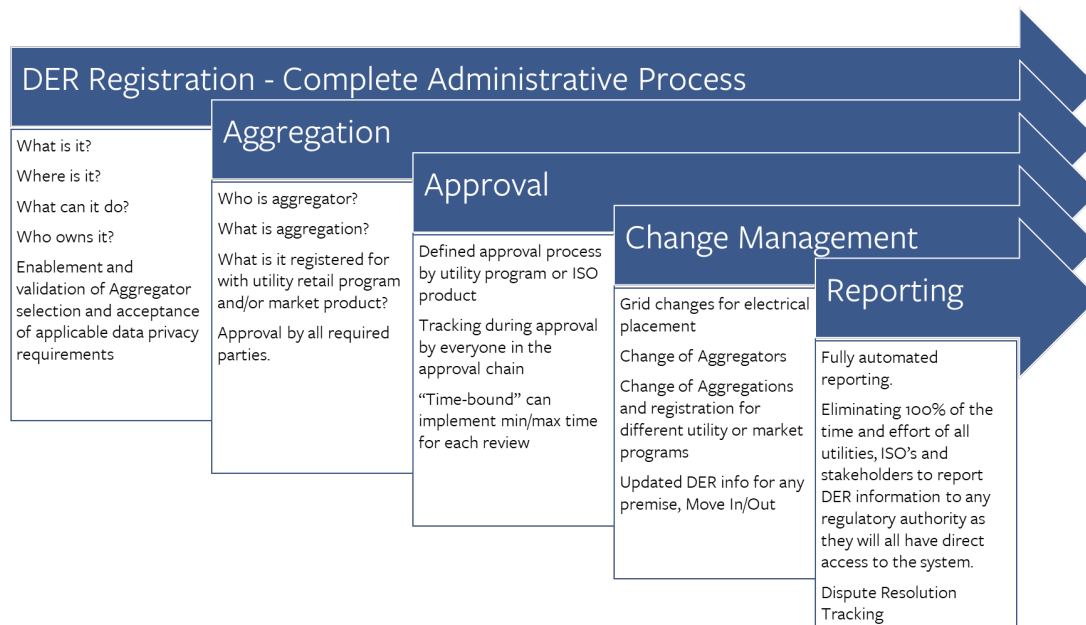
allow an aggregator to create aggregations and then allow all appropriate stakeholders to review and approve the aggregation. Once approved, the operational and market systems will require access to DER, and aggregated DER data. Distribution utilities will need to be able to present planned and unplanned outages on their system via a “distribution oasis” like currently exists for much of the transmission systems in counties with open-access models, as the distribution system will now have market resources embedded within it. And along the way, people will move in and out of houses with DERs installed on them, people will add batteries to their solar arrays, people will add and sell (delete) EVs, people will want to change aggregators or programs, new programs and market products will be created, grid operators will reconfigure their networks or market zones/nodes/regions, aggregators will go out of business, utilities will change names, and so on. Operational systems will need to verify performance. Settlement systems will need access to the DER data for billing and payment. And, finally, regulatory and government agencies will require reporting on all of this. Attempting to consider any aspect of this process in isolation has proven very problematic and costly.

If a data-centric approach is utilized to define the necessary data elements for each step in this process and these data elements are appropriately “mapped” to CIM data structures, then existing industry systems for CIS, GIS, ADMS, EMS, planning and modelling, etc., will be able to effectively share the data through a secure data API based on the CIM data structures of the existing industry systems, thereby eliminating costly software interfaces. This approach allows DER data to conform to existing systems in the electric industry rather than modifying potentially hundreds of industry systems to utilize DER data. With this thought process in mind, CUS has interacted with many different stakeholders over the past few years to address these defined needs by building the collaborative DER Registry platform.

