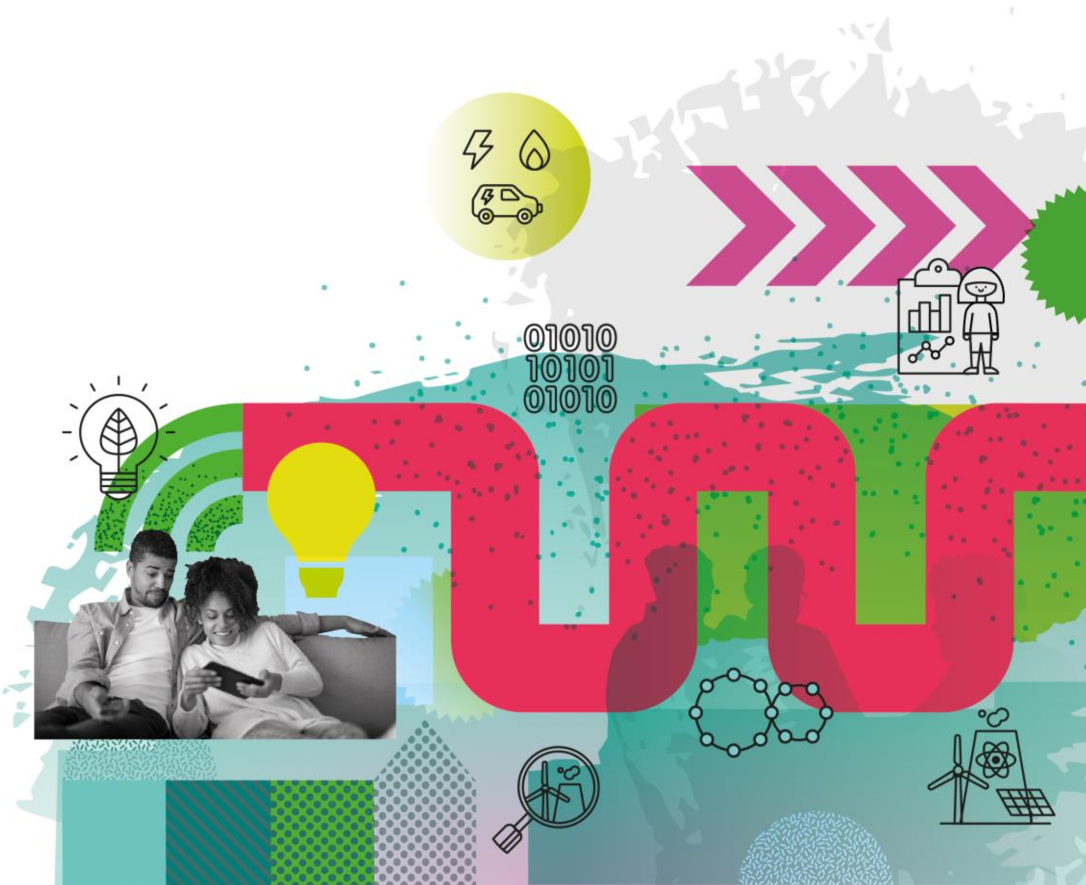
# Data Standards

## Energy Data Taskforce Appendix 6

## Energy Data Taskforce

**13/06/2019**

*Including research and insight from:*



# Contents

# 1. Introduction

The evolution of the energy sector, and the digital systems which support it, have resulted in a proliferation of different approaches to data and a range of incompatible data structures and interfaces. In order to realise the benefits of a smart, flexible Energy System there will be a need for the pragmatic standardisation of data structures and interfaces to enable communication, improve collaboration and allow innovation to be scaled up effectively.

The Energy Data Taskforce commissioned a report from Baringa Partners to consider the standardisation which has taken place within the UK and beyond in order to recognise best practice and identify pitfalls which can be avoided. This work recognises the importance of data (structure and interface) standardisation within the energy sector but acknowledges the current state of relative immaturity and looks to find ways in which we can build on good progress and accelerate where progress has been limited.

