

Submission on a proposed Data Act for the European Union from the perspective of open energy system analysis

European Commission public consultation closing 25 June 2021

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1 Summary

This section provides a summary of our views. Some of the key points given here are later expanded upon. Our remarks are made in the context of our domain, which is **public-interest energy system analysis** with an emphasis on open source development, genuinely open data, and scientific cooperation. We presume that the data under discussion should be machine-readable.

1.1 Our requests

On the basis of the inception impact assessment report issued by the Commission ([European Commission 2021](#)), the submitters advocate the following:

1. that all information made public under **statutory reporting** — including, but not limited to, system status, market monitoring, and mandatory public disclosure — be machine-readable and explicitly open licensed (for instance, disclosure reporting by electricity market exchanges appears to be implemented so as to intentionally restrict recovery)
2. moreover, under current legislation much of the material under statutory reporting can be **legally withdrawn from public access after 5 years** (not that we have examples of this occurring)
3. that **closed public-interest databases** (such as the ENTSO-E sponsored Pan European Market Modelling Database) be made public and explicitly open licensed
4. that **business-to-government** (B2G) information, suitably aggregated, anonymized where necessary, and open licensed would substantially improve the accuracy and legitimacy of our analysis
5. further to the above, typical construction and operations **cost information** would greatly assist
6. that the Commission provide **legal opinions on the interoperability** of the growing number of **national level data licenses** within the European Union (including the German dl-de/by-2.0 and French Licence Ouverte licenses and also the United Kingdom OGL-UK-3.0 license, noting that the UK National Grid continues to supply data to the ENTSO-E Transparency Platform post Brexit) with regard to the Creative Commons CC-BY-4.0 license — or alternatively legislate to prevent a proliferation of **data silos** that would naturally arise from the use of legally incompatible national data licenses
7. that **96/9/EC database protection** has outlived any usefulness and should be repealed — indeed, database protection in our realm provides only legal uncertainty, inhibits risk-averse institutions and researchers but not others, and is routinely ignored by data portals operating from the United States in any case

1.2 Commentary

Our community (see section 2.2) has been **formally engaging with the European Commission** on these matters since 2017 ([Morrison et al 2017](#), [Morrison 2020](#)). And also with various providers of information under statutory reporting within the European energy sector since somewhat earlier. Indeed, almost none of the issues raised here are new. What is novel is the increasingly deep community-wide cooperation on data management within our domain, a dynamic that has only really become evident in the past two years (see section 4.1).

Our community is increasingly desperate for access to reasonable quality **legally-reusable public-interest data** covering the European energy sector — indeed it is hard to overstate how debilitating the current legal regime is for those pursuing independent public-interest energy systems analysis. For us, “legally-reusable” means explicitly licensed under Creative Commons CC-BY-4.0, CC0-1.0, or something inbound compatible. That is because any other choice of license, even if technically data-capable and

approved as open,¹ will necessarily create **data silos** due to legally incompatible licensing requirements (see section 3.7).

As indicated, our own **data management paradigm** is shifting from one of classical databases and schemas, whether local or web-accessible, to domain-wide data use and management (see section 4.1). This paradigm shift is contingent on two factors. First, sufficient community agreement on and adoption of high-level data “specifications” covering specifically: structured semantics (and preferably a formal ontology), metadata practices, collection protocols, and information exchange formats. And second, the application of open licenses as articulated in the previous paragraph.

Our community deals only with **non-personal information** that has been or can be **legitimately published** — hence issues of personal and commercial privacy are not material.

We will later provide examples of the hindrances we collectively encounter that derive primarily from the **current statutory environment** in Europe. These issues can, therefore, be best remedied by legislative reform. In which case, we welcome the opportunity to offer input to a **proposed Data Act** based on our experiences. We will also cite some current instances of good practice to indicate how things could and should be (see section 4.5).

Many in our community also work for **risk-averse intuitions** and a presumption of free-to-republish in the absence of suitable open licensing is not an option. Furthermore, many academic journals require an explicit declaration that such rights are held. These rights are then often routinely transferred to the publisher although the authors may also select from a range of Creative Commons licenses.²

Analysis from **trusted and reliable sources** is critically important for the rapid and complete decarbonization of our society and that analysis is, in turn, critically dependent on good quality usable and reusable data. Moreover science is facing a **reproducibility crisis** and the measures we advocate here should also assist.

