

1. Summary

Working with industry, we have undertaken a thorough analysis of sector needs for data **discovery** and secure data **sharing** that addresses data rights and enables trusted data **access**, and have delivered the objectives of our Phase 2 proposal. This includes:

- 1. **Stakeholder Engagement**: A three-month programme convening industry, academia and public sector stakeholders, reaching 200+ individuals and over with 60 experts directly engaged in Advisory Groups (AGs), and reaching over 200+ individuals. This includes ONS (Energy Data Visibility), OLEV and other direct senior meetings.
- 2. Functional testing of an Open Energy Governance Platform, implementation of an Energy Data Search and development of a Knowledge Graph: Development of a prototype through which market rules can be applied in response to needs articulated in MEDA Phase 1.

This work has been anchored around development of a detailed use-case (highlighted in Phase 1) which received direct endorsement from industry representatives who represent the users.

Through our stakeholder engagement, we furthered our understanding of the material challenges faced by energy sector stakeholders. We considered user, market and societal needs, policy and regulatory issues, and operational and technical capabilities.

Significant outcomes include:

- validation from the market that user needs for **discovery** can be met by Energy Data Search
- validation that a knowledge graph approach can enable the mapping of energy datasets and assets
- confirmation that substantial work is needed to ensure that publishers of data adopt common standards, taxonomies and ontologies to better automate understanding of the relationships and links between related assets and datasets
- validation that a substantial and material amount of the Open Banking (OB) approach translates to meet energy sector needs
- clear gap analysis on the differences and what actions must be taken to address them to meet the needs of energy sector are now well understood and explored below
- discovery that a trusted environment with strong governance for sharing energy data can be provided cost-effectively
- demonstration that OE can enable an Energy Data Service Provider (EDSP) ecosystem with cross-sector interoperability in a manner that can unlock innovation and address significant and diverse use-cases
- validation that stakeholders would prefer to work with a not-for-profit collaborative approach designed, developed and managed on behalf of the sector
- identification that developing the approach will require cohesive collaboration alignment between government policy, data and sector regulators and industry
- confirmation that an OE approach can accelerate the drive to net-zero by removing significant barriers in planning and implementation of low-carbon technologies (LCTs)

Analysis of user needs revealed differing access requirements for Open and Shared Data including types of industrial data (e.g. transactional, commercial or asset-type data), and



commercial and personal data (e.g. smart meter and EV).

The findings include recommendations for Regulatory Authorities and the BEIS Smart Data Initiatives, and suggest important links with and potential input into government policy.

Our findings show that:

- 1. clearly defined participant roles facilitate competition and innovation while minimising risk;
- 2. the trust framework provides flexibility to support a range of innovative use cases and data flows;
- 3. the solution is extensible and adaptable over time. It can cater for a wide range of data sets, including both commercial and consumer data, aggregated sensor data (including but not limited to smart meters) and data from private companies, statutory and regulated organisations;
- 4. the design of the Governance Platform enables different levels of permission for different data sets according to whether the data is commercially sensitive, accrues GDPR protections or carries national security implications;
- 5. there is broad support for the approach from a range of significant market participants.

Operationally, a detailed framework for participants using the OEGP has been developed, covering operating principles, procedures and processes. This will ensure that roles and responsibilities are well understood and reduce operational friction.

Technical requirements were evaluated and confirmed. The sector is characterised by a diverse spectrum of data: from small static sets to trillions of dynamic data points. We confirmed that metadata standards are in their infancy, technical capability to provide data varies significantly, and there are significant gaps and inconsistencies in existing data sets. These challenges can be addressed rapidly as there are many nascent data standards around which actors could align, with the right market incentives—whether industry-led and/or regulatory intervention).

Perception of the business model across the value chain evolved as the needs, culture and legacy infrastructure of the sector were enumerated. It was widely agreed that a not-for-profit approach, developed and run on behalf of the sector would share the cost of convening advisory groups, developing policy and operational requirements, OEGP and Energy Data Search .

The Advisory Groups confirmed Open Energy would benefit the sector by reducing the financial and operational cost of modernising energy data access, unlocking data, enabling faster, broader digitalisation, enabling cross-sector cohesion and interoperability, and assisting with meeting both regulatory and sustainability goals.