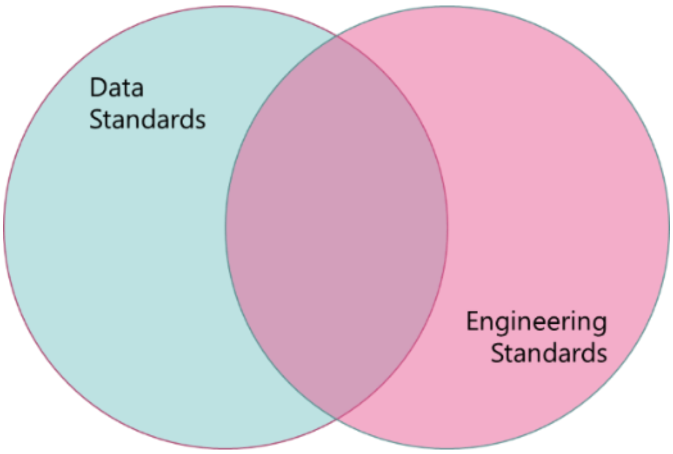
> *"a common [data] framework … is needed to support maximum exploitation of data potential, traditional siloes must be broken down and a lack of interoperability must be addressed"*
>
> *Energy Data Review – (Energy Systems Catapult 2018)*[6]

Within this document we focus on data standards, but it is clear that many of these are driven by engineering standards or are valuable tools to monitor engineering standards adherence. It is therefore important that any recommendations that apply to data or engineering standards are coherent and complementary.

## 1.1. Data and Engineering Standards

The Energy Data Taskforce engaged with the newly formed Electricity Engineering Standards Review to discuss how data and engineering standards interact.

> **Data Standards** are formally defined data structure and interface requirements which aim to improve the quality, consistency and interoperability of information.
>
> **Engineering Standards** are formally defined technical requirements that describe methods, processes, practices and performance which aim to improve the quality, consistency and safety of engineering work.




Historically, there would have been little overlap between the two sets of standards but as the energy system is becoming increasingly digitalised it is possible to utilise data to ensure that engineering standards are being adhered to and that the performance is as required. This means that engineering standards may rely on or create data standards to support their effective function.

We believe that combining pragmatic data standardisation with the Energy Data Taskforce principles of Digitalisation of the Energy Sector and Presumed Open will create a positive environment for engineering standards. Reducing the need for bespoke data requirements and enabling adherence to engineering standards to be monitored much more effectively.

## 2. Case Study 1: The IEC

**Problem**

- In the early part of the 20th century, scientists and engineers struggled to collaborate on emerging discoveries in the electrical industry

**Description**

- Founded in 1906, the IEC is the world's leading organisation that develops and publishes international standards for electrical and electronic technologies. The common nomenclature and standards supported the structured and accelerated development of electrical industry technologies throughout the 20th century
- IEC standards cover power generation, transmission and distribution, batteries, solar and marine energy, home appliances and office equipment, semiconductors, fibre optics and nanotechnology
- Standards are developed and maintained through ~100 technical committees and subcommittees made up of representatives of National Committees (NC)
- Standardization Management Board oversees the creation and disbandment of technical committees
- All IEC standards are consensus-based and represent the needs of every participating NCs. Every member (not affiliate) country, has one vote and a say in what goes into an IEC International Standard
- IEC also manages three global conformity assessment systems that certify if equipment, systems or components conform to its international standards. IEC does not perform the assessments themselves.

**Alternatives**

- Consolidate IEC with its two sister organisations: the International Standards Organisation (ISO) and the International Telecommunication Union (ITU) that develop international standards
- Merge with other major standards development organisations e.g. Institute of Electrical and Electronics Engineers (IEEE)

**Owner**

- 82 countries are IEC members. 82 other industrialising countries participate via an affiliate programme
- NCs represents each member country's interests in standards and conformity assessments
- NCs appoint their own delegates, mostly from industry as well as government bodies and academia
- NCs can be manufacturers, providers, distributors and vendors, consumers and users, all levels of governmental agencies, professional societies and trade associations as well as standards developers from national standards bodies
- About 90% of those who prepare IEC standards work in industry
- Some NCs are public, private or a combination of both IEC is a not-for-profit, quasi-governmental body
- It is funded by a combination of:
  - membership fees
  - income from standards sales
  - income from conformity assessment activities
- IEC operates on an annual budget of ~£15 million. NCs and industry reportedly invest USD 2 billion each year on expert participation in IEC work
- IEC has no ability to enforce compliance

**Adoption**

- IEC standards are adopted voluntarily
- History of Governments adopting standards via law overseen by national standards bodies

**Impact**

- The IEC has published 1325 individual standards. Each standard often contains numerous sub-parts
- Collaborative standard development:
  - Helps make standards precise and easy to understand, giving uses a high degree of confidence in them
  - Mitigates some risk to invest in research and development, promotes innovation
- 'Compliance by default', most companies will attempt to follow ISO and IEC standards because:
  - Meet customer requirements
  - Improve product quality
  - Improve operational consistency
- To make a standard enforceable, some countries have adopted IEC standards into law
- Conformity assessment services provide a 'soft' route to promote standard adoption
- Developing a Nordic wide retail market will begin with national datahubs, ran by each TSO. Interaction between these hubs beyond national borders is a key challenge. Further integration can be expected across the region as a secondary step. Increased cooperation between data hub operators may potentially lead to lower costs and improved IT services for the industry