The CUS DER Registry is specifically designed to recognize that different regulatory authorities may have different views on who should be allowed to access the various data elements in the Registry. Therefore, the DER Registry has been designed to allow each regulatory authority to specify which stakeholder can access any individual data element in the Registry. The regulatory authority can specify, for *every* data element in the Registry, who should be allowed to view that piece of data. The DER Registry makes any required privacy rule or process much simpler for everyone to adopt by securely managing and sharing only necessary data with each appropriate stakeholder according to the rules of each specific regulatory entity, distribution utility (DNO or DSO) and ISO/ESO and is shown in the conceptual figure below. This figure is a conceptual representation just to illustrate the ability of Ofgem to specify by Persona who has access to each data element as determined by the UK:

WHO HAS ACCESS TO THE DATA? (Each Regulatory Authority to define)										DER RESOURCE RECORD CREATION		
Sched Coord	Comp Retail Supplier	Equip Mfg	Aggregator	Regulatory Authority	ISO/RTO	TSO	DSO	Owner Agent	DER Owner	*REQUIRED DATA		DER Registry
										Entered by:		Field Description
	X		X	X			X	X	X	DER Owner*		First Name (As it appears on utility bill)
	X		X	X			X	X	X	DER Owner*		Last Name (As it appears on utility bill)
	X		X	X			X	X	X	DER Owner*		Address 1 (As it appears on utility bill)
	X		X	X			X	X	X	DER Owner*		Address 2 (As it appears on utility bill)
	X		X	X			X	X	X	DER Owner*		City
	X	X	X	X			X	X	X	DER Owner*		State
	X	X	X	X			X	X	X	DER Owner*		Zip
	X		X	X			X	X	X	DER Owner*		Phone Number (premise)
	X		X	X			X	X	X	DER Owner*		Phone Number (mobile)
	X		X	X			X	X	X	DER Owner*		Email
X	X		X	X	X	X	X	X	X	ESRI*		GPS Coordinates
	X		X	X			X	X	X	DER Owner*		Utility Account Number
X	X	X	X	X	X	X	X	X	X	DER Owner*	pick list	Distribution Utility Service Provider
X	X		X	X	X		X	X	X	DER Owner*	Y/N	Do you have a Competitive Retail Supplier (CRS)?
X	X		X	X	X		X	X	X	DER Owner*	pick list	Pick your CRS
X	X		X	X	X		X	X	X	DER Owner*	Y/N	Do you have an Aggregator?
X	X		X	X	X		X	X	X	DER Owner*	pick list	Pick your Aggregator
	X			X			X	X	X	DER Owner*	Y/N	Allow Agent to enter DER Info?
	X			X			X	X	X	DER Owner*	pick list	Pick your Agent
			X	X			X	X	X	DER Owner*	Y/N	Want info from equip mfg?
										DER Owner*	Y/N	Do you have a different aggregator for Demand Response?
X	X		X	X	X		X	X	X	DER Owner*	pick list	Pick your DR Aggregator
										Registry		Premise Unique ID
X	X		X	X	X		X	X	X	Registry		Aggregate DER Unique ID for premise
X	X	X	X	X	X	X	X	X	X	Registry		Date entered into registry
X	X	X	X	X	X	X	X	X	X	Registry		SOLAR INFO
X	X		X	X	X	X	X	X	X	Registry		Date Entered into Registry
										Registry		Solar Unique Identifier
	X	X	X	X			X	X	X	DER Owner or Agent	pick list	Panel Manufacturer Name
	X	X	X	X			X	X	X	DER Owner or Agent	pick list	Panel Model Number
	X	X	X	X			X	X	X	DER Owner or Agent	pick list	Nameplate Capacity of Panel
	X	X	X	X			X	X	X	DER Owner or Agent		Number of Panels

As shown in the figure below, this structure allows the DER Registry to securely provide the necessary information to stakeholders and effectively facilitate the entire administrative process to register a DER and an aggregation of DERs, interact effectively with the aggregation, and efficiently bring DERs to the grid and market, automatically provide any required reporting, and effectively manage any changes along the way. Dispute resolution is also managed via the DER Registry, as it allows a dispute to be entered by any party, routed to appropriate groups per regulatory requirements, and tracked through the entire process to resolution.