If the proposed Data Act actions **only one of our concerns**, let it be this:

- mandate that all information under statutory reporting be licensed Creative Commons CC-BY-4.0

2 Standing

We submitters are part of an open energy modelling community and allied research communities and many of us participate in the [Open Energy Modelling Initiative](#) (see section 2.2). The Initiative itself is a network of individuals and is not incorporated under law. Our [mailing list](#), established in October 2014, now numbers over 800 and our [discussion forum](#) over 700. The majority of participants reside in Europe.

The Open Energy Modelling Initiative has no process for canvassing and endorsing policy positions. Nor has it legal standing. So while some of the material in this submission was discussed on Initiative forums, the views expressed here are solely those of the named submitters. The European Commission classified us as an “informal organisation” for the purposes of previous submissions in 2017 and 2020.

2.1 Submitters

Background on the individual submitters, their affiliations, and the open projects they contribute to, as follows:³

¹ The United Kingdom-based Open Knowledge Foundation (OKF) act as the licence steward for data-capable open licenses and adjudicates on conformance with its Open Definition 2.1.

² This practice of copyright assignment no doubt falls outside of the scope of a Data Act, but is nonetheless something that the Commission should examine and remedy in the context of open science policy.

³ One submitter is resident outside the European Union. This is acceptable under Commission consultation guidelines.

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2.2 Open Energy Modelling Initiative

As indicated, the Open Energy Modelling Initiative, shortened to “openmod”, is an informal network of energy system modellers and analysts committed to open source software, genuinely open data, open science, and transparent policy analysis. The openmod was established six years ago in Berlin primarily by German researchers together with researchers from Denmark, Austria, and Switzerland. The community is now active in the United States and Canada, with interest from India, Africa, South America, eastern Europe, and Russia, and more latterly the United Kingdom. The openmod works solely in english although its first meeting in September 2014 was conducted in German.

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The Initiative has held 13 workshops in Europe and elsewhere and these attract researchers, private sector modellers, and on occasion the interested public. The last physical meeting, pre-Covid, was held in Berlin in January 2020, spanned three days, and brought together 190 participants. Planning has begun for the next physical workshop, contingent on pandemic control measures becoming sufficiently relaxed.

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As indicated, the openmod does not endorse individual projects, nor does it form and advocate policy positions. This being an unwritten but nonetheless negotiated community norm (Morrison 2019). This submission is therefore solely in the name of the listed submitters.

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3 Legal issues

This section looks at some of the legal issues that we believe should be expressly traversed and resolved where possible. This section works from the more specific to the more general. Some of the suggestions below may well be rendered unnecessary if the Commission decides to address the informing concerns at a deeper level.

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3.1 Specific legal points

1. a determination on whether human authorship is a necessary condition for copyright
2. a determination on whether the machine processing of a legitimately held copy of a collection of atomic data under copyright constitutes civil or criminal infringement
3. improve legislative support for the dedication of information to the public domain or some equivalent status
4. amend the 96/9/EC Database Directive to better reflect the intention of lawmakers regarding thresholds and scope and provide guidance on what constitutes “substantial investment” and “substantial extraction” and how that information should be transmitted to users

5. revise the statutory definition for “reuse” provided in the 2019/1024 Open Data Directive under §2.11 — currently and perversely remapped to “use” — so as to provide a definition consistent with the remainder of that statute, including recital 16, its title, and its overall intent⁴
6. either clarify or remove the term “primary owner of the data” from Regulation 534/2013 at §2.23, which covers the statutory reporting of electricity market information
7. explicitly waive 96/9/EC database protection by default on public sector information

We note the concept of a novel industrial property right (IPR) that the Commission was earlier pursuing seems to have fallen by the wayside ([Stepanov 2020](#):80). 18

We note that the notion of high-value datasets (HVDS), as given in the 1024/2019 Open Data Directive, does not include the energy sector. This issue was raised in 2020 ([Morrison 2020](#)) and should be revisited by the Commission. 19

