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COMMISSION DE RÉGULATION DE L'ÉNERGIE

REPORT

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Report of the study committee about the data managed by energy system and infrastructure operators

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THE WORD OF THE RAPPORTEUR

Our societies are experiencing a real *"data deluge"*. There are already more communicating objects than human beings on our planet. The overall volume of data produced doubles every 24 months. According to a CESE report[1], until 2003, Humanity had produced 5 exabytes of digital data. In 2010, this same quantity of data was generated in 2 days. In 2013, only 10 minutes were needed…

The energy world has not escaped this trend. It is even one of the major players since it both creates and abundantly consumes data. By way of illustration, GRTgaz indicated that it collects daily 28 million items of data on its transmission network. The deployment of *Linky* smart meters should lead Enedis to collect, in the five coming years, 5,000 times more data than today.

In addition to this data deluge, there is a flurry of activity in the standardisation sphere. First at the national level, since no fewer than four legislative texts[2] have been issued since 2015 on the management and availability of the data collected by energy system operators. They include in particular the obligation incumbent on distribution system operators (DSOs) and transmission system operators (TSOs) to make available to the public authorities the data required to perform their missions, as set out in Article 179 of the Law on *Energy Transition for Green Growth*[3]. There are also the provisions of the Law *for a digital Republic*[4], especially for detailed consumption data to be made available to the public by the DSOs and TSOs and for the generalisation of obligations for sharing public data in open data format. These legal provisions for the opening up and sharing of energy data have been complemented by 8 implementing decrees and no less than 6 decrees, published or in the process of being so.

Then at the European level, since two important texts have been issued in this matter: on the one hand, the General Data Protection Regulation of 27 April 2016 which substantially strengthens the rights of persons (portability, reinforced consent), while increasing the obligations and the sanctions incurred by companies or administrations that collect such data. Let us recall here that the consumption data of private individuals, including those collected from smart meters, are considered as personal data. On the other hand, the Directive on Security of Network and Information Systems of 6 July 2016, which introduces the notion of operator of essential services and strengthens the obligations in terms of computer security opposable to the companies concerned, including those of the energy sector.

This "data embedment" of the energy world is a source of change and therefore of uncertainty. It blurs the traditional boundaries between the roles of the various players, between the regulated world and the competitive world. It transforms the business of system operators, the services they must provide as part of their public service mission, and the requests addressed to them, in particular by the granting local authorities whose missions in the area of energy transition and energy efficiency have been considerably reinforced by the legislator. It changes the professional profiles of their agents, the nature of certain investments and, more generally, their long-term strategy. It exposes them to new risks, including cyber-risk.

But this "data embedment" is also a source of innovation for all the players of the energy world, and even beyond. First of all, for energy suppliers, which see consumption data as a means to offer their customers innovative services with high added value. Then for IT service and consulting firms, many of which develop solutions related to the use of energy data. This appetence also concerns companies outside the energy sector, like some telecommunication operators, insurance companies, which consider linkage between energy data and data produced by domestic communicating objects as a means to enter the home automation market. For system operators, some of which are involved, via big data techniques, in "predictive maintenance" programmes which could ultimately change the design and planning of their investments.

Finally, this data embedment of the energy world is a source of appropriation, for consumers. The latter will be offered more information on their consumption and their usages, and will more easily take control of the latter on the imperative condition that they have confidence in the services offered and in the protection of their data.

In the context of the magnitude of these changes, the uncertainties they entail, and the questions they raise, it was necessary and legitimate for CRE to address this issue as part of its general mission to contribute to the "*proper functioning*" of electricity and natural gas markets *"for the benefit of the end consumer"*. To that end, it

[1] *Digital data: a matter of education and citizenship* (Éric Peres, January 2015).
[2] All these legislative and regulatory frameworks are more specifically detailed in the present report in Chapter 1.3.1.2.
[3] Law no. 2015-992 of 17 August 2015 *on Energy Transition for Green Growth*.
[4] Law no. 2016-1321 of 7 October 2016 *for a Digital Republic*.

decided to create[5] a Study Committee which met with 5 organisations (regulated companies, start-ups, associations of elected representatives and consumers, national and European administrations, European regulators, *etc.*) and received nearly 300 pages of written contributions from the latter.

In the course of its work, the Committee pursued a twofold objective of clarification and proposal.

The clarification work first consisted in providing a review and in establishing a typology, both legal and technical, of the data processed by system operators. This comprehensive mapping is a first. It reveals the large quantities, the complexity and heterogeneity of these data[6]. The clarification also focused on the public policy objectives pursued through the processing and provision of these data. These objectives are numerous and based on distinct, separately designed legislation, which does not necessarily ensure proper coordination or legibility[7].

Based on this review, the Committee wished to make recommendations. Its conviction is that data management can become – and must become – a lever for improving the efficiency of the French energy system. To do this, it puts forward 15 proposals which can be grouped in four families: the first concerns the essential need for consistency, quality and inter-operability of the data which appears as the necessary albeit insufficient condition, for the data made available by system operators to be fully exploited and to reveal their full value for the market and society as a whole.

The second one intends to clarify the roles of the various players, in particular the system operators, in order to achieve an efficient and, ultimately, multi-fluid governance. At the end of an important census of the various data governance "models" existing in Europe, and given the characteristics that are specific to the French energy and industrial landscape, the Committee developed six principles[8] in order to guide the efficient setting up of a shared platform providing access to energy data. The Committee considers that such a platform must have simple functions, be able to cover multi-fluid data and be compatible or complementary with initiatives already engaged, in particular by local authorities. The purpose of this formalisation of the regulator's evaluation grid is to give energy players more legibility and it will open the door to discussions on this strategic question.

The third category of recommendations is aimed at consolidating the trust of consumers in the management of their data. If the data have value, this value will only be revealed for the benefit of all if trust and confidence prevail throughout their processing. Without trust, there will be no growth based on data use. This presupposes, in particular, strengthening the quality of procedures to secure user consent and promoting a culture of security based on more educational efforts in this area.

Finally, the fourth category of recommendations is more particularly aimed at regulators, and at CRE itself. The legibility of the regulator's analysis criteria and the foreseeable nature of the ensuing action are a necessity for regulated organisations. This requirement is most valuable in the versatile and volatile digital world.

The present report, which is the fruit of about a year's work, is as much a culmination as a starting point for a long-term action and reflections.

Yann PADOVA
Commissioner
Rapporteur of the Study Committee

[5] CRE's deliberation of 31 May 2016 *on the creation of a study committee relating to the data held by operators of energy networks and infrastructures*. The Committee was composed of three Commissioners: Catherine Edwige, Jean-Pierre Sotura and Yann Padova, who was designated as rapporteur.
[6] See part 1 of the present report, from page 8.
[7] See part 2 of the present report, from page 56.
[8] See page 91 of the present report.

SUMMARY

In a context where many technological innovations carry far-reaching consequences for the activities of regulated energy operators, and where recent legislative and statutory texts on the availability of energy data have considerably supplemented the applicable law, CRE decided to create a study committee dedicated to the data managed by energy system operators, by its deliberation of 31 May 2016. Assisted by the CREservices, this study committee is composed of three commissioners: Mrs. Catherine Edwige, M. Jean-Pierre Sotura and M. Yann Padova, who was designated as rapporteur.

The working approach of the study and drafting committee for the present report consisted, first of all, in feeding a review by many hearings. About fifty interviews enabled it to obtain detailed information from regulated energy operators, but also from suppliers, representatives of electricity producers, local authorities and public entities granting the management and operation of public energy networks, and consumer associations. Beyond this first circle directly linked to electricity and natural gas, the study committee also met with operators of heating and water networks, consulting and IT service firms, start-ups in the energy sector and telecommunication operators. It finally wished to meet French (sectoral and cross-cutting regulation authorities, ministerial administrations) and European (European Commission departments, Danish and Dutch energy regulators) institutional interlocutors.

In light of the observations described in the present report, the study committee wished to put forward in this report fifteen recommendations, in order to make relevant data management a lever for improving the efficiency of the energy system.

1. Ensuring data consistency, quality, and inter-operability

Il seems essential to CRE to maintain an objective of consistency and quality in the provision of access to the data, which are produced by multiple players and under the aegis of many legal regimes. It hence proposes that the legislative and regulatory corpus applicable, both complex and exhaustive, be now tried, to analyse any shortcomings and the necessary developments. Special attention should be paid to their overall consistency and to the risk of multiple legal layers (Recommendation no. 1).

In order to allow all the energy suppliers to make offers on the territories served by local DSOs, CRE considers that the deployment of smart metering systems should be considered as an opportunity for adapting the information systems of system operators, which will make them homogenise the exchanges of electronic data that they can have with suppliers. It asks all the distribution system operators to become strongly involved in this convergence process (no. 2).

CRE wishes for data management to be taken into account, in a qualifiable and objective manner, in the incentive regulation framework for the quality of service by regulated energy operators, especially concerning the data of primary interest to their main recipients (no. 3).

CRE notes that technical neutrality and inter-operability of the solutions used are a key element in the successful dissemination of the data made available by operators with a public service monopoly. It will continue to ensure that the use of inter-operable standards avoids any captivity of end customers. For this reason, it recommends that energy suppliers provide standardized pricing information using local outputs from smart electricity metering systems (no. 4).

Having noted the importance of keeping to a schedule for the supply or update rate of some data, CRE deems it necessary to consider expectations of data recipients (in particular, producers and public entities). For this reason, it requests regulated energy operators to send it the list of the main processes within 12 months, where the frequency and the time-limit within which the data is made available must be reviewed, after stakeholder consultation and taking into account technical feasibility and priority ranking (no. 5).

2. Clarifying the roles for an efficient and ultimately multi-fluid governance

It appeared to the CRE study committee that the use of the data managed by regulated energy operators was an unprecedented opportunity to better connect energy networks, both between the different network levels and the different forms of energy, for the benefit of the community. A better knowledge of energy production and consumption flows makes it indeed possible both to better calculate the size of infrastructures and to better operate them, drawing on both the complementarity between the different network levels and that between the various sources of energy. CRE considers it necessary to initiate a reflection process with all the public and private-sector stakeholders, to determine the most acceptable and sustainable regulatory balance to both encourage the use of these data and maintain the solidarity between users and between regions (no.

6).

As regards the respective roles of energy system players in the provision of access to data, CRE considers that the recent progress on the matter has contributed to better define the new missions of these players, in particular those of distribution system operators. However, CRE considers that the boundaries that define their respective attributions, especially those between distribution system operators and energy suppliers, are sometime difficult to perceive, or are subject to inconsistencies or redundancies. It will have regard to specifying the limit of the attributions of system operators in relation to the competitive sector players, especially by defining additional services relating to the data made available and their scope of action (no. 7).

It also recommends that when a regulated energy operator seeks to offer comparable services to those marketed by competitive sector players, it will use the same data as that accessible to energy and service suppliers. This activity must be delivered within a legal framework that enables it to be differentiated from those applying to its public service missions (no. 8).

In areas that are not interconnected to the mainland metropolitan network, CRE considers that a relevant provision of consumption and production data will contribute to a better demand side management, which is a very salient issue on these territories. The question of the boundary of attributions of the various players does not arise in the same terms, insofar as the system operator is also a marketer of offers on the retail market and can be an electricity producer. However, CRE considers that, because of the specific situation experienced by these operators, they must play a prominent role in the provision of production and consumption data, by differentiating these obligations for each of their missions. They must also ensure that they supply all the data that the competitive sector requires to foster the emergence of innovative services based on their use in these areas (no. 9).

One of the main recommendations that the study committee wishes to put forward through its report concerns data management governance models. Several European countries have also initiated a reflection on this issue and some of them have deployed data access platforms specific to the context of their respective energy systems. The emergence of an entity responsible for making available some of the data of regulated energy operators is due to several factors: a necessary equity to be maintained between local authorities of different sizes, which are not all in a position to develop such services; the concomitant processing of all the forms of energy of a territory, which contributes to the consistency of local energy policies; the necessity to avoid that energy data run the risk of being “cannibalized” by a private player, the size of which could enable it to establish a *de facto* monopoly on the database holding data collected and produced by operators with public service missions.

The study committee identified four theoretical models which make it possible to illustrate the advantages and disadvantages of each of them. Beyond such models, the study committee wished to formalise principles which should guide the implementation of a shared platform providing access to energy data (no. 10):

1. Data provision must initially be organised around aggregated energy data. CRE notes that the applicable law gives a precise definition to aggregated energy data that regulated operators must make available to the various public and private-sector recipients. It considers that the scope of these data thus defined is the relevant starting point for an organised provision of data that could subsequently be expanded.
2. Data aggregation must include all the network levels. The added value provided by an organised data provision depends on the consistency and comprehensive nature of the data generated. This consistency is assessed on all forms of energy, but also at all levels of the networks concerned. The aggregated network data must take into account all the voltage levels (for electricity) and all the pressure levels (for gas) for the markets to function properly, in the interests of the end user and of the network tariff management.
3. The platform should be designed to cover “multi-fluid” data. Operators tasked with generating data mostly deal with a single energy source. Yet the demand for data, especially aggregated data, generally relates to the simultaneous knowledge of consumption and production of several types of energy and fluids. As such, any platform project must consider “multi-fluids” from the design stage and ultimately cater for types of energy where the regulation regime is different from those of electricity and natural gas.
4. Creating a platform must meet user needs and have simple functions. Most stakeholders highlighted that the design and implementation of a platform providing access to energy data would represent an investment and recurring operational costs. The development of this multi-energy platform would have to be co-funded by the various operators. The extent of this expenditure should be proportionate

to the needs expressed by the recipients.

5. The platform must be flexible and adaptable. It must gradually meet the various objectives to be achieved, cater for a growing number of data producers over time and, more generally, be sustainable. A such, its design must take into account flexibility and adaptability requirements. This applies to the nature of the handled data, the quantities of data used, and the various parties involved.
6. *The platform must be compatible with initiatives already underway.* The coordinated provision of aggregated energy data, especially for local authorities, will facilitate the delivery of local energy policies under their remit. It would also maintain equity between different regions. However, this platform must be compatible with energy data-related initiatives that some local authorities have already undertaken, and under no circumstances, hinder or replace them.

3. Greater trust at the service of innovation

CRE recognises that the services based on the use of energy data generate only a limited interest among end consumers of energy, let alone domestic consumers. It considers that different factors contribute to explain this lack of interest: the distrust of consumers with respect to the deployment of smart metering systems and the use of the related data; their lack of knowledge of the main concepts and principles handled; a division of roles between energy system players, in particular the distinction between energy suppliers and system operators, which is difficult to perceive.

CRE considers, first, that the quality of consent secured from the end consumer to use his energy data is not merely a technical or legal matter. It is a vital prerequisite to customer trust with respect to the emergence of new services. CRE invites energy and service suppliers, as well as system operators, to offer users procedures to obtain this consent that are succinct, comprehensive and easily understandable for informed consent. Moreover, it considers that system operators, being responsible for managing these consents, must have the necessary powers to exercise control over the aforementioned consents, and thus encourages the legislator and the regulatory authority to amend the applicable legislation to this effect (no. 11).

The fears related to confidentiality of the information collected by smart metering systems have not all been removed. CRE calls for increased educational efforts in this regard, to provide the consumers with a better explanation of the validity and the consequences of personal data use concerning them. This education is vital to building trust and confidence, and therefore for the emergence of new services in good conditions. This is why CRE calls for an end to considering security and confidentiality issues separately (no. 12).

To allow consumers to better appropriate energy data and hence perceive the interest of the possibility for a third party to use these data for their benefit, CRE wishes for an initiative comparable to what the United States have implemented with the *Green Button* to allow anyone to recover and share the data relating to him or her. Furthermore, insofar as raw energy data are not, as such, likely to interest most users, an important communication and educational effort on the part of each of the public and private players concerned, is an indispensable prerequisite to arouse the consumer's confidence (no. 13).

4. Giving legibility to the players and decompartmentalising CRE's approach

In the context of an unprecedented buzz for standardization in data provision, CRE is more naturally inclined to perform the tasks conferred on it by the law on a case-by-case basis, rather than to establish specific measures for energy data. In that sense, it wishes to produce a strategic guidance document on energy data to formalise guidelines that it plans to apply to energy data provision matters. This could be used nationally and by various European bodies (no. 14).

Finally, the report emphasises that many intersections with the spheres of competency of other French regulatory authorities have been identified by the study committee, in particular with ANSSI, CNIL, the *Autorité de la concurrence* (Competition Authority) and ARCEP, all met within the framework of this committee. CRE is convinced by the complexity and importance of the energy data-related subjects highlighted by other regulators within the framework of the study committee, and wishes to develop an approach defining in a more sustainable and organised manner the exchanges it intends to have with other regulators and sectoral and cross-cutting public authorities. Furthermore, it proposes the creation of a governance in matters of energy data dissemination in open data, in order to analyse the industrial sensitivity of the data made available. This governance, to which it could participate, could be placed under the auspices of the public authorities and bring together all the competent players (no. 15).

1. THE DATA OF REGULATED OPERATORS: BETWEEN COMPLEXITY AND HETEROGENEITY

1.1 System operators have an increasing amount of wide-ranging data

According to a report on digital data published in January 2015 by the Economic, Social and Environmental Council[9], until 2003, Humanity had produced 5 exabytes of digital data, i.e. 5 billion gigabytes. In 2010, the same quantity of data was produced in 2 days. In 2013, only 10 minutes were needed.

Energy data have not escaped this trend. For example, GRTgaz indicated that it collects each day 28 million data on its natural gas transmission network. TIGF indicated that the total quantity of data it stores increased from 90 terabytes in 2011 to 175 terabytes in 2016. The Paris urban heating company (*Compagnie parisienne de chauffage urbain* – CPCU), delegate of the public heat distribution service for the city of Paris, indicated that *"servers cumulate a storage volume of about 50 gigabytes for about 1,900,000 indexes per year"*.

These massive data are diversified as they concern consumption and production data, network asset and operational data, billing data, but also quality of supply measurement data. Information technology offers many processing and publication opportunities.

1.1.1 The different technical categories of data

1.1.1.1 Consumption and production data

Network and infrastructure operators are depositaries for technical data relating to all the end consumers and to electricity and natural gas producers. They include, non-exhaustively:

- *for electricity*: the consumption and production indices, the energy consumed and produced, the measurement curve of consumption (more commonly called *load curve*) and production, the power subscribed, the maximum withdrawal power reached, the type of meter, the power installed, the consumption and production profiles, *etc.*
- *for natural gas*: the consumption and production indices, the gross volumes consumed or produced, the converted volumes at standard pressure and temperature conditions, the coefficient of conversion from volume to energy, the consumption and production profiles, the annual reference consumption, the biomethane injection capacity, *etc.*

System operators are in charge of collecting these data, keeping them up-to-date and making some of them, individually, available to the end customer or his representatives, to the electricity or natural gas supplier holder of the point (for retail markets) and to other legitimate and authorised parties, such as the balance responsible entities, aggregators or load shedding operators. Some of these data serve to charge the customer for costs of energy transmission by the system operator itself or, more commonly, by its supplier, within the framework of the single contract.

Furthermore, the data can be aggregated geographically or temporally to be made available to public entities (electricity and gas distribution organizing authorities, local authorities, administrations) or to the general public.

1.1.1.2 Network asset data

The asset data of networks and infrastructures are the data relating to various structures constituting the electricity and natural gas networks:

- *for electricity*: the characteristics of the substations, primary substations at the interface with the public distribution networks, public distribution stations, electric channels, transformers, metering systems, and various devices, *etc.*
- *for natural gas*: characteristics of the delivery stations, gas pipelines, compression facilities, regulating stations, storage equipment, interconnection points with methane terminals, metering systems and various devices, *etc.*

[9] The report *Les données numériques : un enjeu d'éducation et de citoyenneté* (Éric Peres, January 2015) is available on the website of the Economic, Social and Environmental Council.

According to the applicable regimes and the types of operators, a part of these data is made available to the granting authorities and to the public, within the limit of the obligations fixed by the law and regulation, and in compliance with the cyber-security obligations applicable to these operators.

1.1.1.3 Operational data of networks and infrastructures

To carry out their tasks of operation and development of electricity and natural gas networks, system operators have geographic information systems (GIS). Powered by many sensors measuring energy flows in the structures of the networks and infrastructures, these tools enable operators to construct a detailed description of the networks they operate, potentially up to the level of every equipment that they have installed.

Each operator is committed to upgrading the pieces of equipment it operates, in order to control them, in as precise and automated a manner as possible. For example, RTE indicated that its objective is to deploy digital control in all its stations and to equip at least 50 % of its network with supervision solutions by 2030. It intends thereby to improve the observability of the electrical system in order to improve its operation, maintenance and development.

1.1.1.4 Quality measurement data of operators

The supply quality of regulated electricity and natural gas operators concerns, first, the energy distributed to the consumers connected to the public networks, which is the responsibility of system operators. It covers in particular the continuity of the electricity and natural gas supply, the quality of the electricity voltage wave, the composition and the calorific value of transported natural gas, and is expressed according to various physical or chemical parameters.

Well beyond the sole quality of the supply, the quality of the service provided by network operators forms part of their public service missions and encompasses several domains, in particular interventions with end customers connected to the distribution networks for electricity and natural gas such as the commissionings, cancellations, meter readings, billing, processing of claims and the connection timelines of consumption sites, but also the quality of information on natural gas transmission consumption.

In the light of this, CRE set up an incentive-based regulation of the quality of service developed based on indicators enabling it to measure the achievement of the objectives laid down for system operators. These indicators are accompanied, for the most significant ones for the proper functioning of the market, by financial incentives, with a *bonus* or *malus* according to the results observed. The purpose of this mechanism is to check that system operators in a situation of monopoly fulfill their missions with efficiency, without discrimination and by improving their performances.

Since 2009, CRE publishes each year, at its initiative, a monitoring report on the incentive-based regulation of the quality of service by system operators. The last report, published in February 2017, is the 7th edition and covers the period from 1st January to 31 December 2015[10].

1.1.1.5 Financial data of operators

For the purposes of communication with the public authorities, accounting and internal management control, the regulated operator has data which enables it to monitor its investments, its operating costs, the income from its activities, *etc.*

1.1.1.6 Environmental data of operators

RTE indicated in its contribution that it is the recipient of many documents containing information relating to the environment, in particular in the following frameworks:

- Applications for approval of regional plans for connecting to the renewable energy networks (comprising their environmental assessment and the opinion of the environmental authority, *etc.*);
    - documents relating to structure projects: impact studies, opinion of the environmental authority and other documentation in the public inquiry file, authorisation files and declaration files relating to the water law, derogation files concerning protected species, Natura 2000 impact assessments, where

[10] The document is available on CRE's website.

appropriate the application file for approval of the structure project, the building permit application file, but also the measures of *"avoidance, reduction and compensation"* laid down by the decisions to authorize the projects and their monitoring;

- environmental data from plans for the control and surveillance of power lines or for their technical control.

1.1.2 Information technology offers many processing and publication possibilities

1.1.2.1 Bulk data processing technology (big data)

Big data aim at implementing technical solutions for managing giant databases, in order to cross-use a large number of information sources, process large quantities of information in these databases and carry out these operations within a minimum elapsed time. It is generally characterised by the three *Vs*, for *Velocity, Variety and Volume.* In addition, a fourth V can be added, that of *Value* which can be extracted from the data. It has applications in many areas: scientific research, banking and finance, transport, healthcare, meteorology, social networks, but also in the business processes internal to companies.

Energy is a particularly promising sector for the use of big data technology. On the one hand, the consumption data collected by smart metering systems, for residential, tertiary and industrial sectors, with a daily or intradaily frequency, are data to be made available to the users and third parties with a mandate to use them.

On the other hand, a detailed knowledge of real-time energy production and consumption, in all points of the networks, as well as continuously updated technical capacities of the structures of system operators, offers prospects in terms of balance of energy systems, especially electrical systems. The inclusion of energy generation from renewable sources will be facilitated, and at a lower cost for the community. In the future, decentralised energy transactions can even be envisaged.

The accelerated deployment of sensors, itself related to the development of Internet of Things and its communication networks, has already begun to exponentially multiply the amount of data to be processed. Processing technology needs to be continuously adapted to such quantities — which is especially applicable to the areas stated above — in order to improve the efficiency of the energy system.

1.1.2.2 Open data publication platforms

Open data describes both the means by which data subject to a public copyright license are made available, and the underlying philosophy consisting in the open sharing of public interest data. Hence, open data consists, for a player entrusted with a public service mission, in setting up an IT infrastructure enabling a user or other IT services to retrieve and use data that is free of copyright.

In France, the State, in particular the Etalab mission attached to the Prime Minister, has set up a platform called *data.gouv.fr*, which enables anyone to view public data or data produced by a company having a public service mission. They include in particular data relating to public accounts, statistics on efficiency of public policies, electoral results, but also to tourism or the environment. These data can in turn be shared, reused and enriched by the community of users. *"Data producers"* can be certified, in order to publish "data sets" on open data, which can in turn be shared or reused.

In the energy sector, the law confers on electricity and natural gas system operators the obligation to make energy consumption and production data available to public entities and to the public. Operators have developed open data platforms (their respective initiatives are detailed in paragraph 1.3.4.2) of which a part of the content is also included on *data.gouv.fr*.

Finally, like all the other open data platforms, that of Etalab facilitates access to the data published by users who wish to automate their use by setting up open and documented application programming interfaces or *APIs*. The purpose of these APIs is to make available to a processing automaton all the data also available in an illustrated format understandable to a user of the platform. Access to the data *via* the API frees such an automaton from all the constraints related to the display of the data provided for a usage "by a human". It systematises, in the form of a grammar described in the API's documentation also available online, the manner in which requests to the platform must be formulated and the manner in which responses must be interpreted by the automaton.

1.2 The data are governed by different legal regimes which are difficult to articulate

Energy data are subject to several legal categories which are sometimes difficult to articulate: personal data, data considered as Commercially Sensitive Information (CSI) in the sense of the French Energy Code, administrative data in the sense of the CADA law[11], statistical data, *etc.* Illustrating this phenomenon, GRDF in its contribution even referred to the "*schizophrenic exercise consisting in having to ensure at the same time data protection and an increasingly larger opening up of these data*".

It stressed the delicate exercise, for such operators, of the concomitant tasks aiming both at "*ensuring protection of the data*" and "*an increasingly large opening up of access to the data, internally* [...] *as well as externally*". In order to discern the different types of requirements that apply to the data, ranging from those requiring maximum precaution in their dissemination to those made available in open data, information systems of regulated energy operators need extremely precise management. In some cases, this even involves ensuring that the confidentiality of a same piece of data is preserved when it is used for certain purposes, whereas it is also freely disseminated when it has undergone other complementary processing (aggregation with other information, anonymisation of the piece of data).

1.2.1 Personal data

1.2.1.1 The legal context

In France, the protection of personal data was introduced by the law no. 78-17 of 6 January 1978 *on information technology, data files and civil liberties*[12], called "*loi informatique et libertés*" (data protection act). Its scope of application covers "*any information relating to a natural person who is or can be identified, directly or indirectly, by reference to an identification number or to one or more factors specific to that person*".

It also defines the data processing operations and the conditions under which they can be carried out:

- the data must be collected and processed "*fairly and lawfully*";
- the data must be processed for "*specified, explicit and legitimate purposes*", and must not be "*subsequently processed in a manner that is incompatible with those purposes*" (with the exception of further processing "*for statistical, scientific and historical purposes*");
- the data must be "*adequate, relevant and not excessive in relation to the purposes for which they are obtained and their further processing*";
- the data must be "accurate*, complete and, where necessary, kept up-to-date*", considering that data that are "*inaccurate or incomplete*" must be deleted and rectified;
- the identification of the persons concerned should only be possible "*for a period no longer than is necessary for the purposes for which* [the data] *are obtained and processed*".

This law describes the missions of the "National Commission for Information Technology and Civil Liberties" (*Commission nationale de l'informatique et des libertés* – CNIL) with respect to the processing operations that can be carried out on personal data as well as the procedures to be followed by the data controller (declaration, authorization request, *etc.*).

The *law for a Digital Republic* increased the sanctioning powers of CNIL, which can now impose sanctions worth 3 million euros, and introduced new rights for individuals with respect to personal data, and in particular data portability.

At the European level, a new legal framework has been adopted and will enter into force in 2018. It is the Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 *on the protection of natural persons with regard to the processing of personal data and on the free movement of such data*, and repealing Directive 95/46/CE.

This regulation includes in particular:

- the obligation to receive an explicit consent prior to any processing of personal data (Whereas no. 32);

[11] The law no. 78-753 of 17 July 1978 *on various means of improving relations between the authority and the public and various administrative, social and fiscal provisions* is available on the website Legifrance.gouv.fr.
[12] The text is available on the website Legifrance.gouv.fr.

- the recognition of a right to erasure ("right to be forgotten") which allows an individual to request the erasure of the data relating to him or her, including those held by subcontractors or partners, provided that their conservation is not needed for a legitimate purpose (historical or scientific research, statistics, public health, execution of a contract, right to freedom of expression, *etc.*) (Article 17);
- the right to data portability which offers users of an online service the possibility to recover their data to import them into a competing service (Article 20);
- the right to be informed in the case of a data hacking (Article 34).
- the obligation for the data controller to carry out an impact assessment of the envisaged processing operations where a type of processing is likely to result in a high risk to the rights and freedoms of natural persons (Article 35).

1.2.1.2 CNIL's work with regard to energy data

With respect to energy data, CNIL adopted, on 15 November 2012[13], a recommendation setting the conditions for gathering and using the load curves collected by distribution system operators via smart meters.

Based on the observation that is was necessary to protect users against any intrusion related to a use of their personal data, CNIL wished to set out the conditions for collecting and using this load curve. For the setting of tariffs adapted to household consumption and the provision of additional services, CNIL recommended that it may only be collected with the express consent of the persons concerned.

At a later stage, CNIL specified, by a communication of 30 November 2015[14], that the storage of the load curve by the meters, without relaying information back to the system operator, does not require express consent:

"CNIL considered that such a recording would be in accordance with its recommendation of 15 November 2012 regulating the collection of the load curve, it being specified that the procedures would be the following:

- *the Linky meters would be configured to record locally the load curve, with a time step of one hour, for a maximum period of one year;*
- *the consent of the subscriber would be requested for relaying the load curve to the information system of ERDF[15] and for the transmission of the load curve to third parties;*
- *the user would be in a position to oppose the activation of this storage locally, through a checkbox, without giving any reason;*
- *the user would be able, at any moment, to deactivate this storage and wipe out his data (notably in the case of moving home)."*

Article D. 341-21 of the French Energy Code, introduced by the decree no. 2017-948 of 10 May 2017, has now included in the regulations the CNIL's recommendations. Indeed, it stipulates, on the one hand, that "*the electricity load curve is recorded hourly in the memory of the metering device, unless there is an objection from the consumer*". On the other hand, it specifies that "*at the request of the consumer, the load curve is collected in the computer system of the system operator and made available to him, without prejudice to a collection performed by the system operator*" when the load curve is relevant to the fulfilment of its public service missions.

CNIL also published in May 2014 a compliance package on the data produced by smart metering systems[16] by distinguishing three scenarios:

- the "*in-in*" scenario which concerns the management of data collected in the home without communication to the outside;
- the "*in-out*" scenario, which applies to the management of data collected in the home and transmitted outside;
- the "*in-out-in*" scenario which concerns the management of data collected in the home and transmitted outside to allow the remote control of certain appliances within the home.

[13] Deliberation no. 2012-404 of 15 November 2012 *on recommendations for processing detailed energy consumption data collected by smart meters* (text available on the website Legifrance.gouv.fr).
[14] The text is available on the CNIL's website.
[15] Former corporate name of the electricity distribution network operator Enedis.
[16] This document is available on the CNIL's website.

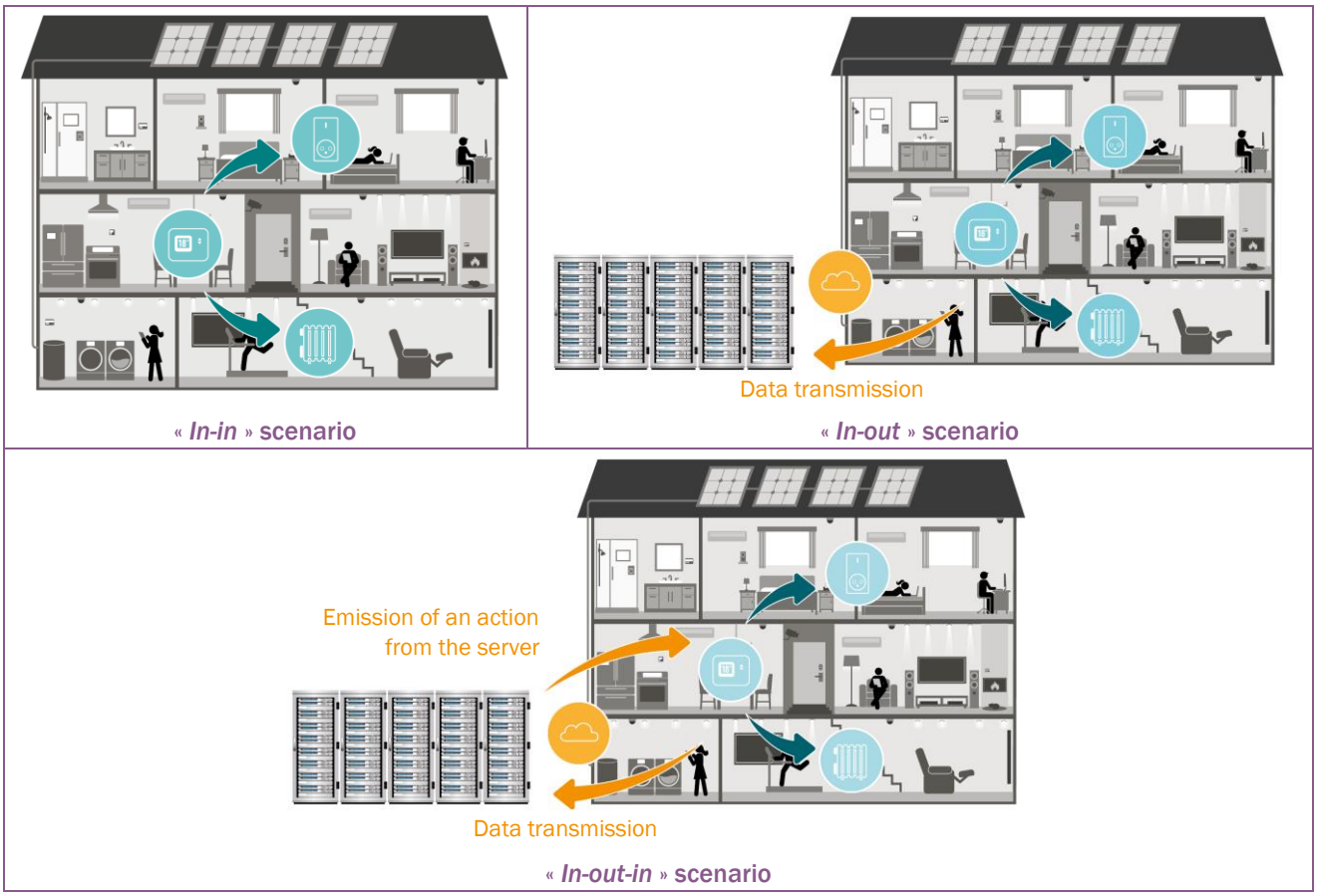

Figure 1 – Scenarios of CNIL's compliance package on the data produced by smart metering systems (*source: CNIL*)

For each scenario, CNIL defines an exhaustive regulation framework dealing with the length of collected data retention, the authorised recipients, the information and the rights of persons, the necessary computer security, and the preliminary formalities for the collection.

1.2.2 Commercially sensitive information (CSI)

The French Energy Code, in its Articles L. 111-72, L. 111-73 and L. 111-77, provides that "*confidentiality of economic, commercial, industrial, financial or technical information whose disclosure would breach rules on free and fair competition and non-discrimination*" must be preserved by the electricity transmission system operator, each electricity distribution system operator and each operator of natural gas transmission, distribution or storage structures or liquefied natural gas systems. The list of information referred to in these articles is determined by a decree of the Council of State.

Pursuant to Articles R. 111-26 (for electricity) and R. 111-31 (for gas) of the French Energy Code, the data falling within the scope of commercially sensitive information (CSI) are the following:

Contractual provisions and information exchanged in this framework	Information drawn from metering and other measurements performed	Information relating to call, adjustment and consumption programmes
Applicable to electricity transmission and distribution system operators • provisions of contracts and protocols for access to the public network; • information exchanged in view	*Applicable to electricity transmission and distribution system operators* • information on the power registered, the volumes of energy consumed or generated and the quality of the electricity, with the exception	*Applicable to electricity transmission system operators* • call programmes (including adjustment proposals and modifications applied by the network operator), supply and consumption programmes and all the information exchanged

of the preparation and application of the former, on the identity of the parties to a supply contract, the prices of electricity transactions, financial data on the balance of transactions, the characteristics of the energy generated, supplied or consumed, the duration of supply or access contracts and protocols, the technical and financial conditions of connection, contractual penalties and sanctions; • provisions of the contracts and protocols for the purchase of electricity; • information exchanged in view of preparing and applying the former, on the prices applied for electricity transactions, financial data on the balance of transactions, characteristics of the energy generated or supplied, the duration of purchase contracts and protocols, contractual penalties and sanctions; • information transmitted by other system operators.	of the annual quantities of energy consumed or generated and the connected power; • information transmitted by other system operators.	between the operators of the networks concerned and the users of these networks in view of establishing and implementing these programmes; • the degree of deviation detected from these programmes, and the corresponding amounts of financial compensation; • information transmitted by other system operators.
Applicable to operators of natural gas transmission, distribution or storage structures or liquefied natural gas systems • provisions of contracts and protocols for access to structures or systems, the use of storage, transit or purchases concluded in view of rebalancing networks; • information exchanged in order to prepare and apply these contracts and protocols on the identity of the parties, the prices of the services, the characteristics of the supply, the duration and conditions for modifying or renewing contracts and protocols, contractual penalties and sanctions; • information transmitted by gas operators operating structures or systems abroad.	*Applicable to operators of natural gas transmission, distribution or storage structures or liquefied natural gas systems* • quantities delivered based on metering (with the exception of annual quantities), pressure measurements upstream from the point of delivery, flow measurements, any other physical measurements by the gas operator on the connection structures or systems of a user of these structures or systems, with the exception of injection capacity and annual injected quantities of biomethane; • information transmitted by gas operators operating structures or systems abroad.	