# 3. Case Study 2: DataHub Denmark

### Problem

- Retail market problems pointed to a DataHub solution
  - Separation of 78 DSOs and 53 electricity suppliers; Competitive market barriers; Varying data quality; Data exchange and transaction errors and inefficiencies; Consumers' ability to obtain data

### Description

- DataHub is a mandatory centralized data exchange platform in Denmark where uniform communication and standardised processes manage the interaction between electricity market participants
- A centralized approach was considered the most suitable way to address identified problem.
- DataHub is intended to be a neutral foundation for retail electricity market competition
- DataHub standardised: Data formats and time of collection; Simplified data usage, integration, and interoperability, making data usage simpler and cheaper
- DataHub initially covered electricity meter data and business process for all metering points in Denmark and exchange of customers consumption information
- Customers do not have direct access to the DataHub. They can access their own data through a web portal which is set up by their supplier
- Through these web portals the customers can grant third party access to their data
- The DataHub took 11 years to develop and implement. First proposed in 2002. In 2007 an industry body summarised retail market problems for the NRA and proposed Energinet develop and operate a DataHub. A workgroup of industry, the NRA and TSO then spent two years designing the "big DataHub solution". In April 2009, Danish Ministry gave broad powers to Energinet to implement it. The DataHub went live in March 2013.
- Energi Data Service, an open data platform launched in June 2017, extends the DataHub to include wholesale market and technical data

### Alternatives

- The NRA, the Danish Energy Regulatory Authority, could have developed the DataHub but it would have required new technical and operation skills and functions
- Regional Security Coordinator or ENTSO-E could perform the tasks at regional or European level
- A decentralised approach such as EstFeed, although DataHub Denmark predates this

### Owner

- The Danish TSO, Energinet, obligated by law to develop and operate the DataHub
- The DataHub cost ~€19m capex to set up and has an annual operational cost ~€3.5m

### Adoption

- Suppliers and grid companies must submit data
- Energinet developed a 'code' governing rules of use and access to the DataHub
- Stakeholders must sign user agreements to access the DataHub

### Impact

- DataHub delivered the following benefits
  - Increased competition through clearer roles and responsibilities
  - Central data communication and standardised market processes
  - Easier access to market data – for consumers, market participants and third parties
  - Increase transparency and efficiency
  - Empowered consumers
  - Data driven business models created new products and services
  - Single bill for consumers via suppliers
  - Clearinghouse for EV public charging
- Potential to integrate with value chains outside the energy sector e.g. Amazon Echo, Google Home
- Collaboration with industry essential to gain trust, buy in and ensure the DataHub is fit for purpose
- A key enabler for DSO transition
- Developing a Nordic wide retail market will begin with national datahubs, ran by each TSO. Interaction between these hubs beyond national borders is a key challenge. Further integration can be expected across the region as a secondary step. Increased cooperation between data hub operators may potentially lead to lower costs and improved IT services for the industry

# 4. Case Study 3: Common Information Model

### Problem

- No consistent model for representing electricity networks and underlying assets
- Composite data is fragmented across multiple source systems often with poor data quality
- The requirement to exchange network information is increasing but there is no uniformity in as-is data

### Description

- The Common Information Model (CIM) gives a common vocabulary and basic ontology for aspects of the electric power industry
- The CIM aims to bring best practices primarily to operational technology (OT) centric integration projects, such as complex network model exchanges and messaging between operations applications
- The CIM provides a structure to describe both the assets and power within the network enabling that data to inform power system modelling
- The CIM draws on a number of standards, primarily: IEC 61970 electric transmission, IEC 61968 electric distribution and IEC 62325 energy markets
- The standard is embodied as a UML data model, freely available by joining the CIM Users Group (CIMUG). The ~90 packages, comprising over 1500 classes, describe most objects of interest to electrical power engineers
- Whilst there is considerable interest, there is limited true expertise or reusable reference cases to help in CIM adoption at scale, the emphasis is either on growing internal capability or utilising vendor expertise and risking a variant on the core CIM standard depending on the vendors current solution
- As the CIM standard evolves many utilities have reported that the cost to maintain full compliance is too high. Utilities therefore need mature internal data management capabilities in order to support adoption
- An increasing number of tools are available to support CIM adoption, conversion and design, however many utilities have struggled to find suitable skilled resources to support their CIM based integration programmes

### Alternatives

- Few other than internally set standards or those aligned to a specific vendors solution
- Incorporate into legislation to implement at distribution level through Europe, although many more smaller DSOs may find the costs prohibitive