2. User Needs

Our scope (defined in Phase 1) was to evaluate the existing Open Banking trust framework, and how it could be adapted to solve two critical industry problems (1) making energy data discoverable (2) providing easy discovery and secure access to shared energy data. Our approach examined the development of new data provision services while maintaining compliance with CPNI guidance. The scope was tested through a specific use-case (to help local authorities meet their climate targets) and endorsed through the OE Advisory Groups, which included the users in the use-case.

The work met user needs through an open, collaborative, consultative approach, developing a



prototype Energy Data Search capability, Knowledge Graph and OEGP (providing participant authorisation and onboarding for secure data access control). We tested our understanding of requirements through Advisory Groups comprising over 60 individual experts from across the energy sector, including for example, Maxine Frerk, Grant Tuff (Consultant Engineer ESC), Dhara Vyas (Citizens Advice), James Johnston (CEO, Piclo), Michael Wilkson (Segment Director - Digital and Data, DNV GL) and other industry specialists.

In addition, the work has been conducted in the open: we have sought external expert input through publishing our materials on a dedicated public website and public webinars. We encouraged challenge and feedback from stakeholders in order to maximise confidence in our findings.

The use-case scenario adopted is a Local Authority planning to retrofit a community with Low Carbon Technologies (LCTs). Local Authorities must be able to evidence changes they are making in support of legally binding net-zero targets through presentation of empirical data, for example carbon reductions associated with replacing fossil fuel assets with low carbon technologies, and adoption of electric vehicle (EV) fleets. Before installation can take place they are also required by the DNO to demonstrate the impact on the energy system so that it can plan against substation available capacity (headroom) and address transmission constraints.

The forthcoming Digitalisation Licence Conditions and the DNO-DSO transition for the regulated network operators will require those organisations to radically change the approach they take to data provision and data sharing. Open Energy will support this capability development and implementation, and enable cost effective delivery of regulatory obligations.

The combination of Energy Data Search, Knowledge Graph and OEGP will catalyse a web of energy data to meet the needs of a diverse and decentralised community of users. Learning from related strategies from across the UK and EU, it can maximise cross-sector interoperability.

It is aligned with the BEIS Smart Data approach for key aspects on consent, authentication, liability and participant authorisation. Once implemented, the consistency of approach for the customer experience and operational aspects will become familiar to industry and consumers.

We identified user personas and mapped their user journeys through the data value chain, including how preemptive licensing, consent management processes and operational cohesion can increase access to using energy data.

Having considered business and consumer applications, we concluded that OE can evolve as the energy system decentralises and the need to support personal data (such as household smart meters or EV data) grows.

Sector engagement and needs analysis identified many adjacent use-cases, such as the impact of natural gas conversion to hydrogen, consumer services for household energy control and EV chargepoint services. These complement the initial Local Authority Use Case, as well as balancing the energy system as defined in MEDA Phase 1. We strongly believe that these present excellent, attractive commercial opportunities to developers that will bring powerful environmental, economic and social benefits.

Open Energy benefits stem from the potential of effective data sharing to support decarbonisation, cost-effective planning, stimulation of new markets, and innovation in new products and services. For example, our Phase 2 use-case enables optimisation of LCT installation; leading to knock-on improvements in air quality (associated with improved public



health outcomes including lower COVID morbidity), access to EV charging infrastructure (combating emerging issues of transport inequality by broadening opportunities for EV ownership, rental and car-pooling schemes), and heat pump operation (improving cold, damp housing and reducing bills when installed alongside appropriate energy efficiency measures).

3. Constraints

OEGP encountered three main types of constraint in implementing an alpha release:

- 1. **Policy, legal and regulation:** there is currently no overarching framework that clearly defines roles and responsibilities of players within the data sharing ecosystem, nor a comprehensive approach to data access rights (particularly where data is not open or is held by a non-regulated private company). While some policy changes are underway, these will take time to implement (e.g. changes under RIIO-ED2 come into force in 2023) and can be limited (e.g. only concern regulated bodies or open data).
- 2. **Incentives, culture and commercial:** data sharing is impeded by limited incentives and cultural tendencies towards a protective approach to data. Reflecting this environment, the establishment of multiple closed bilateral contracts has become the dominant data sharing mechanism, which is opaque and costly (both financially and temporally).
- 3. **Technical:** Digitisation of data and digital readiness among data providers is inconsistent and some are constrained by legacy IT systems. This intensifies challenges related to data formats and quality, making discovery and use more difficult.