Table 1 – List of commercially sensitive information (CSI), whose confidentiality must be preserved *(source: CRE)*

Pursuant to Article L. 111-80 of the French Energy Code[17], the public electricity system operator is liable, in the event of disclosure of a confidential information, to a penalty of one year's imprisonment and a fine of 15,000 euros. The other regulated operators of natural gas and electricity (electricity distribution system operators and all gas operators) are, pursuant to Articles L. 111-81[18] and L. 111-82[19] of the same code, for the same infractions, liable to a fine of 15,000 euros.

Articles L. 111–80 to L. 111–83 of the French Energy Code specify the cases in which the disclosure of CSI does not give rise to a criminal sanction:

Common case	Cases specific to electricity distribution system operators and gas operators
• communication to another system operator; • communication to CRE officials and agents leading to an inquiry; • provision of information to officials or agents of public entities when these data are relevant to the exercise of their competencies.	• communication of information and documents to the granting authorities; • communication of information to a third party mandated by a user of the public distribution network and concerning this user's own activity. However: – a fine of 15,000 euros shall be imposed for any fraudulent declaration made by a supplier or by a third party in order to obtain a customer's consumption data; – the operator of the public electricity or gas distribution system cannot be held liable in the event of fraudulent practices or inaccurate declarations of a supplier or a third party.

Table 2 – Special exceptions in which the disclosure of commercially sensitive information is authorised *(source: CRE)*

In parallel, Articles R. 111-27 to R. 111-29 of the French Energy Code (for electricity) and R. 111-31 to R. 111-35 (for gas) provide for cases in which system operators are authorised to communicate the data that they hold.

In addition to the cases already provided for in Articles L. 111-80 et seq. (communication to another system operator), these articles provide for specific cases of CSI communication:

- Any user of public transmission or distribution networks may authorise a public system operator to communicate directly to a third party or entitle this third party to ask the system operator and to receive directly information relating to this user's own activity;
- In this respect, GRTgaz requested that Article L. 111-83 of the French Energy Code on the protection of distribution system operators in the event of a "fraudulent *declaration made by a supplier or by a third party in view of obtaining"* CSI be extended to the transmission system operators.
- This demand seems legitimate, when it is required by the law, like the operator of a distribution network, to communicate information to third parties.
- This difference in treatment is most likely due to an imperfect articulation of the energy code texts, the disclosure of CSI being treated in two different places.
- The public electricity system operators are authorised to communicate to load shedding operators, for the sites for which the latter declare that they have a consent of the end consumer to that effect, all the data necessary for the identification, accounting and certification of the load sheddings implemented on these sites.

[17] The full text of this article is available on the website Legifrance.gouv.fr.
[18] The full text of this article is available on the website Legifrance.gouv.fr.
[19] The full text of this article is available on the website Legifrance.gouv.fr.

- The public electricity system operator can communicate to the connection requester the information relating to the activity of another user of the network which makes it possible to better assess the cost of a connection and the time frame within which it can be achieved, with the user consent and if the connection requester undertakes to keep such information confidential.
- Public electricity distribution operators are authorised to communicate to any supplier having concluded a single contract with an end customer, or a consumption site, and certifying that it has an express authorization from its customer:

– the available historical information on the power subscribed and the consumption data on this site of domestic customers;
– the available historical information on the power subscribed and the consumption data on this site of the customer, if it is not a domestic customer.

Furthermore, operators are exempt from this obligation of confidentiality in two cases:

- when the application of legislative and regulatory provisions necessarily implies the communication of all or part of this information;
- when this communication is necessary for the proper accomplishment of their missions, in particular to implement the appropriate protection measures in case of threat to the security of persons and goods or to the security and safety of the public networks and systems or storage facilities and for the implementation of protective measures in case of threat to the security of the country's supply in natural gas.

Finally, it is specified that system operators are authorised to communicate to third parties and to publish aggregated information from CSI when this publication would ensure the effective fulfilment of their mission or to report on it, provided that:

- this information does not make it possible to reconstruct the basic data used and is without prejudice to the rules of fair competition, for gas;
- this aggregation respects statistical confidentiality, for electricity.

1.2.3 Administrative data

The law no 78-753 of 17 July 1978 *on various means of improving relations between the authority and the public and including various administrative, social and fiscal provisions*[20], known as the "CADA" law, regulates access to administrative documents by the public. The law was amended on several occasions and is now codified in Articles L. 300-1 et seq. of the French Code of Relations between the Public and the Administration, which entered into force on 1st January 2016.

The right of access applies to documents produced and received by the State, local authorities, as well as other entities under public or private law entrusted with a public service mission, as part of this mission. As such, this access right is opposable to system operators, which are private entities entrusted with a public service mission.

This right of access does not cover documents that are:

- incomplete, i.e. under preparation;
- preparatory to a decision as long as the latter has not been taken;
- publicly disseminated.

The documents containing information on natural persons can only be communicated to the interested parties or their representatives.

The law also protects the interests related to commercial and industrial confidentiality, which covers the secret of processes, economic and financial information, and the secret of commercial strategies.

In case of tacit or explicit refusal of the administration, the CADA can be seized within two months. This procedure is compulsory prior to any contentious action brought before the administrative judge.

[20] The text is available on the website Legifrance.gouv.fr.

Along with this general regime, there are multiple derogatory regimes, both on the extent of access to the data and on the exercise of this right. Hence, information relating to the environment, defined in Article L. 124-1 of the French Environmental Code, is accessible even if it is not included in a document and the exception of documents *"preparatory"* to a decision is not applicable.

With respect to energy data, the CADA delivered a favourable opinion on:

- the communication by the EDF company of the statistical tables transmitted to CRE since 1st January 2010, within the framework of discussions relating to regulated retail tariffs (tables such as surveys to the 100th, distribution by percentile/decile of the customers benefiting from these tariffs) (Opinion 20161147 of 9 June 2016);
- the communication by the GDF Suez company of the variable elements of the new formula submitted to CRE, for estimating the costs of supply to be taken into account in the calculation of changes in regulated tariffs for the sale of natural gas, which do not include any data relating to costs from the accounting of GDF Suez (Opinion 20090193 of 15 January 2009);
- the communication of instruction sheets of candidates selected within the framework of a call for tenders on the building and operation of photovoltaic power production systems, as well as the synthesis report of offers submitted, after concealing the particulars of a commercial and industrial confidential nature (Opinion 20161244 of 28 April 2016);
- the communication of the entire candidature file of the candidate selected within the framework of a call for tenders on offshore wind power systems, as well as any opinion, instruction sheet, report and note established, subject to the concealment of the particulars covered by commercial and industrial confidentiality (Opinion 20145107 of 5 February 2015).

On the other hand, the CADA delivered an unfavourable opinion, considering that the information contained in these documents were covered by confidentiality, on:

- the communication of the disjoined accounts of some local distribution companies (Opinion 20110409 of 3 February 2011);
- the communication by the GDF Suez company of the constant of the formula for estimating the costs of supply to be taken into account in the calculation of changes in regulated tariffs for the sale of natural gas, which would amount to making public the average price negotiated by GDF Suez in its long-term supply contracts (Opinion 20090193 of 15 January 2009);
- the communication by EDF of its regulated retail tariff customer database *"at standard temperature"*, by virtue of the protection of customers' privacy and of EDF's industrial and commercial confidentiality (Opinion 20161147 of 9 June 2016);

The law of 7 October 2016 considerably expanded access to administrative documents by imposing the online publication of a very large number of documents, when they are available in electronic format (see paragraph 2.6).

1.2.4 Statistical data

The law no. 51-711 of 7 June 1951 *on legal obligation, coordination and confidentiality in the field of statistics*[21] (which was amended by the organic law no. 2010-704 of 28 June 2010 *relating to the Economic, Social and Environmental Council*) is one of the earliest pieces of French legislation regulating data collection. This law institutes the National Council for Statistical Information (*Conseil national de l'information statistique* – CNIS), which is responsible, under the auspices of the National Institute for Statistics and Economic Studies (*Institut national de la statistique et des études économiques* – Insee), *"for organising consultation between producers and users of official statistics"*. It also creates an Official Statistics Authority (*Autorité de la statistique publique* – ASP), *"which shall ensure compliance with the principle of professional independence during the design, production and dissemination of official statistics, as well as with the principles of objectivity, impartiality, relevance and quality of the data produced"*.

It prohibits any communication of data pertaining to private and family life, and more generally speaking, to facts and behaviours of a private nature collected by means of a statistical survey for a period of seventy-five years and unless a derogation is granted following the opinion of the Committee on Statistical Confidentiality (on the CNIS website and for the purposes of official statistics or scientific or historical research.

[21] The text is available on the website Legifrance.gouv.fr.

For their part, individual data of an economic or financial nature cannot be communicated to any party for a period of twenty-five years, unless a derogation is granted following the opinion of the Committee on Statistical Confidentiality. This information cannot be used for the purposes of tax control or economic penalties.

Furthermore, Article R. 111-28 of the French Energy Code[22] stipulates that "*operators of public transmission or distribution systems* [for electricity] *are authorised to communicate to third parties and to publish"* information defined as commercially sensitive (see paragraph 1.2.2) "*in an aggregated form respecting statistical confidentiality*". This provision of access to aggregated commercially sensitive information is imposed by some statutory texts (notably Article 23 of the law *for a digital Republic*) and requires an objective criterion defining the manner in which operators can "*respect statistical confidentiality"*.

The reference on the subject was published in the *Guide to statistical confidentiality*[23] by Insee and CNIS. It defines the rule of the *"3 points and 85 %"* concerning the "*tables* [concept extendable to other ways of presenting aggregated data] *providing aggregated data on companies*":

- "*no cell in the table should pertain to fewer than three units (decision of 13 June 1980 of the Director General of Insee);*
- *no cell in a table should contain data, over 85% of which relates to one company (practical dissemination rules drawn up on 7 July 1960 by the Statistical Surveys Coordination Committee (Comité de coordination des enquêtes statistiques – Cocoes), a distant ancestor of the National Council of Statistical Information (Conseil National de l'Information Statistique – Cnis))*".

This concept was directly taken up in Article D. 111-64 of the French Energy Code, introduced by the implementing decree of Article 23 of the law *for a digital Republic* (decree no. 2017-486 of 5 April 2017, see paragraph 1.3.2.3).

1.2.5 This diversity of legal regimes applicable to energy data leads to the intervention of a plurality of regulators

Alongside CRE, a competent sectoral regulator, especially for commercially sensitive information, at least three other regulatory authorities can be called upon to decide on issues relating to the collection, processing, use or communication of energy data:

- CNIL, for issues related to personal data;
- CADA, for right of access to administrative documents;
- the Competition Authority (*Autorité de la concurrence)* when the issues of data access involve high competitive stakes.

The plurality of regulatory authorities concerned have prompted questions on the need for a closer and more structured inter-regulation.

1.3 A wealth of data already made available which is going to increase

Regulated energy operators are already required, by regulatory obligation, by contractual commitment to the granting authorities, or on their own initiative, to provide access to many data, which are themselves governed by very different confidentiality obligations.

In that respect, the Greater Paris inter-municipal Association for Energy and Communication Networks (*Syndicat intercommunal de la périphérie de Paris pour les énergies et les réseaux de communication* – SIPPEREC) insisted on the "*fundamental distinction to be drawn between, on the one hand, the data that can be requested by local authorities* [and granting authorities]*, in particular for the purposes of control and follow-up of delegation contracts signed with operators* [...] *at the service of the energy policy of the concerned territory; on the other hand, the data that may be communicated to the general public"*.

The national legislative and regulatory framework considerably expanded the range of data that must be communicated to the granting authorities, on the one hand (see paragraph 1.3.1), and to public entities, network users

[22] The text is available on the website Legifrance.gouv.fr.
[23] This guide is available on the CNIS website.

and the public, on the other hand (see paragraph 1.3.2). European directives and regulations accompany this trend (see paragraph 1.3.3) whereas operators have taken initiatives of their own on the provision of access to data (see paragraph 1.3.4).

Noting the large number of related legislations, RTE indicated in its contribution that it wishes to "*draw attention to the risk of constituting multi-layered regulations imposing the publication of identical or similar documents or data for different objectives specific to each regulation in standards that are not harmonised. This overlapping of publication obligations generates costs for RTE, which are ultimately borne by the network user*".

RTE illustrated this point with the following example: "*the publication standards arising under the obligation to transmit the geographic information system of the transmission network to prefects and those of the directive Inspire are different, and it seems to us that the draft digital law introduces a third transmission obligation in yet another format*".

1.3.1 Data communicated to granting authorities

1.3.1.1 The framework for annual activity and concession reports was supplemented by the law on energy transition and its implementing texts

The French national federation of local licensing authorities and public corporations (*Fédération nationale des collectivités concédantes et régies* – FNCCR) recalled in its contribution that it "*needs in particular data on the execution of the concession contract, those required for the development of territorial climate-air-energy plans* (plans climat-air-énergie territorial – *PCAET), for the networks coordination, for contracting works on distribution networks and for assessing the quality of supply*".

Legally, the obligation for system operators to disclose certain items of information to granting authorities dates back to 1995, with the introduction of an annual activity and concession report referred to in Article L. 2224-31 of the French General Code of Local Authorities, the content of which has evolved considerably.

This article provides that each electricity and gas distributor holds at the disposal of each of the above-mentioned granting authorities to which it is subject, the economic, commercial, industrial, financial or technical information relevant to the exercise of their competencies. Furthermore, it communicates this information to the relevant granting authorities, in the form of an annual report.

The content of annual reports was most recently defined by two decrees of 21 April 2016, pursuant to the law no. 2015-992 of 17 August 2015 *on energy transition for green growth*, known as "LTECV". The first is the decree no. 2016-495 of 21 April 2016 *on the content of the annual concession report submitted by natural gas distribution organisations to the granting authorities*, which specifies the "*consistency and terms for presenting economic, commercial, industrial, financial or technical information included in the annual report of the concession transmitted by the natural gas distribution organisations holding a monopoly to the granting authorities, for each of the concession contracts of their exclusive catchment area*".

This decree provides that the annual report must include:

« 1° An analysis of the quality of service provided by the distribution organization, assessed according to indicators pertaining to:

« a) its tasks of network operation and maintenance, customer management and network usage development;

« b) the access by third parties to the network;

« c) its knowledge of the public natural gas distribution structures under concession;

« 2° A description of the public natural gas distribution networks under concession including the following elements:

« a) an inventory of the structures, distinguishing to whom the various goods used by the concessionaire belong at the end of the concession contract. This inventory is established by family of structures and distinguishes, when the information is available, whether they are first establishment structures or renewal structures. It indicates the initial or gross value of the structures and the origin of their financing as well as their net value, reassessed according to the principles for setting the tariffs for use of public natural gas distribution networks for those financed by the distribution organization;

« b) a report on the networks' investment and development policy specifying the investments made and including a forecast of future investments for the three coming calendar years for concessions for which the average

investments made over the last three years exceed the amount set by order of the Minister in charge of energy;

« 3° The operating account of the concession, presenting the contribution of the concerned concession contract, whether it is positive or negative, at the equalization of the tariff for use of public natural gas distribution networks in the exclusive catchment area concerned. »

The second text with a regulatory scope is the decree no. 2016-496 of 21 April 2016 relating to the *annual activity report of electricity concessions*, which *"sets out the content of the annual activity report of electricity concessions addressed each year to the granting authority, which reviews the activity of both the system operator and the electricity supplier at the regulated retail tariffs, each for the missions concerning them"*. This decree provides that the annual report must include:

"1° An analysis of the quality of service provided to the users;

"2° The information relating to the investment and network maintenance policy of the networks;

"3° The financial elements related to the operation of the concession;

"4° The consistency of the assets under concession;

"5° The notable legal, economic, technical or commercial evolutions."

This decree also provides that the concessionaire must hold at the disposal of the granting authority, in an electronic format compatible with usual geographic information systems and under the conditions provided for by the concession contract, the *"plans of the network structures, established at medium scale, including in particular the layout of the structures"*. The latter indicates the *"voltage level, the nature, the section and the technology of the conductors as well as the location, function and technical characteristics of the transformer stations and the breaking equipment"*.

Furthermore, the detailed and localized inventory of the structures, distinguishing to whom the various goods used by the concessionaire belong at the end of its contract with the granting authority, is communicated by the electricity distribution organisation to the granting authority, at its request.

1.3.1.2 Texts with a legislative and regulatory scope published in 2016 complement the legal framework for information disclosed to granting authorities

The law no. 2016-1321 of 7 October 2016 *for a digital Republic* added an important brick to this information obligation, since now all the data collected or produced as part of the execution of the public service delegation will have to be accessible in a digital format.

Hence, Article 17of the law *for a digital Republic* complemented the Order no. 2016-65 of 29 January 2016 *relating to concession contracts* with an Article 53-1 according to which *"when the management of a public service is delegated, the concessionaire provides to the granting authority, in electronic format, in an open standard freely re-usable and exploitable by an automated processing system, the data and the databases collected or produced in the course of operation of the public service covered by the contract and which are essential for its execution"*. The granting authority or a third party designated by the latter *"may freely retrieve and use all or part of these data and databases, notably with a view to their being made available free of charge for purposes of re-use free of charge or against payment"*.

The provision or publication of the data and databases provided by the concessionaire is done in observance of the confidentiality protected by the law. In this regard, SIPPEREC insisted on the distinction to be drawn between the data that may be transmitted to the general public, on the one hand, and to the energy distribution organising authorities, on the other hand. The latter use these data in order to ensure the control and the follow-up of delegation contracts signed with operators and to improve the knowledge of the activity under concession at the service of the energy policy of the concerned territory.

Granting authorities also have the possibility to provide access to the data transmitted by their concessionaires. SIPPEREC, wishing to use such data, proposes for example to the local authorities which are members of SIPPEREC's electricity purchasing association *"a monitoring tool, available online, for managing energy consumption via functions for temporal monitoring of multi-fluid energy consumption, multicriteria analysis* [...], *report generation, and for recovering telemetered information"*.

The AMORCE association, for its part, expressed the wish that network operators do not charge the provision of data to their granting authority under Article 17 of the law *for a digital Republic*, "*even if these data are beyond the scope of the decree no. 2016-973 of 18 July 2016*" (see paragraph 1.3.2.2).

The scope of the data provision obligation introduced by the law *for a digital Republic* is very wide as it covers the "*data and databases collected or produced in the course of the operation of the public service covered by the contract and which are essential for its execution*". In this regard, it is surprising that the legislator provided for no decree to specify the application of this legal provision.

Furthermore and pursuant to Article R. 323-29 of the French Energy Code, the decree of 11 March 2016[24] specified the list of information to be recorded in the geographic information of a public electricity system operator. This article provides that the operator of a public electricity network must record in a geographic information system the information that would make it possible to identify any structure of this network following its construction, its reconstruction, its modification or its removal or following the connection of a user to this structure. The geographic information system contains in particular the location of the structures, their dimensions, their date of construc-construction, their electric characteristics, their technology, the particular switching devices and the additional facilities, the significant maintenance operations as well as the date of the technical control.

The information thus recorded is held at the disposal of electrical system manufacturers, of local authorities, and therefore of the organising authorities when it concerns a public electricity distribution network, at the latest three months after the commissioning of the structure.

1.3.2 Data that the law and regulation impose to communicate to public entities, to network users and to the public

The present chapter, after reviewing the various statutory texts published in the last two years with respect to energy data, will present in a little more detail Article 179 of the LTECV, as well as the provisions contained in the law *for a digital Republic*.

1.3.2.1 Overview of the statutory texts published between 2015 and 2017 with respect to energy data

The laws *on energy transition for green growth and for a digital Republic* of 2015 and 2016 have enriched the legal framework for the provision of access to energy data. An in-depth presentation of the data to be made available is annexed to the present document (see Chapter 4.2).

This legal framework, which concerns essentially the access to aggregated consumption data, is supplemented by a section relating to the provision of access to individual consumption data for interested end customers, and for third parties mandated to have access to these data.

[24] Decree of 11 March 2016 *specifying the list of information to be recorded in the geographic information system of a public electricity system operator*. The text is available on the website Legifrance.gouv.fr.

Figure 2 summarises the chronology below:

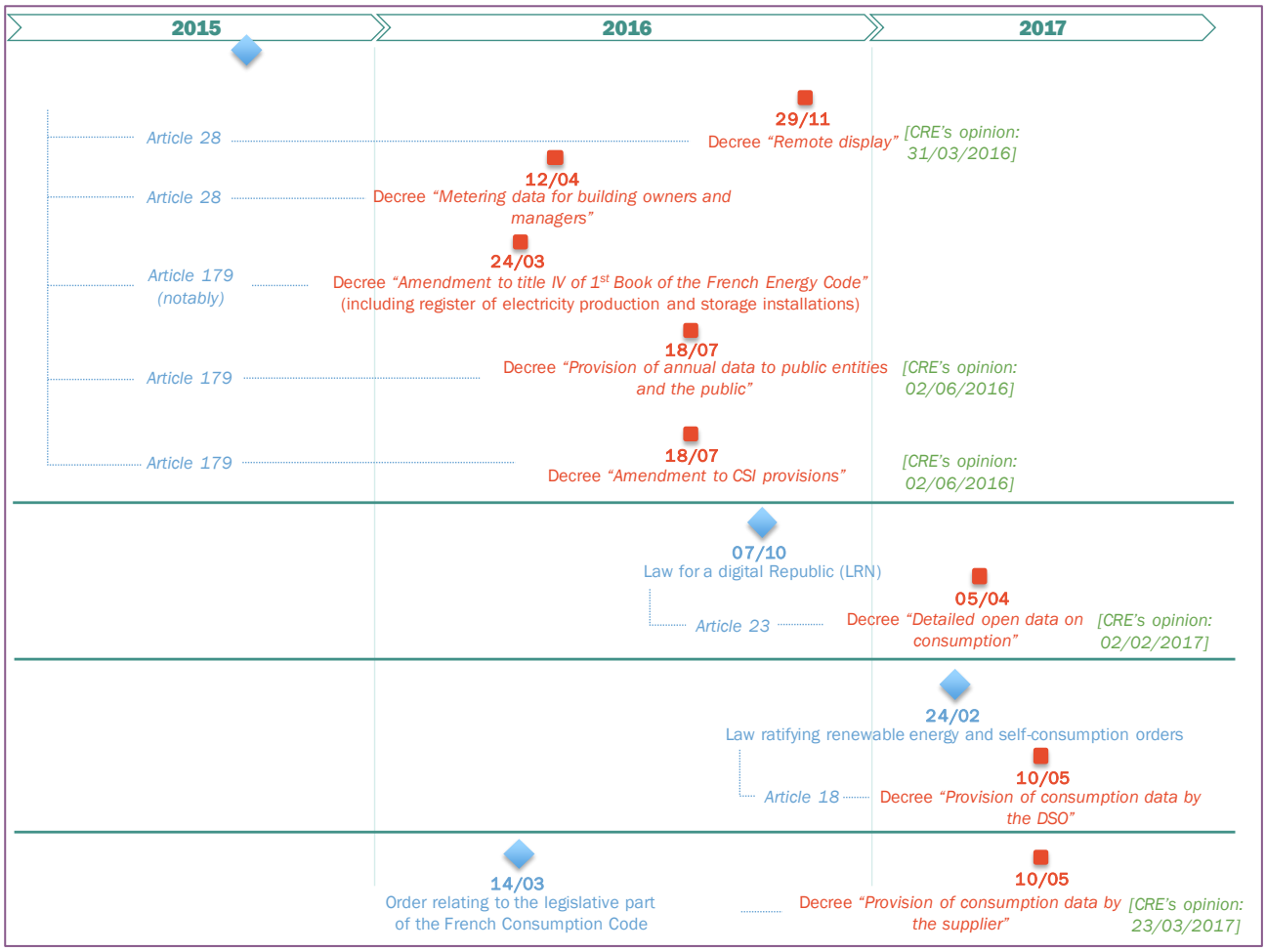

Figure 2 – The main recent developments of the French legal legislative and regulatory context (decrees only) concerning energy data *(source: CRE)*

The content of the main texts described above can be summarised as follows:

Article of law	Implementing decree	Main content items of the statutory text (relating to data)
Article 28 of the law no. 2015-992 of 17 August 2015 *on energy transition for green growth*	Decree no. 2016-447 of 12 April 2016 *on the provision of access to metering data for building owners or management companies by energy system operators*	• Provision of access to consumption data for building owners and management companies by electricity and natural gas system operators. • The building must comprise more than 10 apartments and the requester must justify his request. • The data are transmitted in an aggregated and anonymised manner, over up to 3 years of historical data. • The tariff terms for this additional service fall within CRE's competency.
	Decree no. 2016-1618 of 29 November 2016 on *the offer, by electricity and natural gas suppliers, for transmission of consumption data expressed in euros by*	• The suppliers must propose several offers for the transmission of consumption data (in kWh and in euros), at least one of which must use a "screen *already available to the consumer*". • These solutions are proposed to the Minister in charge of Energy.

Article of law	Implementing decree	Main content items of the statutory text (relating to data)
	means of a remote device	• The amount to be compensated for under the Contribution to the Public Electricity Service (CSPE) for this device, initially proposed to consumers in a precarious situation, is assessed each year. • The possible generalisation of this device to all the consumers requires a technical/economic assessment, that CRE will have to carry out no later than 1st July 2020.
Article 179 of the law no. 2015-992 of 17 August 2015 *on energy transition for green growth*	Decree no. 2016-972 of 18 July 2016 *on confidentiality of information held by natural gas operators and by public electricity transmission or distribution system operators*	• The annual production and consumption quantities that the system operators must disclose, in order to provide access to data for public entities under Article 179 of the LTECV, are no longer considered as commercially sensitive information.
	Decree no. 2016-973 of 18 July 2016 *on the availability to public entities of data relating to transportation, distribution and generation of electricity, natural gas and biomethane, petroleum products and heating and cooling*	• The data to be made available to public entities and to the public are annual data relating to the production and distribution of electricity, natural gas, biomethane, heating and cooling, and the distribution of petroleum products. • The data are aggregated at the level of the building, IRIS unit[25], municipality, EPCI[26] and region (see paragraph 1.3.2.2). • A first part of the data is made freely available by system operators to public entities, which must justify their quality. It is also made available to the Statistics Department of the Ministry in charge of Energy (SOeS). These data can also be made available by the system operator. • A second part of the data concerns annual consumption by point of delivery or by building on which additional services of system operators are provided. The billing terms for these services are defined by CRE.

[25] Blocks grouped for statistical information. The term also designates the zones created by this breakdown (see paragraph 1.3.2.2).
[26] Public inter-municipality cooperation establishment (Établissement public de coopération intercommunale). It is an administrative structure that can take the form of cities, urban communities, communities of cities, communities of municipalities and inter-municipal associations.

Article of law	Implementing decree	Main content items of the statutory text (relating to data)
	Decree no. 2016-350 of 24 March 2016 *on various amendments to Title IV of the 1st Book of the French Energy Code*	• The public electricity transmission system operator or the public distribution system operators of areas that are not interconnected submit to the Minister in charge of energy the long-term forecast assessments and make them public according to terms they shall specify. • The public electricity transmission system operator establishes each year a national electricity report covering the year preceding its publication date. • Electricity producers directly or indirectly connected to the public networks must provide to the operator of the network to which they are connected technical and contractual information on their systems. • The public electricity transmission system operator keeps up-to-date and at the disposal of the Minister in charge of Energy a national register which lists the production and storage facilities connected directly or indirectly to the public electricity networks of the mainland metropolitan territory and the non-interconnected areas. The content of this register is defined by decree.
Article 23 of the law no. 2016-1321 of 7 October 2016 *for a digital Republic*	Decree no. 2017-486 of 5 April 2017on the *processing and public availability of detailed metering data of electricity and natural gas transmission and distribution system operators*	• The data shall be made available by network operators with a historical record of at least twenty-four months. • For electricity and natural gas transmission system operators: provision of the aggregated measurement curves and the aggregated quantities of energy of the withdrawal or injection points of these networks, as well as the corresponding number of points. • For electricity and natural gas distribution system operators: the aggregated quantities of energy may result from *"the metering, or, where appropriate,* [shall be] *evaluated based on standard profiles assigned to them"*. • A joint order of the Ministers in charge of Energy and of Economy will specify in particular the "*terms of accreditation of the statistical analysis*" based on which the measurement curves are reconstructed, the aggregation criteria selected for making available the measurement curves and the energy quantities, the geographical scales to be considered, as well as the measurement intervals and the frequency of provision of these data to the public.

Article of law	Implementing decree	Main content items of the statutory text (relating to data)
Article 18 of the law no. 2017-227 of 24 February 2017 *ratifying the orders no. 2016-1019 of 27 July 2016 and no. 2016-1059 of 3 August 2016*	Decree no. 2017-948 of 10 May 2017 *on the procedures for the provision of electricity and natural gas consumption data to consumers*	• The system operator must implement a secure space through which the consumer has access in particular to his daily and monthly consumption data, and, for electricity, to the maximum power daily extracted and the load curve. • The secure space must also include functionalities enabling the consumer to ask for the activation or deactivation of the load curve recording by the metering system, as well as the deletion of the data recorded. • This space must allow for the provision of all or part of the consumption data to any third party designated by the end customer, or the interruption of the data provision. • This space must make it possible to implement consumption comparisons and the warning systems required by Article 28 of the LTECV, and to download the data in an open standard, easily re-usable and exploitable by an automated processing system.
Article L. 224-9 of the French Consumer Code, introduced by the law no. 2010-1488 of 7 December 2010 *on a new organisation of electricity* and incorporated into the order no. 2016-301 of 14 March 2016 *relating to the legislative part of the French Consumer Code*	Decree no. 2017-976 of 10 May 2017on the *terms of access by consumers to electricity and natural gas consumption data and on the provision of these data by the supplier*	• The supplier must set up a secure space through which the consumer can access his daily, monthly and annual consumption data, the issued bills, a cost estimate of the consumed energy which has not yet been charged, and, for electricity, the maximum electrical power daily extracted and the load curve. • The secure space must also include functionalities enabling in particular the consumer to ask the supplier to transmit to the distribution system operator his requests with respect to the collection, recording, activation or deactivation of these operations concerning the electricity load curve.

Table 3 – Main elements of the decrees published between 2015 and 2017 concerning energy data (*source: CRE)*

1.3.2.2 The complexity of Article 179 of the law *on energy transition for green growth*

Article 179 of the law of 17 August 2015 *on energy transition for green growth* and its implementing texts introduce unprecedented legislative and regulatory provisions, allowing for the publication of energy data aimed at public entities, consisting of local authorities designated by the missions, and at the general public, in particular through an open data platform maintained by the Statistics Department of the Ministry of Energy (SOeS). They are the first provisions involving in France a homogeneous provision of access to the data of electricity, natural gas, heating, and petroleum product delivery networks.

The aim of these texts is to make annual production and consumption quantities available to the public and to public entities, at a geographical scale corresponding to the area of responsibility of these local authorities and in particular:

- the region by virtue of the development of the Regional Planning, Sustainable Development and Territorial Equality Scheme (Article L. 4251-1 of the French General Code of Local Authorities; city of Lyon

and the EPCI with their own tax system grouping more than 50,000 inhabitants, which are required to adopt a territorial Climate-Air-Energy Plan (Article L. 229-26 of the French Environmental Code);

- the *"local authorities"* which ensure the surveillance of air quality and its effects on health and on the environment (Article 221-1 of the French Environmental Code);
- the departments by virtue of their competency in the area of social action (Article L. 1111-9 of the French General Code of Local Authorities) and, where appropriate, the municipalities in the context of the fight against fuel poverty (Article L. 123-4 of the French Code of Social Action and Families).

Furthermore, Insee produced a breakdown of the territory in zones of homogeneous size, for all the municipalities with more than 10,000 inhabitants and most of those with more than 5,000 inhabitants. This breakdown, called IRIS[27], is also used within the framework of Article 179, in order to produce an aggregation of data at the level of a sub-municipal unit.

Finally, for the purpose of enabling some public establishments that have in particular missions to fight against fuel poverty, to support demand side management actions, these legislative provisions introduce the feasibility of providing annual energy production and consumption data at the building level, when they concern:

- non-residential buildings;
- buildings with more than 10 apartments of which the use is considered as residential or of which the use considered as residential exceeds 200 MWh, to ensure that these data are not considered as personal data.

As regards electricity and natural gas, the transmission system operators are required to provide public entities and the public with access to annual production and consumption quantities specified in Appendix 4.2.1, namely:

- annual deliveries by business sector and by IRIS unit, as well as the number of delivery points concerned by this aggregate;
- the biomethane injection capacity and the annual injected quantity for each system;
- information on the production systems made public within the framework of the national register of electricity production and storage facilities[28];
- the presentation of the network, at the regional and inter-municipal level, "*based on a commented map*".

Electricity and natural gas distribution system operators are required to provide public entities and the public with access to annual production and consumption quantities specified in Appendix 4.2.2, namely:

- the total annual consumption by business sector and by IRIS unit, as well as the number of delivery points concerned by this aggregate (the residential aggregates must then necessarily comprise more than 10 points or represent an annual consumption of more than 200 MWh to be disclosed);
- the total annual consumption of residential aggregates, by region and by EPCI;
- the estimate of the temperature-sensitive[29] share and of the temperature sensitivity[30] of the consumption;
- the total annual consumption of each non-residential building or for residential buildings comprising more than 10 residential points or with an annual residential use of more than 200 MWh, as well as the number delivery points by associated building (if the consumption could be disclosed);
- the biomethane injection capacity and annual quantity injected for each system;
- information on the production systems made public within the framework of the national register of electricity production and storage facilities[28];
- the presentation of the network, at the level of a regional and inter-municipal unit, "*based on a commented map*".

Besides this description of these different data categories, the implementing regulatory texts of Article 179 of the LTECV define complex dissemination procedures which multiply the number of parallel publication channels for the same piece of data. As shown in the figure below summarising the general functioning of the provision of access to these data, most of them can be disseminated to the public:

[27] Blocks grouped for statistical information. The term also designates the zones created by this breakdown.
[28] This national register, described in Article L. 142-9-1 of the French Energy Code, is set up by RTE.
[29] Share of the energy consumed that is considered as directly related to outdoor temperature.
[30] Additional energy power for every temperature degree less.

- by the Statistics Department of the Ministry of Energy (SOeS), which, prior to publication on the open government platform, checks the absence of data grouping less than 10 residential delivery points or 200 MWh of residential consumption;
- by the system operator itself, on its own open data platform – it must also check prior to publication the absence of data under such thresholds;
- by a public entity having requested these data – it must also check these same thresholds – subject to the justification of its capacity of public entity legitimate to obtain these data. These public entities also have the opportunity to authorise their delegatees to disseminate the requested data.

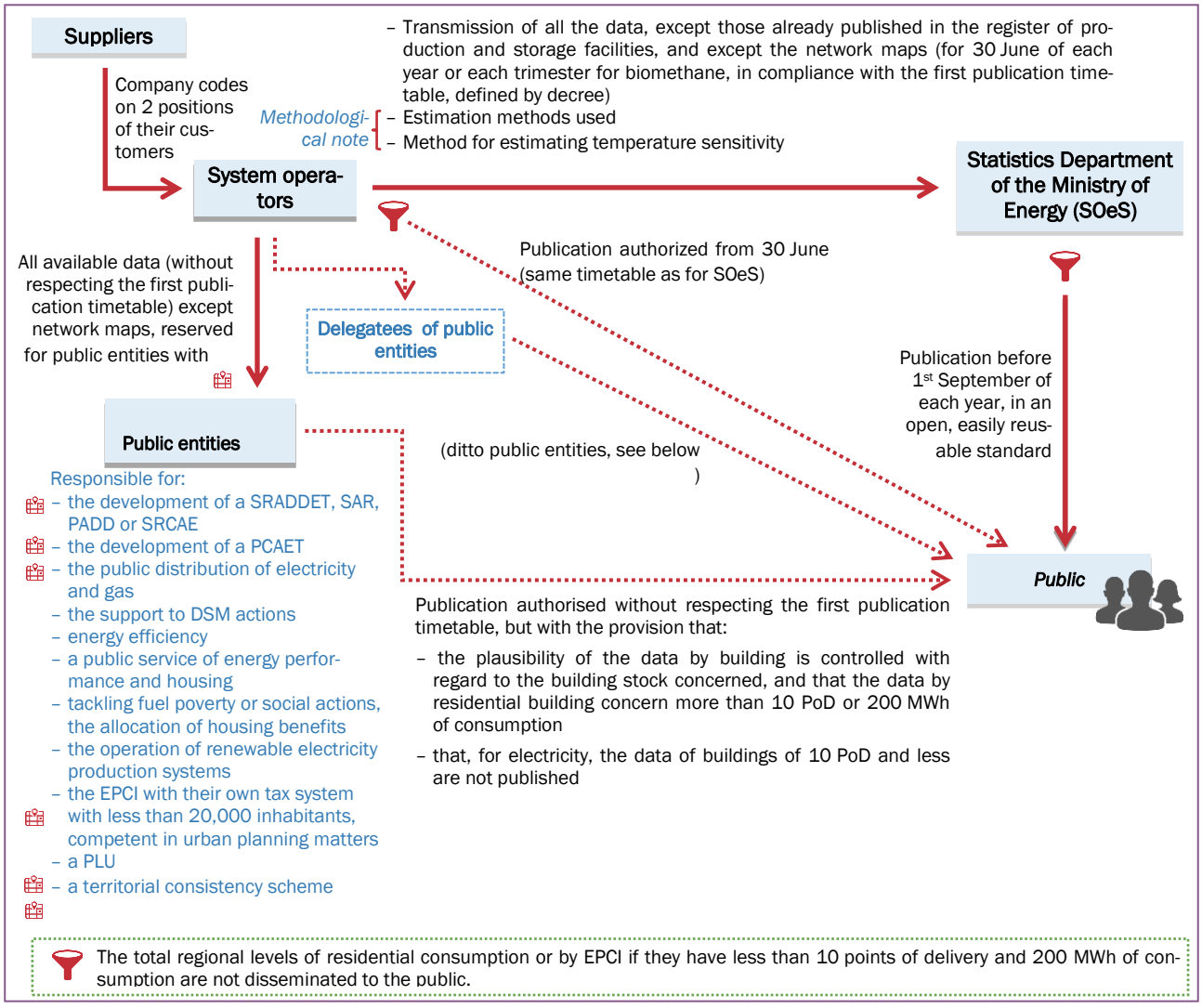

Figure 3 – Diagram showing the functioning of the free provision of access to energy data to public entities and the public (*source*: CRE)

The Table 4, below, presents the types of public entities concerned by the various missions of the public entities mentioned above:

Missions	Public entities				
	Municipality	EPCI	Department	Region	Granting authorities
Development of a regional planning, sustainable development and territorial equality scheme (*schéma regional d'aménagement, de développement durable et d'égalité des territoires* – SRADDET) *[for continental metropolitan France]*, of a regional planning scheme (*schéma d'aménagement régional* – SAR) *[for overseas local authorities]*, of a planning and sustainable development plan *[for Corsica]*				✓	
Development of a regional climate-air-energy scheme (SRCAE)				✓	
Development of a territorial climate-air-energy plan (PCAET)		✓			
Public distribution of energy and gas, heating or cooling					✓
Support to demand side management (DSM)		✓			
Energy efficiency				✓	
Public service of energy performance and housing		✓			
Fight against fuel poverty and social action, allocation of housing benefits	✓	✓	✓	✓	
Operation of renewable electricity production systems	✓	✓			
EPCIs with less than 20,000 inhabitants competent in urban planning matters		✓			
Development of a local town planning plan (*plan local d'urbanisme* – PLU)		✓			
Development of a territorial consistency scheme (*schéma de cohérence territoriale* – SCoT)		✓			

Table 4 –Missions of the public entities that may use data of regulated energy operators (*source:* CRE)

1.3.2.3 The law *for a digital Republic*

The law of 7 October 2016 *for a digital Republic* complemented the legal obligations for regulated energy operators to make data available. In its Article 23, pursuing the objective of *"enabling a re-use of detailed consumption and production data from energy metering systems"* of electricity and natural gas transmission and distribution system operators, it added two articles to the French Energy Code requesting these operators to make these data (defined by decree) available to the public and, where appropriate, to transmit them to the *"administrative authority"* for a "centralised *access"* to these data to be set up.