### Owner

- The standard has been adopted by the IEC, and is widely adopted through ENTSO-E at transmission level
- The CIM Expert Group is responsible for the maintenance of all implementation guides concerning information interchange produced by ENTSO-E
- It forms a useful basis to support the information layer of the CENELEC Smart Grid Architecture Model (SGAM). The SGAM model has recently been used by the Energy Networks Association to define its Future DSO Worlds

### Adoption

- The current level of adoption varies between network organisations, and also across each organisations systems of record and voltage level, with time scales for adoption typically falling into programs of 2-4 years depending on the breadth of solutions and extent of in-house integration between systems
- Drivers for UK adoption have been evidenced through innovation projects (WPD), ADMS upgrades (ENWL) and the trialing of TSO-DSO interfaces (UKPN)
- Adoption is hindered by poor source data quality requiring additional investment (analytics and recapture of data) to obtain a valuable level of CIM compliance
- CIM adoption is best enabled through a service oriented architecture for data integration, as it avoids the need for a rebuilding of the logical data model within each existing application

### Impact

- CIM is a consistent foundation of DSO related data strategies across DNOs in the UK and more widely
- Technology vendors offering established solutions (EAM, GIS, CIS etc.) now provide CIM based integration as a standard offering. Solutions associated with Grid Modernisation and Distributed Energy Resources such as ANM, DERMs, Flexibility Platforms are using CIM as a reference standard to enable integration and interoperability with exiting data models
- The legacy of poor data quality and high variability in the structure of the disparate data sources needed to fulfil a robust CIM based model mean investment is needed to address data issues. In turn this is contributing to an increased focus on data governance
- It is likely that as more parties need to exchange aspects of the distribution level network model that the maturity of CIM adoption will increase rapidly

# 5. Case Study 4: ENTSO-E transparency platform

**Problem**

- Transparent data is indispensable for market participants' ability to take efficient production, consumption and trading decisions
- Data pertinent to cross border trading was sporadically available, of inconsistent quality and accessible was fragmented across the EU

**Description**

- The Transparency Regulation (EU Regulation 543/2013) aims to make pan-European electricity market information more open, precise and comparable
- The European Network of Transmission System Operators for Electricity (ENTSO-E) had to establish and operate a central "transparency platform"
- The platform hosts the publication of generation, load, cross border flows, transmission network congestions, plant outages and electricity balancing data
- Focus is on data to support cross border trading
- The ENTSO-E developed the "manual of procedures" established the key technical requirements for the transparency platform:
  - Data formats and standards
  - Communication and exchange protocols
  - Technical and operational criteria
- The transparency platform has evolved via two revisions "manual of procedures"
  - Improved data quality and ease of accessibility
  - Reorganisation of balancing data after Electricity Balancing Guideline 2195/2017 entered into force
- ENTSO-E developed "manual of procedures" by consulting stakeholders and an opinion from ACER
- Compliments ENTSO-E's winter and summer outlooks and the Ten Year Network Development Plan

**Alternatives**

- Responsibility could originally been given to ACER and integrated into REMIT reporting
- Transfer some functionality to Regional Security Coordinators or to EDSO as real time system operation becomes more localised distribution to accommodate renewables, storage and electric vehicles

**Owner**

- ENTSO-E established, administers and operates the transparency platform
- The information published by ENTSO-E is collected from data providers such as TSOs, power exchanges or other qualified third parties
- Mandatory for each Transmission System Operator (TSO) to collect and submit data to the transparency platform
- National Grid ESO responsible TSO in GB. Participants must submit data to the National Grid MODIS (Market Operation Data Interface System) platform. National Grid submits the data collected to ENTSO-E
- ACER must provide an opinion on changes to "manual of procedures"

**Adoption**

- Transparency Regulation was developed by European Commission and applies directly in all EU Member States
- Mandatory implementation in each Member State.
- The transparency platform went live on 5 January 2015, on time, 18 months after the Regulation entered into force

**Impact**

- The standardisation, centralised collection and publication of electricity pan-European market data has:
  - Markedly increased transparency, e.g. via *PowerFacts Europe* publication
  - Enabled market participants and stakeholders to make better decisions
  - Integration of TSO data, via open data licence, on *Wind Europe Map* and *Tomorrow's Electricity Map*
  - Enabled ACER and NRAs to monitor markets more effectively
- The transparency platform will need to evolve as system operation and the energy systems becomes more localised and decentralised. This may put strain on the current centralised model and increases reporting obligations to a large number of smaller participants
- Interlinkage with REMIT. If a generation outage meets the REMIT publication requirements, the generator must submit the same information to the transparency platform creating overlapping reporting obligation

