

Your Online Data Architecture

Data Best Practice Principles

Richard Dobson

Practice Manager Data Systems

9th July 2020

SIEMENS
Ingenuity for life



Contents

Foreword.....	2
1. Energy Data Taskforce	3
1.1. Recommendation 1: Digitalisation of the Energy System	3
1.2. Recommendation 2: Maximising the Value of Data	3
1.2.1. Data Best Progress Guidance	3
1.2.2. Code Changes	4
1.2.3. ENA Data Working Group.....	4
1.2.4. ElectraLink - FlexR.....	4
1.3. Recommendation 3: Visibility of Data.....	5
1.3.1. ONS Data Visibility.....	5
1.4. Recommendation 4: Coordination of Asset Registration	5
1.4.1. BEIS Asset Registration Strategy	6
1.5. Recommendation 5: Visibility of Infrastructure and Assets	6
1.5.1. ENA Digital System Map	6
2. Data Best Practice.....	7
2.1. Common Data Architecture Alignment with Data Best Practice.....	7
3. Summary and Recommendations	10

Foreword

The path to a zero-carbon future is exciting, challenging and realising this ambition will call for innovative and disruptive ideas, alongside maximising proven sustainable and low carbon solutions. To ensure the UK achieves our carbon neutral commitments, it is critical that the UK energy sector maximises the value of existing (and future) national infrastructure, resources and the significant levels of existing and emerging data.

Realising this value however will call upon the energy sector to undertake a data-enabled cultural evolution. An evolution which actively enables open-data exchange, utilising data fed from multiple energy vectors, encompassing the breadth of the energy system and the plethora of stakeholders within. A true 'whole systems' approach which will give rise to a secure and managed service, a service affording access to the central data exchange for stakeholders wishing to illicit positive, innovative and lasting change within the energy sector.

Siemens, together with its partners the Energy Systems Catapult (ESC) and National Innovation Centre for Data (NICD) will deliver a 'digitally integrated energy system' which supports a Common Data Architecture concept. Underpinning the vision is an implementation of the open-data platform, constructed upon the requirements of the users and employing a sector specific metadata standard to drive commonality, enabling data-exchange. To do this Siemens will create 'Your Online Digital Architecture'.

The platform will be constructed upon the three relevant building blocks identified within the report 'Energy Data Taskforce: A Strategy for a Modern Digitalised Energy System' – incorporating asset registration strategy, data catalogue and digital system mapping.

Siemens promotes an inclusive approach to successful deployment, one which will be employed from beginning to end, facilitating user requirement capture workshops alongside show and tell events to provide insight toward the project outcomes and providing best practice guidelines. These events will support organisations who wish to utilise and embed the insight and outcomes, covering topics such as data transparency, data licensing and liability wavers, and data obfuscation / data protection techniques. Each of which are reflective of the metadata standard and Common Data Architecture underpinning 'Your Online Digital Architecture'.

The challenge is clear – the true value in data, in support of the transition to a low carbon economy, is in enabling visibility, access and insight throughout the energy value-chain – the industry must embrace this opportunity as a true catalyst for change, creating an open, yet secure, data marketplace which will create a modern, digitalized, energy system – one which drives system cost reduction, increases levels of asset visibility, improves system stability, provides capability for informed system management approaches and enables impactful innovation at scale. All critical factors in a decarbonized, digitalized and decentralized energy system.

Andrew Smyth - Head of Customer Success, Software

Siemens Smart Infrastructure

1. Energy Data Taskforce

The Energy Data Taskforce was established to provide Government, Ofgem and Industry with recommendations on how data can unlock opportunities provided by a modern, decarbonised and decentralised Energy System at the best value to consumers.

The Energy Data Taskforce was chaired by Laura Sandys and ran by the Energy Systems Catapult. The team engaged with over 300 individuals throughout the delivery of the taskforce to understand existing challenges, develop hypotheses and test recommendations.

Energy Data Taskforce published a report entitled 'A Strategy for a Modern Digitalised Energy System' which presents five key recommendations that will modernise the UK energy system and drive it towards a net zero carbon future through an integrated data and digital strategy throughout the sector.

The report has been welcomed by Industry (including ENA, Energy UK, etc.) and the recommendations have been formally accepted and endorsed by BEIS and Ofgem. Work is now underway to deliver each of the recommendations.