Whereas the purpose of Article 179 of the LTECV was to publish annual quantities at relatively fine geographical scales (the IRIS unit, or even the building), Article 23 of the law *for a digital Republic* provides for the provision of access to detailed energy consumption information (daily or intradaily data), but requiring to be significantly aggregated, so that personal data such as the consumption of domestic users are not reconstructable.

The decree no. 2017-486 of 5 April 2017[31] *relating to the processing and public availability of the detailed metering data of transmission and distribution system operators (for electricity and natural gas)*, issued under this article, establishes lists of data to be made available to the public on open publication platforms, mainly consisting of:

- the quantities of energy consumed and injected, at different time steps and geographical scales;
- the number of withdrawal and injection points, according to various grouping criteria and at different geographical scales;
- the profiles used by system operators to reconstruct energy flows and the number of points assigned to these profiles, according to different grouping criteria and at different geographical scales;
- "*reconstructed load curves*", which result from the aggregation of consumption and production data considered as similar at a measuring step that can be precise.

In its opinion of 2 February 2017[32], CRE delivered a favourable opinion on the draft decree that was submitted to it. It noted that the latter "*organises a coordinated provision of access to homogeneous information relating to consumption and production data, by taking into account the size of system operators and the means available to them, in particular the deployment of smart metering systems*". Furthermore, it welcomes the possibility of a co-operation between operators in order to meet their obligation, which will facilitate access to these detailed data by the players of electricity and natural gas markets throughout the metropolitan territory, and hence contribute to a better functioning of these markets.

In addition to the broader range of data transmitted to granting authorities (see paragraph 1.3.1) and the obligation to make detailed energy consumption information available, the law *for a digital Republic* lays down a general principle of opening up of public data, the implementation of which will have consequences both for system operators and for the Energy Regulatory Commission (see paragraph 2.6).

1.3.3 European directives and regulations accompany the framework for provision of access to data, by protecting Member States and European citizens

In addition to the provisions relating to energy data, contained in the directives relating to gas and electricity markets, which will be briefly presented hereafter (see paragraphs 1.3.3.1 and 1.3.3.2), several other European texts have an impact, either on the content of the data to be collected by system operators, or on the procedures for their processing and their protection.

Hence, the European Directive 2007/2/EC of 14 March 2007 *establishing an Infrastructure for Spatial Information in the European Community*, known as "*Inspire*" directive, aims to establish in Europe a spatial data infrastructure to ensure the inter-operability between databases and facilitate the dissemination, availability, use and reuse of spatial information in Europe. It is transposed into French law since the Order no. 2010-1232 of 21 October 2010[33], which added to Title II of Book 1 of the French Environmental Code a Chapter VII entitled "*Infrastructure for spatial information*".

The Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April *2016 on the protection of natural persons with regard to the processing of personal data and the free movement of such data, and repealing Directive 95/46/CE*, which will enter into force in 2018, strengthens the rights of natural persons with regard to the consent prior to data collection, data portability or the right to be informed in case of data hacking (see paragraph 1.2.1).

The European Directive 2016/1148 of 6 July 2016 concerning measures for a high common level of security of network and information systems across the Union (*Network and Information Security – NIS*) and which will have to be transposed by 2018 provides that operators of essential services, such as the operator of gas and electricity transmission systems, shall take appropriate and proportionate technical and organisational measures to manage the risks posed to the security of network and information systems (see paragraph 1.6.3).

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[31] The text is available on the website Legifrance.gouv.fr.
[32] CRE's deliberation of 2 February 2017 *giving an opinion on the draft decree on the processing and public availability of the detailed metering data of electricity and natural gas transmission and distribution system operators*. The text is available on the CRE's website.
[33] Order no. 2010-1232 of 21 October 2010 *adapting various provisions to European Union law in environmental matters*. The text is available on the website Legifrance.gouv.fr.

1.3.3.1 The « third energy package » (2009)

The European legislation on the provision of access to energy consumption data already exists since the "third energy package" (2009), composed of two directives relating to the electricity and gas markets, two regulations concerning conditions of access to the natural gas networks, on the one hand, and conditions of access to the network for cross-border exchanges of electricity, on the other hand, as well as a regulation creating the Agency for the Cooperation of Energy Regulators (ACER).

The Directive 2009/72/CE of 13 July 2009 *concerning common rules for the internal market in electricity and repealing Directive 2003/54/CE*[34] already stipulated, in the *h* of its paragraph 1, that "*The Member States* shall *define a format for the* [consumption] *data and a procedure for suppliers and consumers to have access to the data*".

1.3.3.2 The « fourth energy package » (2016-2017)

The proposal to recast the Directive 2009/72/CE of 13 July 2009, which is part of the "fourth energy package" presented by the Commission on 30 November 2016[35], reinforces the right of access to data.

Chapter III of the draft directive contains provisions relating to smart meters (Articles 19 to 21) and improves the regulation relating to the possibility given to consumers to share their data with suppliers and service providers by stating the following principles (Article 23):

- Member States or the authorities designated by them, shall specify the eligible parties which may have access to the data of end customers with their explicit consent. Eligible parties shall include at least customers, suppliers, transmission and distribution system operators, aggregators, energy service companies, and the other parties which provide energy or other services to customers;
- The data shall include metering and consumption data as well as data required for supplier switching;
- Eligible parties should have at their disposal in a non-discriminatory manner and simultaneously the requested data;
- Access to data shall be easy and the relevant procedures shall be made publicly available;
- No additional costs shall be charged to end customers for access to their data. Member States shall be responsible for setting the costs for access to data by eligible parties, it being specified that the regulated entities which provide data services shall not profit from that activity.

A common format for meter readings and the data required for supplier switching

Article 24 provides that the Member States shall define a *common data format at national level*, and a transparent procedure for eligible parties to have access to the consumption data and to the information required for supplier switching. According to the European Commission, this will promote competition in the retail market and avoid excessive administrative costs.

This article provides for the setting up of *a common European data format* and transparent and non-discriminatory procedures for accessing the data, developed by the Commission in implementing acts, which will replace the national data format and procedure adopted by Member States. In its initial assessment, the CRE has reservations regarding the relevance of such a generalisation, in view of the heavy constraints that it would generate.

Finally, Chapter IV (Article 34) reiterates the principle of non-discrimination with regard to data access. It invites in particular the Member States to ensure that the vertically integrated undertaking does not have privileged access to data for the conduct of its distribution activity.

[34] The full text is available on the website of the European Commission.
[35] The full text of the draft directive is available on the website of the European Commission.

1.3.4 The data provision initiatives of operators

1.3.4.1 Data made available by operators on websites or applications

Most of the regulated energy operators have undertaken to make a large amount of data available to the users of their networks and infrastructures, on the one hand, by giving them access to the information which specifically concerns them and, on the other hand, by making available to the community various aggregated and anonymised information, in most cases in open data (see paragraph 1.3.4.2).
The main electricity distribution system operator, *Enedis*, which serves 35 million consumers and connects most of the renewable electricity production systems, has already adopted a digital policy taking into account many stakeholders:

- *aimed at end consumers*: the system operator implemented an Internet portal designed to use the functionalities of its *Linky* smart meter enabling in particular the creation of an account on its website for the customers equipped with this meter to have an overview of their gross consumption and to activate a number of services enabled by the functionalities of this new meter. It also offers its users an application called *Enedis à mes côtés*[36] (Enedis by my side) which provides the user with access to the contact details of the nearest repair service, but also the electrical distribution restoration time in case of power failure;
- *aimed at market players*: Enedis provides electricity market players with access to the data required for their activities, as part of additional services provided on an exclusive basis. For example, it provides suppliers with the data required for billing customers. As regards the mechanism of the balance responsible entities, Enedis has in particular the task of producing consumption reports and making them available to market players. Furthermore, it develops the relevant data for the purpose of calculating the reference powers taken into account to determine the capacity obligations of the obligated players;
- *aimed at electricity producers*: besides *Caparéseau* (see *below*), to which it contributes, Enedis has developed a website called *DISPO Réseau*[37], which is a portal for exchanges between producers connected to medium-voltage (MV) grids and itself, concerning the data related to contracts providing access to distribution networks for producers (CARD-I). For the producer, this involves entering the down-time periods that it envisages for its system. For Enedis, this involves informing the producers of the works planned, in order to optimise their planning and reduce their impact for producers. DISPO Réseau was tested within the framework of the demonstrator *Smart grid Vendée*[38], and was then deployed in the regional operating agencies in September 2016, for a feedback scheduled for the first half of 2017;
- *aimed at local authorities*: anticipating the requests made under Article 179 of the LTECV (see paragraph 1.3.2.2), Enedis has already developed consumption aggregates at the level of IRIS units, with a private access according to the area of jurisdiction of these local authorities. Furthermore, it cooperates in particular with local authorities concerning the installation of electric vehicle charging infrastructures, by proposing mapping models of the charging stations on the network, as well as examples of network constraint assessments and related costs;
- *aimed at granting authorities*: see paragraph 1.3.1, Enedis provides the granting authorities, as part of the annual concession reports, with a network mapping at medium-scale (computerised network maps with enriched data) and at large-scale (exchange of background maps and map data relating to underground structures of the public distribution network in the context of construction work and alteration to structures).

[36] Available for terminals equipped with Android, iOS and Windows systems in *ad hoc* application stores.
[37] The tool is accessible at the following address: https://www.disporeseau-enedis.fr.
[38] Its description is available on the CRE's website dedicated to *Smart grids*.

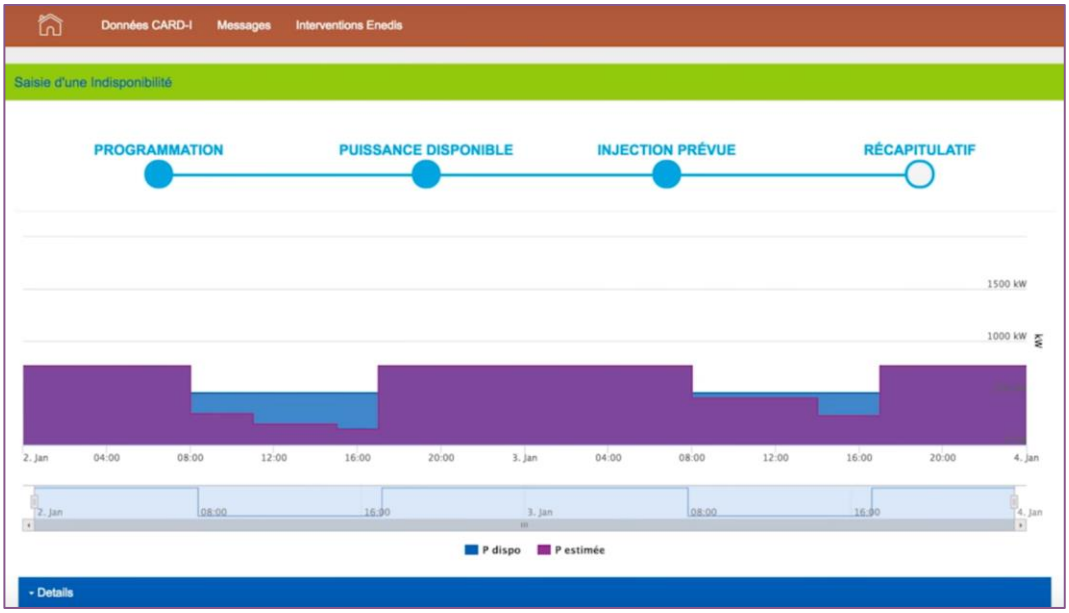

Figure 4 – Screen capture of the down-time of a production unit on the website DISPO Réseau *(source:* Enedis)

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The public electricity transmission system operator, *RTE*, structured its "*digital strategy*" based around three major objectives:

1. Use the data in order to increase the performance of the electrical system, for which it is partly responsible. As such, it developed, for its own use, tools gathered under the terminology of "*digital hub*", which are based on the real-time transmission of information from or to network elements.
2. Provide the energy ecosystem with input to decision making for energy policies. The "*digital mall*", structured to make these elements available both to the business of the company and to many external recipients, aims at "*reinforcing the free access by third parties to the data of the electrical system*", with however the appropriate level of confidentiality to be provided according to the stakeholders concerned: the business of RTE, but also its customers, institutional players, territories, the electrical system, or the general public.
3. Support research, innovation and provide energy and digital ecosystems with software "bricks" to enable innovation. These activities designed for testing new services are gathered under the term of "*digital lab*".

In the context of its digital developments, RTE developed a platform called *eCO2mix*, accessible from a web browser[39] or in the form of an application for mobile terminals. This platform, aiming to carry out both a digital assessment of the electrical system and education on the issues facing the latter, provides the user with an overview of electricity consumption, production sectors (with the associated CO_2 emissions), the volumes exchanged at each interconnection with mainland metropolitan France, and market prices, at temporal scales ranging from near real-time to an annual report.

[39] The tool is available at the following address: http://www.rte-france.com/fr/eco2mix/eco2mix/.

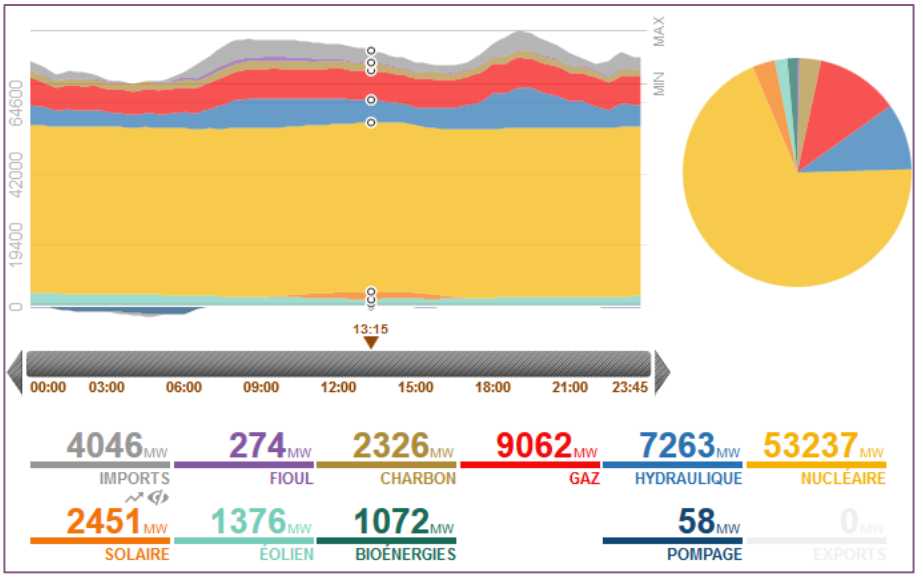

Figure 5 – Power of the production units by sector used in mainland metropolitan France on 5 January 2017 at 13:15 p.m., made available on the eCO2mix website *(source: RTE)*

In that same educational vein, RTE decided to set up a virtual community, called *ÉcoWatt*, in two metropolitan regions whose electrical system is fairly constrained: Brittany[40] and Provence Alpes Côte d'Azur[41]. By subscribing to such a programme, the user can freely "*be made aware of the procedure* [enabling him] *to follow consumption forecasts and better know the 'eco-gestures'*" and receive notification when, in winter, "*between 6:00 p.m. and 8:00 p.m., the highest power consumption peaks occur at the regional level*".

Finally, in order to comply with the legislative requirements concerning the transparency of its activities and its neutrality with regard to wholesale markets, in particular pursuant to the European Regulation no. 543/2013 of 14 June 2013, RTE contributes to the maintenance and implementation of the "*transparency platform*" of the European Network of Transmission System Operators, ENTSO-E[42]. It also makes available certain technical and commercial information on the publication platform of the Electricity Interconnection in South-Western Europe (*Interconnexion de l'électricité du Sud-ouest de l'Europe*[43] – IESOE), consisting of RTE and its Portuguese, Spanish, Moroccan, Algerian and Tunisian counterparts.

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* *

The Directorate of EDF Island Energy Systems (Systèmes Énergétiques *Insulaires*), *EDF SEI*, is in charge of operating the public electricity distribution networks of most of the overseas departments-regions (DROM) and oversees local authorities (COM), and of Corsica. On these territories, referred to as areas not interconnected to the mainland metropolitan network, EDF SEI has the specific feature of being also a producer and supplier of electricity on these different territories.

On each of the websites dedicated to these different areas, EDF SEI publishes the chronicle of production data by sector and associated costs, since June 2016, at an hourly frequency, for Corsica and the DROM. It publishes, in addition, the hosting capacities on the HVB networks, through its website dedicated to connections[44], as well as the forecast assessments and the overviews of renewable energy production on these territories.

Furthermore, EDF SEI has made available on this same online portal[44], both general information concerning the connection of production system units in non-interconnected areas, and functionalities for the submission and follow-up of connection requests. In a form quite similar to *Caparéseau* (see below), it also publishes on the web-

[40] The website of EcoWatt Bretagne is accessible at the following address: http://www.ecowatt-bretagne.fr.
[41] The website of EcoWatt PACA is accessible at the following address: http://www.ecowatt-paca.fr.
[42] The publication platform of ENTSO-E is available at the following address: https://transparency.entsoe.eu.
[43] The platform of IESOE is available at the following address: http://www.iesoe.eu.
[44] The website of EDF SEI is accessible at the following address: https://sei-raccordement.edf.com.

sites dedicated to each of these territories[45] and on a biannual basis, the injection capacities of the substations of the high-voltage (HV) network, the hosting production capacities of the high-voltage/medium-voltage (HV/MV) transformation and the total injection powers of the projects for which an MV connection request has been made and which are on the waiting list.

Finally, in anticipation of the roll-out of smart metering systems in the various non-interconnected areas and the digitalization of their network equipment, which will significantly increase the amount of data to be processed, EDF SEI initiated important IT transformation projects, which will eventually contribute to the provision of access to new data for end users, but also for local authorities and the public.

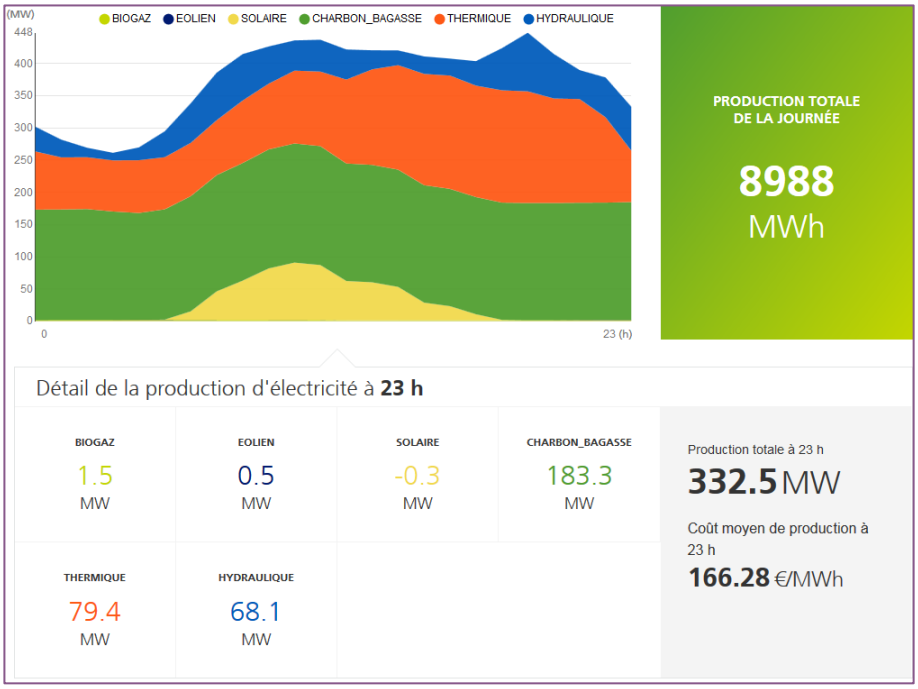

Figure 6 – Electricity production by sector on 16 November 2016 at Reunion Island *(source: EDF SEI)*

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GRDF, a natural gas distribution system operator serving 95 % of French customers, also undertook a major digital programme aimed at all the players with which they interact. For end consumers, GRDF opened, in September 2016, a service entitled "*Mon suivi conso*" ("My consumption monitoring") to offer residential consumers daily readings of their consumption on their GRDF space, the use of which will be especially relevant since they will be equipped with a *Gazpar* meter, which will transmit a daily consumption reading. It intends to open the same type of services for companies and local authorities in the course of September 2017.

Following the publication of the implementing decrees of Article 179 (see paragraph 1.3.2.2) and 28 of the LTECV, GRDF also launched a project called "Calendar aggregates of consumption data" ("*Agrégats calendaires de données de consommation*" – ACDC) notably in order to make available annual data at the level of a building for social landlords and building owners, and to prepare the annual provision of data at the level of each IRIS unit which it must provide to the Statistics Department of the Ministry in charge of Energy (SOeS) and which it also publishes on its open data.

Recognising a growing demand for data from third parties mandated by end customers to which they offer services for using natural gas consumption data, GRDF chose to invest in an automated solution for managing the consent of these end customers, entitled *"Access by third parties to individual data of customers"* ("*Accès aux*

[45] The EDF SEI website will be accessible at the following addresses: for Corsica (https://corse.edf.fr), for Guadeloupe (https://www.edf.gp),for Martinique (https://www.edf.mq), for Guyana (https://www.edf.gf), for Reunion Island (https://reunion.edf.fr) and for Saint-Pierre-et-Miquelon (https://www.edf.pm).

données individuelles des clients par des tiers" – ADICT), due to enter into service at the *"end of 2017"*. This reflection conducted in collaboration with Enedis, is a first step towards a possible French *"Green button"* (see paragraph 2.3).

Finally, GRDF opened in May 2016 on its website space reserved to granting authorities a functionality entitled *"Ma concession gaz"* ("My gas concession") the aim of which is to digitise most of the documents that GRDF and the granting authorities can commonly exchange (access to the concession contract, the concession activity report, network mapping, *etc.*). Local authorities will also be offered new data provision services (in particular those requested by Article 179 of the LTECV) grouped on a same space on the GRDF website, and will be able to monitor consumption levels of their own sites, their connection to the natural gas distribution networks, *etc.*

Figure 7 – View of the access to a plan of a network under concession on the space *"Ma concession gaz" (source:* GRDF)

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GRTgaz, a natural gas transmission system operator, has also invested in a wide-scale digital strategy to provide its customers with access to the data that they may need. GRTgaz set up its customer relation platform *TRANS@CTIONS*[46], which, on a private and secure space with each of its shipper and consumer customers, enables the latter to *"manage their transmission services on the network of GRTgaz* [...] *and to browse, consult and download the publication-related files"*.

The *SmartGRTgaz*[47] website publicly makes available all the physical and commercial data relating to natural gas exchanges on the French territory. It identifies in particular the capacities transiting on the networks, commercial

[46] A description and the user guides of this tool are available at the following address: http://www.grtgaz.com/?424.
[47] The application is available at the following address: http://www.smart.grtgaz.com.

and physical flows, actual and forecast consumption, the flexibility of strongly modulated sites, end-of-day imbalances, projected line packs, and the prices and tariffs applicable. It also displays the works programme on the transmission networks, as well as the data provided by Elengy (allocations, capacities and programming), and by Storengy (data on injection and extraction on the storage sites), by Foxmax LNG and by Dunkerque LNG (methane terminals).

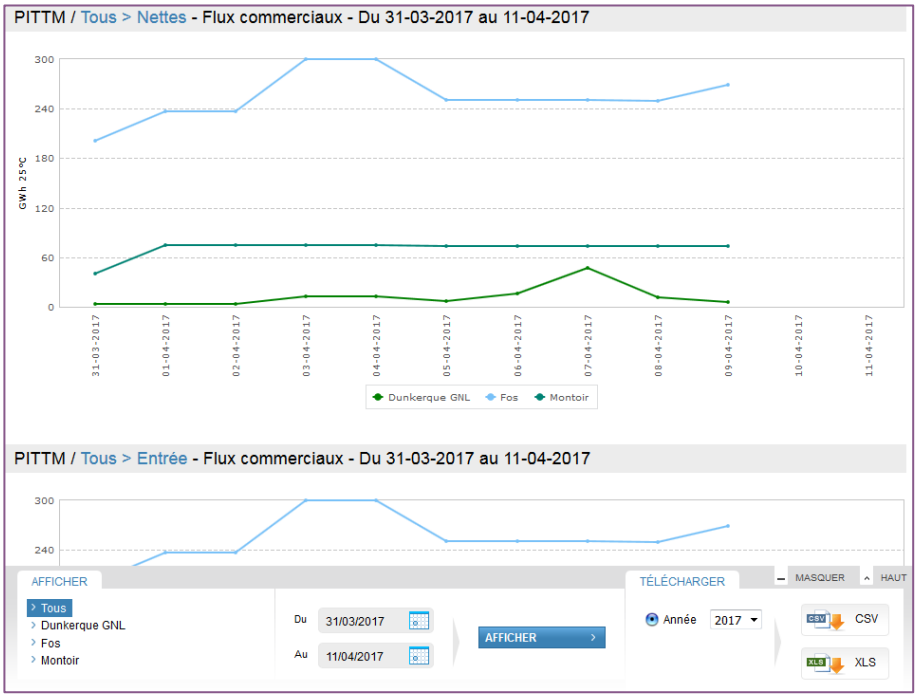

Figure 8 – Synthesis of commercial flows at interconnection points of methane terminals (PITTM) available on the SmartGRTgaz website *(source: GRTgaz)*

The *GRTgaz+*[36] application for mobile terminals is aimed at *"all those who wish to understand and be continuously informed about the transmission of natural gas in France"*, like the eco2mix application of RTE in electricity (see above). It contains the hourly, intraday and daily consumption by type of customer, and monthly consumption levels by region. In addition, it provides the physical flows and a balance of daily inflows and outflows, the price of gas in Europe, and the renewable gas data, and offers quantitative analyses and key figures.

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The second French natural gas transmission system operator, *TIGF*, also produces large amounts of data, both *private*, for purposes of balancing and billing, and *public*, as part of the exercise of its missions.

For the first, TIGF upgraded its TETRA application[48], which presents to its gas shipper and gas storage operator customers all the data required for their activity: contractual elements and operational data. They have thereby access to the real-time monitoring and to the history of consumption, subscriptions, nominations, programmes, storage constraints, as well as allocations and imbalance of their portfolio.

For the second, TIGF implemented Datagas (equivalent of SmartGRTgaz) which contains all the public data required to provide the user with an overview of the usage of the networks it operates: technical capacities (subscribed and available), nominations, allocations, data required for balancing purposes, intraday data, physical flows, line pack gas, congestion management. These data are subject to ongoing updates.

[48] Access to the private space of this tool is available at the following address: https://tetra.tigf.fr.

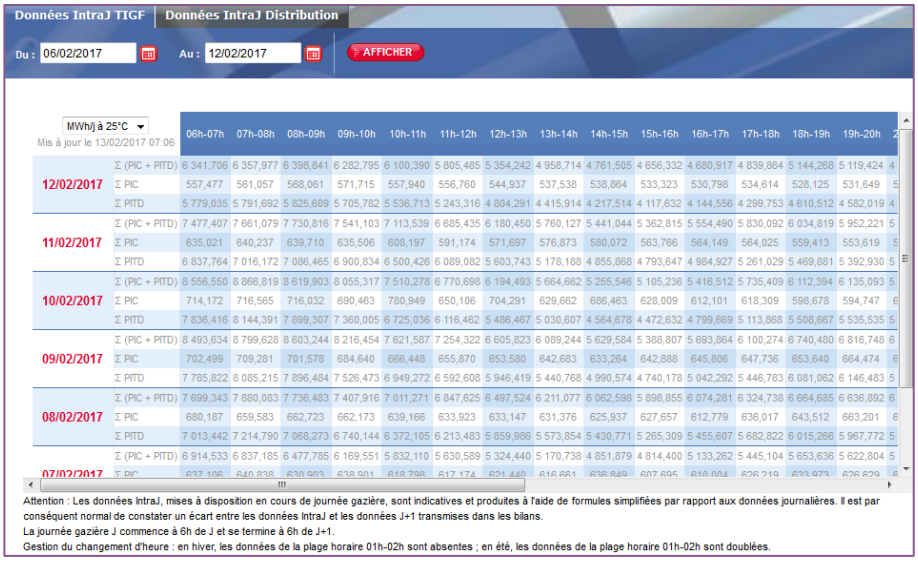

Figure 9 – Provision of intraday telemetered data on the natural gas transmission networks operated by TIGF *(source: TIGF)*

In addition, TIGF offers its customers the mobile application *TIGF4U*[49], which is a tool presenting in a simple manner the main public data related to the use of the TIGF network, useful to the customer for the course of the current and following gas days. TIGF4U presents the most up-to-date information for the possible reductions, the nomination level, the stock level, the forecast consumption levels of the area, the last allocations, *etc.*

In addition, TIGF established a collaboration with all the operators adjacent to its network, in particular its Spanish counterpart, Enagas. The subscription for natural gas capacity at the Franco-Spanish interconnection point (Pirineos) is carried out on a common European platform, called PRISMA[50].

Finally, in order to respond to all its transparency obligations (see paragraphs on RTE above), TIGF publishes the required data on the "*transparency platform*" of the European Network of Transmission System Operators for Gas, ENTSOG[51]. This is also the case of GRTgaz. In keeping with the obligations related to the European Regulation no. 1227/2011 of 25 October 2011 on *the wholesale energy market integrity and transparency*, referred to as "REMIT", TIGF issues daily to ACER individualised information on the transactions made with its customers and on the use they make of the network.

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As a natural gas storage operator operating 8,000 measurement points and 102 TWh of useful capacity on 14 storage sites (all connected to the transmission network of GRTgaz) for about thirty customers, *Storengy* uses many technical data (volume, flow, pressure, temperature, chemical composition, subsoil characteristics) relating to the various elements constituting the natural gas storage facilities (reservoir, wells, antennas, dehydrators, desulphurisers, compressors). Whereas they mainly serve the operator's internal use, they can also be made available to GRTgaz, but they are not published outside of this context.

Storengy also uses commercial data (contracts with its customers, stock levels, nominations), some of which are made available to the customers themselves, through its website[52], and to the European Agency for the Cooperation of Energy Regulators (ACER).

As regards the publication of aggregated data on public websites, in the same way as TIGF (insofar as it is also a natural gas storage operator), Storengy contributes to the *AGSI+*[53] tool of Gaz Infrastructure Europe (GIE)[54], by

[49] Available for terminals equipped with Android and iOS systems in *ad hoc* application stores.
[50] The anglophone platform of PRISMA is available at the following address: https://platform.prisma-capacity.eu.
[51] The publication platform of ENTSOG is available at the following address: https://transparency.entsog.eu.
[52] Storengy's website is accessible at the following address: https://www.storengy.com/fr/.

publishing there its maximum volume capacities and their use (movements and stocks, on each gas day and at each interconnection point between the transmission network and the storage infrastructures). Some of them are also disclosed to the public under the European Regulation on the wholesale energy market integrity and transparency (REMIT).

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Elengy, an operator of 3 methane terminals in France, acts on behalf of 8 customers. In a similar manner to natural gas storage operators, Elengy uses mainly data:

- *of a technical and industrial nature*: volumes, temperatures, pressures, flows within the terminals, for their operation, mainly intended for the terminal itself and for GRTgaz;
- *of a commercial nature*: dates of arrival of the ships, energy quantities loaded and unloaded by date, reservoir stock level, mainly for its customers (individual data) and for the market (aggregated data).

Some of these aggregated data are published on Elengy's website[55], whereas others (daily data on the use of the terminals, end-of-month forecast data, capacity data and annual unloading programme) are made available on *ALSI+*[56], the website of Gaz Infrastructure Europe, similar to AGSI+, in particular under the REMIT regulation.

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Some regulated energy operators have joined together to provide their users with consistent data offerings. This is the case of natural gas transmission networks and infrastructures, where GRTgaz already integrates data of adjacent operators, as described above.

This is also the case in electricity where many initiatives have been undertaken, in particular under the auspices of the Association of Electricity Distributors in France (*Association des distributeurs d'électricité en France* – ADEeF), an organisation bringing together all the distribution system operators of metropolitan France. It has in particular already implemented:

- a data capture tool for the quarterly capacities of renewable energy production systems, intended for electricity distribution system operators (in order to inform the quarterly statistics requested by CRE, as well as the overview of renewable energy (*panorama des énergies renouvelables*) drawn up in collaboration with RTE, Enedis and the Renewable Energy Association (*Syndicat des énergies renouvelables*) on a private space of its website;
- a directory of distribution networks based on the Insee code (or the name) of the municipality[57];
- a "signalman" ("aiguilleur") for the capacity mechanism[58], to direct towards the concerned distribution system operators the certification applications (by means of the certification application form downloadable from this same website) filed in a secure space accessible to operators.

The *Caparéseau*[59] initiative is one of the most notable and most used data provision initiatives in the electricity production sector. Undertaken by RTE in collaboration with all the distribution network operators, it enables access to the possibilities of connection to the transmission and distribution networks of electricity production systems thanks to data updated biannually.
Widely used by electricity producers, *Caparéseau* makes it possible to display, on an indicative basis and before the processing of the connection request of a producer by the competent system operator, the hosting capacity at each primary substation (existing and future), those reserved by systems already connected, those reserved or

[53] The tool is available at the following address: https://agsi.gie.eu.
[54] GIE gathers 69 European operators of natural gas infrastructures (transmission system operators, storage operators, methane terminal operators), coming from 25 countries. It represents its adherents before European institutional organisations (political powers, administrations, energy regulators).
[55] The Elengy website is accessible at the following address: https://www.elengy.com/fr/.
[56] The tool is availavle at the following address: https://alsi.gie.eu.
[57] The directory is available at the following address: http://listegrd.adeef.fr.
[58] The capacity "signalman" is available at the following address: http://aiguilleurcapacite.adeef.fr (the public part of the website proposes only a presentation of the tool and documents applicable).
[59] The tool is available at the following address: http://capareseau.fr.

available under the regional plans for connecting to the renewable energy network (S3REnR), those available outside of these plans, as well as the unit share applicable for the connection of these systems[60].

Figure 10, hereafter, illustrates such a provision of access in the case of a primary substation downstream of which two distribution system operators can connect electricity production systems.

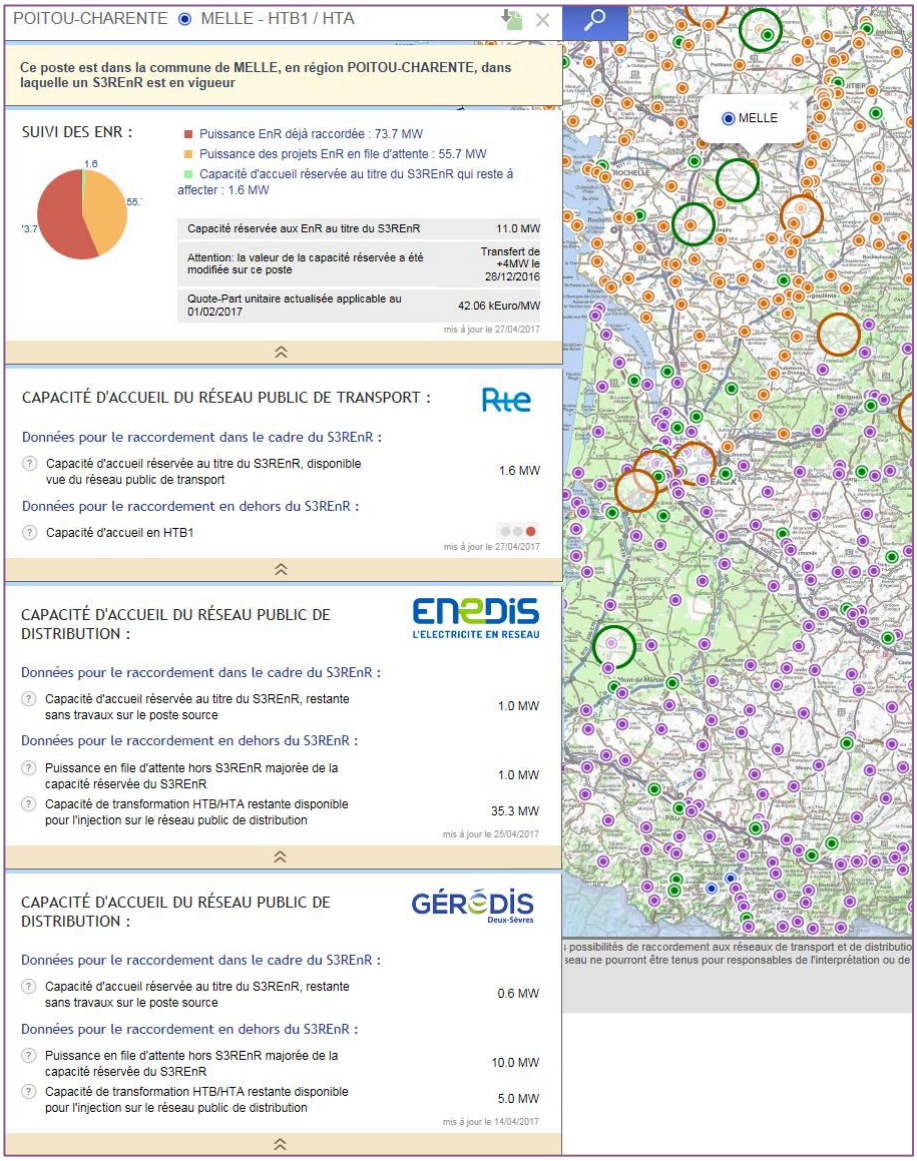


Figure 10 – Example of the provision by *Caparéseau* of access to the capacities at a primary substation *(source: Caparéseau)*

[60] In application of a given regional plan for connecting to the renewable energy network, RTE calculates the amount attributable to each of the producers for the cost of strengthening the structures related to the integration of this production (even if this system is connected to the distribution networks, the structures to be created are located at the level of the transmission network). This share is hence expressed in €/MW installed.