# 6. Case Study 5: GDPR and DAPF

### Problem

- GDPR: absence of holistic and modern data privacy model in EU. Complex and inconsistent data privacy guidelines, policies and standards across Member States created legal uncertainty and excess administrative costs
- DAPF: safeguard consumers' privacy, whilst enabling proportionate access to smart meter consumption data

### Description

- D GDPR (EU Regulation 679/2016) governs how companies and public bodies process and transfer 'personal data', any data identifying a person in the digital single market. It modernises many existing rules to allow for new data paradigms, online services and technologies
- Extends scope of the EU data protection law to all foreign companies processing data of EU residents
- Businesses must report any serious data breaches to the ICO within 72 hours and inform affected individuals
- Strict compliance regime. Severe penalties up to 4% of global turnover or €20m – whichever is greater
- GDPR puts individuals in control of their data and strengthen citizens' rights
- Blunt instrument, applies to all firms uniformly
- BEIS developed DAPF. Ofgem enforces it via the suppliers license and the Smart Energy Code
- DAPF determines the levels of access to energy consumption data from smart meters accessible by energy suppliers, network operators and third parties. It also establishes the purposes for which this data can be collected. Together providing safeguards for consumers
- Provides consumers a choice about access to more detailed energy consumption data, as well as access
- DAPF was developed in parallel with GDPR
- DAPF is specific to consumers' smart meter data, intended to fill a gap, complement not replace GDPR

### Alternatives

- Evolve GDPR into global standard e.g. via ISO. Businesses often prefer ISO type standards with clear requirements, less interpretation necessary. EU Regulations more generic, contain legal jargon
- Incorporate DAPF into another standard e.g. GDPR
- National rules not viable in increasingly global economy

### Owner

- The Information Commissioner's Office (ICO) enforces GDPR in the UK. ICO can issue warnings, impose temporary or permanent bans on data processing, order restriction or erasure of data and data transfers and issue substantial penalties
- DAPF created by Ofgem, enforced by independent panel under Smart Energy Code

### Adoption

- GDPR replaces outdated 1995 Data Protection Directive
- Developed by European Commission. Directly applicable in all EU countries. Mandatory implementation in each Member State. The Department for Culture, Media and Sport was responsible for implementing GDPR in the UK
- Significant interpretation of GDPR text to consider which requirements apply and in what way
- 21 month implementation period was challenging
- GDPR was substantial step change, DAPF less so
- Ofgem enforces DAFT through license conditions
- Consumers must 'opt-in' to share their data under DAPF

### Impact

- GDPR initially perceived as onerous at go live
- Unexpected catalyst for new data privacy rules outside of EU (California, New York and China)
- "Check box" fatigue consumers do not read the consents and just check the box, waiving privacy rights
- Restricted access for EU citizens to software such as Apple or Google Store apps or US based website content from companies not wanting to 'deal' with GDPR
- No guidance on levels of punishment, just maximum
- Number of high profile cases, Facebook and Marriot Hotels. Marriot Hotels fine less than expected as they responded positively to breach
- Too early to tell if enforced consistently across EU
- Anonymisation through aggregation makes not personal
- DAPF not as adaptable as needed – requires amendment to accommodate half hourly settlement
- DAPF: Unintended incoherence between GDPR and DAPF. As smart meter roll-out progressed and GDPR became better understood there are instances where DAPF and the Smart Energy Code represent a more stringent requirement than GDPR

# 7. Case study findings

The case studies consider a range of standards and standards bodies which have been deployed within the energy sector. In this section we consider some of the key stages of standard development cycle.

## 7.1. Initiation and prescription

All data standards considered originate from an identified gap, need or problem. The selected case studies show a mix of **anticipatory** and **reactive** drivers to develop and introduce a data standard or modify an existing data standard.

The ENTSO-E transparency platform was developed in anticipation of the pan-European electricity market, and although that market is not yet fully operational, the existing data pertinent to cross-border trading was fragmented and of inconsistent quality. The IEC standards pursue both anticipatory development, driven by technological advancements such as smart communication protocols for substation devices at electrical substations (IEC 61850) and reactive amendments to keep existing standards relevant. DataHub Denmark and GDPR were reactive to address inefficiencies and shortcomings in existing regulatory frameworks where the overriding need was for greater standardisation.

All the case studies are highly prescriptive which are neither quick nor easy to change. There are various management theories, such as Design for Douglas, that describe how traditional management systems and in turn standards, are highly prescriptive to design out variation, risk and perceived malpractice. Limited agility is only appropriate for highly structured predictable environments, where additional dynamism is required principle-based data standard may be appropriate.