And we note the Commission will release its “fit for 55” energy and climate package on 14 July 2021. That package will doubtless draw very heavily on the kind of numerical data we are discussing here. 20

3.2 Information under statutory reporting

Much of the information that energy system modellers reply upon derives from statutory reporting — also referred to as mandatory public disclosure when dealing with financial information. Reporting divides in system-related and market-related, depending on the implementing statute and its objectives. This section briefly describes the entities involved and then traverses issues of licensing, longevity, and access as they relate to data made public. 21

3.2.1 Entities and regulations

The [ENTSO-E](#) and [ENTSOG](#) umbrella organisations span the electricity and gas transmission system operators (TSO) respectively. Both organisations are required by law to collect and make available system and price information. This written submission deals solely with ENTSO-E although broadly the same matters would apply to ENTSOG. More specifically ENTSO-E is required to operate a “central information transparency platform”, known as the Transparency Platform, under Regulation 543/2013 ([European Commission 2013](#)). The Platform itself was more recently described and reviewed by [Hirth et al \(2018\)](#). This statutory reporting is designed to enhance system security, uncover latent business opportunities, encourage new entrants, and allow customers to better evaluate the supply risks they face. 22

Similarly, the respective market operators are required to publicly disclose information that could potentially or unduly distort the operations of the various physical, ancillary services, and derivatives markets that fall within the single energy market framework of the Europe Union. The [European Energy Exchange \(EEX\)](#) do so under Regulation 1227/2011 ([European Commission 2011](#)), commonly referred to as REMIT. The Agency for the Cooperation of Energy Regulators (ACER) issues guidelines on applying REMIT provisions ([ACER 2016](#)). 23

Regulations 1227/2011 and 543/2013 are the key statutes governing transparency and statutory reporting in our domain, but other regulations also mandate the provision of public information and related processes. Our representations are therefore not limited to the two regulations just cited. 24

Section 4.4 further describes community efforts to engage with ENTSO-E and EEX to remedy the lack of 25

⁴ Both spellings of “reuse” and “re-use” appear in Commission documents. This submission adopts the first variant.

open licensing on statutory reporting and related issues.

3.2.2 Licensing

The underlying problem is that the legislation that mandates statutory reporting is silent on licensing. Thus although the information is publicly available at some minimal level, it remains legally encumbered — or at least, potentially so. The main issue is the uncertain presence of 96/9/EC database protection (Hirth 2020:10). Giannopoulou (2018:5) reviews the status of 96/9/EC database rights in public sector information (PSI) and concludes there are good reasons to believe that no such protection applies. A careful reading of recital 41 of the Database Directive could easily arrive at the same view in regard to information under statutory reporting. Our understanding of the present situation is as follows:

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EXAMPLE 1 **ENTSO-E Transparency Platform licensing** ENTSO-E is not able to add CC-BY-4.0 licenses to Transparency Platform datasets because there is no consensus among member organisations to do so. This lack of licensing is inhibiting efforts to create a reusable data pool for open energy system analysis. Participants from the Open Energy Modelling Initiative have been liaising with ENTSO-E for some years on this question but have yet to make tangible progress.

EXAMPLE 2 **EEX public disclosure licensing** Participants from the Open Energy Modelling Initiative have attempted to liaise with EEX on open data licensing to no avail.

The following example shows how a US-based portal is able to harvest from the Transparency Platform and effectively ignore any legal protections.

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EXAMPLE 3 **ENTSO-E Transparency Platform harvest** The World Resources Institute (WRI) draw from the Transparency Platform to stock their Power Explorer portal and then offer that data under CC-BY-4.0. We understand ENTSO-E contacted WRI and were told that the Database Directive does not apply to servers operating from within the United States.

Further background on open licensing is given in section 3.7, including a graph of license compatibilities.

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We believe that the Commission should propose that the European Union make CC-BY-4.0 licensing mandatory on all material published under statutory reporting.

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3.2.3 Longevity

Turning to data longevity, European Commission Regulation 543/2013 states at 3§1 (European Commission 2013:4) (emphasis added):

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“The data shall be up to date, easily accessible, downloadable and available for **at least five years**. Data updates shall be time-stamped, archived and made available to the public.”