1.3.4.2 The data published in open data

Enedis has undertaken the publication of a large amount of data, both on its institutional website[61] and on a specific website[62]. These data concern an important data field operated by the system operator, pertaining to:

- *the assets it operates*: length of the lines in LV andMV, number of public substations operated at different geographical scales;
- *the systems connected to its networks*: producer waiting list by region or by power range;
- *electricity markets*: flexibility capacities participating in the adjustment mechanism or in the NEBEF by region;
- *the electrical system*: electricity balance at the scale of its networks (total consumption and average powers over different time horizons), electricity consumption by installed power, by customer category or by sector;
- *it missions and its level of service*: flow reconstruction (coefficients applied to the consumption profiles), calculation coefficients and modelling of the losses on the networks it operates, *ad hoc* regulatory indicators (supply continuity, average power-cut duration).

In areas not interconnected to the mainland metropolitan territory, *EDF SEI* undertook the implementation of several open data platforms[63] concerning each of the territories whose networks it operates, to provide access to information relating to its regulatory obligations and which, to date, are only the subject of a static publication, but also to data that is beyond the scope of this strict regulatory framework. Indeed, it plans in particular to publish, in open data:

- the information relating to production that was already made available by EDF SEI;
- the register of production and storage facilities at the level of the IRIS unit, as requested by Article 179 of the LTECV;
- the disconnection times of intermittent electricity production systems for each of the territories served by EDF SEI;
- datasets concerning demand side management (DSM), which, in view of the particular energy context of these territories, is a priority development objective.

A part of the content taken up on the website and the mobile application eCO2mix (see previous paragraph) is also the subject of publications on the open data website of *RTE*[64]. It is possible to freely download static information concerning the electricity report at national level, the monthly overviews and the forecast assessment drawn up by RTE, as well as specific datasets: load curves of gross consumption (national or regional), load factors and regional coverage rate of wind and photovoltaic solar power generation systems, *etc.*

As regards natural gas, the main distribution system operator, *GRDF,* also launched its own open data platform[65]. In addition to the data that Article 179 of the LTECV authorises it to disseminate to the public (see paragraph 1.3.2.2), the operator already publishes, at the level of the networks for which it is the concessionaire, the daily quantities dispatched on the territory and the quantities of biomethane produced and injected by system and at national level. One of the transmission network operators, *GRTgaz,* did the same, and provides on its platform[66] about ten datasets aimed at the general public.

With the processing and publication tools they use and which all rely on a same IT solution of French origin, OpenDataSoft, all these operators benefit from functionalities enabling them to make this information available, in the form of:

- data tables;
- maps, with relevant contextual information;
- graphic representations (histograms, pie charts);

[61] The open data of Enedis is available at the following address: http://www.enedis.fr/open-data/.
[62] The open data of Enedis is available at the following address: https://data.enedis.fr.
[63] The open data of EDF SEI are available at the following addresses: https://opendata-corse-outremer.edf.fr, https://opendata-corse.edf.fr, https://opendata-reunion.edf.fr, https://opendata-martinique.edf.fr, https://opendata-guyane.edf.fr, https://opendata-guadeloupe.edf.fr et https://opendata-iles-ponant.edf.fr.
[64] The open data of RTE is available at the following address: https://opendata.rte-france.com.
[65] The open data of GRDF is available at the following address: https://opendata.grdf.fr.
[66] The open data of GRTgaz is available at the following address: https://opendata.grtgaz.com.

- exports;
- exploitation through APIs, whose user documentation is easily available.

Taking advantage of the joint use of OpenDataSoft, which makes it possible to homogenise the data presentation, RTE and GRTgaz implemented a common open data platform, *Open data Réseaux Énergies*[67], which TIGF decided to join. RTE specified that "this *implementation is accompanied by a data governance charter which is designed as an upgradable and multi-manager document*".

1.4 CRE encourages energy players to use the data to accompany the energy transition

1.4.1 CRE's deliberations of 12 June 2014 providing recommendations on smart low voltage grid development and of 25 February 2015 on smart grid development

The CRE's deliberation of 12 June 2014 *providing recommendations on smart low voltage grid development*[68] and that of 25 February 2015 *providing a communication on smart grid development*[69] constitute the foundation of the first positions adopted by the regulator on the subject of energy data.

In its first deliberation, CRE reiterated that "*operators using or creating IT files containing personal data must ensure that these files are declared to, and if necessary authorized by the CNIL*". It recommends (Recommendation no. 6) that *Smart grid projects "carry out impact assessments, with the support of the CNIL, in accordance with the Data Protection Impact Assessment Template for smart grids and smart metering systems"* currently being prepared at European level.

Furthermore, having prior to the publication of this document carried out a consultation with all the stakeholders as from 2010, CRE put into perspective the data needs of local authorities with respect to the regulations then in force. In order to accomplish their land use planning and local energy policy planning missions, they require data such as "*grid equipment data, technical data, quality of supply data or consumption and generation data*". CRE hence requested (Recommendation no. 7) that public distribution system operators:

- consider the implementation of interfaces in order to dynamically provide the granting authorities with the data collected on the networks and which must be disclosed, particularly in application of Article L. 2224-31 of the General Code of Local Authorities;
- consider the implementation of interfaces in order to dynamically provide data which may be freely disclosed to any party so requesting.

These objectives, set out by CRE before the preparation of the LTECV, were partly taken into account by Article 179 thereof, which requests system operators to implement, through their own open data, interfaces allowing the public to download "*data which may be freely disclosed*".

1.4.2 CRE's deliberation of 8 December 2016 providing new recommendations on the development of smart electricity and natural gas grids

Having pursued its efforts to promote the development of smart grids for electricity and natural gas, CRE published on 8 December 2016 a new deliberation[70], reviewing both the actions undertaken by system operators following the publication of the previous deliberations and providing new recommendations.

The issue of data availability, which blatantly emerged over the last three years, was the subject of ad *hoc* recommendations in this deliberation. In order to provide the users with a full knowledge of the consents to the use of personal data relating to them, the Recommendation no. 5 of this document ("*R. 2016-05*") requests "*operators of public electricity and natural gas distribution systems having deployed a smart metering system aimed at producers and domestic and professional consumers, to implement software tools which will guarantee to the users a comprehensive knowledge of the delegations they have given to authorized third parties (suppliers, load shed-*

[67] The platform is available at the following address: https://opendata.reseaux-energies.fr/.
[68] The deliberation is available on the CRE's website.
[69] The deliberation is available on the CRE's website.
[70] Deliberation of the CRE of 8 December 2016 *providing a communication on the progress of the roadmaps of system operators and providing new recommendations on the development of smart electricity and natural gas grids*. The deliberation is available on the CRE's website.

ding aggregators, building managers, energy diagnostic consulting firms, etc.*) to use their consumption data"*. This deliberation, in its Recommendation no. 6 ("*R. 2016-06*"), requests especially system operators to "*coordinate with each other regarding, in particular, the nature and the format of the data they collect, in order to facilitate their cross-reference and their use by the final users and public entities"*, which will enable the latter to use these data on a common and comparable basis.

As regards the data on the assets and state of the networks operated by public electricity system operators, CRE requested the latter, under Recommendation no. 7 ("*R. 2016-07*"), to "*implement software tools for reporting on the location of the voltage and current constraints of the networks they operate, in order to enable third parties to offer them appropriate solutions to manage such congestions"*, the main objective of which is to complement the information already made available by operators to network users and electricity market players.

Finally, in its Recommendation no. 8 ("*R. 2016-08"*), pursuing also this objective of an opening up to other players that can make a relevant use of the data related to the assets of regulated operators, CRE requested operators of public transmission and distribution systems for electricity and natural gas *"to provide very high-speed network operators with the procedural, contractual and financial terms of access to the assets of the networks they operate, for transparency and non-discriminatory purposes"*, in order to enable all these players to establish the contractual terms required for collaboration and for the common use of some structures of system operators.

1.4.3 Services offered by public distribution system operators and regulated by CRE accompany technological developments

1.4.3.1 Concerning public electricity distribution system operators

The CRE's deliberation of 16 November 2016 *providing a decision on the pricing of additional services performed exclusively by electricity distribution system operators*[71] complemented the principles already defined in its deliberation of 3 March 2016 concerning additional services[72]. These two deliberations take into account the necessary evolution of the range of services to accompany the deployment of smart metering systems (*Linky* at low voltage at Enedis, but also the metering systems of other customer segments, and those of other public electricity distribution system operators). The implementation timetable will have to be established by each public distribution system operator in relation to that of the deployment of smart meters on its catchment area, and the constraints related to its information systems (this timetable is transmitted to CRE and made public by the system operator).

CRE specifies that the user must have access to all his consumption data at no charge. It also states that the third parties authorised by the user must be able to access at no charge the data to which the user has access. These third parties can be the supplier holding the supply contract, a competing supplier, or other parties chosen by the user (energy service companies for example).

On the other hand, the following services can be charged, provided that there are additional costs resulting from the mass subscription to such services:

- The collection of data which entails an additional cost compared to the collection of basic information;
- the transmission of data through a costlier channel (such as a daily flow) if the data in themselves remain accessible free of charge by another channel.

CRE had submitted for consultation the implementation of several data transmission or access services:

- the *access to metering data*, including the general data of the connection point, the historical consumption indices, the powers reached, the power overruns, the load curves, as well as the invoices for the transmission tariff of customers that have signed an access contract for the public distribution network;
- the *issuance of historical metering data*, concerning the same data as the previous point. This service previously existed for the consumers connected at low voltage with a subscribed power exceeding 36 kVA and for those connected at the MV level (concerning only the transmission of an

[71] The deliberation is available on the CRE's website.
[72] CRE's deliberation of 3 March 2016 *providing a decision on the pricing of ancillary services performed exclusively by electricity distribution system operators*. The deliberation is available on the CRE's website.

index or load curve history), it was therefore extended to low-voltage consumers with a subscribed power lower than or equal to 36 kVA;

- the *recurring transmission of data*, to the consumer himself, to third parties he has mandated or to his electricity supplier. The transmission of the load curve with a time step of 10 minutes for the users of subscribed power strictly greater than 36 kVA or connected to an MV network could be done at a monthly, weekly or daily frequency. In this last case, it would require payment of a fee (€5/month).

During the public consultation, most of the players declared themselves in favour of these services, which were incorporated into the deliberation of 16 November 2016. Once the target defined, CRE considers that the development of the details of these procedures falls within the scope of the consultation, while making clear that the data transmission services provided for must enable a mass access to the data for a set of consumers.

Finally, in order to meet the requirements of Article 28 of the LTECV, complemented by the implementing decree no. 2016-447 of 12 April 2016 (see paragraph 1.3.2.1), CRE introduced new services relating to the provision of consumption data aimed at building owners and managers (or third parties mandated by the latter). This mainly involves transmitting, without any billing, the total consumption of a building or housing complex, within a minimum threshold in line with the data protection rules in force, and over an available period of not more than 3 years from the date of the request, as well as the number of measurement points concerned.

1.4.3.2 Concerning public natural gas distribution system operators

In the same way as for electricity, the deliberation of 16 June 2016 *providing a decision on the services performed exclusively by natural gas distribution system operators*[73] takes into account the deployment by GRDF of *Gazpar* smart meters for approximately 11 million residential consumers and small businesses, whose widespread implementation started in May 2017. It was followed by a deliberation of 16 November 2016 *amending the deliberation of 16 June 2016 deciding on the services performed exclusively by natural gas distribution system operators*[74].

Following a public consultation, the deliberation of 16 June 2016 introduced the following services carried out by GRDF, directly related to data access:

- the *access to metering data*, including biannual or monthly consumption data (used by the supplier for billing) over the last five years, daily consumption data over the last three years, and hourly consumption data over the last two years (hourly data are only accessible if the chargeable service for the hourly collection of these data has been subscribed beforehand);
- the *recurring transmission of daily data*, aimed at the supplier, whether incumbent or not, or third parties, following the authorisation given by the consumer equipped with a *Gazpar* meter, consists in transmitting daily indices recorded by the meter as well as the associated consumption with a provisional Higher Heating Value (HHV);
- the *issuance of historical data*, whose list and historical depth are defined within the framework of the consultation groups under the auspices of CRE. The data are sent by GRDF to the requester (consumer or third parties authorised by the consumer) by electronic mail or by mail. This service also enables mass access to historical data for a set of consumers.

The deliberation of 16 November 2016 established the same service for building owners and managers as for electricity. This service is not subject to billing.

1.4.3.3 Concerning the public electricity transmission system operator

Additional services carried out under the monopoly of RTE are defined in the decision of 7 August 2009 *setting the date of entry into force of the tariffs for additional services performed under the monopoly of public electricity system operators*[75], following a proposal of CRE dated 30 October 2008.

These services are the following:

- the *transmission* (by electronic mail) or *provision (on the RTE website)* of public transmission network access data, including the raw and validated metering data of the user;

[73] The deliberation is available on the CRE's website.
[74] The deliberation is available on the CRE's website.
[75] The decision is available on the website Legifrance.gouv.fr.

- the *data of the balance responsible entities*, which allow them to have access to detailed data used to calculate the deviations and to integrate these data into their information system;
- the *data relating to the forecast position of balance responsible entities*, which enable the them to access their whole forecast position: "daily *purchases and sales, delivery to compensate for losses, notifications of past block exchanges, etc."*.

Following the developments in the communication technology with which the public transmission network has been equipped, RTE undertook a consultation on the evolution of access to metering data.

At the beginning of 2017, CRE submitted for public consultation a range of additional services which concern in particular data provision by the operator. Once this consultation is completed, a new deliberation on all the services performed exclusively under the monopoly of RTE will be published.

1.4.3.4 Concerning natural gas transmission system operators

GRTgaz exclusively performs for the users of the transmission network it operates the following additional data access-related services. It is mainly an *information service*, which can be disseminated *via* the TRANS@CTIONS website (see paragraph 1.3.4.1), locally *via* the delivery station, *via* the regional surveillance centre of the transmission system operator or *via* the chromatographs installed on its network.

According to the channel used, GRTgaz provides different information: they include hourly and daily volumes, gross and adjusted, the energy supplied; the HHV, the physico-chemical characteristics of the natural gas composition; the consumption summaries for the current month and the previous months, *etc.*

1.4.4 The tariffs for use of the networks and infrastructures provide resources for providing access to energy data

Most operators indicated that, despite a lack of visibility related to a relative regulatory instability (partly resolved following the publication of the law *for a digital Republic*), the resources they will have to mobilise for the data are expected to increase in the future, if only to improve the performance of their processes, through that of their information systems.

As GRTgaz pointed out, it is necessary to maintain equity with respect to the coverage of the costs of these regulated operators regarding the provision of access to energy data: "*on the one hand, socialise what corresponds to data of general interest"*, and therefore ensure that any network user contributes to finance the costs for implementing a base of tools for the benefit of all; "*on the other hand*, *envisage to market data that have undergone a more specific processing or requiring occasionally more intense resources"*, knowing that, if the operators request that some access to data be subject to *ad hoc* billing, it is merely a question of recovering costs related to the supply of a service, and not ensuring a sales margin on specific provision of access to data.

The tariffs for use of network and infrastructure operators established by CRE cover investment costs and operating expenditures of these operators related to the collection, processing and provision or transmission of data as part of their public service missions. For example, the tariffs for use of public electricity networks include a metering component, which, in addition to the costs "*of metering, control, reading"* of the meters they operate, takes into account the cost of "*billing data transmission"*.

CRE is also committed to ensuring that regulated operators have the funding required for the implementation of their innovative initiatives, related in particular to data provision, whether it is the "*Digital programme*" of Enedis, whose main objective is the *"provision of data access to users, local authorities and market players"* or equivalents for the other operators.

Finally, many demonstrators involving electricity system operators have backed technical experiments on smart grids with a data exchange platform, to increase the benefit of the studied functionalities. For example, the demonstrator *Smart grid Vendée*[38], whose objective is to experiment new flexibility-related business models based on a better observability of the network capacities, implemented an IT platform enabling potential flexibility operators or aggregators to propose their offers to system operators, which must previously present the needs related to the local consumption and production balance and the constraints on the networks they operate.

1.5 Different data provision procedures according to countries

1.5.1 European countries that have decided to organise the provision of access to energy data have made heterogeneous choices

The Council of European Energy Regulators (CEER) published on 13 December 2016 a report on current and future data management models, mainly for consumption data, in different European countries (*Review of Current and Future Data Management Models*[76]). This report includes various recommendations relating to privacy protection, cyber-security, transparency, accuracy, accessibility and non-discrimination in data processing and provision. It follows up a first CEER publication of 7 November 2012, entitled *Benchmarking Report on Meter Data management – Case studies*[77].

Figure 11, hereafter, gives a synthetic overview of the different target mechanisms for data provision for the countries that wish to implement them. This map shows:

- the *public or private-sector player(s)*, regulated or not, responsible for implementing this provision of access;
- and its *centralised or decentralised nature*, i.e. the Member States' will to create a single data management platform at national level, or, conversely, to let several players carry out this provision of access, at the scale of a catchment area (in the case of a responsibility left to system operators), of a territory with administrative boundaries (in the case of responsibility left to local authorities), or according to any other criterion for delimiting the area of responsibility in this domain.

[76] This report can be downloaded on the CEER's website.
[77] This report can be downloaded on the CEER's website.

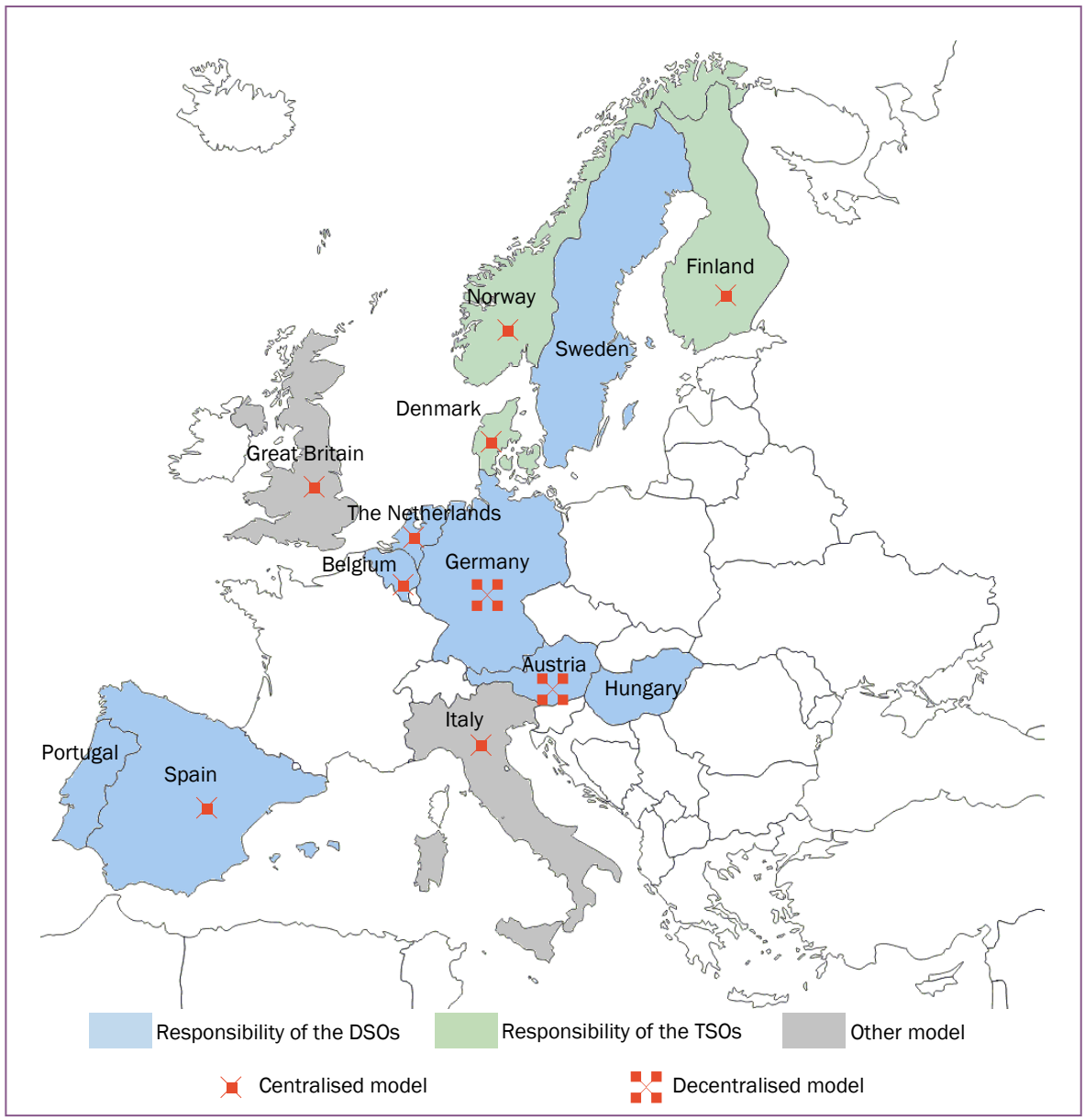


Figure 11 – The different target models for electricity metering data management envisaged in Europe *(source: CEER/Enedis/CRE)*

Regarding the governance models for consumption data management, the CEER report highlights, in general terms, the following aspects:

1. Most of the European countries that wished to organise the provision of access to data began with a phase whereby distribution system operators, mainly for electricity, each implemented on their catchment area a platform providing access to consumption data, aimed at end users and energy players, storing information and managing access rights. This is in particular the case in Norway, Italy, Germany, Denmark, the Netherlands, and Spain. We can consider that it is also the case in France on the catchment area of Enedis and GRDF, system operators which, under Article 28 of the LTECV, must provide access to such data.
2. Most of the European States that wish to organise the provision of access to consumption data have taken steps towards centralisation of means. Some countries have renewed an existing organisation based on the distribution system operators, whether or not they have created an autonomous legal entity to that end (the Netherlands, Belgium, Spain), or whether they have chosen to implement a centralised data platform at the level of the transmission system operator(s), mainly for electricity (Denmark, Norway, Finland), thanks to a dedicated entity.
3. A few European countries have made more original choices (Germany, Great Britain, Italy), which are each explained by national specificities (see below).

1.5.2 These organisation choices are based on a national historical, cultural, legal and market functioning context

The choices regarding the organization of consumption data provision made by these various countries are related to different national contexts. First of all, Table 5 below, which presents the number of system operators for each country of the study carried out by CEER, illustrates the fact that, when a country has a single transmission system operator and many distribution network operators, without a single distribution system operator encompassing by itself a large part of the catchment area (Denmark, Norway), it seemed more natural for the transmission system operator to be the player taking responsibility for handling data provision. In the case of each of these countries, a legislative text gave a mandate to national electricity transmission system operators to create a data platform gathering all the data necessary for retail markets to function properly, in particular.

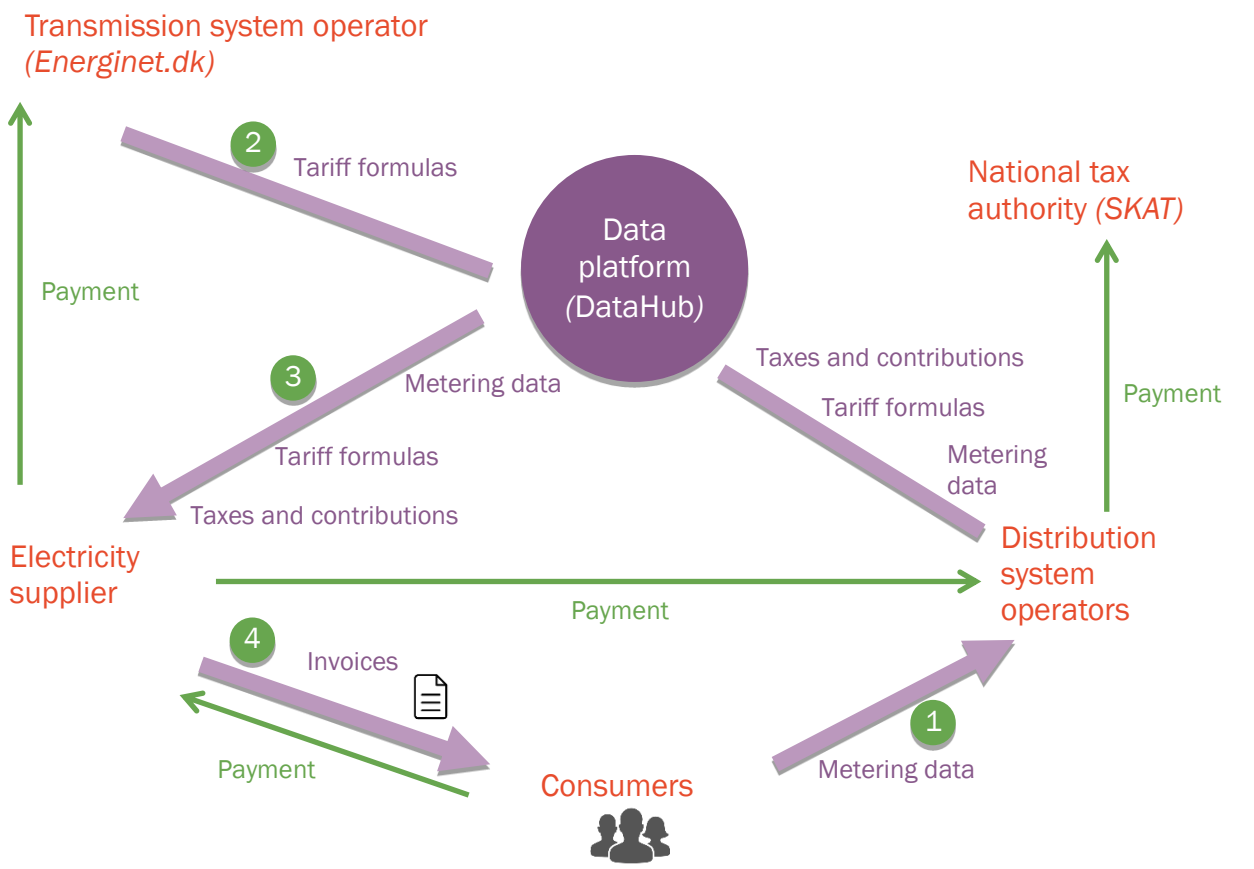
Country and its population (in millions)		Electricity				Natural gas			
		GRT	*GRD*	*Suppliers*	*Metering*[78]	*GRT*	*GRD*	*Suppliers*	*Metering*[78]
Germany	81	4	866	1 013	GRD[79]	16	707	820	GRD
France	67	1	150	25	GRD	2	26	26	GRD
Great Britain	65	7	18	24	Supplier	1	22	30	Supplier
Italy	61	1	144[80]	381	GRD	10	274	231	GRD
Spain	46	1	> 300[81]	> 100	GRD	4	6	> 60	GRD
The Nether-lands	17	2	7	> 50	GRD	1	10	> 30	GRD
Belgium	11	1	27	25	GRD	1	18	19	GRD
Denmark	5,5	1	62	> 60	GRD	1	3	11	GRD
Norway	5	1	157	100	GRD	*Not concerned*			

Table 5 – Number of system operators and suppliers in the nine European countries of the CEER studies concerning energy data management (*source: CEER/CRE)*

1.5.2.1 In Denmark, a centralised platform, operated by the electricity transmission system operator, makes it possible to market processes

The case of *Denmark*, whose regulator and electricity transmission system operator were interviewed by the study committee, speaks for itself, in that it shows that national specificities, of a historical, cultural and legal nature and those relating to market functioning, have a significant impact on the chosen model. Indeed, this country decided to implement a so-called "supplier-centred" model, whereby, similarly to the single contract established in France, the supplier is responsible for billing both the costs of provision and supply of energy, and for collecting the costs of network use on behalf of the system operator and the taxes on behalf of the national tax authority.

[78] Entity responsible for metering on retail markets.
[79] In Germany, electricity metering is not necessarily assumed by the distribution system operator, but by a metering operator, to which the system operator can delegate this task. System operators remain responsible for defining the technical prerequisites and the accuracy of the metering.
[80] Including e-distribuzione (subsidiary of Enel) which serves a large part of the territory.
[81] Including 5 operators serving 95 % of consumers.



Billing of the end customer

1. The distribution system operator transmits the metering data, the relevant grid tariff data and the pricing elements to the DataHub platform.
2. The transmission system operator loads on the platform the grid tariffs applicable to the transmission network.
3. In a continuous manner, the DataHub platform sends the metering data and the tariff formula for each point of delivery to the electricity supplier. The supplier only receives the data of the points for which it is responsible.
4. The supplier generates a single invoice towards the end customer, including supply and transmission costs and the taxes.

Billing flows between players

The billing flows between distribution system operators, the transmission system operator and suppliers are realized on the basis of aggregated consumption data from the DataHub platform and based on the metering data and the tariff data of each supplier.

Based on these aggregated data, the transmission and distribution system operators each generate a transmission invoice to the suppliers. The distribution system operator is responsible for collecting the taxes and contributions owed by end consumers and pays them on their behalf to the national tax authority (SKAT).

Figure 12 – Process for the billing of end customers in Denmark, based on the data of the DataHub platform *(source: Energinet.dk/CRE)*

In such a model, with a multitude of distribution system operators, it seemed relevant to the Danish parliamentarians that the data available to each electricity distribution system operator should be centralised on a same platform, where each supplier would collect the information it needs for billing the end customer, based on the

meter reading and the network tariffs in the hand of the system operators. In a landscape comprising 62 distribution system operators and about 60 suppliers and where the deployment of a smart metering system to the homes of 3.3 million residential customers will be completed in 2020, the supplier switching process is hence already fully automated, immediate and accessible online by the user.

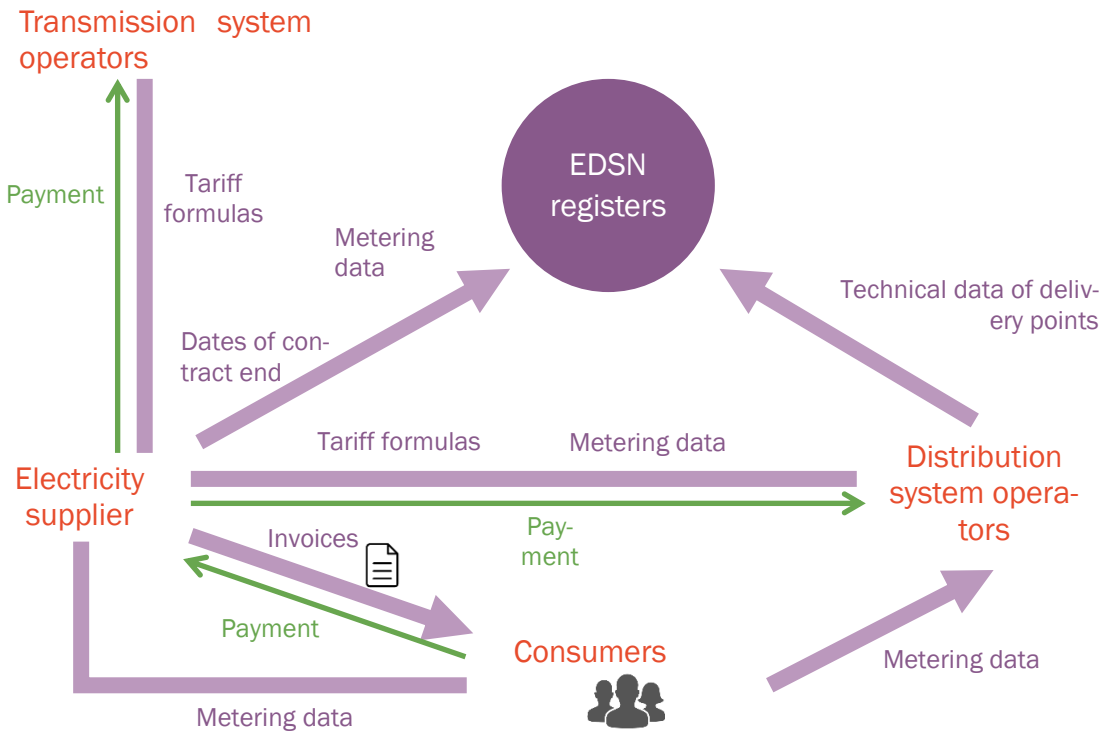
Furthermore, it was decided by the Danish law and accepted by its population that all the residential customers would be subject to consumption metering with a time step of one hour. This enabled upstream energy markets to benefit from data in real-time — in 2016, 54 % of the energy consumed in Denmark was already supplied on the basis of real hourly data and 46 % on the basis of profiled data — and suppliers to make supply offers with dynamic tariff incentives to their customers.

1.5.2.2 In the Netherlands, a platform managed by distribution system operators makes it possible to improve the billing of the end customer

In the *Netherlands*, before 1st August 2013, the single contract managed by the suppliers for billing the end customer for gas and electricity was not mandatory. Following the opening-up of retail markets in 2004, the development of market offers resulted in many billing errors and in many complaints from the end customers, generating what the national regulatory authority described as "*administrative chaos*". Following on from this acknowledgement, the Dutch Parliament decided to create a joint venture called EDSN[82], which would be 100 % owned by the transmission and distribution system operators, in order to ensure a coordinated provision of access to data.

In this country, which is committed to the deployment of 8.6 million smart meters to residential and tertiary consumers, due to be completed in 2020, the system operator has the metering devices and the *ad hoc* technical infrastructure; it is responsible for the proper functioning of the metering system. Suppliers are responsible for collecting from the system operator the data required for billing the end customer, for validating them and ensuring confidentiality.

[82] *Energie Data Services Nederland* (Dutch energy data service).



In view of the suppliers' responsibility for the single billing of end customers, the supplier takes responsibility for obtaining from the customer his metering data *via* the distribution system operator, for billing for the supply, the transmission and the taxes and contributions, and for repaying to the network operators their due share of this single invoice.

The EDSN platform to date mainly consists of:

- a register of metering data (TMR), maintained by the suppliers;
- a register of dates of supply contract end (CER), maintained by the suppliers;
- a register of the technical data of delivery points, maintained by the system operators.

Figure 13 – Process for billing end customers in the Netherlands, based on the data of the EDSN platform *(source: ACM/CRE)*

1.6 A rising cost in the short term and new challenges for the business and activities of network and infrastructure operators

1.6.1 Operators deploy significant resources to make energy data available and ensure data security

The growing digitisation of activities of regulated energy operators increases the risk of intrusion and malicious remote handling of their equipment. As indicated by the IBM company, interviewed within the framework of the study committee, "*the arrival of "IP"* [i.e. communication technologies relying on the technical protocol of Internet] *with communicating meters, connected objects and mobility increases the risks to equipment and infrastructures and to data confidentiality. Security and cyber-security have become a major concern"*for regulated energy operators which are among its customers.

Each of them takes into account the necessary and proportionate measures to ensure a maximum security for the data it handles. For this reason and non-exhaustively:

- TIGF integrates a "risk *analysis which concerns availability, integrity, confidentiality and proof (AICP) criteria*" in all its IT projects, and has a "*nominal operation site for its IT applications, and a delocalized back-up site, in case of loss of the nominal site"*;
- GRTgaz has a *Security Operation Centre* (supervision centre for computer security), which "*ensures real-time analysis of security events that can occur on* [its] *critical infrastructures"*;

- Storengy employs approximately 8 full-time equivalents to ensure "the *securing of industrial control systems*", which "*represents a cost of about €1.2 M/year in capital expenditures (CAPEX) for the next four years, and operating costs (OPEX) of about €1.5 M/year*";
- Elengy indicated that the "*resources dedicated to the security of the industrial information system (IS) of Elengy are 2 full-time equivalents"*;
- RTE implemented processes for the protection and confidentiality of personal and commercially sensitive data, and deployed *ad hoc* IT tools: connectors (VPN) enabling the secure communication of a computer or server to another IT network of RTE; securing the authentication of communications which pass through APIs it provides; use of a firewall to protect the sensitive data handled on its local network;
- GRDF implemented an "*IS infrastructure and security*" hub. It is designed in particular to gradually integrate the "*issue of data security in project processes"*, to promote the use of specific risk analysis tools, and to deploy *ad hoc* monitoring tools: "*traceability of access to the data through the various channels and access tools; dashboards on the evolution of the use of external dissemination; analysis tools for detecting particular user behaviours*";
- Enedis implements a "*security governance for its information systems*", based on the "*reference frameworks in this area (ISO 27000 standards, ANSSI recommendations)*", which works operationally through an "*information systems* security policy". As regards data protection, Enedis implemented a specific governance, based in particular on a policy "*carried out in regions by a network of data administrators and run by a general administrator"* at national level. It is steered by a data governance committee, directly attached to the company's executive committee.

1.6.2 CRE accompanies the work of operators in research and development and data security

As previously described (see paragraphs 1.4.3 and 1.4.4), through its regulatory framework, CRE accompanies the evolution of the business and activities of regulated energy operators, the evolution of costs at the service of their efficiency, and for the benefit of all the stakeholders, including end users, public entities, granting authorities, *etc*.

The investment and operating expenses' trajectories show that the issues of data management, processing and provision and cyber-security have significant budgetary consequences for these operators. Some operators choose greater caution than others over their strategic choices on the subject, but all now need to spend several millions to several tens of millions of euros per year on these issues.