CUS supports providing DERs with the maximum possible optionality and flexibility to participate in both retail and wholesale programs, but without duplicating compensation. This implementation promotes greater competition and the best potential for customer savings and optimizing value of DERs. The DER Registry, which serves as the “single source of truth” for DER data, ensures that all relevant stakeholders have access to the relevant data to ensure this flexibility and optionality while prohibiting double counting. The

DER Registry is specifically designed to allow dual participation without dual compensation in both retail and market programs according to the specific rules of each state/ISO.

Q3. Are there any other policy alignments or industry developments, in the UK or internationally, which should be considered as part of ongoing FDI policy development?

Movement to fully integrate DERs represents a significant opportunity for regulators and stakeholders to collaborate to control ever-escalating information technology (IT) costs, not only for DERs, but also for other potential collaborative solutions, such as a common meter authority, communication systems for utility (gas, water, electric) AMI, etc. To date, the electric industry has specifically chosen to have isolated and specific systems instead of collaborating, and those choices have significantly increased costs for consumers. By way of example, please consider what Ontario ISO did to significantly reduce costs and simplify settlement as a tangible example of collaboration for this function across multiple utilities. Per the diagram below,⁵ the Canadian province implemented a solution for meter data management that requires the distribution utilities to create/operate/maintain the meter infrastructure, but all distribution utility head end systems push their data to a centralized data repository. This repository has consistent structures and policies, like evaluation, measurement, and verification (EM&V) for all utility data, and the repository is utilized for everything from real-time operations and billing to premise validation for consideration for a program. The use of this centralized data repository has created significant efficiencies for meter data management and use.

⁵ Doug Thomas, Ontario's Changing Electricity System & The Role of Data (June 22, 2016), full presentation available at <https://conferences.sigcomm.org/eenergy/2016/DougThomasKeynote.pdf>.

Ontario's Smart Metering System



Ontario provides a clear example of how other jurisdictions could have their utilities collaborate in a way that achieves dramatic savings by aggregating the IT burden of the data, data management, hardware, software, sharing, etc. to a single system that has a CIM-based interface to interface with all other systems. It is not business as usual, and it requires regulatory leadership to set the policy to save ratepaying constituents money. It may not be easy, and it will not happen overnight, but it is possible, it has been done, it is dramatically more cost-effective, and it is almost becoming a requirement to effectively enable and settle millions of DERs.

FINANCIAL AND OPERATIONAL SUPPORT STRUCTURE OF THE CUS NON-PROFIT DER REGISTRY

CUS was created as a non-profit 501(c)(6) organization under the U.S. tax structures to be able to provide a pre-competitive platform to enable DER's to the industry at the lowest cost

possible now and in the future. CUS is designed to be member led. Our charter is set up to allow each defined user group (e.g., by country, by ISO/ESO) to have complete control over the future of the platform via an industry led user group. The cost of the platform is defined by the cost of future development, licenses for data management and software and the cost of administering the user group. This cost can be collected in whatever manner the regulatory authority determines is appropriate. CUS has two current methodologies that are supported based on industry feedback. First, we have a structure where utilities pay based on the number of meters they service, and aggregators pay based on the number of sites they represent. All other members have access to the system at no cost, but the appropriate regulatory authority defines who has visibility of each data element in the registry. Second, we allow the ISO or ESO to charge all aggregators and utilities through their current structures to provide the necessary funding.

CUS is willing to adopt any effective payment structure that Ofgem would deem appropriate for the European marketplace. The two requirements that CUS will stipulate is first, the DER Registry must remain non-profit, and second, the DER Registry must be structured to be member led so that it can continue to serve the needs of everyone in the marketplace at the lowest possible cost.

SCOPE OF A DER REGISTRY

Referring again to the Ofgem PowerPoint, there are several additional points to make regarding the CUS DER Registry fit to the requirements provided.