So after five years, datasets hosted by ENTSO-E can go dark and there is little or nothing that energy system analysts could do about that under present conditions. Hence:

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EXAMPLE 4 **ENTSO-E Transparency Platform longevity is truncated** The Transparency Platform need only make public datasets available for a maximum of 5 years to comply with current regulations.

We add that we know of no examples of datasets being removed from the Transparency Platform due to this provision.

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3.2.4 Accessibility

Data access is crucial and datasets must be available in machine-readable formats. Here is a problem our community currently faces in relation to public-interest market reporting: 33

EXAMPLE 5 EEX public disclosure is viewable but not otherwise recoverable The [European Energy Exchange](#) (EEX) market operator serves public disclosure and other statutory reporting in such a way that it can be viewed on screen, but cannot be copied, extracted from HTML, otherwise web-scraped, or downloaded. In other words, that data is not recoverable or numerically usable in any meaningful sense. We have no idea if this practice is legally compliant, but it must certainly be counter to the spirit and intent of the legislation that mandates disclosure in support of the public interest.

Repeated attempts within our community to liaise with the EEX market operator have so far yielded nothing substantive. It would appear that EEX policy is to release as little information as possible under the most restrictive conditions possible. 34

3.3 Business-to-government (B2G) information publication

Our community has begun to consider the option of obtaining key metrics via mandate, suitably aggregated, anonymized where necessary, and made public under suitable open licensing. Indeed, we recently wrote the following in a community interview in April this year ([Cooper 2021](#)): 35

“Cost information is necessarily estimated in most cases because this information is normally commercially sensitive. Notwithstanding, the European Commission, as well as other governing agencies around the world, could collect cost and performance information under a public interest rationale and make key metrics available in generic form. Future costs and performance projections, which can also be subject to technological learning, are necessarily speculative.”

This is a topic covered extensively in a High-Level Expert Group on B2G report ([HLEG on B2G 2020](#)) which also makes a number of references to “aggregated, anonymized” information. Notwithstanding, the authors barely mention energy and decarbonization data in this exercise. Indeed, it seems that our domain is not much considered when investigating this kind of reporting (nor for HVDS for that matter). 36

3.4 Incumbent databases

We use the term “incumbent database” to describe databases developed in a regulatory context that are not made available to independent researchers under explicit open licensing — earlier tagged “closed public-interest databases” under request 3 in section 1.1. 37

EXAMPLE 6 PEMMDB database remains closed The Pan-European Market Model Database (PEMMDB) is not accessible as best we can determine.⁵ Moreover, results using this particular database are often quoted in presentations aimed at influencing public policy. And yet independent researchers cannot gain access. The United Kingdom [CLEARHEADS](#) project would like to connect but has been unable to do so.

We view the practice of incumbent databases as deficient, an inefficient use of public resources, and counter to the norms of both science and public policy development. Nor is the PEMMDB database an isolated example. 38

⁵ The ENTSO-E legal department was contacted on this matter on 11 June 2021 and that appears to be the correct status at that juncture.

3.5 Public records

We simply raise this issue but make no recommendations. As energy system models become more resolved in spatial terms, some are starting to represent individual buildings and streets. As a result, these models draw on municipal public or associated commercial databases records covering such facilities. No strictly personal information is involved, but this analysis does mark a transition regarding the use of detailed public records. It also raises questions about the legal status of such records and what measures are in place or should be in place to protect personal privacy and private life.

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3.6 Artificial intelligence

Some in our community work with artificial intelligence methods. Notwithstanding, the focus of this submission is on primary data. That is the kind of data that would also normally be used to create training sets.

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3.7 License choice and license compatibility

The debate on the best choice of data license or set of licenses rarely looks at the question of legal interoperability — meaning can material under one licence be mixed in with material under another license. Rather, the merits of individual classes of license are debated and then the merits of individual licenses. This same discussion takes place within our community too. But this approach tackles the problem from the wrong end. Instead, licence interoperability must be a paramount consideration. For background, please see this recent thread:

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- [Which open data license](#)⁶

The open data-license compatibility graph (figure 1) summarises the key issues.⁷

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One conclusion is that the following subset of open data-capable licenses should be used exclusively:

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- Creative Commons CC-BY-4.0 license
- Creative Commons CC0-1.0 license
- any license inbound compatible with the above

If the Commission wish to encode this recommendation, the following abbreviated phrase should suffice: use of CC-BY-4.0, CC0-1.0, or something inbound compatible.