Moreover, the matter can, and must, be seen as an opportunity to transform the business of the company. Cyber-security, in particular, represents for operators an internal challenge of recruitment and training, which cannot always rely on audits carried out by experts external to their organisations. Implementing policies that are necessary for securing the data requires both the development of internal skills and teams, which are some of the transformation possibilities for the business and activities of these operators, and the acquisition of new talents.

1.6.3 Cyber-security: a new challenge for network and infrastructure operators

1.6.3.1 The French law on military programming and the European Directive on *Network and Information Security (NIS)*

France is particularly committed to cyber-security issues. It has a national agency for the security of information systems (ANSSI), created by the decree no. 2009-834 of 7 July 2009 *creating a service with national competency called "National agency for the security of information systems* (Agence nationale de la sécurité des systèmes d'information*)"*[83] and whose missions were reinforced by the law no. 2013-1168 of 18 December 2013 *on military programming for the years 2014 to 2019 and laying down various provisions concerning national defence and security*[84].

Article 22 of this law provides for the adoption of measures to enhance the security of *operators of vital importance* (OVI) and confers new prerogatives on ANSSI: it will be able to impose to OVI security measures and controls of their most critical information systems, called *information systems of vital importance (ISVI)*. Furthermore, Article 22 makes compulsory the reporting of incidents identified by OVI on these systems.

[83] The full text is available on the website Legifrance.gouv.fr.
[84] The full text is available on the website Legifrance.gouv.fr.

Furthermore, Article R. 1332-1 of the French Defence Code specifies that operators of vital importance are designated among the public or private-sector operators involved in activities in a sector of vital importance (telecommunications, finance, energy, healthcare, food, transport, *etc.*) and which operate or use establishments, structures or systems whose damage, down-time or destruction caused by a malicious act, an act of sabotage or terrorism, could have serious consequences for the Nation's war or economic potential, its security or capacity for survival, or seriously compromise the health or the life of the population.

In October 2016, several decrees relating to the energy sector entered into force, and in particular those of 11 August 2016 *laying down the security rules and procedures for reporting information systems of vital importance and security incidents relating to the subsectors of vital importance "Electrical energy supply"*[85] and *"Natural gas supply"*[86]. These decrees set a list of measures to be put in place by operators to protect their information systems, including the implementation of an information systems security policy (ISSP) describing the means deployed to protect the ISSP and including a procedure for the certification of the information system every three years, the mapping of existing systems, the notification to ANSSI of any cyber-security incident, *etc.*

One of the energy operators indicated that the *"implementation of the requirements of the military programming law will lead to an increase of the CAPEX, by approximately €1,200 k/year over the next years"*.

Another argued that the *"implementation of the requirements of the military programming law to protect industrial IT will lead to a minimum increase of €400 k/year of our operational costs (OPEX) and an investment of €800 k (CAPEX) for the 3 coming years. The CAPEX concern in particular costs of upgrading of the security of* [its] *industrial IS, the purchase of materials and auditing, risk analysis and certification services"*.

In parallel, the Directive (EU) 2016/1148 *of the European Parliament and of the Council of 6 July 2016 concerning measures for a high common level of security of network and information systems across the Union* (known as *"Network and Information Security* directive" or "NIS *directive"*) was adopted by the European Parliament and the Council on 6 July 2016[87] and will have to be transposed by Member States of the European Union before 10 May 2018.

The Directive lays down obligations for all Member States to adopt a national strategy on the security of network and information systems.

It creates a cooperation group in order to support and facilitate strategic cooperation and the exchange of information among Member States and to develop trust and confidence among them. It also creates a computer security incident response teams network, called *CSIRTs network*, in order to contribute to the development of trust and confidence between Member States and to promote swift and effective operational cooperation. Each State of the Union has an obligation to designate one or several computer security incident response teams.

The NIS Directive gives a definition of the *operator of essential services* (OES) and defines its obligations. It is any public or private entity, active in one of the sectors covered by the directive (energy, transport, banking, financial market infrastructures, health, drinking water supply and distribution, digital infrastructures) and which meets the three following criteria:

- the entity provides a service which is essential for the maintenance of critical societal and / or economic activities;
- the provision of that service depends on network and information systems;
- an incident would have significant disruptive effects on the provision of that service.

The Member States must ensure that the operators of essential services:

- take appropriate and proportionate technical and organisational measures to manage the risks posed to the security of network and information systems;
- take appropriate measures to prevent incidents affecting the security of network and information systems;
- notify, without undue delay, the competent authority at national level or the CSIRT, of incidents having a significant impact on the continuity of the essential services.

[85] The full text is available on the website Legifrance.gouv.fr.
[86] The full text is available on the website Legifrance.gouv.fr.
[87] The text of the directive is available on the website of the documentation of EU institutions.

Finally, each Member State of the Union must designate one or several national authorities covering the sectors and the services that are the subject of the NIS Directives as well as a single point of contact.

The differences between the European and existing French legal frameworks, before the publication of the NIS directive, relates above all to the concepts used. The directive uses the concept of Operator of Essential Services (OES) whereas the French sectoral decrees use the concept of Operator of Vital Importance (OVI), the definitions of which differ.

Minor adjustments will therefore have to be made to adapt our legislation for the transposition of the NIS Directive in case of designation of new OES.

Indeed, the decrees specifying the conditions for implementing the law on military programming are compatible with the NIS directive and this French model, a precursor in Europe, already interests other European Union countries.

1.6.3.2 A sector already subject to many attacks

Beyond the players with the status of OVI and those which will be designated as OES, cyber-security has a vocation to become a major concern of all the stakeholders of the sector.

A study published by the French Institute of International relations (*Institut français des relations internationales* – Ifri) in January 2017[88] documented about twenty attacks and incidents affecting energy infrastructures between 1982 and 2015 throughout the world (Russia, United States, Iran, Lithuania, Ukraine, South Korea, *etc.*). The attacks did not always specifically target the energy sector.

Three types of attack can be identified:

1. *"attacks which aim to interrupt the availability of a system or a service"*;
2. *"attacks on confidentiality which aim to acquire information and monitor an activity, often for financial gain"*;
3. *"attacks on the integrity of the system aiming to change or disrupt information or processes"*: removing critical software, modifying the behaviour of some machinery, causing the computer operating system of the network to send false commands.

The Saudi Aramco oil company, in Saudi Arabia, was the victim of the first type of attacks, following the *introduction of a malicious software* called *Shamoon*, which destroyed 30,000 computers. The company had apparently implemented security measures to protect the operational network, which was therefore not affected. The attack was restricted to the company's management network, impacting for example invoicing.

The attack on Areva in France in 2011 illustrates the second type of attack: a *theft of data*, not critical according to the company, during an infiltration which allegedly lasted two years.

Two examples illustrate the third category of attacks:

- a software called Stuxnet was designed to *attack the uranium enrichment site* at Natanz, in Iran. It modified the rotation speed of the centrifuges which caused damage to a thousand centrifuges before the programme was detected in 2010. This software, specifically designed to attack the target site, is described in the study as *"the most advanced attack on a nuclear infrastructure so far"*;
- more recently, the Ukrainian electricity network was the victim in December 2015 of a malware which deprived 200,000 residents of electricity for several hours. The attackers took remote control over the electricity distribution network and *activated circuit breakers in about thirty electricity substations*. The transfer of electricity to the remaining lines overloaded other parts of the network. In parallel, two control centres blacked out, as their backup power system had been reprogrammed by attackers not to be triggered in the event of power failure.

[88] Gabrielle Desarnaud, *Cyber Attacks and Energy Infrastructures: Anticipating Risks*. This study is available at this address on the Ifri website.

The Ifri study also indicated that between 2014 and 2015, the discovery of vulnerabilities on industrial systems rose by 380 %. This shows that the "know-how *of hackers in this area is improving, whereas there are very few cyber-security experts for industrial systems at present*".

The energy sector is particularly targeted by attacks on industrial systems. The study tells us that in 2014, American authorities were solicited for 245 attacks, most of which occurred in this sector.

Finally, the Ifri study highlighted that challenges in terms of cyber-security also extend to new players such as aggregators:

"*The electricity grid of tomorrow will be made up of a multitude of individual producers, as well as new actors such as power aggregators. The latter are intermediaries between the electricity system and its users (households, collective dwellings, industry, etc.) whose function is to optimise operations of several decentralised producers.* [...] *In order to pilot these "virtual power stations", aggregators also use control and command systems, such as those currently employed to manage the transmission and distribution of electricity. These are commercial off-the-shelf software, less expensive than proprietary systems but better known from the public, and better accessible to malicious persons."*

For its part, one player emphasised that the articulation of the various European codes may present difficulties, particularly in that the electricity transmission system operator may require producers connected to the public distribution networks to provide it with certain information directly, whereas the producers already have means of communicating with the operators of these distribution networks. It considered that the *"transmission of data to several entities poses real risks to the electrical system. Indeed, a risk of inconsistency according to the timestamp exists during the data processing by transmission and distribution system operators. Aside from the fact that additional means of communication must be set up, the systems' security might be impaired by the multiplication of communication channels*".

Another player made the same observation: *"It is a question of streamlining the communication mode for the same data to be transmitted only once. As well as preventing the multiplication of communication channels, this ensures consistency of the data received by the various system operators. Transmission and distribution system operators must find the means to simplify exchanges, avoid unnecessary investments and secure exchanges"*.

2. DATA TO SERVE MANY OBJECTIVES OF GENERAL INTEREST

2.1 Data for the proper functioning of energy systems and markets

The energy data of regulated energy operators benefit to all the market players, as GRTgaz indicated in its contribution: the "availability *of energy data offers development potential towards more economic, societal and environmental performances"*.

These beneficial effects on the markets could however be impeded in the event of anti-competitive behaviours surrounding their use and their provision.

2.1.1 Expected benefits for consumers, producers, suppliers and flexibility operators

For consumers, the possible standardisation and simplification of the retrieval and dissemination of their energy data will make it easier both to track their energy invoices and to change supplier as soon as the competition leads to offers that are more advantageous and better suited to their needs. The price data that suppliers each make available have enabled, for instance, the creation of the comparator of energy supply offers, present on the website of the national energy ombudsman[89]. Furthermore, the standardisation of formats for the transmission or provision of consumption data, whether those aimed at the end customer directly, or those exchanged between system operators and their energy supplier, facilitates supplier switching, and thereby promotes the opening-up of retail markets. This aspect is especially significant in the territories served by local DSOs: the state of play of electricity and natural gas retail markets in 2015 and 2016 drawn up by CRE[90] specifies, for example, that until 31 December 2015, "*less than 0.1 % of the residential sites"* of the areas served by a local electricity distribution company "*subscribed to a market-based retail offer with an alternative supplier. On these territories, almost all the residential customers are today at the regulated tariffs"*. With data flows the terms and content of which are standardized, it will be easier for energy suppliers to propose offers to the consumers of these territories. This report indicated that, "*according to the website energie-info.fr, on the territory of the six local distribution companies* [the most important ones]*, only the historical suppliers propose offers to residential customers"*.

For electricity producers and natural gas shippers, the provision of access to the data will promote in particular the integration of renewable energy for the overall benefit of both electricity and natural gas systems and the community. It enables operators of natural gas infrastructures and networks, as TIGF pointed out, to privately make available "*daily reports to their shipper customers"*, their billing basis. It also makes it possible, for instance, to reduce the costs of connection through a better knowledge of the flows on the networks and, for electricity, to dynamically adjust the production capacity to the technical constraints of the public transmission and distribution networks.

For energy suppliers, it will contribute to differentiating the offers, based in particular on the deployment of smart metering systems, without which a different pricing according to times of the day or days of the week would be impossible to implement. The development of new usages in electricity, such as the electric vehicle or self-consumption, will also stimulate tariff innovation. Furthermore, these suppliers act in most cases as balance responsible entities (a valid concept in electricity): they are contractually committed to financing the cost of the imbalances calculated *a posteriori* between the energy injected on behalf of their customers and that actually consumed by the latter. To date, the *ex-ante* estimate made by the suppliers on behalf of their customers (at least, those whose production and consumption are the lowest) is based on data called *profile*, approximating the behaviour of users. The use of these profiles generates differences between the estimate and the reality subsequently observed, which the balance responsible entities (a role generally undertaken by energy suppliers) must assume. The use of smart metering system data, especially load curves, can contribute to improve this mechanism, which can then be made more precise, provided that all the players make changes to their information systems. Some players, such as the editor of IT solutions Oracle, wished for the "*load curve to be used and allow for a development of tailored offers encouraging balance (evolution of flow reconstruction mechanisms)*".

For flexibility operators, the data made available by regulated operators, especially production and consumption data, will have to correspond to their operational constraints, in order to be actually used. Indeed, they must feed the algorithms contributing to the decision to mobilise production and demand flexibility capacities. Without such data, they implement the necessary sensors and telecommunication means by themselves.

[89] See on http://www.energie-info.fr.
[90] The state of play is available on the CRE's website.

Many demonstration projects test the implementation of virtual marketplaces enabling for example the various stakeholders to exchange flexibility capacities. The European project *Flexiciency*[91], financed within the framework of the call for research and innovation projects Horizon 2020, brings together to this end 18 stakeholders, in particular 4 important European electricity distribution system operators (Enedis, e-Distribuzione, Endesa, Vattenfall), energy suppliers, digital service companies, research centres, and energy market experts. The project aims to develop a virtual flexibility service marketplace for distribution system operators, in order to encourage the implementation at European level of such services whose communication protocols between players are based on new open standards.

2.1.2 These benefits entail preventing anti-competitive scenarios which can be associated with data collection and use

In a recent report entitled *Competition Law and Data*[92], published on 10 May 2016, the French Competition Authority (*Autorité de la concurrence*) analysed the interplay between data, the market power of companies and competition law.

In the energy sector, the main cases examined by the Competition Authority related to the use by a company of customer databases holding data collected on a market in order to develop its activity on another market.

In its opinion of 14 June 2010 on the cross-usage of customer databases, the Competition Authority indicated that the criteria used to determine whether the use of such databases could result in a restriction of competition require determining:

- the conditions under which they were constituted;
- whether they can be replicated under reasonable conditions by competitors;
- whether their use is likely to result in a significant competitive advantage.

The Competition Authority applied this line of reasoning in various instances, either to sanction anti-competitive practices, or to order upstream the provision of access to the data in order to preserve equal opportunities.

Hence, in its decision 13-D-20 of 17 December 2013, the Competition Authority sanctioned the EDF company for having abused its dominant position in the market for supplying electricity to residential customers "*by using the data available to it in its capacity as historical electricity supplier to facilitate the marketing of the offers of its subsidiary EDF ENR*" in the market for photovoltaic solar power offered to individual consumers. The Authority noted in this respect that "*the use of inside information held exclusively by EDF under its former monopoly and its public service missions conferred a significant competitive advantage on EDF ENR which enabled it to promote its offers to a large number of prospects, under conditions that could not be replicated by competitors*" (paragraph 460).

In its decision 14-MC-02 of 9 September 2014, applicable to the GDF Suez company, the Authority specified that the same reasoning applies when the monopoly activity and the competitive activity are in a same market. Hence, even if the gas supply offers at the regulated tariffs were substitutable for market offers, the use of the database of customers who benefited from regulated tariffs to encourage these customers to subscribe to a market offer could constitute an abuse of a dominant position. This reasoning was confirmed by the Court of Appeal of Paris and by the decision rendered by the Competition Authority at the end of the investigation "on the merits" (Decision 17-D-06 of 21 March 2017).

In its opinion 13-A-25 of 20 December 2013, the Authority adopted a recommendation concerning the demand response/load shedding market: "*In the light of the risks of eviction described and in order to preserve equal opportunities on the load shedding market, it is recommended to provide all load shedding operators with some of the data held by EDF on its electricity customers in France. This measure is similar to the injunction pronounced against France Telecom* [...]. *The terms of this provision of access, on the details of the data in particular, should allow an equitable access for all operators to the information which would make it possible to identify load shedding potential capacities, without revealing business secrets of EDF or enabling a collusion on the market*" (paragraph 175).

[91] See its description on its official website (anglophone).
[92] The report, published on 10 May 2016, is available on the website of the *Autorité de la concurrence*.

The report of May 2016 also recalls that the issues pertaining to data are examined within the framework of merger control. "*In its Enerest/Électricité de Strasbourg merger decision*[93]*, the Competition Authority expressed the concern that the new entity which would result from the merging of the two historical suppliers of gas and electricity which were, respectively, entrusted with a legal local monopoly on the retail supply of gas and electricity at regulated tariffs in the area of Strasbourg, would be the only market player to have exclusive access to extensive electricity and gas consumption data derived from their respective legal monopolies. These data would allow it to propose offers combining gas and electricity specifically adjusted to each potential customer, thus giving the new entity a competitive advantage. In order to have the same level of information, competitors would have to send requests to their prospects, which would represent a commercial cost that the merged entity would not have to bear. The Authority cleared the operation following the commitment by Enerest and Électricité de Strasbourg to send every competitor that would request it the information necessary to design tailored combined commercial offers.*" (paragraphs 79-80 and 87-90)

2.2 Data to serve territorial development

2.2.1 The applicable legal framework

The new legislative provisions stemming from the law no. 2014-58 of 27 January 2014 *for the modernisation of public territorial action and confirmation of métropoles* (so-called "MAPTAM" law), the law no. 2015-991 of 7 August 2015 *on new territorial organisation of the Republic* (so-called "NOTRe" law) and the law no. 205-992 of 17 August 2015 *on energy transition for green growth* (so-called "LTECV" law) strengthen the role of local authorities in the energy sector.

Under these new texts, the region becomes the lead collectivity in terms of energy efficiency. It is responsible for the territorial strategy in terms of energy management, through the Regional Planning, Sustainable Development and Equality Scheme (*Schéma régional d'aménagement, de développement durable et d'égalité des territoires* – SRADDET) created by the law NoTRe[94].

Article 3 of the MAPTAM law confers new competencies on the department which is entrusted with a mission to fight against fuel poverty. Furthermore, according to Article 43 of this same law, the *métropole* now assumes in the place of the municipalities, all the powers which aim to:

- contribute to the energy transition;
- support demand side management actions;
- develop and adopt a territorial climate air energy plan consistent with the national objectives in terms of greenhouse gas emission reduction, energy efficiency and renewable energy and with the regional objectives defined in the SRADDET.

Finally, the LTECV establishes the competency of municipalities concerning the creation and operation of public heating or cooling networks.

2.2.2 The ambitions of granting authorities and local authorities

In order to accomplish all their assigned missions, these local authorities request that data be made available to them, in order to make the best choices on expenditure and investment planning by having an objective knowledge of the infrastructures of which they have ownership or the energy needs (which, for a small-sized local authority, is impossible).

France Urbaine emphasized, in this respect, that it is in the interest of local authorities to work towards the reduction of energy consumption, drawing on the complementarity of the various forms of energy, which cannot be in the direct financial interest of system operators. In this context, SIPPEREC, for example, proposed during the re-

[93] Competition Authority, Decision no. 12-DCC-20 of 7 February 2012.
[94] This scheme sets the medium and long-term objectives in terms of regional balance and equality, location of the various infrastructures of regional interest, improved access to rural territories, housing, cost-efficient spatial management, intermodality and transport development, energy management and recovery, combating climate change, air pollution, protection and restoration of biodiversity, waste prevention and management. It includes pre-existing plans such as the Regional climate air energy scheme (SRCAE), the Regional intermodality scheme (SRI), and the Regional waste prevention and management scheme (PRPGD).

newal of its concession contract with Enedis "*broader terms for the automatic and regular communication of data*", principles which, according to it, have been "*widely refused by the concessionaires*".

AMORCE and France Urbaine recalled that these data are essential to implement energy policies at the scale of the concerned local authorities and proposed that principles, or even criteria, between local authorities and organisations responsible for transmitting the data to them, govern this provision of access: these data must be comprehensive, consistent in view of the geographic scale defined, easily obtained and with a sufficient level of reliability.

Some local authorities, whose size enables them to carry out more easily projects aimed at using data, already wished to take some initiatives.

The Lyon *métropole*, *Greater Lyon*, for example, "*undertook in January 2015 the development of the energy master plan*", based on an "*operational tool for energy planning* [...]*, for an implementation starting in 2018*". This tool will have to carry out the "*diagnostic of energy consumption and production (electricity, gas, heating and cooling), and of the distribution networks that enable their circulation; a projection of the territory's energy developments in 2030;* [defining] *scenarios with a view to arriving at an action plan to optimize the entire energy chain*".

The *métropole* has already implemented an open data platform[95] on which data of all types are already published. A Lyonese incubator for innovative businesses, founded by private companies and supported by the *métropole* and the region, and called "TUBÀ Lab", was also set up. It is a "*laboratory, a meeting place where citizens, start-ups and companies come together to test new services, accompany project leaders, improve innovative services by encouraging citizen participation*", which has, for example, already enabled the testing of digital gas consumption monitoring services on mobile terminals, in collaboration with GRDF. Before that, Enedis and Grand Lyon Habitat had carried out the project *Watt & moi*[96], which aimed at experimenting the provision of access to consumption data based on the data of the *Linky* meter.

The Paris Climate Agency is also testing with Enedis a smartphone application with a panel of customers in the city of Paris. This application aims at testing a mechanism to accompany customers on their electricity consumption based on data of the *Linky* smart metering system.

Figure 14 – Example of a digital natural gas consumption monitoring service developed by the TUBÀ Lab in Lyon, based on data provided by APIs of GRDF *(source:* TUBÀ Lab)

95 https://data.grandlyon.com.
96 The description of the project is available on the CRE's website dedicated to *Smart grids*.

Figure 15 – Illustration of a service developed by the Paris Climate Agency and Enedis on a panel of consumers in Paris (*source:* Enedis)

The *former Franche-Comté region* has also launched a territorial climate-air-energy observatory, called OPTEER[97], and financed by ADEME and the Bourgogne Franche-Comté region. Its objective is to *"offer territorial planning and management players an access to finely territorialized data, enabling the diagnostic and monitoring of territorial energy systems and impacts in terms of greenhouse gas and pollutant emissions, while taking into account the context and specificities of the studied territories"*. It hence provides the various local authorities, at the scale of their territory and according to their respective missions, with tabular, graphical and mapping data, which, concerning energy, relate to *"the consumption* [...] *and production of renewable energy "*.

Laureate of the "Smart electricity grids" call for projects (consisting in organising a large-scale deployment of smart electricity grids in France), the *SMILE project*, led by the Bretagne and Pays de la Loire regions, and gathering many local players, also seeks to *"jointly build data platforms with companies and local authorities, by reflecting on procedures for disseminating, using and protecting these data for the citizen"*.

Generally speaking, local authorities pay particular attention to ensuring that data are made available to them in a consistent, comprehensive and homogeneous manner; that they cover all forms of energy and fluids, or even extend beyond (transport data), in order to implement relevant territorial development policies; that a neutral third party enables them to have access to data whose accuracy and objectivity are incontestable, which would be difficult for a player of the competitive sector to guarantee.

2.3 Data at the service of a better appropriation of energy consumption

Energy is a prominent expense item for some households and, associated with all the sustainable development issues, an area of collective concern for citizens. This subject remains however largely unknown to the general public, because of its complexity, that of its markets, and the difficulty for many to comprehend what constitute the main concepts used in energy billing, whether it be the physical quantities used (consumed energy, subscribed power) or how the invoice is established (costs of energy supply, costs related to networks and infrastructures, various taxes and contributions).

For this reason, the provision of access to data which has already begun to take place, whether it be data related to the consumer's own use of energy or more general information, can constitute an opportunity for the consumer to better appropriate energy data and be able to take action to reduce his energy needs or to participate in flexibility mechanisms. GRDF advocates for example for an indispensable effort regarding, *"measures accompanying the*

[97] http://www.opteer.org

transformation, both internally and externally, whether involving communication [...] *or training* [with respect to] *the staff of GRDF or its providers, consumers, or communication relays*".

The "French Green Button"

On 7 November 2014, the president of the Modernity Action Forum (*Forum d'action modernités*) and of the New Generation Internet Foundation (FING), Philippe Lemoine, submitted to the Ministers of Economy, of Civil Service and State Reform, and to the Secretaries of State for State Reform and Simplification, and for the Digital Sector and Innovation, a report on the "*digital transformation of the economy*"[98].

It is based on the assumption that the widespread roll-out of smart metering systems for domestic consumers of electricity and natural gas will constitute a major technological breakthrough and will enable many start-ups to offer "*applications for individual consumption control based on a simple real-time data display, and for the statistical and predictive analysis of this data*". It rightly indicates however that, despite this technology, "*the impact on the behaviours of individuals (load shedding during peak periods, etc.), and therefore on energy bill reduction has not been demonstrated*".

In 2011, energy sector companies in the United States recognised the need for consumers to easily have at their disposal their consumption data in order to enable many players to offer them services to use this data. Taking up this initiative, the American Presidency, the United States Department of Energy, as well as the National Institute for Standards and Technology (NIST) launched the Green Button Initiative, to provide residential and professional consumers with secure access to their consumption data, in a standardized format. As the report indicates, the country implemented "*a platform enabling households to have secure access to their consumption data, to stimulate virtuous behaviours through better information, and to allow innovative players to create APIs and helper applications for energy management. More than 35 companies are in the Green Button*".

The member companies of the Green Button Alliance hence decided to systematise the use of buttons in order to allow their respective customers both to retrieve their consumption data, in a standardised format, and to authorise the sharing of their consumption data, through APIs, after securing the user's consent.

Drawing on this initiative, the report suggests to "*create a 'French Green Button', allowing each household to have secure access to its energy data to improve its consumption management, fight against fuel poverty, and allowing innovative players to use these large amounts of data, in a manner that respects the privacy of consumers, in order to design and offer new products and services for energy management*".

In parallel with this report, one of the working groups of the *Smart Grids Task Force* of the European Commission published, in November 2016, a first work carried out by industrialists in the sector entitled *My Energy Data*. The stated objectives were to provide an overview of initiatives on data access and management that may exist at the level of distribution networks, to identify possible constraints to be lifted in this area and to study, at a European level, the relevance of an initiative of industrialists concerning a potential common data exchange format.

It revealed the interest of two types of functionalities called "*Download my data*" and "*Share my data*", in order both to enable the user to view his data in a format common to all the players and understandable to an interested consumer, and subsequently allow him to easily propose their use by a third-party service provider. This fully converges with the ambitions described above.

The provision of access to data that may be of interest to the consumer is not restricted to simple data derived from energy metering. Those relating to the ***quality of energy supply*** (see paragraph 1.1.1.4), which underpin the incentive-based regulation regarding the service quality of operators, can also interest consumers: since the long power outages or the voltage excursions for which system operators could be responsible are data that can give rise to indemnification, the automation of such a control could for example increase consumers' awareness of the expected quality of service of this public service concession holder.

2.4 Data at the service of innovation

Energy data, once processed, could be the base material of many applications for the benefit of the consumer or the energy producer.

[98] The report is available on the website of the Ministry of Economy.

All the stakeholders consulted, without necessarily disclosing the future initiatives they could propose to their retail market customers, insisted on the need to have consumption data at a sufficiently fine time step and made available on a sufficiently frequent basis to differentiate themselves, and offer their customers and prospects, *"high value-added services"*. Furthermore, since they do not all have the opportunity to install devices permitting the use of customer consumption data at a sufficiently fine time step, suppliers expressed their wish to use the data generated by smart metering systems once they have been deployed.

2.4.1 Innovation brought by energy suppliers

In order not to be left behind by other players of the competitive sphere, energy suppliers now deem it necessary, as Engie expressed it, *"to approach the customer relationship in a more comprehensive manner"*, by offering their customers value-added services complementary to energy supply, related in particular to home automation or expanding beyond energy. Atos Worldgrid pointed out in its contribution that the *"need for differentiation through services"* has become indispensable for energy players. Hence, the *"tariff battle is no longer the only source of competitiveness, the commitment to a personalised customer relationship, the contribution through services to a better management or to the well-being of their customers"* are becoming, according to Atos, a *"possible strategy"*.

Some energy suppliers have already formed subsidiaries allowing them to enhance their offers of *complementary services* to energy supply and often coupled with these supply contracts. The Think Smartgrids association considered in this respect that, *"it is a combination of data of several business areas which will make it possible to really provide differentiating and personalised services"*. This is for example the case of EDF, which, by creating its subsidiary Sowee, is able to offer *"packs"*, proposing, under a same offer, a natural gas contract, associated with a heating control, a home air quality measurement monitor, as well as a consumption monitor on a smartphone application.

For its part, Engie entered into partnership with a manufacturer of connected objects to propose a combined offer of consumption monitoring and remote programming of the heating, thanks to the connected thermostats of the manufacturer. Suppliers have thus become aware of the interest of diversifying their sources of income, beyond the simple energy sales, or even beyond the energy sector.

Capgemini, during its hearing before the study committee, pointed out for example that the energy supplier and producer Eneco offered its customers a home-based multifunction display service, including, in addition to consumption monitoring, *"challenges"* to encourage customers to reduce their energy consumption, or a control of the recharge of electric vehicles, and services beyond energy supply such as, for instance, the schedules of the trains taken by the customer, as well as their possible delays.

2.4.2 Innovation brought by digital companies

2.4.2.1 IT service and consultancy firms

Many IT service and consultancy firms develop solutions related to the use of energy data. Atos, for example, developed a platform *"at the service of energy-positive territories"*, the main interest of which is to offer all the players (system operators, energy suppliers, local authorities, *etc.*) energy data use services *"in white label"*, i.e. which can be integrated without the presence of any specific Atos graphic charter on the digital tools of these players.

In partnership and under the supervision of GEG, which is both a supplier and an operator of electricity and natural gas distribution systems in Grenoble, Atos developed in particular the VivaCité project, which *"seeks to accompany the customer towards the control of his energy consumption (for gas, water, electricity) thanks to new services"*, to eventually provide the Grenoble *métropole*, the owner of the electricity and natural gas distribution networks, with a multi-fluid vision, through the operator of its networks.

Beyond the integration of solutions for energy data management and provision to the end customers, Capgemini also acts as a *metering operator* for mid-sized system operators, particularly in Eastern Europe or in California. In addition to these activities, the company had chosen to work with big data information technology providers to offer its energy customers new solutions, designed according to a top-down approach. The aim was then to determine concrete situations of use of these solutions and to identify those which could lead to a potential return on investment for its customers. The company recognized that this approach tended to impose limits on its capacity for innovation and decided to implement data platforms on which its data scientists can search for potential combinations or uses of raw data, to experiment them, and then propose them to its customers, by possibly freeing itself from the limits of the energy domain (see paragraph 2.4.1).

IBM, also interviewed within the framework of the study committee, noted that energy players run the risk of seeing players from other related sectors (automobile, electronic, digital, telecommunication sectors, *etc.*) encroach on their traditional activities owing to an effective and original data management and use. Energy companies can then be overtaken by *giants* from other related sectors, which is made possible by the emergence of mature technology (IP-based smart metering systems, Internet of Things). In order to provide its energy customers with solutions addressing these issues exhaustively, IBM hence decided to unify its solutions offering, which now has five main objectives: operational efficiency improvement with analytical platforms for predictive maintenance, better knowledge of customer relationship management, transformation of models related to new usages and to renewable energy, security of critical equipment and infrastructures. IBM hence proposes an open digital innovation platform for the development of new data value-adding services using cognitive, analytical and blockchain services.

2.4.2.2 The start-ups

Considering that energy is a business sector that brings with it economic opportunities, many start-ups wished to develop original energy-related service offers. Some of them, such as the French firms CoSMo Company or DCBrain, have developed solutions to facilitate the predictive maintenance of the equipment operated by energy system operators, by basing their powerful and sophisticated algorithms on a large data collection (big data). Cross-analysing, for example, the age of the different equipment pieces on the network, their rate of use with various technical and physical parameters, with the maintenance operations already performed on the network, provides the operator with a theoretical modelling of the state of its fleet, and hence makes it possible to prioritise the maintenance actions to be carried out, sometimes even before a failure occurs.

Most of the start-ups, however, deal primarily with issues related to production or consumption of the end user. For example, Ijenko, met within the framework of the study committee, developed, mainly for the international market, an IT infrastructure to ensure the communication between connected devices (smart meter, water heater, thermostat, *etc.*) regardless of the technology used and the information systems of service providers. Such services consist in particular in making available to the end user supervision data on his equipment and a monitoring of his usages, which may cover several forms of energy and flows (water, fuel, natural gas, electricity) to allow him to act on his energy demand, and hence achieve savings.

The French company Deepki, also consulted by the study committee, opted for an original approach to energy consumption data processing: an intelligent and in-depth use of the current energy invoices of companies in the tertiary and industrial sectors can enable the latter to review their activities and thus generate strong energy savings. Its algorithms, based in particular on a comparison with companies with similar activities, enable it to identify how to optimise their tariff formulas, introduce a better regulation of their energy consumption, and especially detect abnormal consumption, without necessarily resorting to energy metering at a finer measuring step.

2.4.3 Innovation brought by companies outside the energy sector

Traditional energy companies, digital service companies and start-ups are not the only ones interested in the data of regulated energy operators, in particular those related to the consumption of end customers or energy production. During its interview with the study committee, Orange Business Services explained how the consumption data were part of the broader context of a service offering around various connected objects. Orange works in particular with insurance companies to enhance their service offers: with the end customers' consent, it is taking a stance as a player that can collect a range of data, including energy data, to detect fires early, feed algorithms participating in remote surveillance, offer services to elderly, disabled or dependent persons, *etc.*

In the recent past, the large Internet and digital companies in the majority American (collectively termed "*GAFAM*"[99]), with considerable resources, have often been at the cutting edge of innovation related to the massive and large-scale use of data, relying on powerful and sophisticated algorithms. At present, none of them has emerged in a direct manner by using the data of regulated energy operators. They may be waiting for the widespread deployment of smart metering systems to use their huge computing capacities. Furthermore, apart from Google, which acquired in January 2014 one of the main manufacturers of connected thermostats, Nest, none of these players has, at present, developed products or systems likely to supplant one of the players of the energy sector.

[99] Google, Amazon, Facebook, Apple, to which Microsoft is also associated.

Furthermore, in the name of the "*economic sovereignty of the nation*" and protection of French economic interests, the Strategic Information and Economic Security Department (*service d'information stratégique et de sécurité économiques* – SISSE) of the Ministry of Economy and Finance draws the attention of all the regulated energy operators to the location of their IT infrastructures, so that they can retain control over their data.

2.5 Data at the service of operators' efficiency and moderation of their costs

As organisations with a public service delegation, regulated energy operators provide all the players with many data, for end customers and local authorities, the State and market players. They also produce data in the interest of their own activities: using technology to better know and operate their equipment, limiting their operating costs and their investments, enables them to be more productive and efficient, and to ensure a better quality for network users.

Many illustrations of this aim were presented by the regulated energy operators during the interviews with the study committee. Storengy, for example, indicated that, "data *analysis and processing can make it possible to control the operational costs of installations for the production"* and, hence, in particular, to "*perform a predictive maintenance*" of the compressors, "*historically implemented by the manufacturers themselves*".

The digital Hub of RTE is for example mainly for internal use: with the real-time transmission of indicators, the public electricity transmission system operator contributes to improve the resilience and the performance of the electrical system, connecting its information systems to those of the distribution system operators, to the suppliers, but also to upstream market players (EPEX SPOT[100], ENTSOE[101], Coreso[102], *etc.*). The digitization of the networks it operates also enables RTE to "*increase the transit capacities on the lines, for equal infrastructures"*, to "*reduce the delays of incidents on the network (self-healing)*", to "*improve the quality of electricity*", to "*implement a more targeted maintenance"*, to "*improve the environmental performances of the equipment"*, which has direct consequences on the operator's performance.

Generally speaking, the emergence of an increasingly wide and intelligent use of the data by operators to improve their own performance has significant consequences, particularly with respect to the nature of their expenses. CRE, through the missions conferred on it by the law, is very sensitive to this issue. Indeed, whereas it is possible to postpone or cancel investments in the networks and infrastructures of regulated operators due to increased expenses in data-related research and development, this generates, from an accounting point of view, a reduction in investment costs (CAPEX) and an increase in operating expenses (OPEX) of these operators. The terms of coverage of these costs by the users are fixed exclusively by CRE, in the various tariffs for use of the networks and infrastructures (TURPE, ATRT, ATRD, ATTM).

In the last tariffs for use of public electricity networks ("TURPE 5")[103], CRE introduced a new mechanism for financing innovations of system operators, dedicated to smart electricity grids. This mechanism enables transmission and distribution network operators "*to request, once a year, the integration in the trajectory of costs covered by the TURPE 5, of operating cost overruns related to projects pertaining to the deployment of smart electricity grids. This integration is possible for a group of projects entailing operating costs above €3 M, subject to a favourable cost-benefit analysis of the project or group of projects, and for unanticipated costs at the time of entry into force of the TURPE 5*".

Finally, a more qualitative issue should be noted regarding the performance of regulated energy operators resulting from the emergence of many new data-related activities: the transformation of the business of such operators. As previously mentioned, the latter have implemented important policies for the training and recruitment of staff, which, until then, were more specialised in information systems than in mass data processing or cyber-security. This profound evolution constitutes, in short, an unprecedented opportunity to make this business develop, to acquire new skills within the companies and offer prospects to the people working there.

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[100] European Power Exchange.
[101] European network of electricity transmission system operators.
[102] Technical collaboration centre of transmission system operators of five European countries (Germany, Belgium, France, Italy, United Kingdom) responsible for increasing the security of power supply of these countries.
[103] The CRE's deliberations on the subject are available on its website site: at this address for that of 19 January 2017 *deciding on the request of the Minister of Environment, Energy and the Sea, in charge of international relations on the climate, for a new deliberation on the tariffs for the use of public electricity grids in the MV and LV voltage ranges*; and at this one for the deliberation of 17 November 2016 *deciding on the tariffs for the use of public electricity grids in the HV voltage range*.

2.6 Data at the service of transparency in the operation of the public administration and organisations

The principle of opening up of public data was announced in France in 2011, around the creation of the Etalab mission, responsible for creating a single inter-ministerial portal for public data.

The circular issued by the Prime Minister dated 26 May 2011 *on the creation of the single portal for public information held by the State, "data.gouv.fr", by the "Etalab" mission, and application of the provisions governing the right to reuse public information*[104] hence stated that "*facilitating the online access to public information in the interest of transparency of public action and its reuse to promote innovation are a priority in the government policy for the modernisation of the State and the development of the digital economy*".