In initial scope	Out of scope*
Markets	
<ul style="list-style-type: none"> ESO: all ancillary and balancing services, including the BM DSO: all 5 products 	<ul style="list-style-type: none"> Wholesale markets Capacity Market
Assets	
<ul style="list-style-type: none"> Small-scale domestic and small business owned < 1 MW capacity e.g. electric vehicle chargers, heat pumps, battery energy storage systems 	<ul style="list-style-type: none"> Larger assets with commercial and industrial ownership > 1MW capacity e.g. Larger battery storage systems, I&C
Data	
<ul style="list-style-type: none"> Common across flex markets Static data required for registration and pre-qualification Flexibility service data, e.g. name of FSP, flex service, duration of contract Technical asset data, e.g. type, serial number, MPAN, flex capacity, ramp-up time 	<ul style="list-style-type: none"> Market-specific data fields Dynamic data required for operation and settlement E.g. battery state of charge, asset availability, pricing information, user settings
*solution may seek to include markets, assets, and data that are currently out of scope in future iterations	

Based on our understanding of these requirements, the CUS DER Registry can satisfy all items in the initial scope, as well as many of the items listed as out of scope.

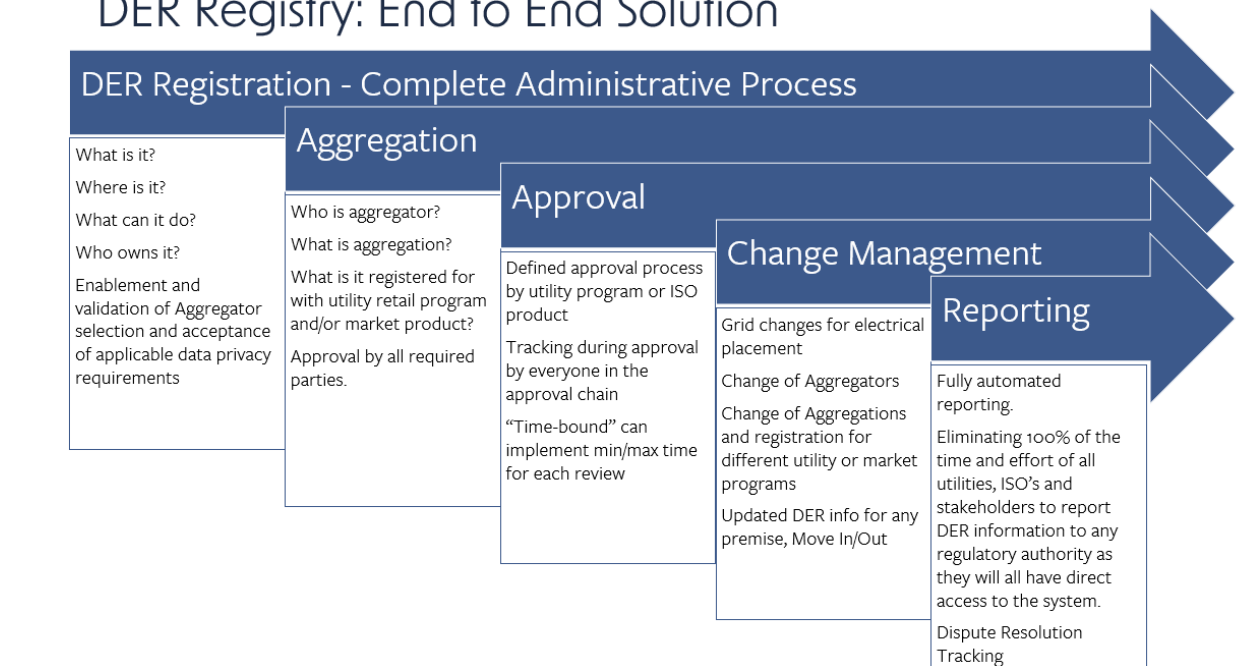
Functional Outcome	Summary
1. Single Master data record	Asset data stored as a single source of truth , in a standardised and machine-readable format, accessible by a common backend API
2. Unique ID	Unique asset and user IDs
3. Data quality	Data held is of sufficient quality to be reliable for user needs, and ideally populated from trusted sources
4. Appropriate collection points	Data collected primarily at point of market entry , via common client APIs for ESO and DSO markets, enabling ' just once ' registration
5. Common data access	Data accessible via common backend API to ESO, DSOs and other users as needed
6. Data exchange mechanisms	Machine readable interfaces , with the ability to create, read/write master data including update mechanisms , with search and access including real-time exchange.
7. User experience	User-friendly interfaces (API and GUI) and supporting documentation to provide good user experience
8. Consumer consent framework	Publication of clear consent framework , aligned with Ofgem Consumer Consent work, with easy mechanism for users to grant and manage consent with relevant parties
9. Integration with wider systems	Integrates with systems providing wider FDI outcomes (e.g. product register, pre-qualification, and ESO-DSO coordination), ESO and DSO procurement systems , DSI and Consumer Consent mechanisms, and external trusted sources of data (e.g. OEM catalogues, Type Test Register, etc)
Non-functional requirements	<ul style="list-style-type: none"> Standard data models and communications protocols Trust framework Reference architecture