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3.8 Of limited relevance

For completeness, the following topics are of limited relevance to our community. The bulk of proposed measures in the inception report ([European Commission 2021](#)) are aimed at improving business-to-business (B2B) flows while simultaneously protecting private communications or promoting fairness in regards access to B2B information and participation in nascent digital markets.

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4 Data management within our domain

This section describes some relevant themes that arise from within our domain of energy system modelling and analysis. This material is intended to primarily provide context.

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4.1 A paradigm shift

Data practices within our domain appear to be partway through a shift in paradigm from localised management to domain-wide cooperation. The idea of local, as used here, extends to databases and their

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⁶ <https://forum.openmod.org/t/2611>

⁷ Various national data licenses are to be added in due course.

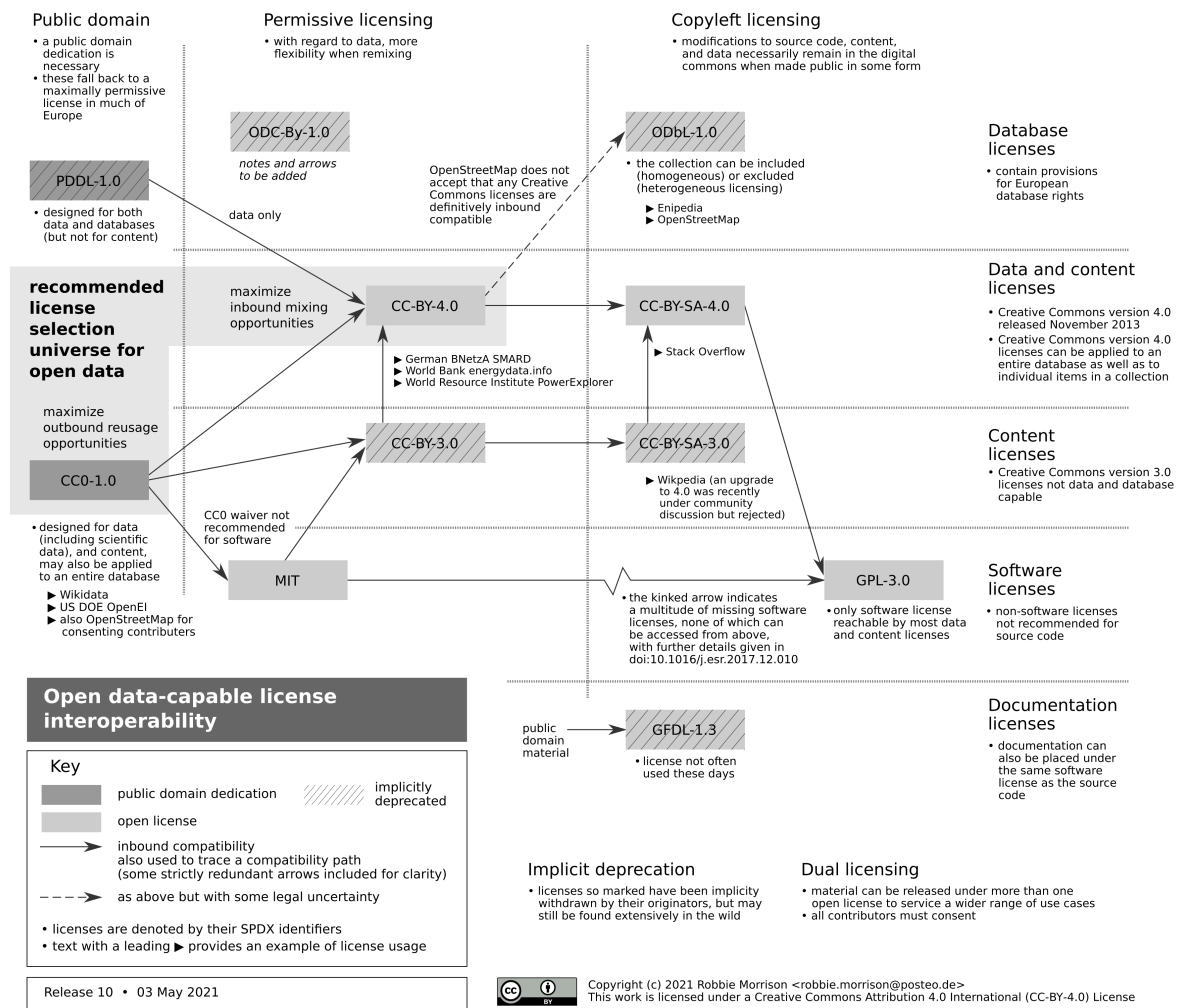


Figure 1: Open data-capable license compatibility graph.

schemas accessible from the web but not otherwise coordinated.⁸ This change in practice has been evident in our community for about two years now and involves a number of component projects implicitly coalescing to produce this larger vista. Most of the relevant projects are summarised in this thread:

- [Domain-wide data projects](#)⁹

This switch in data practices necessarily parallels and lags an earlier transition in modelling practices from closed source to open source (Morrison 2018). And just as open software licensing was material to that coding revolution, open data licensing is a necessary condition for the new data management paradigm being described.

Looking ahead, one logical endpoint would be for energy system data to form part of a common pool under community curation. Data semantics would move from a proliferation of localised schemas, as indicated, to an agreed formal ontology. Metadata would likewise be standardised. New model-agnostic and smart “data systems” offering coherent and complete datasets covering particular geographic regions would

⁸ A database schema describes the structure of a given database in a formal way. Broadly a schema may cover the types of data that can be stored, the meanings of that data in a consistent manner, the internal organisation of the database itself, and any other relevant rules, constraints, and conventions in play.