The current energy system is complicated. The future energy system will become an increasingly complex system as it rapidly becomes smarter, increasingly intermittent and more decentralised. Regulatory frameworks, including data standards, must evolve to facilitate this transition. The slow reactive evolution of standards can inhibit innovation and add to the regulatory burden. A more 'agile' principled approach could be employed to manage the increasing complexity where appropriate.

Anticipatory standards development should start with why, be clear on intent, incorporate constant feedback, embrace rapid failure, and utilise an iterative approach to value creation. These design principles can be used for developing or modifying a data standard. Anticipating future data standard needs and using agile principles to develop them will therefore become increasingly important to manage the pace of the energy transition.

Reactive standard development or modification can be effective where the subject area is well known, established or is more predictable. The recent rate of change the industry is experiencing suggests this may become a less attractive approach to develop new standards, and it may be better suited to modifying existing data standards.

## 7.2. Development

In all case studies a single organisation was responsible for developing the data standard: the IEC, Energinet, ENTSO-E, the European Commission and Ofgem. However, the organisations took different approaches to coordinate and develop a data standard.

The IEC and ENTSO-E employ decentralised committee structures as a form of governance. IEC committees are made up of delegates from national committees while ENTSO-E committees consist of a cross-section of volunteers from its member countries. The delegates are embedded in the end to end development of the data standard.

The European Commission, Ofgem and Energinet used centralised structures. These rely on a central development team combined with periodic engagement and consultation with a wide variety of stakeholders.

The case studies show both centralised and decentralised approaches can be effective ways to development data standards.

## 7.3. Adoption

In addition, the case studies highlight different methods to adopt or impose data standards.

IEC standards are adopted voluntarily. There is no ability to enforce compliance without putting additional measures in place. This has three implications.

- A 'compliance by default' situation emerges where most companies volunteer to adopt a standard because it meets their requirements, improves product quality and operational consistency. The adopting organisation has identified a tangible benefit which drives voluntary adoption and compliance.
- Voluntary adoption reflects positively on the decentralised co-development process as it indicates users and stakeholders have a high degree of understanding and confidence to unilaterally adopt the data standard.
- Where enforcement is deemed necessary, there are examples of governments adopting IEC standards into law to impose enforcement and compliance frameworks. This tends to occur where the standard has safety implications or there is an additional push needed to consolidate the gains made and ensure full adoption across the industry.

Legislation was chosen to impose DataHub Denmark, the ENTSO-E transparency platform, GDPR and DAPF. This creates the prospect of reputational or financial risk which in turn generates a strong incentive to comply. The substantial fines that can be imposed for lack of compliance with GDPR are an example of a traditionally strong incentive mechanism. Adoption is driven by the legal need for compliance and value of standardisation is not a paramount consideration.

The case studies contrast the 'carrot' and 'stick' approaches to adopt or impose data standards.

The combination of collaborative development and voluntary adoption has a proven track record in IEC data standards and provides insight on how to foster value-based adoption however, it should be recognised that many standards are developed but not widely adopted.

Centralised development and mandated compliance regimes are traditionally used as deterrents for inappropriate conduct but can be used to drive adoption of standards which provide wider sector benefit rather than significant, direct value to those implementing the standard. Mandating standards can be effective but there is a risk of disguised compliance or poor consistency across organisations and undermines the value of standard.

There are advantages and disadvantages under either approach. For policy makers, the underlying objective of the standard itself can guide the choice of one approach or the other. Where a clear value statement can be articulated for a wide range of actors and the aims of all involved are consistent or at least compatible then a value based, voluntary adoption has a chance of being effective. Where the key intended beneficiary is consumers, or the benefits are unevenly distributed across the actors a directive approach is a more natural fit.

## 7.4. Implementation and enforcement

Coordinated implementation and enforcement is important to ensure a level playing field and create consistency in increasingly global, interconnected markets. This is particularly relevant for European or multi-national standards. The ENSTO-E transparency platform, GDPR and the integration of Nordic retail markets illustrate this.

The GDPR case study offers some interesting implementation possibilities. As a European law, GDPR applies uniformly across many countries. However, compliance is adjudicated at national level and enforcement may diverge as a result. Divergence can occur when national regulators are inconsistent with the breaches they choose to pursue or if they impose vastly different penalties. GDPR is less than a year old and the evidence to date it is unclear whether cross boarder difference will emerge in practice. Within the single digital market this could cause certain businesses or industries to locate themselves in countries that are less willing to enforce or penalise breaches. This would undermine the integrity of scheme.