It also stated that "*in terms of technological innovation, supply often creates demand. By providing access to its public information, the State participates in the construction of digital society. This strategy of opening up of public data (*open data) *illustrates the ambition of the government's industrial and innovation policy. The unrestricted and easy reuse of public information, at no charge, is an essential lever to promote the innovation dynamics driven by the community of developers and entrepreneurs based on the data made available online on "*data.gouv.fr*".* [...] [It] *will propose online to reinforce the transparency of public life and the confidence of citizens in the institutions of the Republic. These services will showcase the work of administrations, contribute to the transparency of public action and will inform the public debate. They will thus enrich the life of our democracy."*

This principle of the government policy to open up public data was reaffirmed on 17 May 2012, when the President of the Republic had each member of the Government sign a deontology charter which recalls their "*duty of transparency*", their "*strict compliance with the provisions guaranteeing that citizens have access to administrative documents"* and their commitment to "take *determined action to make a large amount of public data available on the Internet, conveniently and free of charge*". During the first Interministerial Committee for the modernisation of public action of 18 December 2012, the government reiterated the "*principle of free reuse of public data"* and wished to "*extend it, in consultation, to local authorities, public service delegations, to the social sphere and independent administrative authorities"* (Decision no. 32). Finally, the government seminar on the digital sector of 28 February 2013 led to the government roadmap for opening up and sharing public data. This movement is international, as illustrated by the G8 charter of 18 June 2013 for the opening up of public data.

The European Union adopted for its part the Directive 2013/37/EU of the Parliament and of the Council of 26 June 2013, amending Directive 2003/98/EC of 17 November 2003 *on the reuse of public sector information*[105]. This directive was transposed in France par by the law no. 2015-1779 of 28 December 2015 *on free access to and the terms of reuse of public sector information*[106].

Finally, the law *for a digital Republic* considerably expanded the access to administrative documents by imposing the online publication of a very large number of documents, when they are available in electronic format.

This publication concerns in particular the databases, regularly updated, that the public entities or those entrusted with a public service mission produce or receive and which are not otherwise publicly disseminated, as well as the data, regularly updated, whose publication is of economic, social, sanitary or environmental interest.

This results in an inversion of the paradigm for the concerned administrations and organisations entrusted with a public service mission, which will have to publish a very large number of documents on a voluntary basis, and no longer in response to a request.

RTE emphasized in its contribution that this law thoroughly changed the provisions of the French Code of Relations between Citizens and Administration "*to move from a logic of access to documents/administrative data upon request by a private individual, to a logic of default accessibility through the availability in open data of these documents/administrative data without the communication being triggered by a request*".

As RTE pointed out, "*the identification of all the 'administrative' or 'environmental' data less centered on the core business of RTE – which will have to be published in application of the law for a digital Republic – requires a substantial inventory work generated in particular by difficulties in interpreting the new provisions"* when the concept

[104] The full text text is available on the website Legifrance.gouv.fr.
[105] The text of the directive is available on the website of the documentation of EU institutions.
[106] The full text is available on the website Legifrance.gouv.fr.

of data whose publication is of economic, social, sanitary or environmental interest, is not defined by the law and when the practice of the CADA does not mention it either.

3. MAKING DADA MANAGEMENT A LEVER TO IMPROVE THE ENERGY SYSTEM'S EFFICIENCY

3.1 The imperative of consistency in data provision and its objectives

3.1.1 Article 179 of the Law on Energy Transition for Green Growth establishes a consistency ambition for the benefit of local public policies

Through their representatives (in particular, France Urbaine), the local authorities, on which many competencies have been bestowed following the successive legislative developments in the energy area, expressed the need to *have consistent and proportionate data with respect to these different objectives*. Article 179 of the LTECV (see paragraph 1.3.2.2) and its implementing texts constitute a decisive step in this respect, in that they will provide public entities with energy production and consumption data at the scale of their territories, at an annual frequency. In parallel with this provision of aggregated or anonymised open-access data, the granting authorities welcomed the fact that they can benefit from additional and more detailed data, in a manner proportionate to their assigned objectives.

All the local authorities regretted, however, that the detailed data on petroleum products (concerning in particular individual or collective oil-heating), according to a granularity similar to that required for electricity and natural gas, could not be made available by these texts. They wished the "*data on the delivery of petroleum products to be made available when they exceed 30,000 litres, or approximately 300 MWh/year*". Going further, FNCCR wished for granting local authorities to have even "*information relating to private road transport (taxis, buses, trains), ports and airports, i.e. fuel consumers, to have a complete overview of the energy consumed and produced on their territory*".

However, the local authorities were satisfied with *the introduction of a rendez-vous clause* in the implementing texts of this article: they are aware of the diversity of ambitions of the various local authorities and granting authorities. Some of them have already invested in computing tools enabling them to use energy data in fine detail and could process more information in finer detail, whereas others will not have the opportunity to use them, at least in the first instance. This feedback following the first provision of data to public entities will make it possible to identify the potential inadequacy of particular data with respect to their missions.

3.1.2 The consistency of both the data generated and the channels through which they are made available is essential for the markets to function properly

As previously described, the consistency of the data produced is essential for their proper use by the various stakeholders. Yet, since they have *different legal natures* (see paragraph 1.2) according to the context of their use, these data can be disseminated by a same operator in different ways. For this reason, in order to make its staff more aware of these different legal contexts, GRDF for example, has begun to develop "*for internal use, a data catalogue shared within the company, to achieve more easily a traceability of the different types of data*".

Furthermore, since the networks are highly interconnected (see paragraph 3.5), the respective roles of the various operators entail ensuring a *consistency at the limit of their respective perimeters*, which requires a better coordination between them, and often requires the development of common tools. *Caparéseau* illustrates this need for a coordinated provision of access to data between players for the pursuit of a same objective. The producers also called for a rapprochement between the transmission and distribution system operators to implement the information obligations arising under the various European codes (see paragraph 1.6.3).

The evolution of the networks, infrastructures, and of their usages, will continue to make this consistency essential. For example, the future recourse by electricity distribution system operators to flexibility capacity, in particular proposed by aggregators, in order to resolve local constraints, will necessarily have consequences on the national mechanisms for which RTE is responsible. Several users of electricity reports also reported that the data made available by RTE on the one hand, and Enedis on the other hand, were not always consistent at the interface between the electricity transmission and distribution networks, because a comprehensive and consistent electricity report, at the scale of all the public electricity networks, would require coordinating its production. Along the same lines, Engie suggested for example to create "*a website dedicated to regional plans for connecting to the renewable energy network (S3REnR) including Caparéseau and the website dedicated to the S3REnR of RTE*".

With respect to the provision of individual consumption data, Article 28 of the LTECV is also indicative of this necessary consistency between the distribution system operator and the energy supplier. The box below illustrates the issue of the consistency of the provision of access to the data produced in this framework:

Example of the remote display of consumption

The remote display of domestic consumption is subject to specific legislation since the LTECV. Its article 28 provides that, for electricity, *"for domestic consumers benefiting from the special tariffs* [staple product]*, the provision of access to metering data* [...] *is accompanied by an offer, by the suppliers, for transmission of consumption data, expressed in euros, by means of a remote real-time display device"*. This device *"is gradually being proposed to all the domestic consumers, after a technical/economic assessment carried out by the French Energy Regulatory Commission"*. For natural gas, *"for domestic consumers benefiting from the special* [solidarity] tariffs [...]*, the provision of access to metering data* [...] *is accompanied by an offer, by the suppliers, for transmission of consumption data, expressed in euros, by means of a remote device"*.

The decree no. 2016-1618 of 29 November 2016 *relating to the offer, by electricity and natural gas suppliers, for transmission of consumption data, expressed in euros, by means of a remote device*[107] supplemented the regulatory part of the French Energy Code on this subject. For electricity, as for natural gas, this decree requests that *"at least one [*of the offers*] enables the display of consumption data by means of a device set with a screen already available to the consumer"*. For electricity, *"another one, primarily for consumers lacking an appropriate device, enables the real-time display of consumption data by means of a dedicated remote device that can be read inside the home, that the supplier makes available to the consumer"*.

It follows from these provisions that the remote display device that the supplier will have installed at its customer's premises could be the subject of misunderstanding between them. Indeed, if a customer telephones its supplier to get an explanation on the amount of his consumption in kilowatt-hours or in euros, calculated and displayed in real time for electricity, the customer will have more precise information than the supplier, insofar as the consumption data collected by the system operator are, at best, made available on the day after their collection.

1

CRE requests all energy system players to ensure the information they produce is consistent, with special attention to be given to the large number of access channels that could lead to the same item of data being made available. CRE requests all network and infrastructure operators to send it the procedures introduced to ensure this consistency, within a period of 12 months.

CRE considers that the current legislative and statutory texts on the provision of data to the public entities constitute genuine progress to introduce ambitious and consistent local policies. Their scope must be assessed in the medium-term, following feedback.

For future amendments to texts on data provision, CRE draws the attention of the Legislator and the regulatory authority on their necessary comprehensiveness, while ensuring their overall consistency and by avoiding the risk of onerous legal situations (i.e. multiple legal layers). Furthermore, it would be useful if these future texts concern data for all energy and fluids.

3.1.3 The consistency of exchanges between distribution system operators and energy suppliers is essential for the markets to function properly

The deployment of smart metering systems requires the implementation of information systems enabling the remote use of these meters and the access by consumers, suppliers and authorized third parties to the data. This work to be conducted should be the opportunity to reach the inter-operability of the information systems of distribution system operators. They must concern:

- the data formats sent by IT flows, drawing on the work already underway within working groups under the auspices of the CRE and which has already led to the adoption of a common meter reading data transmission flow;
- the implementation of automated access to the data and to the market service orders (commissioning, supplier switching, *etc.*);

[107] The full text is available on the website Legifrance.gouv.fr.

- the access by third parties, including non-contract holder suppliers, to the consumption data, with the end user's consent.

As indicated in paragraph 2.1.1, this homogenisation will in particular allow for the effective opening up of the markets in the territories served by local DSOs. Furthermore, it will enable these consumers to benefit from the same demand side management services as on the rest of the territory. In the absence of harmonised inter-operable information systems and data, energy suppliers and service providers will not be able to propose their offers to these consumers, due to a development cost considered too high for these potential customers only.

2 *CRE considers that a standardised format and content of data exchanged between distribution network operators and energy suppliers is vital for retail markets to function properly. It asks all distribution system operators to do their utmost to standardize and merge information systems.*

3.2 The imperative of quality of the data made available

3.2.1 Data of insufficient quality impede the activities of their users

The granting authorities emphasised, first, the need for quality of the data made available and the pitfalls they can currently encounter in that regard. SIPPEREC pointed out, for example, that the mapping of the networks for which it has granted a concession for operation are frequently incomplete, derived from data at a level that is too aggregated, requiring the association to "*carry out a heavy task of reconstructing the piece of data"*, or lack attribute data which are nonetheless indispensable (such as the equipment identifier, the connection between equipment pieces). It added that "*The use of data considered as reliable but which are not represents a significant risk*" to the exercise of the association's missions. With this in mind, the publication of the data should be accompanied by *information* on the *methods of collecting*, *processing* and *possibly aggregating* these data; otherwise, they could be interpreted and used improperly.

In its contribution, AMORCE noted, furthermore, that the "*time step of the data is an essential element"*. In order to "*better interpret the annual data (mostly extrapolated), for example to monitor building renovations, and to build alternative technical/economic offers for the providers*", the aggregated data transmitted to public entities should, according to AMORCE, be produced at a finer frequency than the annual frequency introduced by Article 179.

Furthermore, the production data, which are the most geolocalised, as well as the data related to operator constraints, should not be neglected: the first are essential sources of information for local authorities, which "*are increasingly implementing energy master plans aimed at organizing the energy supply of their territory, coordinating the production and distribution* networks", while the second allow local authorities to "*prioritise* [their] *demand side management actions or implement a local flexibility service to limit consumption peaks in areas where the network is under strain*".

Without complete information of a sufficient quality, the exercise of these missions could, at best, be difficult to implement, or biased or incomplete, in case of approximate data.

3.2.2 The provision of data of satisfactory quality represents an oganisational and financial effort

For all the potential consumers of energy data, the quality of the information made available is a particularly prominent issue when it is used both for the establishment of public policies and for commercial services.

In order to be able to meet these expectations, the system operators themselves, whose information systems had to gradually undergo developments or specific processing to improve the quality of the stored data, came to the conclusion that this improvement represents a *meticulous and costly work*.

GRDF, EDF SEI and Enedis, whose computing tools have been gradually upgraded, claimed that they need to continue along this path to fully meet their new regulatory obligations. For example, the central point of the *quality of their repositories of addresses* was raised several times, in particular by the representatives of granting authorities and by the suppliers: since the consumer addresses could, in particular, have been entered in the information systems in a non-systematic format, this aggregation can be non-exhaustive, and hence inaccurate, when it is necessary to regroup the data by building.

Nonetheless, in order to promote the improvement of the repository of addresses and the association of the right residence with the right point of delivery, Engie proposed to "*bring together on a common database the cross-referenced repositories of the points of identification of electricity and natural gas distribution system operators*", by associating them with a same premise. The effect of this double-check would be to limit the phenomenon *of inversion of delivery points*, whereby two customers from a same building can be billed in place of one another.

Similarly, since Article 179 of the LTECV requires disaggregating the consumption data according to the French classification of economic activities (*nomenclature d'activités française* – NAF)[108] or integrating the concept of IRIS[27] (to be related to the geolocalisation of metering or delivery points), the information systems of system operators will now have to collect and process this information, which they previously never needed to do.

In its contribution, GRTgaz pointed out that all the data extraction from its information system that will need to be carried out within the framework of its new regulatory obligations will be, in a first stage, performed manually, when the amount of demands is unknown. Conversely, others, like Enedis, wished to already begin to industrialise this provision of access. This potential industrialisation hence constitutes, for each of these organisations, a *strategic operational decision* with regard to its information system.

3.2.3 Making performance in data management a means of measuring the quality of service by regulated operators

It follows from the above that the quality of the data made available by regulated energy operators is an essential issue for all the players.

CRE had already expressed the wish to include data management in its *incentive-based approach to the improvement of the quality of service* delivered by operators. In its deliberation of 10 March 2016 *deciding on the equalized tariff for the use of the public natural gas distribution networks of GRDF*[109], CRE stated in particular that the system operator "*will for example have to provide public entities with the available data on natural gas and biomethane consumption and production, according to procedures which are currently being defined. CRE considers that the transmission of these data is an important issue which could be subject to a particular monitoring: new indicators will be implemented, if necessary, during the tariff period, within the framework of the incentive-based regulation mechanism concerning the quality of service*". A similar wording also appears, for example, in the deliberation of 17 November 2016 *deciding on the tariffs for the use of public electricity grids in the MV and LV*[110] *voltage ranges*,

As part of the monitoring of the quality of service of operators, CRE wishes to initiate an approach to improve *performance in the management and provision of data to the different categories of users*.

3 *In line with regulated energy operators, CRE proposes defining and reviewing indicators relating to data management performance, by considering industry players' expectations. A dedicated dashboard could then be established to check that expected progress has indeed been achieved. This monitoring could be integrated into the CE's report on incentive-based regulation concerning the quality of service by regulated operators.*

3.3 The imperative of technological neutrality and inter-operability

The data of regulated energy operators are the basic material of an ecosystem including very heterogeneous players, which, as outlined above, require the exchange of a wealth of data, in processes that are sometimes highly complex.

In this context, the *technological neutrality and inter-operability of the solutions used* are a major element in the successful dissemination of data made available by operators holding a public service monopoly. "*Inter-operability*" means the capacity for several solutions of different natures to communicate with each other through the precise and unambiguous definition of the terms of their interaction. In other words, different technologies or

[108] The NAF code or principal activity code (*code d'activité principale exercée* – APE) makes it possible to characterise in a standardised manner the business activities of companies at the national scale.
[109] The deliberation is available on the CRE's website.
[110] The deliberation is available on the CRE's website.

tools of a different design meeting a same need must be able to substitute for each other in an undifferentiated way.

As regards the devices installed at the end customers' premises by regulated energy operators, it is a requirement which must be set by the regulator, or by the operator itself, in order to ensure the proper functioning of its equipment. It would be inconceivable, for example, that smart meters of different brands do not work in the same way, to the extent of requiring adaptations for each of them. However, in the competitive sector, the players can make proprietary choices, contrary to technological neutrality, which depend on their commercial strategy and their interests.

In the area of energy, CRE wishes to emphasise that technological neutrality is, above all, *in the interests of consumers and public entities*. It enables them to make choices without depending on an energy or service supplier which would hence make them captive and would constitute a kind of private monopoly, based on data made available by a pooled funding. Moreover, the increasingly widespread provision of open data access makes it essential to define inter-operable and accessible IT interfaces through APIs.

Two of the most obvious and concrete illustrations of this necessity are located *downstream from smart electricity metering systems*.

Should a standardised pricing information be accessible downstream from the smart meter for electricity?

The local interface for the customer on smart meters[111] is defined in a precise and standardized way by the system operators, which enables any energy or service supplier to use this device as they find appropriate. System operators guarantee the metering of the consumed energy volumes; energy suppliers possess the pricing information for this energy which is relevant to the use of the data, for example, to implement energy consumption control actions.

The UFC-Que Choisir emphasised, during its hearing, the necessity to "*implement open and non-proprietary protocols for communicating the price*" (which are not, for example, included in *Linky's* tariff grid, which only has time ranges such as "peak hours", "off-peak hours", *etc.*). The National energy ombudsman also considers that it would benefit the client if direct pricing information could be interpreted by any device placed downstream from the meter.

Access to prices downstream from the meter is indeed essential. It could enable an energy operator to more easily control the electricity usages of the home based on unambiguous tariff data, provided locally and with no additional connection.

In the interest of the end consumer, this information should also be standardised in order to prevent the supplier holder of the customer contract from making the customer captive of a device downstream from the meter it has installed and, more generally, from making the customer captive of this supplier.

Are the chosen communication protocols for Linky's local radio transmitter suited to the different usages that could be made of it?

The main functionality of Linky's *local radio transmitter* (LRT), specified and developed by the EDF supplier and the grouping of electricity industries IGNES, within the framework of the Smart Electric Lyon demonstrator, is to make available, through an internal radio communication in the housing, the meter's information to any connected object able to interpret this information. This functionality will make it possible to offer home automation services, considering, for example, that tariff information contained in the meter can be used by an automatic regulation of the heating in the housing (for example, the activation of an off-peak hours time range or a change of state of a virtual dry contact[112]). It is hence a non-exclusive solution for a wireless communication gateway between *Linky* and devices using its infor-

[111] The *customer teleinformation* (TIC) of the *Linky* meter for electricity and the *customer output* of the *Gazpar* meter for natural gas.
[112] The virtual dry contacts of the *Linky* meters are elements of the tariff grids of the suppliers intended for controlling electricity usages (see paragraph 2.1.1.2 of the CRE's deliberation of 8 December 2016 on smart grids, available on the CRE's website).

mation.

An order of the Minister in charge of Energy[113] regulates the minimum specifications of the protocols that can be used by the radio equipment connected downstream from the smart electricity metering systems.

The two radio communication protocols chosen for the LRT and compliant with this order, namely KNX and ZigBee, are standards for short-distance transmission of information with a reduced energy consumption. If the LRT developed within the framework of this demonstrator were to come into widespread use, in order to connect the *Linky* meter to home automation devices, the latter would have to be able to work according to at least one of these protocols.

However, Engie pointed out in its contribution that these choices of protocols are not, for example, "*currently compatible with smartphones*", or with computing devices that domestic and professional consumers commonly use (computers, digital tablets).

Although these specifications are based on real arguments and suited to a usage in home automation, the technical choices made for the LRT hinder the direct and local use of the meter data by a mobile application. The design of such applications is however within the capacity of a large number of market players, whose range of activities lies beyond that of the sole manufacturers that can produce devices able to communicate with the KNX and ZigBee protocols.

The use of inter-operable standards must hence be assessed in relation to the objectives. By its technical design, the LRT implies being used by home automation equipment; it is hence up to other players to possibly develop another product than the LRT if it seems to them necessary that the data collected from *Linky* may be used by other types of solutions.

4

CRE considers that inter-operability and technological neutrality are in the interests of the end user and public entities. As such, it will continue to ensure that the use of inter-operable standards avoids all situation of capturing end customers.

CRE recommends that energy suppliers provide standardised pricing information using local outputs from smart electricity metering systems.

3.4 The imperative to rapidly communicate regularly updated data

The imperative of speed of the data provision is meaningful for some of the data, since they must either be made available at a date corresponding to the expectations of those who wish to use them (*timeliness* constraint) or be sufficiently recent to be usable (*frequency of updating* constraint).

As regards the compliance with the timelines for making the data available, the energy trade associations, recipients of the data of public distribution system operators, also attach particular importance to compliance with "*regulatory timelines*" which they must respect "*for the implementation of their territorial climate-air-energy plans (PCAET)*[114] *(from the end of 2016 for some of them to the end of 2018 for most of them)*", as AMORCE noted in its contribution.

During the hearings of the study committee, the first of these constraints proved to be particularly critical, for example, for the activities of electricity producers. According to France Énergie Éolienne (FEE), the producers do not completely trust the *Caparéseau* tool, whose aims are unanimously considered as relevant, but whose data updating is not sufficiently frequent and whose information is sometimes obsolete.

The period of six weeks on which RTE and all the distribution system operators have aligned themselves to update the data is sometimes considered as insufficient. The producers, for example, suggested that the tool be updated dynamically and that any entry to the queue for a connection request *be automatically updated* by *Caparéseau*.

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[113] Order of 7 February 2017 *defining the minimum specifications for inter-operability of the radio transmitter mentioned in Articles D. 337-17-5 and D. 124-21 of the French Energy Code*.The text est is available on the website Legifrance.gouv.fr.
[114] These plans, defined in Article L. 229-26 of the French Environmental Code code, consist in defining the "*strategic and operational objectives* [of a] *public authority in order to mitigate climate change, fight it efficiently and adapt to it, in keeping with france's international commitments"* and the "*action programme to be implemented"*, in terms of energy efficiency, optimal development of energy networks, renewable energy production, *etc.*

Also illustrating the need for a provision of specific data within the relevant time limits, the Hespul association working in photovoltaics highlighted that the network renewal procedures in rural areas are not the subject of frequent communication between electricity distribution system operators and the granting authorities, beyond the annual report of concession activities. However, it was observed *"repeatedly"*, according to Hespul, *"that the network renewal procedures* [...] *implemented by the system operator or by the energy trade association took place in parallel and with no communication with the connection procedures of the producers"*. As a result, the reinforcement works were charged to the producer *"whereas these exact works were already planned by the granting authority before* [their] *connection request*".

Although this example cannot be generalised, it is sufficient to illustrate that the implementation of a frequent communication between the concessionaires and their granting authorities can avoid imposing an undue burden on the producers.

5

CRE considers it necessary to include the expectations of data recipients (in particular, producers and public entities) in how often some of them are updated, as well as a data provision schedule compatible with the obligations of specific data users.

For this reason, it requests regulated energy operators to send it the list of the main processes within 12 months, where data provision deadlines and frequency must be reviewed, after stakeholder consultation and considering technical feasibility and stated priority ranking.

FEE pointed out that RTE and Enedis launched a "working *group at the end of November 2016 on the developments of Caparéseau*", in order to allow producers to express their requests in connection with the provision of information in the tool. Since many of them have been *"taken into consideration by the system operators"*, the association indicated that it is *"very satisfied"* with these first works.

3.5 Optimising the connection of the networks to preserve the future

3.5.1 The close intertwining between geographic levels and the various forms of energy call for considering energy networks as a whole

Energy networks are subject to complex intertwining, whether technical and physical, regulatory and legal, economic, or political, at geographical scales ranging from the intermunicipality to the European Union. The energy policy objectives of the Member States, for which a framework and an organisation are given by the European directives and regulations, are subject to regional variations, in particular through the regional climate, air and energy schemes (SRCAE).

In such a context, all the public players met by the study committee, with which CRE associates itself, believed it essential to consider the different geographic scales of the energy networks in a consistent manner. On a more horizontal level, the complementarity of the different forms of energy, being itself the subject of objectives now enshrined in the law, needs to be reinforced and designed in a consistent manner.

3.5.2 The development of information technology will improve the connection of energy networks

Before the development of information technology, it was much more difficult to bring these aspirations into effect and to demonstrate, by practice, that these objectives were actually pursued. The provision of access to data now makes it possible to improve observability for all the energy system players, public entities responsible for energy policies, network and infrastructure operators, market players and companies wishing to develop energy-related services. This, both through the "private" provision to players of more precise data relating to their respective activities, and the open availability of data to the general public, in order to foster innovation.

This increased provision of access will also enable:

- regulated operators of networks and infrastructures to perform a *more precise sizing of their investments*, for the benefit of the community. The gradual instrumentation of the structures of electricity and natural gas system operators has already contributed to calculate as precisely as possible the size of the new equipment or the maintenance to be performed on those already deployed. The widespread development of smart metering systems will give system operators a full knowledge of the energy flows or transits on the low-pressure or low-voltage networks that they operate, on which they have almost no data before these deployments;

- to encourage energy producers and consumers to *make the best use of their systems* and to achieve energy and bill savings. For example, with a detailed knowledge of their production and their consumption, the self-producers of electricity will be able to make a better assessment of the economic optimum concerning them, will be able to maximise the self-consumed production and thereby generate cost, supply and transmission savings;
- local authorities to carry out a *better territorial energy planning* and to establish consistent and precise public policies in this respect. The enrichment of concession activity reports with more precise data (see paragraph 1.3.1) contributes to this same objective.

3.5.3 The risk of "energy *communitarianism*" should be taken into consideration

The generalisation of information technology, access to data, and decentralised production, can generate *major risks* for the necessary solidarity among network users with respect to the expenditure and investments made by regulated operators for the community. Indeed, the principle of individual (a user provides himself for his own needs and injects a possible surplus into the public networks) or collective (several electricity producers and consumers located in proximity to each other associate for all or part of the production to be allocated to these consumers) self-consumption could become widespread, in particular with the emergence of technology which now enables a precise monitoring of production and consumption, or even authenticated transactions between users (the objective of blockchain technologies for example).

In such a case, the public networks would be considered as a back-up by these users if their needs are not met by the local production. They would then be deserted by all the users who can afford to co-finance this local production – an article[115] of the Boston Consulting Group introduced the concept of "*zombie grids*" –, letting the others bear the funding of the public networks deployed until then. The stranded costs of investment and operation on these networks could become so high that the tariffs for use of the public networks and infrastructures would no longer be sustainable for their users, who will be fewer.

Hence, beyond the strong social eviction effects that such a decentralisation of energy production and consumption can thereby produce, the role of public entities, and especially CRE, is to assure all the stakeholders that the complex connection between energy networks is effected *for the benefit of the community*, without countering individual initiatives, but by taking into account the objectives laid down by the law and regulations.

6

CRE considers that the emergence of information technology constitutes an unparalleled opportunity to better connect energy networks for the benefit of the community. It wishes to give consideration to identify the best and most sustainable regulatory balance, with all public and private stakeholders, to:

- *encourage the use of data and innovation, to help manage energy demands, calculate the size of public networks more precisely and to deliver better territorial energy planning;*
- *safeguard mutually beneficial arrangements between territories that are currently guaranteed by pooling funding for energy infrastructure facilities undertaken using network tariffs.*

3.6 What role for public distribution system operators?

3.6.1 The role of system operators in terms of data, as provided for by law, is difficult to understand for the producer and the consumer

With the legislative and regulatory evolutions, followed by additional services defined by CRE in the area of data provision, the role of regulated energy operators and especially system operators, has changed considerably. At the heart of energy markets, in particular retail markets, public distribution system operators have ever more powers, for the benefit of the end consumer, while allowing competitive services to develop based on the data that they make available.

Enedis views its role as that of a "*data operator, at the service of market functioning and for the energy transition*". In its address to the territoires, it wished to "*stimulate or participate in territorial smart city projects, in particular* via *urban platforms*". With respect to end customers, its ambition is to "*provide data for the end cus-*

[115] *How to avoid « zombie » grids in the age of solar power*, Boston Consulting Group, April 2016 (available on the website of BCG Perspectives).

tomers and stimulate innovation, facilitate the integration of producers [of renewable energy] *and accompany self-consumption*". Figure 16, below, shows the position of the public electricity distribution system operator at the heart of the electrical system, between the provision of access to data for the competitive sector (thereby fostering the emergence of new services) and the public service missions.

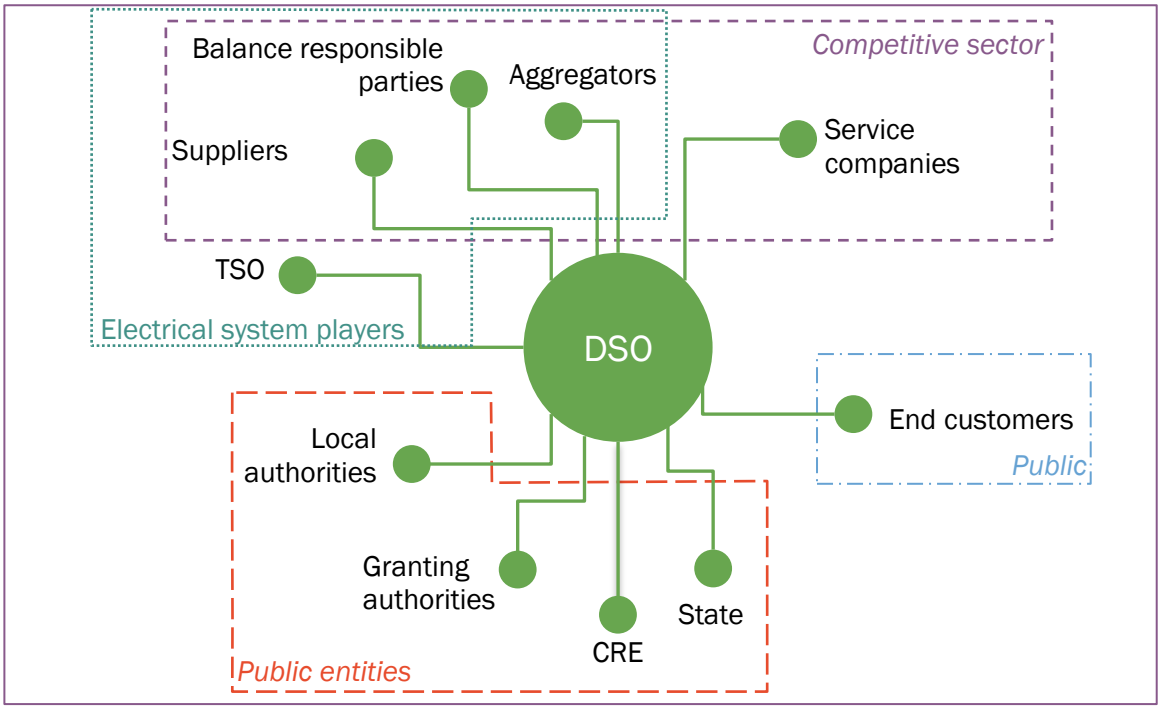


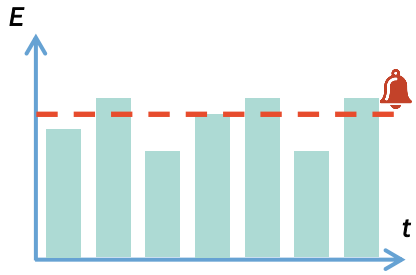
Figure 16 – The distribution system operator at the heart of electricity markets (*source: CRE*)

As for GRDF, it wished to "*encourage the use of data (mainly on consumption) to allow for more energy efficiency and a better demand side management (DSM)*[116]". It also considered it essential to "*contribute to confidence in the data and their dissemination*".

Many interlocutors of the study committee revealed that the distinction between the missions of distribution system operators and the role of energy suppliers is difficult to grasp for consumers, including in data matters. This is due especially to the particularity of the single contract concluded between the energy supplier and the end customer: within this framework, the supplier's mission is to centralise all the consumer requests, including when they are ultimately within the remit of the public distribution system operator. Similarly, the supplier bills the customer for the costs of energy supply, but also for those of transmission and the various taxes and contributions applicable. Some of them, such as the ENI supplier, called for "*vigilance of the regulator and the regulatory authority concerning each other's missions, and for their respective missions to be clarified*". Engie went further by arguing that, under the single contract, the latter "*is the entry point of the customer for any request concerning energy*". This supplier advocated the following division of roles: the "*technical aspects on the meters and the data aggregated in open data should be within the remit of the system operator*", whereas the "*offers and uses of the data, as well as the information on detailed consumption, are in the realm of the supplier*". According to the public distribution system operators, this proposal is however unfounded: according to the law and regulations, they must also make available detailed consumption data (not valued in euros), which is set out in their respective catalogues of additional services.

[116] Demand side management consists, for a consumer, in implementing actions aiming to reduce or modulate his consumption (thermal insulation, more efficient heating equipment, use of thermostats, *etc.*).

The example of warning devices for when the threshold is exceeded



Article 28 of the LTECV provides that, in the context of the deployment of smart metering systems for natural gas and electricity, DSOs for electricity and natural gas must make *"available to consumers their metering data, warning systems related to their consumption level, as well as comparative data derived from statistical average"*.

Hence, DSOs are asked to offer consumers a warning system, whose thresholds will be determined by the consumer without the supplier having knowledge of them. Yet, the customer will be able to turn to the supplier in case of a question on these warnings. In this regard, Engie suggested in its contribution to *"allow the supplier to obtain within the same time-frame the warnings transmitted to the customer, or the means of accessing the information as soon as a warning has been issued"*.

This article hence contributes to make ***the boundary between the missions of distribution system operators and those of suppliers approximate.*** This complementary information is considered by CRE as information that is not essential to the exercise of system operators' missions. As such, they should be proposed in the context of competitive activities, by the suppliers or by third party players.

Likewise, the data related to climatic conditions (weather data) used by GRDF for the billing of its customers[117] and made available on the private online space of the users it serves, could be the subject of services in the competitive sector.

In its contribution, SIPPEREC indicated that it is *"concerned in particular about the use by operators of data derived from a regulated data market* [...] *for uses which are themselves open to competition"*. The secular family associations (*Associations familiales laïques* – AFL) of Paris, met within the framework of the study committee, insisted, as well, for *"the essential to be on the personal space of consumers"* proposed by the system operators, whereas the *"suppliers seem to be best placed to offer personalized, or even leisure, services"*, adding that *"third party companies specialising, for example, in the home automation area, will also be able to offer services that are more sophisticated or adapted to these specific populations (elderly or disabled persons,* etc.*)"*. In the same line of though, the Oracle company indicated that *"it is critical that the data and services be rapidly made publicly available (load curve) so that suppliers can develop their offers and services.* [...] *The suppliers obey the law of the market and will make all the investments necessary for the development of their activity"*.

The boundary issue is more delicate when ***network operation data*** are involved. Direct Energy argued that, within the framework of the single contract, the *"energy supplier is the privileged interlocutor of the customer, including with regard to his access to the network"*, and wished to be able to offer its customers potential power cut and load-shedding warning services, requiring this information to be obtained from the public distribution system operators. The latter, considering that it is the heart of their business, did not wish to respond to the supplier's request.

7

CRE acknowledges the new missions that the law and regulations bestow on public distribution system operators in terms of data provision-related activities. CRE reiterates that these must continue to play the role of neutral operators in relation to electricity and natural gas markets.

Within its remit, CRE will ensure that it specifies the extent of attributes of system operators in relation to the competitive sector players, especially by defining additional services on data provision and their scope of action.

3.6.2 The role of system operators should be differentiated according to whether the provision of access to energy data concerns aggregated or individual data

The latest legislative evolutions have imposed on the public distribution system operators new data provision obligations, which concern essentially data aggregated at various geographical and temporal scales (see paragraph 1.3.2). These aggregated data are mainly intended for public entities and for the public. The collection of

[117] A natural gas system operator uses information on pressure and temperature actually observed in order to convert a consumed volume into a quantity of energy to be billed.

these data, their processing in view of their aggregation and their provision is within the full scope of their public service mission (see paragraph 3.6.2.1).

Furthermore, public distribution system operators are required to make available to the consumers and authorised third parties the individual consumption data relating to them (not valued in euros), within a secure online space, pursuant to the decree no. 2017-948 of 10 May 2017. This secure space coexists with that of energy suppliers, themselves required to provide the consumers and authorised third parties with some data in application of the decree no. 2017-976 of 10 May 2017. The links between the respective roles of system operators and energy suppliers have vocation to be redefined, particularly with regard to the provision of individual data (see paragraph 3.6.2.2).

3.6.2.1 The aggregated energy data provided to the granting authorities, the local authorities and the public are at the heart of the public service mission of system operators

The territorial energy planning related missions assigned to the granting authorities and local authorities have considerably increased in the course of the last decade. They require relying on the data made available by the public distribution system operators to which they grant the operation of their networks. The advance established by Article 179 of the LTECV constitutes, as emphasised above, an essential step in the pursuit of these objective.

The evolution introduced by the decree no. 2016-972 *relating to the confidentiality of the information held by gas operators and public electricity transmission and distribution system operators*[118] and consisting in eliminating any sanction in the event of dissemination by the regulated energy operators of annual data previously considered as CSI is also viewed as a progress: AMORCE noted that, "*local authorities need to know in particular the consumption levels of the main consumers which are often manufacturers. Developing a PCAET without taking them into account would be pointless*".

During the work of the study committee, most of them insisted on the necessity to have reliable and comprehensive information, despite the difficulties encountered by some of their concessionaires with some data (for example, SIPPEREC reported "*difficulties since several years in obtaining data relating to concessions, not only from system operators, but also from the supplier at regulated retail tariffs*").

A general consensus seems established regarding this provision of aggregated data by the network operators, as part of their public service missions. However, a last sticking point seems to remain concerning, in particular, the data collected at a very fine grain level, which the local authorities deemed essential for the success of their missions, whereas the system operators considered that they cannot communicate them in order to respect the secrets protected by law.

With regard to the necessity to protect industrial and commercial secrets, SIPPEREC insisted on the necessary distinction to be made between the data that can be transmitted to the general public and those that can be transmitted to energy distribution organizing authorities. SIPPEREC considered that the granting authorities are legitimate to access a higher information level given their control over the concessionaires.

As regards the protection of personal data, DGEC pointed out during its hearing before the study committee that, if local authorities pursue legitimate objectives of implementing fuel poverty policies, the latter do not justify sacrificing the principle of personal data protection.