⁹ <https://forum.openmod.org/t/2553>

be widely shared. Data portals would be augmented by a graph of semantic triples relationships, some referencing individual datasets, to realise the concepts behind [linked open data](#) (LOD). Smart “data buses” would interface between analysts and these web-based resources to account for operational deficiencies in the internet, such as inadequate guarantees on persistence. Future scenarios would be managed collectively and the outputs from different models compared and dissected.

As indicated, quite a few of the building-block projects needed are currently being realised. To this end, two key high-level projects are covered shortly in sections [4.2](#) and [4.3](#).

Outside our community, the interface between policy development and numerical analysis is also trending toward open data. [Süsser et al \(2021:1\)](#) review that boundary and opine: “Our study implies that greater transparency, including open-source code and open data, and transdisciplinary elements in modelling could increase model legitimacy and impact in policymaking”.

4.2 Semantics

One key part of the paradigm shift under discussion is a shared semantics. Our community is currently developing an Open Energy Ontology (OEO) ([Booshehri et al 2021](#)). That particular effort could have built on earlier scientific work but was prevented from doing so through a lack of suitable licensing, thus:

EXAMPLE 7 The EnArgus ontology The EnArgus ontology was developed with German public funding to support public decision-makers but remains proprietary nonetheless ([Booshehri et al 2021:10](#)). As a result, none of the substantial work invested could be recycled by the OEO project, causing both delays and expense that our society can ill afford at present.

It is worth noting too that similar work on ontologies is being undertaken by the smart systems community under the rubric of “digital twins”. Our community informally coordinates with these efforts via the Linux Foundation LF Energy data architecture working group.

4.3 Metadata

Metadata policy and practices are being pursued by the EERAdata metadata project ([Wierling et al under review](#)). This initiative covers non-open data and extends well beyond our community. The details of that project are not relevant here but what is notable is that the process strives to be inclusive and consensus-based.

Entities providing information under statutory reporting should also adopt these policies and practices where applicable and practicable.