To address these constraints in Phase 2, we have:

- 1. <u>Policy, legal and regulation</u>:
 - a. Defined participant roles and responsibilities, facilitating an open and competitive data sharing market. This opens pathways for growth of the Energy Data Service Provider (EDSP) third party provider role, which accesses data on behalf of a Data User and can provide additional value-add services (e.g. data cleaning, modelling).
 - b. Agreed to develop a voluntary approach enabling parties to enter the ecosystem prior to any regulatory mandate.
 - c. Built for extensibility so that Data Subject consent can be required for certain datasets in the future. This facilitates sharing of personal data (e.g. metering data, thermal comfort) while also enabling future interoperability with datasets from sectors such as payments.
 - d. Provided the foundations for a legal structure which can enable paid-for datasets (e.g. investment-quality data) to be shared in future.
- 2. Incentives, culture and commercial:
 - a. Reduced risk to data-sharing participants by clearly identifying liabilities whilst still facilitating flexible chains of data sharing.
 - b. Created the concept of data tiers to which datasets are allocated on the basis of



sensitivity (e.g. privacy, commercial and security) - enabling construction of an ecosystem in which participants can only access data with appropriate permissions and authentication.

- c. Engaged a diverse set of stakeholders to address concerns currently limiting data sharing and encourage culture change.
- d. Adapted Open Banking's operational guidelines to the energy sector context, supporting a clear and consistent approach to adoption of Open Energy.
- 3. <u>Technical:</u>
 - a. Created the Knowledge Graph and Energy Data Search function, enhancing dataset transparency and discoverability.
 - b. Created a Governance Platform to standardise the approach to identification and authentication, to remove unnecessary friction for participants and aid scaling of the entire ecosystem.

Remaining constraints include:

- Variable digital readiness and data maturity across the sector.
- Limited incentives to share data or improve its quality.
- No overarching requirement to make both Open and Shared data available from a variety of entities.
- Restrictions of a voluntary approach

Phase 3 will address constraints of a voluntary approach through a programme of outreach outlining benefits and encouraging on-boarding. We will create mechanisms for open discussion and trouble-shooting amongst participants to reduce risks and behaviour that may harm the integrity of the membership structure (e.g. sanctions avoidance). The approach creates an effective and adaptive roadmap, providing a pathway towards a potential regulatory mandate at an appropriate point.

In the longer term, removal of remaining constraints will require policy and regulatory support. This will require ongoing work with Ofgem and BEIS with a commitment to:

- Establish clear regulatory requirements on all energy sector actors (including and beyond regulated entities) to digitise data and make it available in a timely way in standardised formats.
- Create clear rules and/or rights regarding energy data access. This will require exploration of any differentiations applied to certain actors (both data providers and data users), and any purpose limitations.
- Establish public interest access rights (and purpose limitation) to certain datasets required to support Net Zero.
- Encourage adoption and scalability of secure data sharing by standardising access to data authenticated via the OEGP.
- Put in place a schedule of automated penalties to ensure market discipline.
- Define the liability framework (building on our framework) and put in place a right to redress for Data Subjects (personal and commercial).



4. Working in the open

Our approach has been inherently industry led, consultative, and collaborative, recognising that any solution created requires working deeply with the stakeholder community. We created four Open Energy Advisory Groups (AGs) with 60+ expert stakeholders from the data sharing and energy sector, organised two public webinars, and took part in a wide range of business meetings.

Wherever possible, material from this Phase of our work has been publicly published on the Icebreaker One and energydata.org.uk websites, inviting comment and feedback from the wider sector. This includes our use-case, research outputs and summary of the findings from each of the AGs, as well making the webinar recordings available online.

Recruitment for the AGs was targeted at subject matter experts representing a wide cross-section of private and public stakeholders relevant, with additional opportunity for individuals to self-nominate. Members acted as individual experts, informed by their industrial knowledge, rather than as representatives of a company or organisation, so as to ensure the development of a service for the good of society and the energy sector, rather than any single stakeholder.

The AGs provided expert input into the MEDA Phase 2 programme, including industry and the public sector. The MEDA Phase 2 programme included delivery of specific implementations based on AG recommendations.