GRDF summarised as follows the progress made by the last legislative and regulatory evolutions, as well as the efforts to come:

"*The local authorities have a wide diversity of competencies, which translates into a wide diversity in their expectations regarding data:*

1. *Territorial planning and energy planning competencies, which require general data at the level of the municipality or IRIS unit. These territories enable the cross-referencing of multiple data available at these scales, where the level of aggregation ensures, overall, the anonymity of the data disseminated (even if vigilance must remain in the preservation of personal data, in particular with respect to the risks of reconstruction).*

[118] The full text of this decree is available on the website Legifrance.gouv.fr.

2. *Building renovation competencies, which require data at the level of the concerned buildings, translated into mailing addresses in our databases. We* [...] *consider that it is imperative to have a precise feedback on the quality of the data disseminated, the associated respect of confidentiality and the contribution of knowledge of these data in the prioritisation of investments or in the measurement of renovation work results.*
3. *Competencies in social affairs, especially in the accompaniment of fuel poverty. These competencies require an individual vision of the consumption data and require securing customer consent, which is currently a significant issue*".

According to GRDF, the LTECV has "*fully met the local authorities' expectations on the first two subjects"*, although one should *"remain vigilant on the dissemination of data at the building scale for reasons of quality and confidentiality*". The consultation held to establish implementing statutory texts of its Article 179 *"also marks the recognition of shared work to be continued to improve the quality of these data and to move forward on how they can be efficiently used*".

On the other hand, as regards public entities' competencies "*in social affairs"* (point 3), the processing of the consent by either of the parties, which was referred to a forthcoming discussion around a specific decree, was the subject of a "*heated debate"*. This decree will have to define the procedures for securing consent in order to satisfy "*on the one hand, the local authorities; on the other hand, CNIL and consumer associations"*. On this subject, GRDF said that it is "*alert to the fact of not being responsible for securing the consumer's consent for a use of these data by the local authorities*". Beyond the cost of this activity, which could "*prove to be very expensive"*, it indicated that "*all the players recognized"*, during the consultation, that securing this consent "*is the responsibility of the user of the data, and not that of the entity in charge of their collection"*.

Finally, GRDF raised the issue of the complementarity of the roles of public distribution system operators and local authorities regarding the external dissemination of these data. It recalled that the "*most advanced local authorities in energy planning wish to be actors in the dissemination of available data, be they anonymous data, data disseminated in open data or sensitive data, transmitted to identified and authorized recipients". "Some of them consider implementing territorial energy data platforms and consider that they could or should have a monopoly in disseminating these data on their territory*", whereas the system operator "*does not wish to be reduced to a simple role of service provider".* This issue of complementarity is one of the ferments of the reflection related to the possible governance models for data provision, described in paragraph 3.7.

3.6.2.2 The individual data of the users made available by system operators should be subject to enrichment as part of competitive services

The effect of the decrees no. 2017-948 and 2017-976 of 10 May 2017 is that the provision of data to end consumers is both the responsibility of system operators and that of energy suppliers.

These two decrees provide for consumers equipped with a smart meter the creation of a secure space allowing them to access selected data (monthly indices, monthly or annual consumption, invoice, load curve, maximum power daily extracted, *etc.*) and some functionalities (data recovery, interruption of their collection, management of the list of authorized third parties).

There can be questions about the appropriateness and necessity of establishing a double portal, which adds to the complexity of the customer paths and multiplies the costs concerning the data and functionalities which widely overlap.

The existence of a secure space on the website of the system operator seems however necessary, at least to centralise the list of third parties for which the consumer consented to the transmission of his data. In this respect, in its deliberation of 23 March 2017 *providing an opinion on the draft decree relating to the terms of access by consumers to electricity or natural gas consumption data and to the provision of these data by the suppliers*[119], CRE was opposed to the introduction of functionalities relating to authorized third parties in the secure space of the supplier. These provisions would have enabled the suppliers to know the list of third parties that have received from their customer an authorisation to access their data, and which are likely to offer consumption monitoring and demand management services equivalent to those offered by the supplier.

[119] The full text of this deliberation is available on the CRE's website.

However, the provision of access to raw consumption data such as those proposed on the website of the system operator, is not, for the time being, an essential issue for the producer or for the consumer, in the almost unanimous opinion of the players met in the framework of the study committee. According to the statistics of Enedis of January 2017, only 0.6 % of the domestic consumers at whose premises the *Linky* smart meter has been deployed requested that the load curve be made available to them on their online customer space. This does not prove the uselessness of this provision of access, but that, at this stage, the appetence of consumers for this type of data is limited to the sole experts or precursors.

First of all, these data are both considered as difficult to understand and as having no particular interest except to reduce their bill or serve as a basis for energy savings related, for example, to the renovation of buildings. Atos rightly stated, in its contribution, that the "*consumer does not need to appropriate technology, but new usages. It is up to the manufacturers* [...] *to manage the technological complexity in order to offer consumers new services based on connected objects that are easy to integrate into the home*".

The main enrichment of the data produced should be carried out in the competitive field of energy suppliers, service providers, aggregators, *etc*. (see Figure 16). In general, the energy suppliers interviewed by the study committee indicated that they wished to rely on the data generated by smart metering systems. These data provide the basis for a future commercial differentiation and will enable them to propose new tariff offers. Furthermore, the aim for most of them will be to cross-reference the data in order to offer new services, based as much as possible, and at least when this is relevant, on real-time access.

Indeed, most energy suppliers noted that their business could not simply remain that of a "*simple energy supplier*", but needed to evolve towards an enhanced accompaniment of their customers, that can take various forms, as part of a "*more global*" relationship (Engie). According to the cases, the suppliers are forming partnerships inside or outside the group to which they belong to establish a commercial strategy going beyond the simple sale of energy (remote heating control, personalized consumption monitoring, individual advice, *etc.*). Capgemini specified on this subject that, in the light of its experiences, energy consumers are not ready to "*subscribe to a service on the basis of a lower consumption promise, but on the basis of third-party services (home temperature regulation, challenges on consumption flexibility, electric vehicle charging control, etc.) that can be provided to them*".

Furthermore, as shown in paragraph 2.4, many other companies, distinct from energy suppliers, have also begun to offer new energy-related services based on the use the data of public distribution system operators. In the same way as energy suppliers, so that such companies can stand out on high value-added services related to energy, it is often essential for them that the public distribution system operator can directly make all the customer's data available to them in a simple, comprehensive and efficient manner, in particular *via* APIs (procedures especially supported by the DGCCRF and which have been requested in the decree setting down the procedures for open data publication of detailed production and consumption data). According to the purposes of these third-party companies, it is also up to them to define their needs in terms of data, in relation to their commercial objectives and their technical constraints.

Finally, this does not rule out the enrichment of the data by the system operators themselves. Enedis specified that, "*having invested on electricity distribution data and the related intelligence*", it intends to "*propose for this purpose value-added services, and not only issue baseline data*". GRDF seemed to have more reservations on the subject, but pointed out that it is already solicited to that effect: "*beyond the simple provision of access to data, some players are already asking us to deepen the analysis of historical consumption patterns, to go further in the identification of standard deviations, averages, consumption of buildings without the businesses on the ground floor. These analyses will raise the question of the limit of the role of the distributor and its competitive role. On this subject as well, it seems relevant to wait for the first requests, to experiment and then exchange with the concerned players based on these feedbacks*".

CRE emphasizes that the implementation of such service offers will indeed have to rely on ***the same data as those accessible to energy suppliers and service providers***, within a legal framework that enables them to ***distinguish such activities from those related to their public service missions***. This is the framework within which RTE seems to take its place, pointing out that "*in the competitive domain, services based on the use of the electrical system's data will be developed, should the need arise, via the subsidiaries of the RTE group. Furthermore, these services will be developed based on databases accessible to all*".

GRTgaz, for its part, indicated that it "*has no desire to diversify its activity towards energy optimisation for example by using the data*".

8 *CRE recommends that when a regulated energy operator seeks to propose comparable services to those marketed by competitive sector players, they will use the same data as that already ac-*

cessible or to be provided to energy and service suppliers. This activity must be delivered in a legal framework that enables it to be differentiated from those applying to its public service missions.

3.6.3 The role of system operators in the specific context of non-interconnected areas

The insular character some non-interconnected areas, their geographical constraints, the relative weakness of their port and road infrastructures, in particular, imposes for these areas having recourse to different technological solutions from those developed in mainland France. At the origin of significant electricity production cost overruns, they are financed by the contribution to the public electricity service (*contribution au service public de l'électricité* – CSPE). An increased use of consumption and production data, at a fine time step, helps to better account for DSM actions implemented and, hence, to promote savings of CSPE whose relevance is assessed by CRE.

Furthermore, the missions of system operators on these territories are not the same as in mainland France. They can hence be owners of production systems, which are in competition with those held by private operators, while also being responsible for marketing the regulated retail tariffs. They must hence guarantee the provision of production and consumption data which enables electricity producers to contribute to the proper functioning of insular energy systems at the lowest possible costs. This provision of access will also enable players to propose flexibility to the system operator, in particular *via* storage assets, in areas where this is the most relevant in view of the constraints observed on these networks (see CRE's recommendation "R. 2016-07" on smart grids, presented in paragraph 1.4.2).

9

CRE considers that a system providing relevant consumption and production data will contribute to better managing energy demands in non-interconnected areas, which constitutes a particularly pressing problem in these areas.

In addition, it considers that, given their specific role in non-interconnected areas where they are both electricity suppliers and producers, system operators must play a key role in the provision of consumption and production data by differentiating these obligations for each of their missions.

As part of their public service missions, they must also ensure they supply all the data that the competitive sector requires, to foster the emergence of innovative services based on their use in these areas.

3.7 For a consistent, efficient and multi-fluid approach to managing the energy data of regulated operators

3.7.1 Energy data interest many players and their dissemination requires to be organised

All the work of the study committee showed the complexity of energy data provision and the fact that these data could be used in the pursuit of many objectives, according to the players concerned (see Chapter 2). Many arguments may raise questions on the necessity for disseminating energy data to all their recipients, whether it is an open or private access according to the cases, to be organised in a consistent and efficient manner.

First of all, with regard to public entities, it is clear that the municipalities or small-sized inter-municipalities will not be able to gain the knowledge and technical skills required for the use of energy data, as necessary as it is for exercising some of their competencies.

Moreover, these data come from multiple players and concern several types of energy. To establish consistent energy policies, it is therefore also necessary to carry out an in-depth work, by combining various information sources.

If no initiative to organize the provision of access to the data emerges, the local authorities that have the resources and the competencies to achieve their ambitions in terms of energy policy will be able to develop innovative projects, whereas other regions will not, thereby generating a lack of equity between their respective inhabitants.

In addition, *without the emergence of an organised and consistent initiative*, the energy data could run the risk of being "cannibalized" by a private player, whose size could enable it to establish a *de facto* monopoly, on the basis of data collected and produced by operators entrusted with public service missions.

3.7.2 The provision of access to data financed by the network tariffs must not lead to resale of these data in their current form by third parties

The arrangements for financing the provision of access to the data collected and processed by regulated operators are at the heart of the missions that the law and regulations conferred on CRE, which has in particular the exclusive competency of establishing the tariffs for use of the public electricity and natural gas networks, and the pricing of additional services performed exclusively by the operators of these networks.

As such, CRE establishes the principle that the financing of the expenditure and investments that regulated operators must make, as neutral market players, for the proper functioning of the markets or for objectives related to their public service missions, should be shared, and hence rely on a collective contribution. It can also decide that *ad hoc* requests for the provision of data considered as being in the sole interest of their requester and generating a specific work of the operators may be billed on a fee-for-service basis.

In any event, the provision of data financed by the local authority must not lead to their resale by third parties. This applies first of all to public entities: VI of Article D. 111-55 of the French Energy Code now authorises them, "*under their responsibility*", to "*delegate the collection, processing, control and dissemination of these data to third parties, in particular those performing general interest missions on the knowledge and development of public policies contributing to the energy transition. These public entities can also ask the system operators for this information to be directly provided to these delegates*".

Furthermore, the massive use of data by some large non-European players of the digital world, thanks to considerable financial and technical resources, can rightly raise concerns among the players of the French energy sector. According to all the contributors to the study committee who expressed their views on this issue, pending a more advanced deployment of smart metering systems, these players have so far not been able or have not wished to substantially develop services based on energy data. Nonetheless, CRE draws attention to the risk of emergence of a private *de facto* monopoly, which would be able to pre-empt these data and then market their use.

3.7.3 Many governance models exist

In the next paragraphs, following its many interviews where the governance issue was discussed many times and drawing upon European examples (see paragraph 1.5), the study committee wished to present a few possible models for organising the provision of access to data, which could be the subject of "*an energy data public service*", under certain conditions. The organisation principles underlying these various models, as well as their advantages and disadvantages, in all respects, are presented.

3.7.3.1 A model where public distribution system operators ensure the provision of access to data by form of energy

As of now, Enedis considers that, by virtue of its public service missions, it must assume a role of *"data and big data operator"* and, as such, collect, store and process the data it operates, but also protect them according to the current regulations and implement the IT infrastructures, to provide each of the potential users of these data with an open or private access, according to the cases. As illustrated in the first part of this document, Enedis already provides access to many data, be they open data for the general public or data for the various energy stakeholders.

As an operator of public natural gas distribution networks "*almost at the scale of the French territory*", GRDF also considered that, "*in view of* [its] *public service missions, in particular that of consumption data management*" and because of its new regulatory obligations, it must "*take its place as a partner of the ecosystem*". It did not explicitly state its support for the model described above, but proposed, as a first step, to "*continue the consultative approach with other data users, by integrating the new players, to clearly understand their expectations, at national and local level, and ensure that the service* [provided] *is efficient*".

Figure 17, below, presents in a simplified manner such a model, which is already in use in several countries of the European Union for electricity metering data (Austria, Belgium, Spain, Hungary, Italy, Portugal, Sweden) though there may be differences in some of the specifics. In this model, public electricity and natural gas distribution system operators ensure the provision of access to information relating to them, but also bring together that of other players of their sector. They implement specific APIs to automate the recovery of data from the third parties, as well as consultation portals for each of the categories of recipients entitled to have access to these data.

In the French context, according to the respective desires of operators, this scheme could be replicated to each form of energy, so that each of them can propose to the data recipients a consistent vision of the processes and markets concerning it.

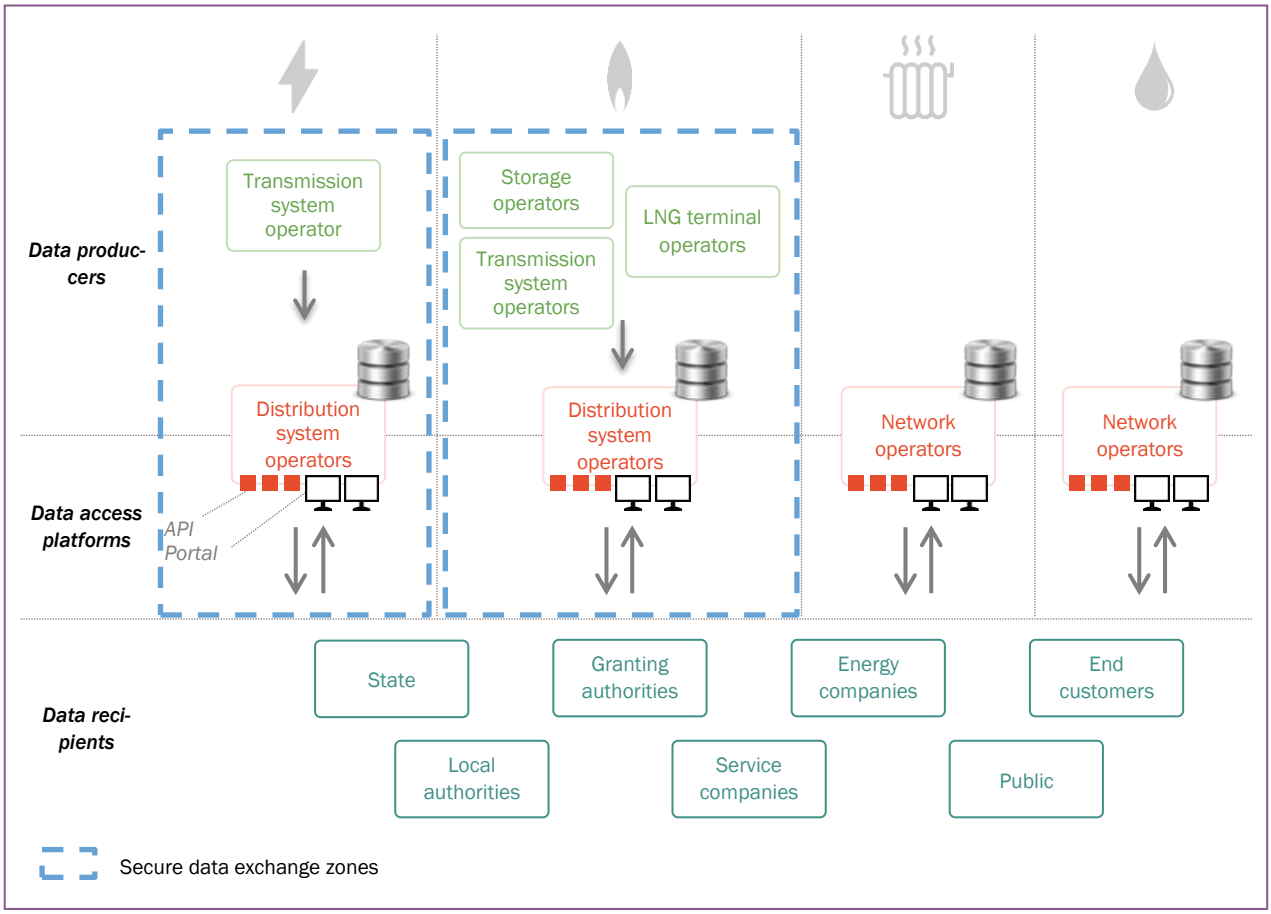


Figure 17 – Model of data dissemination to the players, where distribution system operators ensure the data collection and provision (*source: CRE*)

The table below identifies the advantages and disadvantages of this type of organisation proposal that CRE perceives:

Advantages	Disadvantages
• Such a model ensures the consistency of the data produced for each form of energy. • In view of the proximity of the players, accustomed to collaborating, this model can be considered as simpler to implement than others. • The deployment of smart metering systems by form of energy could make this model relevant. • It will probably be easier to establish a standard for data exchanged for each form of energy, while respecting its specificities.	• The many recipients, whose interest may be to combine information on the various forms of energy (which concerns, in particular, local authorities and competitive sector players) will each have to use several data platforms. • There is a risk of heterogeneity of the data produced due to the fact that there are several platforms and several data producers (in nature, in quality, in production frequency). • Such a configuration does not resolve the difficulties that the small local authorities will encounter in using the data coming from several sources. • The distribution system operators will not have, by themselves, the consumption and production data of the transmission network users nor market data or supply/demand balance data, bearing interest and value for market players.

Table 6 – Advantages and disadvantages of a data management model where distribution system operators ensure the data collection and provision

3.7.3.2 A model where the data provision is ensured by transmission system operators

Figure 18, below, presents a data provision scheme whereby electricity and natural gas transmission network operators are the key players of the data provision to all the stakeholders.

Some Nordic countries (Norway, Denmark, Finland) have begun to roll out this model, *applied to electricity*, following the publication of legislative texts. These texts required the transmission system operators to endorse this role and to set up a real data hub (platform), which is now used by most retail market processes.

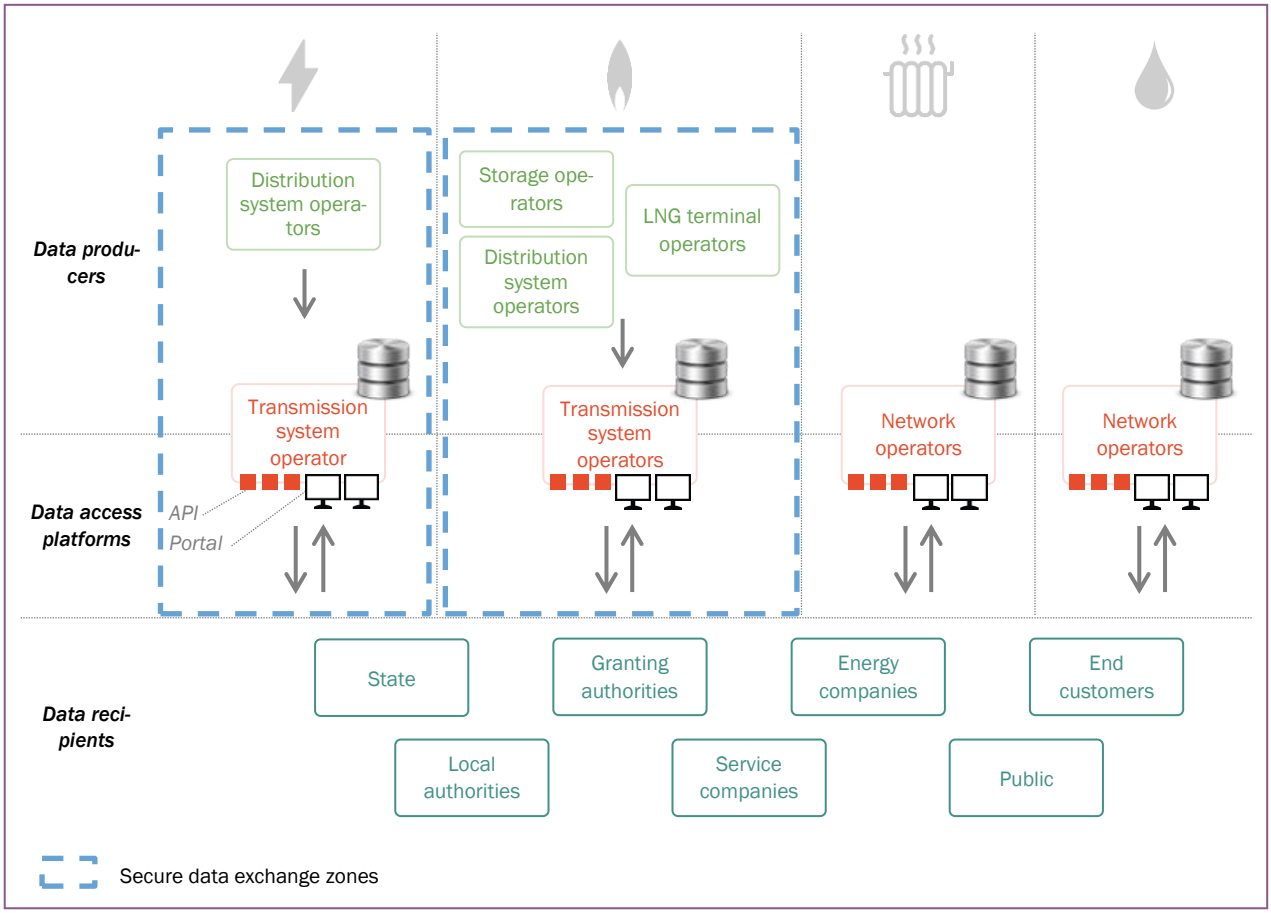


Figure 18 – Model of data dissemination to players, where transmission system operators ensure the data collection and provision (*source: CRE*)

The table below identifies the advantages and disadvantage of this type of organisation proposal that CRE perceives, similar to those of the preceding table:

Advantages	Disadvantages
• Such a model ensures the consistency of the data produced for each form of energy. • In view of the proximity of the players, accustomed to collaborating, this model can be considered as simpler to implement than others. • The deployment of smart metering systems by form of energy could make this model relevant. • It will probably be easier to establish a standard for data exchanged for each form of energy, while respecting its specificities.	• The many recipients, whose interest may be to combine information on the various forms of energy (which concerns, in particular, local authorities and competitive sector players), will each have to use several data platforms. • There is a risk of heterogeneity of the data produced resulting from the fact that there are several platforms and several data producers (in nature, in quality, in production frequency). • Such a configuration does not resolve the difficulties that small local authorities will encounter in using the data coming from several sources. • The transmission system operators do not have, by themselves, the consumption and production data of the users of the medium and low voltage/pressure networks, which fall however into categories whose use carries the most interest and value. • The example of Scandinavian countries shows that it is essential that a law explicitly gives the mandate to implement such platforms.

Table 7 – Advantages and disadvantages of a data management model where transmission system operators ensure the data collection and provision

In its contribution, RTE indicated that it intends to *"use the technological innovations in the digital area"* in particular to "*promote the decompartmentalisation of the data of the electrical system at the service of the community*". *"It is important for RTE to anticipate the arrival of the future public data service and to accompany the energy transition players by reinforcing in particular its expertise and its educational efforts*", by proposing both an *"access to data in an open format easily reusable to allow for the emergence of new players, offers and energy services"* and "*put this reinforced expertise at the service of all the stakeholders"*. Whereas it mentioned a "*future public data service"*, it does not intend however to play a central role in the governance of this service.

For its part, GRTgaz assured, for the sector related to natural gas transmission, having "*already organised itself with adjacent operators"*, such as Storengy, Elengy, Fosmax LNG and Dunkerque LNG, in order to publish the consolidated data in *Smart-GRTgaz*. It also noted, that "*alongside this first level response and so that the local authorities can go further in the use of the information provided by operators, they need to implement a collaborative work to explore and define their needs and develop the most efficient system to meet them"*. CRE welcomes these collaborative approaches and encourages operators to coordinate their efforts as part of common objectives and processes.

3.7.3.3 A model where the data provision is ensured by local authorities

For a "*better territorial equity*", SIPPEREC would like local authorities to "*act as the lead contractor with a multi-fluid vision to ensure an overall consistency of the territory"*. FNCCR hence considered that the "*local authorities must remain involved in the governance, which must remain local, anchored in these territories*". However, insofar as they will not all, by themselves, have the necessary "*means or competencies*", the association proposed the implementation of a "*national data service with a shared platform, to provide local authorities with a basic service, which would in particular make it possible to qualify the reliability and the comprehensive nature of the data provided"*. In such conditions, it added that the local authorities could "*then supplement this with the implementation of local complementary data services, in relation to the territorial energy policy"*.

In the same vein, FNCCR called for "*local public service missions for data, the structuring of data players at local level and the setting up of a national network of computer pooling structures*". The latter would require the creation of a "*local public data service under the governance of local (municipal, departmental and regional) elected officials managed by an organizing body and trusted third-party with respect to the general public, accountable for the security and confidentiality of the raw data*". Remaining within the "*scope of action of the local authorities and public governance*", this service could in the longer term "be *expanded to tourism, healthcare, administration data, etc.*".

Figure 19, below, illustrates such a scheme, whereby the local authority ensures, at its scale, the coordination of energy data provision, possibly extended to heating and water networks. This scheme can be naturally envisaged at the level of an intermunicipality, a department or, more likely, a region, and, as FNCCR highlighted in its contribution, share the technical infrastructures. This would lead to cost sharing and a steering of the responsibility for the platform at the scale of all the local authorities that could use it, but would enable each of them to personalise its use, according to its needs and usages.

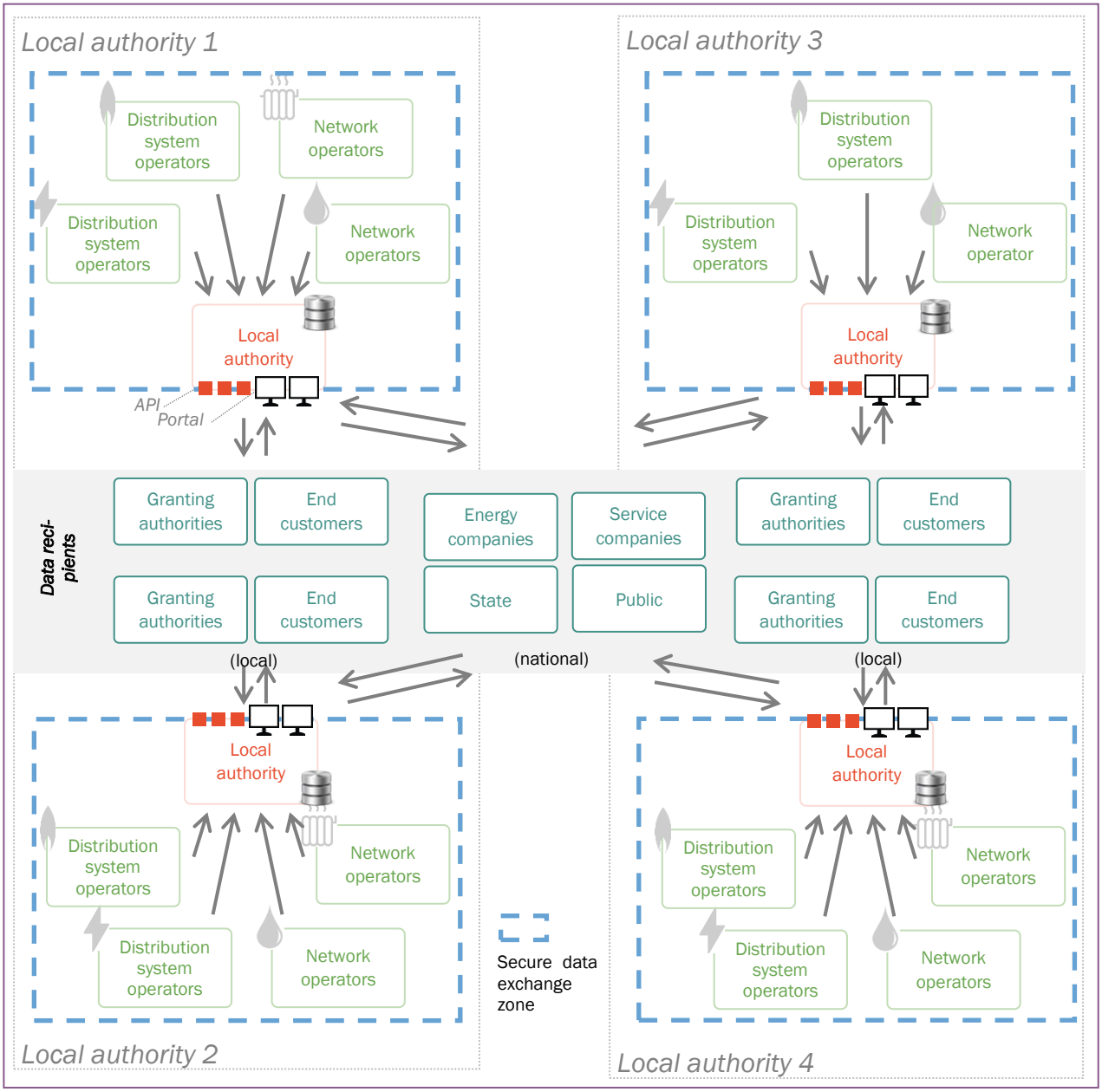


Figure 19 – Model of data dissemination to the players, where local authorities ensure the data collection and provision *(source: CRE)*

The table below identifies the advantages and disadvantages of this type of organisation proposal that the CRE perceives:

Advantages	Disadvantages
• It is possible to share the technical infrastructure of the platforms between local authorities. • The data produced on the scale of the territory will be more naturally consistent. • The territorial players have a strong proximity, hence facilitating coordination. • By the model's design, the data provision is multi-energy. • It is possible to extend the provision of access to other local players outside energy (for example, a public transport region).	• It may be difficult to identify arrangements for financing such platforms, which could require the creation of a tax resource. • The implementation costs considered at national level may not be optimal (in case of non-sharing). • A data cross-referencing work will have to be carried out to aggregate data on several territories. • According to the degree of commitment of the local authorities in favour of such an initiative and the expertise in data use, inequities could exist between inhabitants of the various local authorities. • There is a risk of heterogeneity of the data produced (in nature, in quality, in production frequency).

Table 8 – Advantages and disadvantages of a data management model where local authorities ensure the data collection and provision

According to a slightly different formula, Orange, which is one of the main initiators of the data platform implemented as part of the *Smile* project (see paragraph 2.2), proposed the creation of semi-public companies (*sociétés d'économie mixte* – SEM) at regional level, in which *"energy trade associations, local authorities, system operators and private players would be represented"*. They could *"ensure the political and social responsibilities of the local authorities on the urbanisation of their territory and its social diversity"* and encourage a *"healthy emulation of the services market through the opening up of these data to the market service"*. This last objective would therefore consist, in other terms, in giving these SEMs the opportunity to offer themselves market services, based on the use of data whose provision by the regulated operators would be largely free of charge. Given that FNCCR was not certain that the data marketing by local authorities will attract commercial interest, it proposed, instead of these SEM, to set up public interest groupings (*groupements d'intérêt public* – GIP) or economic interest groupings (*groupements d'intérêt économique* – GIE) with the various partners of the local authorities.

3.7.3.4 A model where the data provision is ensured by a national "trusted third-party"

Many interlocutors of the study committee were in favour of a governance model relying on a national *"trusted third-party"*, this same terminology being systematically used by all those promoting such a centralised model. This concept of trusted third-party, particularly used both in law, especially tax law, and in computing, consists in defining a reference player, which will be able to perform a number of tasks, with a technical or legal legitimacy which is conferred on it by all the users.

UFC-Que Choisir claimed for example that *"more and more portals are set up, whereas the consumer spends very little time there. It is necessary to reflect on the complexity and the comprehensive nature of the information displayed"*. An entity which would be a trusted third-party creating a common platform open to many usages, that can extend beyond energy, could contribute to this simplification.

Applied to the provision of energy data, this model can be illustrated by the scheme described in Figure 20, below. In this scheme, an entity, whose nature and status would remain to be defined, ensures both the provision of the data to all the stakeholders, and the storage of data that the custodians of the latter, of all kinds, have transmitted to it.

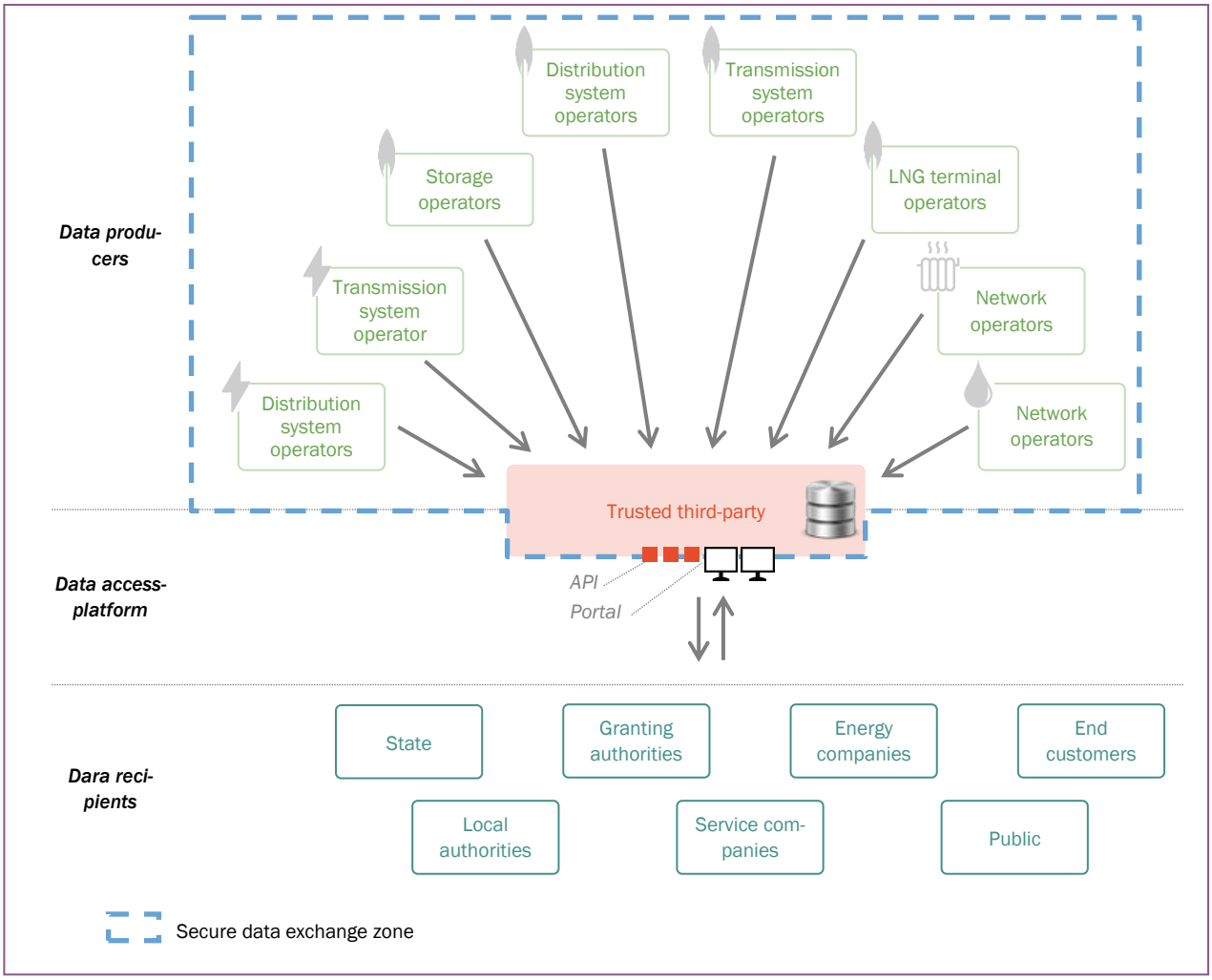


Figure 20 – Model of data dissemination to the players, where a "trusted third-party" ensures the data provision (*source: CRE*)

An alternative and simplified version of this scheme can consist in ensuring that the trusted third-party is only responsible for authentication with respect to those who produce and use the data, and for centralizing services, whereas there is no transfer of ownership of the data to this trusted third-party. The databases would hence remain the property of each of the operators, but would be searched at the request of the central layer, which would store no other data than those necessary for authentication.

The promoters of such a centralised model see it as the opportunity to implement, in a neutral, coordinated and fair manner with respect to all the network users and the citizens, a public energy data provision service. Atos considered that the "*construction of a trusted third-party which is the custodian of the data of distribution system operators, capable of delivering services to all the local authorities, at a low cost, is essential*". The Renewable Energy Association is in favour of implementing a "*standardised system for real-time grouping and sharing of information between all the electrical system players (producers, transmission and distribution system operators, and consumers). A single platform would be able to generate opportunities for a concerted optimization of the flows which would take into account the constraints of all the parties, but also all the scope for action offered by each of them*". AMORCE and France Urbaine suggested that such an organisation, which could be envisaged in the form of an "*economic interest grouping, similar to that of the CB bank cards, which would bring together all the players of the sector*" and "*would free the State from a role that it does not need to assume*".