4.4 Interacting with statutory entities

Participants of the Open Energy Modelling Initiative have been interacting with ENTSO-E for quite some time. For instance, this thread was initiated in October 2017 and explores various opportunities for cooperation:

- [Cooperating with ENTSO-E on data](#)¹⁰

We understand that ENTSO-E is committed to open data but that they are a membership-driven organisation and that all members would need to consent to a policy of CC-BY-4.0 licensing before embarking on such. An alternative is, of course, that the European Union mandate such licensing. And after at least

¹⁰ <https://forum.openmod.org/t/367>

four years of engagement with ENTSO-E with no apparent movement, that is exactly what we are asking the Commission to propose.

All attempts within our community to engage with the EEX energy market operator have to date proved fruitless. Again, mandating suitable open licensing would seem the most sensible path forward.

4.5 Examples of good practice

An example of good practice is the recently released database of European energy storage technologies and facilities. The database is published on the data.europa.eu portal under CC-BY-4.0 licensing and accompanied by documentation.

- [announcement posting on the Open Energy Modelling Initiative forum](#)¹¹
- [Database of the European energy storage technologies and facilities](#)¹²

The [Open Power System Database](#) (OPSD) is another example of good practice ([Wiese et al 2019](#)). The OPSD draws from ENTSO-E Transparency Platform, curates that material in a transparent, reproducible, and open fashion, and then republishes it for use by researchers and others. The legal context of the datasets served remains nonetheless grey. Hence:

EXAMPLE 8 OPSD portal licensing The OPSD project (see section 4.5) also serves data drawn from the Transparency Platform but is unable to apply CC-BY-4.0 licensing for the reasons indicated in section 3.2.2.

The German BNetzA [SMARD](#) site also source from the Transparency Platform, but then offers the data served under CC-BY-4.0. BNetzA does so on a basis of a legal opinion.¹³

EXAMPLE 9 German BNetzA SMARD portal The SMARD portal is able to draw material from the ENTSO-E Transparency Platform and make it available under CC-BY-4.0 licensing.

The Wikipedia article on [open energy system databases](#) may be worth reviewing by the Commission as well.

Finally, the Commission could consider transferring and cleaning core material from the ENTSO-E Transparency Platform and EEX reporting to the data.europa.eu portal for reasons of access, persistence, and licensing.

4.6 Community curation and related projects

The paradigm shift mentioned earlier (see section 4.1) is as much social as it is technical. And one of the consequences is a growing sense that the community “owns” the data it collects, curates, and uses.

In that regard, the OPSD is an example of a conventional portal. But as indicated, the OPSD has invested considerable effort in cleaning datasets sourced from the ENTSO-E Transparency Platform.¹⁴ A 2018 review found significant shortcomings in data quality ([Hirth et al 2018:1056-1061](#)).

EXAMPLE 10 Power plant lists Obtaining a list of power plants in Europe has proved difficult. Indeed researchers have had to source lists from several sources and then algorithm-

¹¹ <https://forum.openmod.org/t/2689>

¹² <https://data.europa.eu/data/datasets/database-of-the-european-energy-storage-technologies-and-facilities?locale=en>

¹³ One of the submitters requested a copy of that opinion but was politely turned down. The overarching message here is, once again, is that the current statutory context is inconsistent and unsatisfactory.

¹⁴ Indeed, we understand that some member organisations return spreadsheets to the Transparency Platform via email with unilaterally altered column identifiers.

mically identify the least inconsistent combination (Gotzens *et al* 2019). There surely has to be a better way.

This forum thread provides further background in relation to this topic:

- [Lists of power plants](#)¹⁵

Several projects, many of which derive from the United States, have been assembling coherent and complete datasets specifically for energy system modelling purposes. These project are more than databases or portals — they contain sophisticated code to check the integrity and completeness of the inventory, perform basic network calculations, provide interfaces with various model frameworks, provide standardised reporting, and more.¹⁶ US-based projects include [PowerGenome](#), [PowerSystems.jl](#) and its associated data libraries, and the [Open Energy Outlook](#) database. The [Spine Toolbox](#) from Finland represents another example.

To reinforce the point being made, these new domain-specific “data systems” provide joined-up data that can service any number of projects and modelling teams working within the same local, national, or regional scope. Moreover, these data systems encourage cooperation on the collection and maintenance of the assembled information and enable cross-model comparisons. Both aspects are vital for robust analysis. We cannot help but speculate that most of these developments originated in the United States because the bulk of their energy sector data is legally unencumbered.¹⁷ Or conversely in Europe, very little of this effort is legally possible without the primary data first being released under CC-BY-4.0 licensing.