Supported by a research team, responsible for publishing a bibliography of the material being used online, these AGs each had two co-Chairs, one of whom is deeply embedded within the energy sector, the second with deep data expertise.

The AGs covered four broad areas:

- User, Market and Societal Needs: Use-case, needs analysis, business model and benefits.
- Policy, Regulation and Legal: Data rights, authorisation and trust, liability, stewardship and governance.
- Operational Guidelines: Operating model and principles, procedures, processes and systems.
- Technical Requirements: Architecture and governance platform capabilities.

They met three times each over the project. To ensure alignment between the work being carried out within each, and ensure we were sharing sectoral knowledge, all 8 co-Chairs met on an informal weekly basis.

The Co-Chairs reported to a Steering Committee which oversaw this work, providing a focal point for reporting, challenge function and included the Co-chairs of each Advisory Group, with observers from Open Banking, BEIS and Ofgem.

In order to support transparency, the Terms of Reference for both the Advisory Group and Steering Committee have been published and linked to from the Icebreaker One website, as have summarised notes from these meetings.

The project is therefore structured so that AGs shape the requirements for the Energy Data Search, Knowledge Graph and Governance Platform, using the reference use-case for context and to bring the concepts to life. The team has sought to use accessible language and graphic



illustrations in order to make the outputs widely understandable, important given the technical nature of the project.

Targeted meetings with key stakeholders (e.g ONS, OLEV, Electralink) have also been held to explore and understand specific aspects.

Overall, the stakeholder spectrum included individuals from the following organisations:

- Electricity and Gas Distribution Network Operators,
- Representative bodies e.g. Electralink, Gemserv, ENA Open Networks Programme Data Working Group,
- Data Providers such as EV Chargepoint Operators, EV innovators, Smart Metering Data Providers,
- Local and Combined Authorities across Wales, Scotland and England
- and Government/Regulatory bodies including BEIS, ONS, OLEV and Ofgem.

Two successful public webinars, one of which featured as a part of London Climate Action week, attracted 130+ individuals and provided significant insight through the live Q&A. The videos (available on our website) have been viewed an additional 60+ times since. In addition, members of our team have spoken about the process and findings of OE at at least 6 events which have been widely shared.

Throughout Phase 2, we also engaged directly with MEDApps developers, published a public FAQ aimed at the wide variety of developers, and have incorporated them into our Phase 3 planning.

All outputs are published online, under a CC-BY license, allowing for the re-use of our work by others.

Our values, across our team, partners and advisory groups are Open, Expert and Collaborative. Participants proactively solicit views and openly share our opinions, plans and knowledge. They bring our expertise to discussions, constructively synthesising the views of others to advance the overall thinking, using good judgement regarding privacy and confidentiality. They collaborate and support, hold each other to account, and encourage inclusive, balanced discussion.

This approach has resulted in the Open Energy team being invited to share its work with a wide set of businesses, including to C-Suite leaders, and at public events.

5. Spending

The work was undertaken by a combination of full-time staff of Icebreaker One Limited and sub-contractors. The claims for the costs incurred were reported to our Monitoring Officer through the Innovation Funding Service portal with a 25% mobilisation payment in Month 1 followed by actual costs in Months 2 and 3.

Our spend profile was broadly as expected including:

- 1. Industry experts (across energy, data, policy, strategy, licensing, legal, technology)
- 2. Technical development (architecture, software)
- 3. Product marketing
- 4. Communications



Appendix

1. Summary

Phase 2 of Open Energy has translated and adapted learnings from Open Banking to the energy sector, working across four domains: user and market needs; policy, legal and regulatory; operational; technical. While there is significant potential for translation across all domains, the technical, policy and regulatory landscapes differ between banking and energy necessitating adaptation or new developments for the Open Energy model.

Does Open Banking translate to Open Energy and what needs are energy-specific?



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Open Energy will enable an energy ecosystem to develop, including new 'Energy Data Service Providers' through evolution of pre-existing players and new entrants. These will drive innovation and address sector challenges using data, anchored around a trust framework.