Policy makers will need to consider the underlying objective of the data standard in choosing a compliance and enforcement framework. Value based adoption provides a natural incentive to comply with a standard. There may be little reason to mandate compliance as a result or if a legal obligation to comply is necessary financial incentives may not be. Mandating compliance is often to encourage behaviour that may not be wilfully provided. In such circumstances, incentives such as financial penalties or reputational harm provide a suitable deterrent to combat any adverse behaviour.

## 7.5. Adaption and extension

There is an increasing need for cross-sector thinking, collaboration and coordination as energy transitions to become a service, particularly in the retail sector. The standardisation and integration of data sets to gain richer insights. The DataHub Denmark case study eludes to this potential as non-traditional participants such as Google Home look to participate in the energy value chain with greater integration of Nordic retail markets.

Within the UK, there are moves towards cross infrastructure standardisation of data structures to enable future digital twin use cases. The Digital Framework Task Group are focused on building the right information management and digital frameworks to enable data which is drawn from disparate sources to be utilised in a common way.

# 8. Insight and Recommendations

The case studies provide a number of useful insights for data structures, interfaces and standards as part of the Energy Data Taskforce. The underlying problem or need is the key determinant to guide policy makers on the approach to take to develop or modify a data standard.

The energy system is rapidly becoming smarter, increasingly intermittent and more decentralised. Regulatory frameworks, including data standards, must evolve to facilitate this transition. Anticipatory data standard development the use of agile principles will help regulatory frameworks keep pace with this transformation. A reactive approach is appropriate where change is slower or where regulatory frameworks are established and stable.

Consistent implementation and enforcement of multi-national data standards is essential to maximise their effectiveness. National implementation and enforcement introduces the potential for divergence that could undermine the data standard itself. Compliance and enforcement frameworks should complement the existing framework to develop or modify the data standard. The choice on the approach should ultimately be driven by the underlying objective of the data standard itself.

There is a growing need for cross-sector thinking, collaboration and coordination as energy transitions to become a service. The retail energy sector is a primary candidate for this as non-traditional player increasingly participate.

## 8.1. The Principle and Approaches

**Structures, Interfaces and Standards: A Proportionate approach to standards**

Data structure and interface standards should be adopted or developed where appropriate to enables data across organisations to be aggregated and utilised more easily.

The Taskforce proposes three approaches to standardisation that respond to the varying situations which may help or hinder the development and adoption of useful standards.

**Standardisation Driven by Value:** Much of the required standardisation can be driven by industry and international groups when there is a clear, shared value for all participants.

**Government or Regulator Led Adoption:** Where standard adoption has stalled there may be need for the government or regulator to intervene in order to consolidate the gains made and maximise the value to the industry as a whole. Intervention could take the form of enhancing the value case by linking standardisation to an industry function e.g. reporting or flexibility services. Alternatively, the standard could be mandated by legislation, licence or code, this can result in surface level compliance which does not deliver the expected benefits.

**Government or Regulator Led Development:** Where there is little value to industry actors or value is unequally distributed, it may be necessary for the regulator or government to drive standard development. This can be through a focused industry group convened by government or the regulator or it could be developed by an independent group. Adoption may be voluntary or led by the government or regulator, see above.

## 8.2. Application of the Approaches

In this subsection we outline a few concrete examples of data structure and interface standardisation issues, identify the characteristics and map to one of the approaches described above

### 8.2.1. Flexibility

As flexibility markets and platforms emerge, network operators have been cautious of vendor lock in and pushed for open data structures to enable interoperability. Data interoperability will allow network operators and flexibility providers to communicate clearly and enable new business models to develop. Whilst interoperability is important, it will be necessary to develop formal standards as the industry grows, and the number of actors increases, to ensure that emerging products and platforms are truly interoperable.

Ofgem, through the Platforms for contracting flexibility project, have independently reviewed the role of platforms for flexibility, noting that for traded flexibility value to be realised, coordination and stacking across markets is a priority, and that data interoperability is central to facilitating this.

*Standardisation Driven by Value*

The industry is well placed to lead on the development and adoption of flexibility standards, but the regulator and government should monitor to ensure things progress at the required pace.

### 8.2.2. Common Information Model

The common information model (CIM) is a data structure standard which was one of the subjects of case study 3. During the course of this taskforce it has become clear that CIM has a great amount of value for Electricity transmission and distribution. Many of the operators have started to transition to a consolidated CIM representation of their network, with some having reached a very good level of maturity. However, there are some networks which have not been able to identify sufficient value to make the investment required.

*Standardisation Driven by Value* ▸ *Government or Regulator Led Adoption*

The taskforce identifies that CIM offers value to the network operators but also system operators, innovators and the regulator alike. Therefore we believe that the government and regulator should take actions to embed CIM into regulatory processes and new markets to clarify the value statement and ensure that CIM creates maximum value for the Energy System.