1.1. Recommendation 1: Digitalisation of the Energy System

This recommendation inspired Ofgem to ask the network companies to develop and publish their 'Digitalisation Strategies' which were published in late 2019. Ofgem have since responded to the publications and requested that these be extended and deepened as part of the formal RIIO2 process.

<https://www.ofgem.gov.uk/publications-and-updates/modernising-energy-data-digitalisation-strategy>

<https://www.ofgem.gov.uk/publications-and-updates/digitalisation-strategies-modernising-energy-data>

<https://www.ofgem.gov.uk/publications-and-updates/review-and-next-steps-riio-digitalisation-strategies>

1.2. Recommendation 2: Maximising the Value of Data

"Government and Ofgem should direct the sector to adopt the principle that Energy System Data should be Presumed Open, using their range of existing legislative and regulatory measures as appropriate, supported by requirements that data is 'Discoverable, Searchable, Understandable', with common 'Structures, Interfaces and Standards' and is 'Secure and Resilient'."

1.2.1. Data Best Progress Guidance

Innovate UK, Ofgem and BEIS commissioned the Energy Systems Catapult to build on the work of the Energy Data Taskforce and develop a set of Data Best Practice guidance with principles, explanations, techniques and examples which help organisations to implement the recommendations of the Energy Data Taskforce. Ofgem have indicated that they intend to integrate this as part of the upcoming RIIO2 licence conditions.

<https://modernisingenergydata.atlassian.net/wiki/spaces/MED/pages/69042178/MED+Data+Best+Practice>

1.2.2. Code Changes

The Energy Data Taskforce recommended that the principle of Presumed Open should be implemented across the energy sector and that code bodies were uniquely placed to deploy this quickly. Code bodies have reacted and changes have been proposed and implemented across a number of codes.

Balancing and Settlement Code: P398 Increasing access to BSC Data

P398 seeks to increase accessibility to data held by ELEXON and BSC Agents. It will better align the BSC with the United Kingdom's Industrial Strategy.

<https://www.elexon.co.uk/mod-proposal/p398/>

Distribution Connection and Use of System Agreement (DCUSA): DCP 350 - Creation of Embedded Capacity Registers

The change seeks to require each DNO and IDNO to create a public register of all sites that use their networks and influence the operation of the GB power market. The Register would contain details of each connected site and would be kept up to date by each DNO and IDNO.

<https://www.dcusa.co.uk/group/dcp-350-working-group/>

Uniform Network Code: Introducing 'Research Body' as a new User type to the Data Permissions Matrix and UNC TPD Section V5

This Modification seeks to further realise the benefit of the Data Permissions Matrix reflecting the direction to greater data openness by adding 'Research Body' as a new user type to UNC TPD Section V5 and the Data Permissions Matrix.

<https://www.gasgovernance.co.uk/0702/>

1.2.3. ENA Data Working Group

Following the publication of the Energy Data Taskforce recommendations the Energy Networks Association reformed their data working group to bring together high-level representation from across the network organisations to discuss data issues and progress data projects.

<https://www.energynetworks.org/info/modernising-energy-data.html>

1.2.4. ElectraLink - FlexR

Electralink have created the concept of FlexR to help the Electricity Distribution Network Operators (their owners) to standardise and grant access to data from across the network companies. The initial MVP will build systems (including storage, portal and APIs) which enable Electralink to share information about all half hourly settled embedded generation resources which they have access to via their access to the Data Transfer Service settlement flows. In addition, Electralink will work with one 'pathfinder' DNO to ingest and standardise their infrastructure data such that access can be provided in a standardised format – this is likely to be based on the widely supported CIM standard with additions where required. Beyond the MVP, the plan is to expand the FlexR solutions to all DNOs and look to move beyond static infrastructure data into more real time data sources. However, this is subject to funding approval.

Electralink have shown interest in the MEDA project and have confirmed that they are willing to:

- Integrate with the MEDA solution as a data provider both independently and on behalf of the DNOs
- Adopt API standards as they emerge
- Use third party authentication

https://www.enwl.co.uk/globalassets/stakeholder-engagement/documents/consultations---have-your-say/flexr_consultation.pdf

1.3. Recommendation 3: Visibility of Data

“A Data Catalogue should be established to provide visibility through standardised metadata of Energy System Datasets across Government, the regulator and industry. Government and Ofgem should mandate industry participation through regulatory and policy frameworks.”