Open Energy in the wider ecosystem

The Open Energy governance platform aligns with, and can enable, a range of policy and regulatory developments concerning data sharing and interoperability outlined in energy sector initiatives. It also complements cross-sector initiatives, aligning with broader data governance workstreams. Key considerations include:

- Support for the Energy Data Taskforce's 2019 recommendations. •
- Compliance with the MED collaboration's draft data best practice guidance (v0.21). •
- Scalable extension of the sharing ecosystem enabled by the Presumed Open principle to • facilitate sharing across the data spectrum (open, shared, and closed).
- Interoperability with cross-sector and cross-government initiatives, such as BEIS' Smart • Data work and the ONS' Energy Visibility Services.
- Ability to link with further cross-sector initiatives such as the National Digital Twin • programme, Electric Vehicles Task Force and wider National Data Strategies in finance,



transport and telecommunications

• Alignment with overarching data sharing requirements and strategies underpinning Net Zero 2050.



Open Energy's relationships with the wider policy and regulatory ecosystem as well as various initiatives are illustrated below.

Energy & cross sector interoperability across gov. data & digitalisation strategies and initiatives





Open Energy sits in the data governance layer as it enables access to energy data by authorizing participants from energy and wider ecosystems. Open Energy checks the participants' security credentials and automatically provides access to open and/or shared datasets depending on the participants level of authorisation, creating a secure and trusted data governance ecosystem for all parties.





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2. User needs

Local Authorities delivering a Local Energy Plan must be able to understand the impact of Low Carbon Technologies and whether retrofitting or new installations would be achievable without investment by the local Distribution Network Operator. With the rapid pace of change, understanding how a specific retrofit sits within an overall regional plan, or where investment will be required over time, is critical both for the Local Authority and the District Network Operator (DNO). This lack of certainty can cause significant delays to the rollout of retrofitted low carbon technologies (LCTs).

Open Energy enables Local Authorities to retrofit with Low Carbon Technologies



BI IcebreakerOne.org Net-zero future

A user's journey

How does this look to Leah, a Project Manager for the community retrofit project at the Local Authority? She's comfortable with using analytical software, and needs to be able to understand how Local Authority decisions will impact the DNO available capacity and the implications of any transmission constraints. She decides to use a service called 'Retrofitly', an Energy Data Service Provider. Leah starts by setting the area they are working on and searches for the energy data she needs. The search is easy and intuitive to use. She selects 8 data sets. Some are Open, others are Shared, only accessible through a company like Retrofitly, because it's a licenced service provider for Open Energy. As she's from a Local Authority and her request comes through an approved service provider, access to the Shared data is granted.

Access control is managed through the Open Energy Governance Platform (OEGP). This ensures that only authorised service providers can access the data, provides the control point over the specific datasets, signposts the API endpoints, confirms the security protocols, and allows the data provider to recognise that it is a legitimate request.

Retrofitly presents Leah's range of scenarios back to her, demonstrating the impact on DNO available capacity. This is crucial in the decision making process, discussions with the DNO, and with citizen engagement. As a result, the certainty provided means that the retrofit proceeds faster than previously possible.



The Knowledge Graph solves the problem of searching for and finding the correct information amongst the diverse and disparate data sets. It collates the availability, structure and content metadata to simplify the discovery of data for the end-user. It identifies parties that can provide the required data, confirms where that data is, and what level of regulatory authorisation is required to access that data. The combination of easier search and access will benefit new service providers and incumbents alike. A preemptive licencing regime and access control through the Governance Platform will provide a trusted environment and ultimately lead to new services and better insight.

How does Open Energy Modernise Energy Data Access for users?



The Governance Platform solves the problem of identification and authorisation. It ensures that the right parties can validate and confirm their identities and roles to each other. This provides the foundation for the value of data exchange to take place, and is an enabler for all other ecosystem services to be successful. The Governance Platform is the core central service that will enable any distributed data sharing ecosystem to flourish. It allows participants to confirm **who** they are, **what** they are allowed to do, and confirms **how** they will communicate with each other. It also provides the central authority complete visibility and control over that access and those roles.



The Governance Platform ensures that the right parties can communicate in the right way - and facilitates direct connections that are secured and automated.



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3. Constraints

Open Energy Membership Overview:

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The Open Energy Membership (voluntary approach) is constituted of three main pillars: authorisation, assured governance platform for shared data access, and membership contract. The graphic below outlines these three pillars in relation to remaining constraints.