Again, based on our understanding of these requirements, the CUS DER Registry can satisfy all nine functional requirements as well as the non-functional requirements in this table. In addition, the CUS DER Registry is designed to scale well beyond the number of meters and customers in the UK.

The CUS DER Registry was built with a dedicated “end customer” interface to enable customers or their agents (installers/contractors) the ability to enter the appropriate data as systems are installed. It also provides an API for bulk upload from utilities, aggregators or other entities in the stakeholder value chain. In all cases, the “change history” will track where every single data element came from, when it was entered and who was the person that was logged in to the system entering data.

CUS understands that there is some debate regarding whether a DER Registry is simply for the DER data and data management, or if it should include aggregation and registration functionality. The CUS DER Registry was initially scoped to only be the DER data and data management system. However, once complete, all test users quickly came to the conclusion that without including the ability for aggregation creation and enrolment into programs, the system fell short of effectively enabling DERs as many different systems would have to be created by different groups for these functions and it would create another barrier to effective DER enablement.

DER Registry: End to End Solution



By expanding the scope, the CUS DER Registry can ensure appropriate coordination between ESO and DSO for ESO market products and ESO programs while also allowing approval, change management and fully automated reporting. This workflow management functionality added for the approval process has been further expanded to manage and track dispute resolution and members are currently considering additional workflows that might be managed in the registry. Ultimately, the decision to expand the scope was governed by one key concept: all of these activities are “pre-competitive” and support the rapid and efficient enablement of DERs. Separating these administrative process functions across different systems could create significant issues for DER enablement. In addition, as the EU utilizes CIM holistically, existing DER platforms for aggregators can continue to be utilized and data shared via API, but no competitive aggregator is faced with significant cost to create or buy another system to participate in the marketplace.

CONCLUSION

CUS appreciates the opportunity to provide these comments. Adoption of a DER Registry as the “single source of truth” will be critical to success in the integration of flexible DER assets across multiple jurisdictions, at the lowest possible cost to customers and market participants. The DER Registry developed by CUS is intended to facilitate a collaborative, secure approach to sharing DER data as well as a collaborative approach to the continued development of the DER Registry itself. Perhaps most importantly in this discussion, the CUS DER Registry is already built and has perhaps 90% (or more) of the functionality specified in the consultation information and referenced PowerPoint. As such, the time to implement is greatly compressed and any missing or additional functionality can be added versus spending time to create a new solution to meet base level requirements. Finally, as the CUS DER Registry is structured as a non-profit entity, and the base level platform is already built, there is little, or no, chance that any other solution could be more cost effective for the EU.

Respectfully submitted,

/s/

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