1.3.1. ONS Data Visibility

The Energy Data Taskforce recommended that the ONS should be asked to lead the development of a data catalogue solution which helps to improve visibility of datasets across the energy sector. The ONS (with support from Hippo Digital) completed a discovery project in Q2 2020.

The draft discovery report suggests that the ONS should progress to Alpha and develop an MVP of the data catalogue which initially focuses on making public energy system data more accessible with a limited set of metadata fields. The roadmap suggests that the MVP should be evolved and expanded to cover a wider range of data (beyond existing public data), metadata sophistication is evolved, and search functionality gets more mature. In addition, the recommendation suggests moving from simple URL indexing to proxying or even hosting certain datasets.

There are obvious integration points with the YODA proposal in the following places:

- Metadata structure (including convergences towards an ontology approach)
- Glossary of business terms (linking with the Reference Data Library)
- Enabling access to datasets (authentication and security)

The key recommendations for Alpha include:

1. Start with public data and evolve
2. Start with a simple set of *[metadata]* attributes and evolve
3. Business glossary
4. Visibility and access
5. Evolutionary and collaborative approach



ONS EDV - Discovery
report.pdf

1.4. Recommendation 4: Coordination of Asset Registration

“An Asset Registration Strategy should be established to coordinate registration of energy assets, simplifying the experience for consumers through a user-friendly interface in order to increase registration compliance, improve the reliability of data and improve the efficiency of data collection.”

1.4.1. BEIS Asset Registration Strategy

Following the taskforce recommendation BEIS took ownership of this building block and have been working with industry to understand the user requirements more deeply so a solution can be defined. BEIS have now engaged Baringa to drive the work forward.

BEIS have not yet defined a solution or even laid out options so there is possibility for the YODA project to help define the solution.

1.5. Recommendation 5: Visibility of Infrastructure and Assets

“A unified Digital System Map of the Energy System should be established to increase visibility of the Energy System infrastructure and assets, enable optimisation of investment and inform the creation of new markets.”

1.5.1. ENA Digital System Map

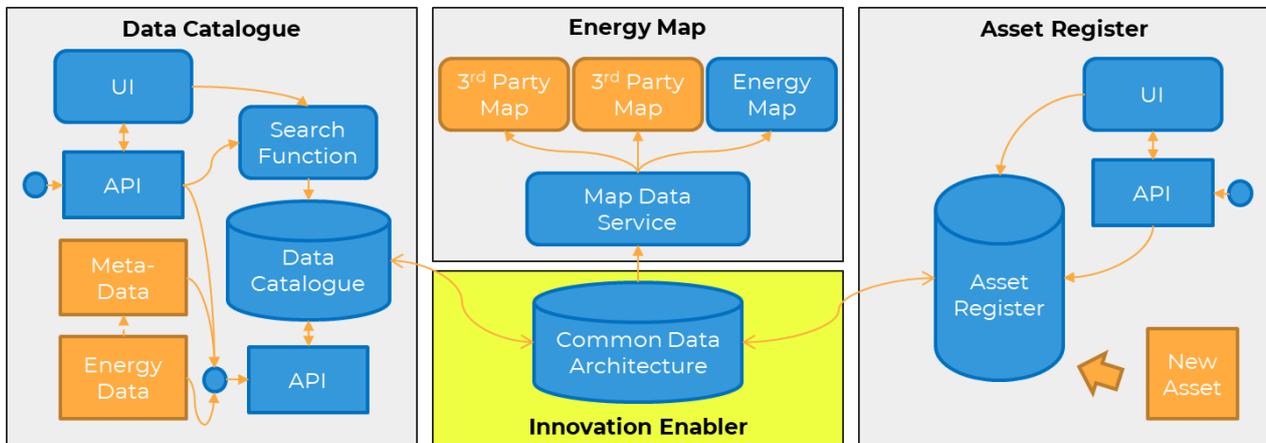
The ENA data working group has led the development of a cross network Digital System Map solution prototype. To date, two options have been explored, one based on the well known ESRI mapping platform and one based on AREMI, an open source mapping solution developed and used in Australia. Both solutions seek to standardise and integrate data from different network companies using an API interface.