Phase 2 developed the policy, regulatory and legal framework to enable organisations to share data without the need for bilateral contracts





Granular components of pillars 1 and 2 have been identified and validated through research and engagement with Advisory Groups. Five main components are outlined below:

	Authorisation	Defining participants: who provides, receives or facilitates data flows. Identifying, authenticating and authorising data shares between participants
	Data rights	Defining data: what is open, shared or premium, what is static or dynamic; raw or derived insights. Defining purpose, value, sensitivity and limitations of data
	Trust framework	Mechanisms for trust: directory, levels of authorisation and authentication, consent (where applicable) and consent management
	Liability	Identifying roles and responsibilities; risks and liabilities; ensuring traceability in data chains and data protection requirements
	Standards stewardship	Governance roles and responsibilities; regulatory or scheme based approach (ideal scenario); implementation requirements, enforcement and sanctions
	Open Energy Governance Platform & pre-emptive 'licence' (conditions) to participate	

While a voluntary approach will be used for Phase 3, OE has identified benefits for a regulatory mandate to be established in the longer term. Implications and recommendations for development of this mandate are outlined below.

Long term implications for Ofgem

Ofgem could significantly accelerate Open Energy by mandating access to Open and Shared data sets, building on Open Energy Membership to create frameworks defining:



A regulatory mandate for Open Energy, alongside some stretching targets, would accelerate sector digitalisation and support quicker delivery of net zero.

Phase 2 also identified a key aspects of data protection worthy of further consideration



Key aspects of data protection worthy of further consideration

Areas requiring further consideration in Phase 3 include:

Standard consumer data

- Data will be handled in line with GDPR. Explicit consent will be obtained for data sharing where Data Subjects are identifiable.
- Aggregated data, so long as sufficiently anonymised, can be shared without invoking GDPR.
- Example dataset: household thermal comfort preferences read from smart thermostats.
- <u>Question</u>: can the GDPR 'public interest gateway' be used to access any datasets supporting net zero?

Smart meter data

- Data will be handled in line with GDPR and the Data Access and Privacy Framework (DAPF) where applicable.
 Appropriate applicable.
- Aggregated smart meter datasets can be shared, so long as sufficiently anonymised (9 households minimum) and dataset combination does not enable re-identification.
- Obtaining aggregated smart meter datasets remains difficult due to the absence of a central data access point.
- <u>Action</u>: OE will continue engagement with the Smart Meter Energy Data PIAG to explore options of data access - e.g. via a "trusted processor".

Non-personal data:

OE requires consideration of a variety of policy, regulatory and legal measures impacting data sharing beyond personal data. Ongoing consideration of these areas includes:

- Security (national, infrastructural, cyber)
- Commercial sensitivity
- Intellectual property, copyright & database rights
- Energy industry law and policy (examples not exhaustive)
- $\circ~$ New proposed Ofgem license conditions
- MED Data Best Practice Guidance
- Data triage outcomes for specific datasets
- Provisions for specific types of data collection or sharing (e.g. DCUSA DCP 350 derogation enabling creation of >1MW embedded capacity registers)
- Legal frameworks (e.g. Utilities Act 2000)

Overarching Policy:

OE will continue to engage with cross-sector initiatives including:

- Smart Data policy & recommendations of BEIS Smart Data Working Group
- Cross-sector law and policy (examples - not exhaustive)
 Net Zero 2050 (and
 - Devolved Nations' equivalent targets)
 UK Industrial Strategy
 - 2017 and National Data Strategy consultation

Comparison: approach in Open Banking

GDPR is the data protection framework. Additionally PSD2 provides for the concept of explicit consent to access data. This twin approach causes confusion and must be clarified for Open Energy. Firms are also subject to the FCA's principles of business and must Treat Customers Fairly.



4. Working in the open

Four Advisory Groups were established, with oversight by a Steering Group. The objectives for these were to:

nese were to.

- Provide a forum for discussion and review of the progress made;
- Provide feedback and recommendations to the OE team;
- Guide the development of Open Energy;
- Endorse the final documented deliverables for the AG.

The use-case provided context to each Group, and informed development of the Open Energy Proof of Concept.





Additionally, two well attended public webinars (130+ viewers) were held as well as dozens of meetings with stakeholders. We have provided FAQs for MEDapps entrants and responded directly when requested. All of the work has been published to <u>https://energydata.org.uk</u>