### 8.2.3. Asset Registration

An increasingly diverse range of energy generation and storage assets are being deployed across the system and at present there is no coordinated approach to asset registration. This means that it is hard to build a complete picture of all assets, the data gathered about assets is inconsistent and when an asset owner tries to migrate from one service provider to another they have to 'reregister' which adds to the overall confusion.

*Government or Regulator Led Development*

The wide range of organisations involved, and the variety of objectives means that a government or regulator led standardisation would be most likely to lead to a satisfactory outcome. Development of a minimal, interoperable data standard would dramatically increase the interoperability of asset data and enable the development of solutions which deliver a much greater level of asset visibility.

# 9. Summary

Standardisation needs to be approached with care, imposing standards too early stifles innovation but leaving it too late entrenches inefficiency. When standardisation is needed, it is important to identify the characteristics of the problem and adopt the right approach to ensure the best outcome is delivered in the most efficient way.

# Appendix A Bibliography

This appendix sets out the sources used to compile the case studies.

## A.1 International Electromechanical Commission


- https://www.iec.ch
- https://www.iec.ch/perspectives/general_public/iec_creation.htm
- https://www.iec.ch/standardsdev/how/management.htm
- https://www.iec.ch/about/profile/funding.htm
- https://www.iec.ch/standardsdev/resources/processes/work/
- https://www.iec.ch/conformity/systems/
- https://mep.utah.edu/10-reasons-why-you-need-iso9001-certification/
- https://www.iecee.org/about/batteries/
- https://www.iso.org/sites/policy/
- https://www.iso.org/sites/policy/sectorial_examples.html
- https://en.wikipedia.org/wiki/List_of_International_Electrotechnical_Commission_standards
- Using and referencing ISO and IEC standards to support public policy (link)


## A.2 DataHub Denmark


- Making the Most of the Introduction of Centralized Data Hubs in the Nordic Energy Market, IDC Energy Insights (link)
- Nordic Council of Ministers, Nordic Data Hubs in Electricity System – Differences and Similarities, 2017 (link)
- NordReg, Implementation of data hubs in the Nordic countries, Status Report, June 2018 (link)
- "My Energy Data" - European Smart Grids Task Force Expert Group 1 – Standards and Interoperability, November 2016, (link)
- Open Energy Data in Denmark, Energinet, December 2017 (link)
- https://en.energinet.dk/Electricity/DataHub
- https://www.thema.no/can-the-nordic-datahubs-support-retail-market-harmonisation/


## A.3 Common Information Model


- https://www.westernpower.co.uk/projects/common-information-model
- https://www.westernpower.co.uk/docs/Innovation/Current-projects/Common-Information-Model/CIM-Registration-Document-Superseded.aspx
- https://en.wikipedia.org/wiki/Common_Information_Model_(electricity)

## A.4 ENTSO-E transparency platform

- Commission Regulation (EU) No 543/2013 on submission and publication of data in electricity markets (Transparency Regulation) (link)
- https://transparency.entsoe.eu/
- ENTSO-E Manual of Procedures (link)
- https://www.entsoe.eu/news/2019/02/01/tsos-increase-number-of-open-data-available-through-entso-e-s-transparency-platform/
- https://www.entsoe.eu/major-projects/rscis/
- https://www.edsoforsmartgrids.eu/
- http://www.dthomas.co.uk/content/energy/generation/ETR-Remit-Modis.shtml
- https://www.emissions-euets.com/regulation-on-submission-and-publication-of-data-in-electricity-markets

## A.5 General Data Protection Regulation and the Data Access and Privacy Framework

- Commission Regulation (EU) No 679/2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data (General Data Protection Regulation) (link)
- Information Commissioner's Office, Guide to the General Data Protection Regulation, March 2018 (link)
- IT Governance, GDPR Implementation Review (link)
- Ponemon Institute, The Race to GDPR report (link)
- https://www.theguardian.com/world/2018/nov/30/marriott-hotels-data-of-500m-guests-may-have-been-exposed
- https://www.theguardian.com/technology/2018/oct/03/facebook-data-breach-latest-fine-investigation
- https://www.theguardian.com/technology/2018/may/24/sites-block-eu-users-before-gdpr-takes-effect
- https://www.forbes.com/sites/forbestechcouncil/2018/08/15/15-unexpected-consequences-of-gdpr
- https://www.theguardian.com/technology/2018/may/25/gdpr-us-based-news-websites-eu-internet-users-la-times
- Ofgem, Access to half-hourly electricity data for settlement purposes: a Data Protection Impact Assessment, July 2018 (link)

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