There has not been a solid decision to use either of the solutions yet but the ENA have been supportive of the MEDA projects and are keen to integrate with the successful solution.

<https://www.youtube.com/watch?v=MyZs0wxc0OI>

1.1. Extension: Modernising Energy Data Access

The Modernising Energy Data Access (MEDA) competition was designed by the Modernising Energy Data group and launched by Innovate UK. The goal of the project is to improve the level of data interoperability across the energy sector through the development of a **Common Data Architecture** which has the ability to integrate with the core building blocks and any other data provider or consumer across the energy sector and beyond.



2. Data Best Practice

Following the publication of the EDTF report BEIS, Ofgem and Innovate UK formed the Modernising Energy Data (MED) group to continue to push forward the recommendations of the EDTF. This group commissioned the development of Data Best Practice Guidance with the intention of providing the energy sector (and beyond) a clear set of principles which describe data best practice accompanied by techniques and examples of how these principles could be implemented.

The Energy Systems Catapult led the project to develop the principles which were thoroughly tested with industry (via a number of workshops and direct engagement) to ensure that they described best in class data practices and that industry supported all elements.

Data Best Practice Principles

1. Identify the **roles of stakeholders** of the data
2. **Use common terms** within Data, Metadata and supporting information
3. Describe data accurately using **industry standard metadata**
4. Enable potential users to understand the data by providing **supporting information**
5. Make datasets **discoverable** for potential users
6. Learn and understand the **needs of their current and prospective data users**
7. Ensure **data quality maintenance and improvement** is prioritised by user needs
8. Ensure that data is **interoperable** with other data and digital services
9. Protect data and systems in accordance with **Security, Privacy and Resilience** best practice
10. **Store, archive and provide access to** data in ways that maximise sustaining value
11. Ensure that data relating to common assets is **Presumed Open**
12. Conduct **Open Data Triage** for Presumed Open data

Ofgem have announced that they intend to include the data best practice principles in the upcoming RIIO2 Licences and therefore it will be important that the MEDA solution responds to these to ensure that Network companies are able to deploy the solution widely.

2.1. Common Data Architecture Alignment with Data Best Practice

In order to maximise deployment of the YODA solution it will be important to show that the platform complies with the data best practice principles and has the potential to help organisations become compliant with the upcoming RIIO2 licence conditions.

Within this section we discuss how a common data architecture can be implemented in a way that meets or exceeds the data best practice principles which will in turn increase the chance of cross sector deployment.

Principle	Common Data Architecture Considerations
Identify the roles of stakeholders of the data	<p>Data Custodians – YODA will enable data providers to better understand who their data users are. This will enable data providers to iteratively build up a better picture of their stakeholder landscape. In addition, it will be vital that data custodians understand the subjects of data which is registered on the platform as this will be vital to ensure that personal or commercial data is protected effectively.</p> <p>YODA – The MEDA projects have been asked to complete a Discovery phase. The YODA project we started with a number of open workshops which helped to identify stakeholders who will need to be consulted and informed throughout the process.</p>