Another community resource, more technical than informational, is the [Open Energy Platform](#) (OEP).¹⁸ The OEP offers backend services to energy modelling teams and can be used to define and host framework-independent scenario sets for use across any number of projects (Reder *et al* 2019).

We note in passing, that the Commission has recently undertaken exploratory work for what may be a somewhat similar platform (Gaschnig *et al* 2020).

4.7 Looking forwards

It can be expected that some of the themes articulated in the submission will continue. Speculatively:

- that data is increasingly viewed and treated as a domain-wide common pool resource
- the shift from classical schemas to semantic triples graphs with embedded datasets will continue
- parallel work on a community-agreed ontology and on metadata practices will proceed
- the ethos of open science and open policy analysis will gain ground, be it for ethics or pragmatics
- conversely, non-open science and non-open policy analysis will become increasing untenable

5 Discussion

We wish to underscore again how debilitating it is to not have good access to important public-interest datasets licensed under Creative Commons CC-BY-4.0.

¹⁵ <https://forum.openmod.org/t/2526>

¹⁶ The term “model framework” is used within our community to separate the underlying application software from specific instances that have been populated with data. These instances are then generally known as “models” and a specific model may then be used to run any number of exploratory “scenarios”. These scenarios are then interpreted relative to some stated “reference case” scenario, often but not necessarily some expectation of business-as-usual.

¹⁷ Work produced by federal employees is automatically public domain, datasets lacking creative input are not subject to copyright, and there has never been legislated database protection.

¹⁸ The Open Energy Platform should not be confused with a energy sector data brokerage service with a similar name being developed by United Kingdom-based Icebreaker One.

Moreover, the adoption of that particular data license looks likely to unlock a new data management paradigm within the domain of open energy system modelling based on linked open data (LOD) concepts. This new paradigm has the potential to radically improve public policy development in complex areas like energy systems analysis. In addition, this emerging data revolution parallels, lags, and is synergistic with a similar revolution underway in model development, namely the uptake of open source models. Taken together, these two changes in paradigm should bring substantial benefits to society through higher quality, more extensive, more transparent, and more rapid public policy analysis.

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We highlight again the need to fully decarbonize our energy systems in three short decades. Indeed, energy systems, broadly defined, may well need to be substantially net-negative in order to counteract emissions from hard-to-decarbonize sectors such as agriculture.

74

We note that, in general, the transmission system operators have been much easier to engage with than the market operators. And reiterate the point about the EEX serving statutory information in formats that are viewable but not recoverable or numerically usable.

75

Furthermore, to reinforce that much of the public information available is in relatively poor state and often lacks provenance.

76

The Commission should not simply introduce a new Data Act, but also take the opportunity to repair other statutes including the 1024/2019 Open Data Directive as indicated earlier.

77

The submitters would be happy to provide the Commission with further information, sources, and examples on request. And many in our community would doubtless be willing to engage with the Commission and explain trends, expand on their experiences, and/or discuss their research interests in the context of open data, open science, and public good.

78

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79

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80

Abbreviations

ACER	Agency for the Cooperation of Energy Regulators
API	application programming interface
B2G	business-to-government information flows
EEX	European Energy Exchange
ENTSO-E	European Network of Transmission System Operators for Electricity
ENTSO-G	European Network of Transmission System Operators for Gas
IDR	industrial data right (speculative)
HVDS	high-value dataset (European Commission 2019)
ICT	information and communications technology
LOD	linked open data
ODD	2019/1024 Open Data Directive (European Commission 2019)
OEP	Open Energy Platform
openmod	Open Energy Modelling Initiative
PEMMDB	Pan-European Market Model Database
PSI	public sector information
REMIT	Regulation on Wholesale Energy Market Integrity and Transparency
SPDX	software package data exchange
TP	European electricity market transparency platform (ENTSO-E 2017)
TSO	transmission system operator
UrhG	<i>Urheberrechtsgesetz</i> (the German statute covering copyright)
WRI	World Resources Institute

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