Principle	Common Data Architecture Considerations
<p>Use common terms within Data, Metadata and supporting information</p>	<p>Data Custodians – YODA will incentivise the use of common terms. Data custodians which use common terms will benefit from their data being more easily linked with third party data which will enable more valuable use cases to be implemented.</p> <p>YODA – The project team will work collaborative with industry to develop a Reference Data Library which defines terms and enables the wide-spread adoption of common terms.</p>
<p>Describe data accurately using industry standard metadata</p>	<p>Data Custodians – YODA will require all data to be described standardised metadata. This will further incentivise data custodians to deploy and maintain metadata.</p> <p>YODA – Metadata standards will be deployed in line with other industry initiatives such as the Energy Data Taskforce and the Data Visibility Project being led by the ONS.</p>
<p>Enable potential users to understand the data by providing supporting information</p>	<p>Data Custodians – YODA will provide guidance to data custodians which promotes the use of data standards and publication of supporting information. YODA will enable data custodians to easily link to common reference documents such as standards definitions (e.g. ISO / IEC standards) and reference data (e.g. location references).</p> <p>YODA – Stakeholder input has shown that this is a key concern of data users and YODA will address this in multiple ways. Firstly, YODA will promote the use of standards which limit the need for bespoke supporting documents where possible. In addition, we will promote the development and publication of supporting information which should be referenced within metadata.</p>
<p>Make datasets discoverable for potential users</p>	<p>Data Custodians – YODA will provide interoperability between data silos both across industry and perhaps within organisations. This will enable data from desperate sources to be linked and analysed more easily than ever before and enable more granular searching of data. This will help organisations to improve their data discoverability</p> <p>YODA –YODA intends to deploy metadata standards, provide open APIs and integrate with the Data Visibility Project solution to ensure that all data that is registered with the system is discoverable via third party platforms.</p>
<p>Learn and understand the needs of their current and prospective data users</p>	<p>Data Custodians – YODA will provide data custodians with metrics which enable data custodian to understand demand for data they hold which will enable more targeted engagement with data users</p> <p>YODA – YODA has engaged with users right from the start of the project to understand their needs and ensure that we enable as many of their use cases as possible.</p>
<p>Ensure data quality maintenance and</p>	<p>Data Custodians – YODA will help data custodians to understand demand for their data and also provide</p>

Principle	Common Data Architecture Considerations
<p>improvement is prioritised by user needs</p>	<p>opportunities to identify discrepancies between different datasets. This will ensure that data maintenance and improvement is targeted and valuable.</p> <p>YODA – Will focus on developing the data network model in line with user needs. Focusing on the areas which have the potential to unlock the most industry use cases and accelerate the transition towards a net zero economy.</p>
<p>Ensure that data is interoperable with other data and digital services</p>	<p>Data Custodians – YODA will enable interoperability of data across the energy sector and beyond. Initially providing the underlying infrastructure needed to enable secure data transfer between stakeholder and moving towards interoperability of the underlying data (in line with user needs) during the Alpha, Beta and Beyond.</p> <p>YODA – YODA will use many open source solutions and data standards to ensure that interoperability is included by design. Where standards do not exist the team will seek to work with industry to ensure that solutions have support from a wide range of actors.</p>
<p>Protect data and systems in accordance with Security, Privacy and Resilience best practice</p>	<p>Data Custodians – YODA will provide data custodians with a secure data transfer network which is capable of protecting the most sensitive data (e.g. critical national infrastructure)</p> <p>YODA – The project team are experienced in working with clients across security conscious sectors and will ensure that best practice is followed in the development and deployment of the solution.</p>
<p>Store, archive and provide access to data in ways that maximise sustaining value</p>	<p>Data Custodians – YODA will provide data custodians with a method of providing modern access methods for data they wish to share. This can complement simple open data publication methods.</p> <p>YODA – The project team will ensure that modern API standards are made available to enable access to a range of underlying data delivery methods.</p>
<p>Ensure that data relating to common assets is Presumed Open Conduct Open Data Triage for Presumed Open data</p>	<p>Data Custodians – YODA will enable data custodians to select from a range of data licences and provide evidence of their Open Data Triage process. Where data has been processed, YODA will enable scripts and protocols to be referenced as supporting information.</p> <p>YODA – The project team are advocates for the principle of Presumed Open and acknowledge that there will be many datasets which can be entirely open. However, where data cannot be open there is significant value in being able to securely share data and this is what YODA will provide. YODA will allow data custodians to compare the openness of their data with other actors to benchmark and compare their decisions.</p>

3. Summary and Recommendations

The Energy Data Taskforce was able to make 5 key recommendations in the movement towards 'A Modern Digitalised Energy System, with the aligned integration points of the YODA project being;

- Metadata structure (Including convergences towards an ontology approach)
- Glossary of business terms (Linking with the Reference Data Library)
- Enabling access to datasets (Authentication and Security)

In order to realise maximum deployment of the YODA solution, there is a requirement to show that the platform will comply with the data best practice guidelines and has the potential to help other organisations become compliant with the upcoming RIIIO2 license conditions.

Energy Systems Catapult supports innovators in unleashing opportunities from the transition to a clean, intelligent energy system.

Energy Systems Catapult

7th Floor, Cannon House
18 Priory Queensway
Birmingham
B4 6BS

es.catapult.org.uk
info@es.catapult.org.uk
+44 (0)121 203 3700