Whereas many players were in favour of implementing a provision managed by a national trusted third-party, some others had more reservations, or were opposed to such organisations. While wishing for a "*a national solution*" to be proposed in order to ensure a minimum base of services, SIPPEREC considered, for example, "*that it is neither possible, nor desirable to standardise at national level all the data made available*". It justified this by the fact that "*each territory has its specificities in terms of energy resources, density or poverty*" and that "*each local authority has also specificities in terms of competencies and political and public will*". In the opinion of AFL de

Paris, "*it seems that the addition of a platform, which would not extend beyond the sole energy data (for example, recovery of banking, insurance, mobile telephony data) could generate additional costs without the added value being certain*".

The table below identifies the advantages and disadvantages of this type of organisation proposal that CRE perceives:

Advantages	Disadvantages
• The produced data will be more naturally consistent, for each form of energy and at national level. • By the model's design, the data provision is multi-energy, while ensuring a neutrality between the forms of energy. • Such a system maintains equity between the inhabitants of the various regions, by facilitating the use of the data for small local authorities. • It is possible to expand the provision of access to other local players outside energy (for example, a public transport region). • A platform ensuring a centralised provision of access will facilitate the standardisation of the requests and the data provided, and will hence increase the efficiency of these processes.	• It can be difficult to identify arrangements for financing such a platform, if it is not financed by the network tariffs. • It could generate additional costs for the community, with unchanged funding levels. • The introduction of a trusted third-party private operator, could present a risk of "cannibalization" of energy data and create a *de facto* monopoly, based on the data collected and produced by operators with public service missions. • The implementation of a project of this magnitude presents a high inertia. The maintenance and the developments to be made to the platform, once in place, will also require the consent and the work of multiple parties. • It can be difficult to determine the legal structure adapted to such a platform, in particular if it is open to other purposes than energy.

Table 9 – Advantages and disadvantages of a model where a trusted third-party ensures the data provision

3.7.4 CRE recommendations on the governance of energy data provision

The diversity of the opinions collected regarding the governance of energy data provision within the framework of the study committee reflects the importance of this subject for most of the stakeholders with which it was able to discuss.

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CRE considers that the following principles should guide the introduction of a shared platform providing energy data:

1. *The data provision must initially be organised around aggregated energy data. CRE notes that the law and regulation give a precise definition to aggregated energy data that regulated operators must provide to various public and private-sector recipients. In this respect, it has introduced new additional services to the portfolio of regulated operators. It therefore considers that the scope of this data, once defined, constitutes the relevant starting point for an organised provision of data that could subsequently be expanded.*
2. *Aggregating data must include all levels of the network. The added value provided by an organised provision depends on the consistency and comprehensive nature of the data generated. This consistency can be gauged on all forms of energy, but also at all levels of the networks concerned. Aggregated network data must hence include all levels of voltage (for electricity) and all levels of pressure (for natural gas), so that the markets operate properly in the interests of the end user and control of network tariffs.*
3. *A platform must be designed to cover "multi-fluid" data. Operators tasked with generating data mostly deal with a single energy source, but the demand for data, especially aggregated data, generally focuses on simultaneous knowledge of energy consumption and generation of several types of energy and fluids. As such, any plans for a platform must consider "multi-fluids" from the design stage and ultimately cater for types of energy where the regulatory*

regime is different from those of electricity or natural gas.

4. *Creating a platform must meet user needs and must have simple functions. Most stakeholders highlighted that the design and implementation of a platform providing energy data would represent investment and recurring operational costs. The development of this multi-energy platform should be co-funded by the various operators. The extent of this agreed expenditure must be proportionate to the needs expressed by the recipients and consistent with an acceptable level of funding from public network and infrastructure tariffs.*
5. *The platform must be flexible and adaptable. It must gradually meet the various objectives to be achieved, cater for a growing number of data producers over time and, more generally, be sustainable. As such, its design must meet priorities of flexibility and adaptability. This applies to the nature of the data handled, the quantities of data used, and the various parties involved.*
6. *The platform must be compatible with initiatives already underway. The coordinated provision of aggregated energy data, especially for local authorities, is likely to facilitate the delivery of local energy policies under their remit. It would also maintain equity between different regions. However, this platform must be complementary to energy data-related initiatives that some local authorities have already undertaken, and under no circumstances, hinder or replace them.*

In this regard, CRE acknowledges the recent initiative of all the public electricity and natural gas distribution system operators to create a Digital Service Agency (*Agence de services numériques*[120]). Its purpose would be to install tools to facilitate and streamline market functioning, to stimulate innovation and accompany energy transition players in the understanding of the data. In its first assessment, CRE considers that this initiative fits into the framework of the present recommendations.

Towards an agency for digital services shared by system operators?

Electricity and natural gas distribution system operators have recently informed the study committee of a digital service agency project, which is in their view an opportunity to "*pool resources to deliver certain data provision services in a homogeneous and coordinated way*". An association, whose statutes will soon be filed, will subsequently enable other operators to participate in this initiative and hence enhance the functionalities proposed.

The creation of this digital service agency will not entail any transfer of responsibility from operators to this agency, nor lead to the abolition of the data provision that each of them must carry out as part of its public service missions. Its aim will be to propose to energy market players, service providers, public entities, building managers and the general public, an initial centralised base of services, offering in particular the following functionalities:

- provide market players with a single window, designed to simplify the terms of access to the data when they involve the data of several operators;
- pool the expertise tools and the methods of calculation related to certain market processes, which are, in part, already proposed by some distribution system operators and ADEeF;
- create a shared open data platform, which will offer consistency and comprehensiveness of the data published by all the French distribution system operators and the transmission system operators wishing to join the agency. This platform will give all the distribution system operators, including the small-scale DSOs, the technical means to implement the data provision required by the law and regulations;
- implement a referral of requests from third-parties mandated by the end customers, making such requests easier and ensuring the consistency of the results between operators;
- propose electricity and natural gas production and consumption reports, based on aggregated data of system operators.

The CRE's study committee highlights the practical interest of this initiative, at least with regard to the following aspects:

- such an agency will provide all the distribution system operators with IT infrastructures (in particular for publication in open data) and skills, that some of them (the small local DSOs) would not have had the means to implement;
- this project moves in the direction of harmonizing and ensuring consistency of the data produced and

[120] This name is provisional.

made available, which is an essential prerequisite for using the data and revealing their value;

- the single window and the referral of requests from energy system players that the agency proposes make it possible to streamline the provision of access to complex data, which, for example, pertain to several operators.

The study committee considers that it is an interesting first stage for the coordinated provision of access to the data held by regulated operators. Il wishes to point out however that it is vital for electricity and natural gas transmission system operators to have the possibility, if they wish, to take part in this association and to be involved in its governance, which must be capable of evolution. The system operators of non-interconnected areas are also destined to integrate such a mechanism.

In the longer term, CRE's study committee is giving thought to the question whether to extend the functionalities of this platform to the main retail market processes: could this agency, at a later stage, address end consumers and facilitate the automation of commissioning, termination, supplier change, *etc.*? If such objectives are pursued, standardising the format and content of the data exchanged between distribution system operators and energy suppliers will prove essential (see paragraph 3.1.3).

Finally, such an initiative must be fully compatible with the data access platforms already set up at the scale of local authorities. Only in this way can the data of other operators (heating, cooling, water, transport networks, *etc.*) be jointly used by these local authorities, which will considerably increase their interest and useable value.

CRE also notes with interest the joint initiative of RTE and GRTgaz, joined by TIGF, for the provision of access to data, *Open Data Réseaux Énergies* (presented in paragraph 1.3.4.2). At this time, it consists in making available in open data consumption and production data on the transmission networks operated by these companies. It therefore appears likely to meet the stakeholders' expectations. However, the various projects undertaken by all the network and infrastructure operators will have to be complementary in order, on the one hand, to remain cost-effective and, on the other hand, not to become a source of complexity for their users.

3.8 Greater consumer trust to foster innovation

3.8.1 Improving the quality of user consent

The low consumer interest in energy data described in section 3.6.2 is firstly because the figures provided to them are raw. They must be presented to consumers in the form of a service that has commercial value for them, or linked to demand side management actions. Consumer interest subsequently depends on the trust users place on the services offered to them. This trust is based on the clarity and quality in obtaining their consent.

Article 7 of European Regulation of 27 April 2016 (see paragraph 1.2.1.1) introduces constraints designed to protect users when obtaining their consent. It states, among other things, that:

- the controller can *"demonstrate that the data subject has consented to processing of his or her personal data"*;
- the request for consent is *"presented in a form that is clearly distinguishable from other matters"*;
- the data subject *"has the right to withdraw his or her consent at any time"* and that *"it shall be as easy to withdraw as to give consent"*.

Turning, more specifically, to energy data, Decree No. 2017-948 of 10 May 2017 on consumer implementation measures for electricity and gas consumption data, establishes explicit and unequivocal principles for collecting consumption information from the user. It concerns, in particular, the load curve, which requires explicit consent for it to be, *"collected in the electricity transmission system operator's computer system"*.

Enedis is already aware of this issue and has developed IT tools as part of the *Solenn*[121] demonstrator system (introduced in 2012 and launched in 2014) so that consumers may accept their data being collected and used by a third party (see Figure 1). Enedis has since continued efforts to improve the quality of consumer information on their energy data, based on feedback from the demonstrator system and research.

As such, in late 2016, Enedis established a panel of service operators likely to use the consumption data collected by Linky meters. The purpose was to consider new "Green button"-type data sharing mechanisms (see

[121] A description is available on the CRE website, dedicated to Smart grids.

paragraph 2.3). These considerations will result in a trial in 2017 to test its technical feasibility and receive customer appraisals.

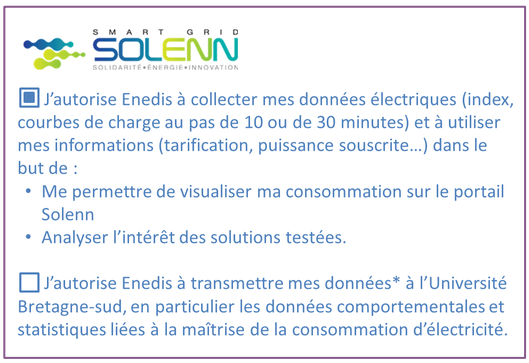

Figure 21 – Example of a screen capture for consent to collect indices and the load curve on the Solenn smart grid demonstrator (source: Enedis)

Figure 22 – Screen capture for consent to share consumption data with a fictitious service operator (source: Enedis)

CRE considers that this type of initiative to inform the consumers what they are authorising their personal data to be used for will gain their trust on this matter. It is even a prerequisite to developing energy data–related services that must not be overlooked.

The national energy ombudsman reiterated to the committee the consumer preoccupations about undue exploitation of their data by third parties claiming to hold authorisations, which might not exist in reality. *"Consumers are regularly mistreated about their consent and the worst offenders are still compromising trust"*, it emphasised.

The aforementioned Decree (No. 2017-948) also requests, in Article D. 341-22 of the French Energy Code, that the end customer's personal space on the public distribution system operator's website *"features a list of all third parties which the public distribution system operator regularly provides their data to, as well as the option to remove the identity of third parties for which they have decided to interrupt the availability of this information, at the request of the consumer."* It subsequently confirms the public distribution system operator's responsibility to show the end customer the data access authorisations they have agreed to. CRE also declared its support for this solution (see recommendation no. 5 of the deliberation by CRE of 8 December 2016 on smartgrids, paragraph 1.4.2).

In this respect, it is vital that public distribution system operators have the necessary legal powers to manage the existence of consents given to the suppliers. However, according to Article L. 142-37 of the French Energy Code, this remit is currently reserved for *"judicial police officers and officials, civil servants and public officials authorised by the Minister in charge of energy referred to in Article L. 142-21 and sworn in conditions defined by a Council of State decree"*, which can be restrictive. In addition, according to Article 34 of the Law on information technology and civil liberties, the public distribution systems operator, tasked with data processing, must ensure that personal data they use is not communicated to unauthorised third parties. For this reason, it therefore appears necessary that they have the means to exercise this control.

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CRE considers that the quality of consent secured from the end customer to use their energy data is not merely and technical or legal matter. It is a vital prerequisite to customer trust with respect to the emergence of new services. In this context, CRE requests that energy and service suppliers, as well as system operators, offer users procedures to obtain this consent that are succinct, comprehensive and easily understandable for informed consent.

Furthermore, distribution system operators are responsible for managing consents which third parties "authorised" by the final consumer use and must have the necessary powers to exercise control over the aforementioned consents.

CRE encourages the Legislator and the regulatory powers to develop texts applicable to this matter. If required, an amendment to statutory provisions of the Energy Code may be necessary to enable distribution system operators to oblige suppliers to justify authorisations they claim to have, and if not, suspend communication of this data.

3.8.2 Promoting a culture of data security and confidentiality

The study by the Institut Français des Relations Internationales (Ifri) mentioned above[88] highlights changes to networks that expose businesses to heightened risks of cyber-attacks.

"Smart grids and meters have the particularity of increasing singularly the number of entry points into a network in which data is exchanged. As far as the meters are all configured in the same way and so may have the same flaws, they increase considerably the available surface for attack. Considered as essential to the creation of smart cities, the development of the "Internet of things", still in its infancy, will also reinforce this trend. The interaction of little protected private electronic devices (cell phones, electrical appliances) with components of the electric grid will make the needs in cyber security policies and expertise even more pressing."

Engie also stressed this point, *"In terms of data transmission, system security must remain a fundamental issue. Pooling energy-related information requires interconnected data exchange systems. The risk of propagating an attack in systems is very real and must, on no account, depict a weakness in the electricity system."*

All regulated energy operators have duties in terms of user data security and confidentiality, especially with respect to the public service missions required of them and, for some, even their status as operators of vital importance (OVI).

Above and beyond these cyber-security risks and the combined opinion of consumer association representatives highlighted by the AFL de Paris, "*Even if the framework has been laid down by the CNIL, the issue of data raises numerous questions fuelled by smart meter detractors"*, the Think Smartgrids Association considers that, *"securing, classifying and protecting personal data in compliance with the appropriate new European regulation forms a key issue to develop services and gain their acceptance by consumers."*

The educational approach on the need and advantages of introducing smart meter systems brings up in the question data provision. For what purposes are these systems being introduced? Is there an advantage for the local community or for each individual grid user? Who ultimately receives individual consumption and production data and how is this data used? These questions on respecting the confidentiality of personal data remain important for most consumers. In a study[122], the EY consultancy firm highlighted that "*70% of consumers say they are never happy for companies to share their personal data and 49% of customers say they will be less willing to share personal information in the next five years."*

Yet, some contributors, such as the Oracle company, highlighted that, *"fears expressed by consumers appear disproportionate in the energy sector, as telecom operators have never had to justify themselves (to the same degree) on the subject"*. According to IBM, *"if a service stems from the publication of data, the user must find a compromise between the service provided and the risk incurred to privacy*". Capgemini stated that, *"people leaving their email addresses or bank card numbers on numerous websites is nevertheless more serious than a distribution network operator collecting energy consumption data."* However, Atos confirmed that, "*the fear of advanced metering system data is tiny compared to data collected on smartphones"*.

12 *CRE wishes to expand awareness-raising efforts on data linked to advanced metering systems, to provide the consumers with a better explanation of the merits and scope of personal data use concerning them.*

It considers this educational approach vital to building trust and, as such, the emergence of new services in the right conditions. This is why it calls for an end to considering security and confidentiality issues separately.

[122] *Ready for takeoff? Overcoming the practical and legal difficulties in identifying and realizing the value of data*, EY, 2014.

3.8.3 Obtaining energy data for innovation

Following the consumer representative interviews conducted by CRE, it considers that every energy system player can take every opportunity, at their level, to reiterate their roles and commitments.

Firstly, as Capgemini explained, consumer desire for value-added services largely depends on the speed with which they are put on the market and become widespread. This period must be a short as possible. Capgemini specified that a service will already be obsolete, *"if it takes more than 3 to 6 months to put a previously tested service offer on the market"*.

In its contribution, the Think Smartgrids Association proposed that, *"entertaining and innovative educational tools show the impact individual consumers have on the grid (for example, the balance between supply and demand, or the results of consumption peaks on the generation mix)", which can "help create a sense of ownership of energy data".*

In their respective interviews, Deepki and the national energy ombudsman stressed that public authorities must also carry out, *"this type of communication and promote the presence of statutory bodies guaranteeing that consumers are well protected (CRE, for example). Public authorities do not communicate enough on the advantages of introducing smart meters (as was done, for example, with high-definition DTT)"* in 2016. The Union Française de l'Electricité (UFE – French electricity trade association) stated that, "*Public authorities must use trustworthy and legitimate words to foster the consumer's understanding of data and explain the sensitivity of the data provided."*

Furthermore, the national energy ombudsman emphasised that *frequent availability of consumption data*, on a remote display system (be it an application or an ad hoc device) was liable to familiarise the consumer with energy-related concepts. Subsequently, as the DGE pointed out, progress in introducing advanced electricity and natural gas metering systems could have the beneficial effect of accustoming the end customer to being informed about their consumption, which is a prerequisite for the emergence of new services.

Based on opinions from all the contributors who expressed their views on the subject, creating a French Green Button is an imperative. It would enable individual consumers to obtain their energy data and disseminate them to all the third parties they authorise to use them. As the UFE stated in its contribution, this "*assumes, however, considerable work on technical matters (in terms of inter-operability), but also on customer relations",* especially on methods to obtain customer consent (see paragraph 3.8.1).

Broadly speaking, CRE is aware of the complexities concerning energy data, which helps explain the corresponding relative lack of consumer interest. It agrees with UFE's comments, which state that, *"We are at the outset. The raw materials are emerging, but we don't exactly know what can be done with them."* However, consumers will only see the merits and advantages of new services when they become clear and from then on, the concepts dealt with will be more easily accessible to them.

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Given the above comments, CRE considers that:

- *the emergence of a French Green Button (see paragraph 2.3) is required to allow users to retrieve and share data on energy use based on a formal procedure and systematic measures, regardless of the industry player concerned. This feature embodies consumer rights on their data portability. It is geared to helping consumers perceive the existence and benefits of the data and facilitates the transmission of their data to third parties that can offer them innovative services;*
- *considerable efforts in communication and educational initiatives must be made. The respective roles of suppliers and system operators in data provision and service offers must still be clarified. The same applies to efforts made by regulated energy operators on data security and confidentiality;*
- *apart from the price of energy and origin of the energy mix, raw energy data, per se, is unlikely to interest most users. All industry players should therefore focus their efforts on data visualisation, by concentrating on simple concepts that consumers can understand, without feeling they have to search fastidiously through the information.*

3.9 Should CRE have strategic guidelines for data management by regulated operators?

The legislative and regulatory assessment undertaken for the present report, shows there is an unprecedented buzz for standardisation in data provision. In this regard, the law confers responsibility to CRE for:

- offering opinions to the Minister responsible for energy, on data-related legislation;
- setting user tariffs for regulated network and infrastructure operators, to enable them to cover their investment and operating costs to make the required data available, as part of their missions;
- to set up pricing formulae for the additional services offered by these operators, featured in their service portfolios.

In this flurry of activity, CRE is more naturally inclined to meet these requirements in an ad hoc manner, rather than to establish specific measures for energy data. It could, however, subsequently use them to establish its future positions. Given, for example, the aspects that will be introduced by new European texts in the "4th Energy Package" (see *paragraph* 1.3.3.2), which will ultimately make new additions to the legal framework applicable to France, CRE deems it necessary to formalise these data-related principles.

14 *CRE wishes to produce a strategic guidance document on energy data to formalise guidelines that it plans to apply to energy data provision matters. This could be used nationally and by various European authorities.*

3.10 For a more structured approach to inter-company regulations

3.10.1 A more structured approach to joint-working arrangements between regulators

In terms of cyber-security, the report published by Ifri[88] deplores the, *"lack of strategic thinking on cyber risk impacts on tomorrow's energy structure"*. It notes that while ANSSI is addressing technical aspects, there are no specific measures in France concerning the cyber-security of energy facilities and its role in security of supply, nor in the energy transition law, *"or the section concerning security of supply, developing facilities and flexibility in the power system"* of the draft multiannual energy programming period.

This comment about a certain lack of a cross-cutting dimension applies more generally to the way in which energy data is understood. The range of regulators and authorities interested in issues related to this data reveals the necessity for a more structured approach to their exchanges. The *CNIL* cannot measure everyone's growing interest in data provision that now concerns all sectors, especially *data portability rights*. In this respect, its role of ensuring personal data protection supplements that of CRE, once energy data is considered.

In all other areas, *the Competition Authority* has dealt with several referrals concerning energy industry businesses, particularly when it adjudicated on the list of data that established electricity and natural gas suppliers had to provide alternative suppliers with, to ensure the retail market was competitive and whether public authorities had to compel them to do it. The sensitive matter of allocating roles between regulated operators and industry players in the competitive energy sector (such as mentioned in paragraph 3.6.2) is a subject that the Authority and CRE could work on together in the future.

ARCEP, an authority that regulates the telecoms sector, highlighted several subjects for which its expertise and that of CRE could be used for greater joint-working, especially in access costs for energy network infrastructure to introduce very high-speed telecommunication networks (see paragraph 1.4.2). ARCEP is, in fact, tasked with checking that energy system operators make their facilities available to deploy fibre optics at a reasonable cost. Furthermore, with energy, in general, being a significant factor in telecommunication operators' costs, CRE is seen by its counterpart as a source of expertise on the subject, that should be involved as required.

3.10.2 Building cyber-security into the concept of an efficient operator

Collaboration with *ANSSI* is one of the most important issues for inter-company regulations. Some gas network and infrastructure operators have OVI-status and are subject to specific cyber-security requirements, leading to high investment and operating costs. In these circumstances, without knowing the amounts spent, ANSSI must check OVI-compliance with the rules established by law and, broadly speaking, the way these rules are applied. This does not just concern computer security, but also, for example, guaranteeing that a company is, itself, organised to protect its own information system by creating an information systems security policy (ISSP). This describes all the organisational and technical resources used by the operator to ensure information systems of vital importance (ISVI) are secure. As specified in Rule No. 1 of Appendix I of decrees applicable to the electricity and natural gas sectors[123], the ISSP and its regulatory documents, *"are formally approved by the operator's manage-*

[123] See notes 85 and 86.

ment board. The operator produces a ISSP implementation report and regulatory documents, at least once a year". Given the energy sector's size, ANSSI recommends that leeway left to operators is invested as far as possible in protecting their facilities and their sensitive information systems.

For its part, CRE establishes various user tariffs for public networks to cover an 'efficient' network or infrastructure operator's costs. It should therefore be able to measure how effectively these operators are in taking account of specific obligations incumbent upon them as operators of vital importance. As such, without a sharp increase in cyber-security competition so that it can assess if operators are properly respecting their cyber-security obligations, CRE can only conduct retrospective checks on the expenses an operator incurs to see if this corresponds to a reasonable budget target, such as that communicated to it by ANSSI. In this respect, CRE considers that closer joint working arrangements with ANSSI are particularly valuable to more generally define how the cyber-security can fit into the concept of an "efficient" operator.

3.10.3 Including the issue of economic security and sovereignty in implementing open data

Providing aggregated and anonymous information in open data is universally considered to be a lever helping the development of innovative services, which the French Law for a Digital Republic supports. However, as the Ministry of Economy and Finance's strategic information and economic security service explained at its interview with the Study Committee, the cross-use of data sets published by several organisations can incur an economic strategic and sovereignty risk. This risk cannot, as a result, be perceived by each one of these entities at the time they make the data available.

Prior to publishing new data sets, their industrial sensitivity must be scrutinised by an authority placed under the auspices of public authorities, which could bring together all the relevant players.

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CRE is convinced by the complexity and importance of the energy data-related subjects highlighted to the Study Committee by other regulators and wishes to adopt a procedure defining in a more sustained and organised manner the dialogue that it should have with other regulators and sector-specific or cross-cutting public authorities.

Furthermore, to manage the industrial sensitivities of new energy data sets provided on open data, CRE calls for the creation of governance on the subject. The Government must introduce this governance which it will be part of and placed under the auspices of public authorities, bringing together all relevant players.

4. APPENDICES

4.1 Glossary of terms used

Term	Definition	Source
API	*(Application Programming Interface, or applicable programming interface*). All functions or services that a software application or an information system reveals to a third party to enable them to use them, without publishing the IT programme source code.	CRE
Big data	Database management IT solutions to rapidly process large amounts of information from many information sources.	CRE
	Big data features generally referred to, deal with size in terms of data volume and variety, the way the data is collected (quickly from multiple sources) and the IT and algorithmic power required to process and analyse it. Big data is therefore characterised by the three V's, Velocity, Variety and Volume. A fourth, Value, can be added from extracting value from the data.	Competition Authority, Competition and Data Law, 10 May 2016 *(which specifies that this term is employed with a common definition).*
Blockchain	Decentralised transaction principle and technology, based on a comprehensive knowledge of all operations undertaken by all participating parties. The "bitcoin" crypto-currency was the first well-known application of this process. Applied to energy, this concept could enable consumers and producers connected (or not) to the same network, to trade energy between themselves.	CRE
Digital ecosystem	All services, companies and bodies interacting in the same digital business sector.	CRE
Green Button	American electricity industry initiative, stemming from a call to action by the White House, to standardise data consultation services on electricity consumption that the 48 energy suppliers taking part in the initiative can offer their 60 million customers. The purpose is to enable users to download their data using common definitions and formats and offer them additional services.	CRE
Data sets	This refers to all consistent information published in open data, to be exploited by a user and often provided in several formats (tables, graphs, maps, *etc.*).	CRE
Open data	Technology to provide public data by referring them to a licence for free use.	CRE
	Data that an organisation makes available to all in the form of digital files, so that they can be re-used.	Decision of the French General Commission for Terminology and Neology, published in the Official Journal of 3 May 2014
Personal data portability	The right the data subject has to receive the personal data concerning him or her, which he or she has provided to a controller, in a structured, commonly used and machine-readable format and the right to transmit those data to another controller without hindrance from the controller to which the personal data have been provided.	Article 20 of Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data.

Self data	Production, use and sharing of personal data by the users themselves, under their control and for their own purposes.	The "Mesinfos" website of the Next Generation Internet Foundation (Fing).

4.2 List of freely available information for public entities and the public

4.2.1 IRIS unit data provided by transmission system operators (Article 179 of the Law on Energy Transition for Green Growth)

Data	Units	Data unit groupings	Electricity	Gas	Available to public entities and observation and statistics units (OSU)	Available to the public
Total annual delivery and number of delivery points by aggregate	MWh	• By business sector • By IRIS	✓	✓	Yes	Yes
Biomethane injection capacity and annual quantity injected into each facility.	MW and MWh	• By sector origin • By IRIS connection and IRIS main generation site (if different from the first)		✓	Yes	Yes
Information on generation facilities made public in the national register of electricity generation and storage facilities [28]		By IRIS	✓		• *Public entities*: Yes • OSUs: No	Yes *(by TSOs or public entities)*
Presentation of the network, to regional and inter-municipal unit level, based on a commented map.			✓	✓	• *Public entities*: Some • OSUs: No	No

4.2.2 IRIS unit or building data provided by distribution system operators (Article 179 of the Law on Energy Transition for Green Growth)

Data	Units	Data unit groupings	Electricity	Gas	Available to public entities and observation and statistics units (OSU)	Available to the public
For non-residential aggregates greater than 10-points, or consumption greater than 200 MWh: Total consumption and number of delivery points or measurement points by aggregate.	MWh	• By business sector • By IRIS	✓	✓	Yes	Yes

Data	Units	Data unit groupings	Electricity	Gas	Available to public entities and observation and statistics units (OSU)	Available to the public
Total of annual residential aggregate consumption	MWh	• By region • By EPCI	✓	✓	Yes	Yes
Estimation of the heat-sensitive percentage [29] and heat sensitive consumption percentage [30]	% MW	By IRIS	✓	✓	Yes	Yes
Total annual consumption for each building • non-residential; • or comprising more than 10 residential points; • or comprising a residential use greater than 200 MWh + number of delivery points per building	MWh	By building	✓	✓	Upon request by a public entity	Yes
Biomethane injection capacity and annual quantity injected into each facility.	MW MWh	• By sector origin • By injection unit and main generation site unit (if different from above)		✓	Yes	Yes
Information on generation facilities made public in the national register of electricity generation and storage facilities[28]		By IRIS	✓		• *Public entities:* Yes • *OSUs:* No	Yes *(by the TSOs, or public entities)*
Presentation of the network, to regional and inter-municipal unit level, based on a commented map.			✓	✓	• *Certain public entities* • *OSUs:* No	No

4.2.3 Detailed consumption data (introduced by decree implementing Article 23 of the French Law for a Digital Republic)

Network level	Data	Data unit groupings	Electricity	Gas
Transmission	Measurement curves and raw and consolidated quantities of energy from injection points + Number of points concerned	• By territorial network • By technical or economic category	✓	✓
	Measurement curves and raw and consolidated energy quantities from withdrawal points + Number of points concerned		✓	✓
Distribution	Number of injection and withdrawal points		✓	✓

Network level	Data	Data unit groupings	Electricity	Gas
	Standard generation and consumption profiles + number of injection and withdrawal points allocated to them		✓	✓
	Quantity of energy from aggregated injection points resulting from metering, or eventually assessed using standard corresponding profiles.		✓	✓
	Quantity of energy from aggregated withdrawal points resulting from metering or eventually assessed using standard corresponding profiles.		✓	✓
	Measurement curves reconstituted from producers and consumers considered to be similar (in terms of statistical analysis).		✓	✓

4.3 CRE Study Committee recommendations

No.	Recommendation
1	CRE requests all energy system players to ensure the information they produce is consistent, with special attention to be given to the large number of access channels that could lead to the same item of data being made available. CRE requests all network and infrastructure operators to send it procedures introduced to ensure this consistency, within a period of 12-months. CRE considers that current legislative and statutory texts on the provision of data to public entities constitutes genuine progress to introduce ambitious and consistent local policies. Their scope must be assessed in the medium-term, following feedback. For future amendments to texts on data provision, CRE draws the attention of the Legislator and the regulatory authority on their necessary comprehensiveness, while ensuring their overall consistency and by avoiding the risk of onerous legal situations (i.e. multiple legal layers). Furthermore, it would be useful if these future texts concern data for all energy and fluids.
2	CRE considers that a standardised format and content of data exchanged between distribution system operators and energy suppliers is vital for retail markets to function properly. It asks all distribution system operators to do their utmost to standardise and merge information systems.
3	In line with regulated energy operators, CRE proposes defining and reviewing indicators relating to data management performance by considering industry players' expectations. A dedicated dashboard could then be established to check that expected progress has indeed been achieved. This monitoring could be integrated into CRE's report on incentive-based regulation concerning the quality of service by regulated operators.
4	CRE considers that inter-operability and technological neutrality are in the interests of the end user and public entities. As such, it will continue to ensure that the use of inter-operable standards avoids all situations of capturing end customers. CRE recommends that energy suppliers provide standardised pricing information using local outputs from smart electricity metering systems.
5	CRE considers it necessary to include the expectations of data recipients (in particular, producers and public entities) in how often some of them are updated, as well as a data provision schedule compatible with the obligations of specific data users.

No.	Recommendation
	For this reason, it requests regulated energy operators to send it the list of main processes within 12 months, where data provision deadlines and rates must be reviewed, after stakeholder consultation and considering technical feasibility and stated priority ranking.
6	CRE considers that the emergence of information technology constitutes an unparalleled opportunity to better connect energy networks for the benefit of the community. It wishes to give consideration to identifying the best regulatory and sustainable balance, with all public and private to: • encourage the use of data and innovation, to help manage energy demands, calculate the size of public networks more precisely and to deliver better territorial energy planning; • safeguard mutually beneficial arrangements between territories that are currently guaranteed by pooling funding for energy infrastructure facilities undertaken using network tariffs.
7	CRE acknowledges the new missions that the law and regulations bestow on public distribution system operators in terms of data provision-related activities. CRE reiterates that these must continue to play the role of neutral operators in relation to electivity and natural gas markets. Within its remit, CRE will ensure that it specifies the extent of attributes of system operators in relation to the competitive sector players, especially by defining additional services on data provision and their scope of action.
8	CRE recommends that when a regulated energy operator seeks to propose comparable services to those marketed by competitive sector players, it will use the same data as that already accessible, or to be provided to energy and service suppliers. This activity must be delivered in a legal framework that enables it to be differentiated from those applying to its public service missions.
9	CRE considers that a system providing relevant consumption and production data will contribute to better managing energy demands in non-interconnected areas, which constitutes a particularly pressing problem in these areas. In addition, it considers that, given their specific role in non-interconnected areas where they are both electricity suppliers and producers, system operators must play a key role in the provision of consumption and production data by differentiating these obligations for each of their missions. As part of their public service missions, they must also ensure they supply all the data that the competitive sector requires, to foster the emergence of innovative services based on their use in these areas.
10	CRE considers that the following principles should guide the introduction of a shared platform providing energy data: 1. Data provision must initially be organised around aggregated energy data. CRE notes that the law and regulation give a precise definition to aggregated energy data that regulated operators must provide to various public and private-sector recipients. In this respect, it has introduced new additional services to the portfolio of regulated operators. It therefore considers that the scope of this data, once defined, constitutes the relevant starting point for an organised provision of data that could subsequently be expanded. 2. Aggregating data must include all levels of the network. The added value provided by an organised provision depends on the consistency and comprehensive nature of the data generated. This consistency can be gauged on all forms of energy, but also at all levels of the networks concerned. Aggregated network data must hence include all levels of voltage (for electricity) and all levels of pressure (for natural gas), so that the markets operate properly in the interests of the end user and control of network tariffs. 3. A platform must be designed to cover “multi-fluid” data. Operators tasked with generating data mostly deal with a single energy source, but the demand for data, especially aggregated data, generally focuses on simultaneous knowledge of energy consumption and generation of several types of energy and fluids. As such, any plans for a platform must consider “multifluids” from the design stage and ultimately cater for types of energy where the regulatory regime is different from those of electricity or natural gas. 4. Creating a platform must meet user needs and must have simple functions. Most stakeholders highlighted that the design and implementation of a platform providing energy

No.	Recommendation
	data would represent investment and recurring operational costs. The development of this multi-energy platform should be co-funded by the various operators. The extent of this agreed expenditure must be proportionate to the needs expressed by the recipients and consistent with an acceptable level of funding from public network and infrastructure tariffs. 5. The platform must be flexible and adaptable. It must gradually meet the various objectives to be achieved, cater for a growing number of data producers over time and, more generally, be sustainable. As such, its design must meet priorities of flexibility and adaptability. This applies to the nature of the data handled, the quantities of data used and the various parties involved. 6. The platform must be compatible with initiatives already underway. The coordinated provision of aggregated energy data, especially for local authorities, is likely to facilitate the delivery of local energy policies under their remit. It would also maintain equity between different regions. However, this platform must be compatible with energy data-related initiatives that some local authorities have already undertaken, and under no circumstances, hinder or replace them.
11	CRE considers that the quality of consent secured from the end customer to use their energy data is not merely and technical or legal matter. It is a vital prerequisite to customer trust with respect to the emergence of new services. In this context, CRE requests that energy and service suppliers, as well as system operators, offer users procedures to obtain this consent that are succinct, comprehensive and easily understandable for informed consent. Furthermore, distribution system operators are responsible for managing consents which third parties 'authorised' by the final consumer use and must have the necessary powers to exercise control over the aforementioned consents. CRE encourages the Legislator and the regulatory powers to develop texts applicable to this matter. If required, an amendment to statutory provisions of the French Energy Code may be necessary to enable distribution system operators to oblige suppliers to justify authorisations they claim to have, and if not, suspend communication of this data.
12	CRE wishes to expand awareness-raising efforts on data linked to smart metering systems, to provide the consumer with a better explanation of the merits and scope of personal data use concerning them. It considers this educational approach vital to building trust and, as such, the emergence of new services in the right conditions. This is why it calls for an end to considering security and confidentiality issues separately.
13	CRE considers that: • a French Green Button is required to allow users to retrieve and share data on energy use based on a formal procedure and systematic measures, regardless of the industry player concerned. This feature embodies consumer rights on their data portability. It is geared to helping consumers perceive the existence and benefits of the data and facilitates the transmission of their data to third parties that can offer them innovative services; • considerable efforts in communication and educational initiatives must be made. The respective roles of suppliers and system operators in data provision and service offers must still be clarified. The same applies to efforts made by regulated energy operators on data security and confidentiality; • apart from the price of energy and origin of the energy mix, raw energy data, per se, is unlikely to interest most users. All industry players should therefore focus their efforts on data visualisation, by concentrating on simple concepts that consumers can understand, without feeling they have to search fastidiously through the information.
14	CRE wishes to produce a strategic guidance document on energy data to formalise guidelines that it plans to apply to energy data provision matters. This could be used nationally and by various European authorities.
15	CRE is convinced by the complexity and importance of the energy data-related subjects highlighted to the Review Committee by other regulators and wishes to adopt a procedure defining in a more sustained and organised manner the dialogue that it should have with other regulators and

No.	Recommendation
	sector-specific or cross-cutting public authorities. Furthermore, to manage the industrial sensitivities of new energy data sets provided on open data, CRE calls for the creation of governance on the subject. The Government must introduce this governance which it will be part of and placed under the auspices of public authorities, bringing together all relevant players.

4.4 List of persons interviewed

Organisation	Participant	Job title
Association des distributeurs d'électricité en France (ADEeF – Association of electricity distributors in France)	Christophe Chauvet	President (Managing Director of GIE Synergia)
	Marion Bonnetain	Vice-President (Project Manager, Enedis)
AFL Paris	Françoise Thiébault	Secretary-General
AMORCE	Jean-Patrick Masson	Vice-President AMORCE energy-climate, member of France Urbaine
	David Leicher	Energy Networks Department Director
Association Nationale des Régies de services publics et des Organismes constitués par les Collectivités locales (ANROC – French association of public utilities boards and local authority bodies)	Guillaume Tabourdeau	Managing Director
Agence nationale de la sécurité des systèmes d'information (ANSSI – French national agency for information system security)	Thomas Hautesserres	Business Sector Coordinator for energy and nuclear energy
Atos Worldgrid	Franck Freycenon	Business Development Director – "Digital Transformation & New Energy Services"
	Hervé Barancourt	"Smart grids strategy" Director
Autorité de la concurrence (Competition Authority)	Umberto Berkani	Deputy General Rapporteur
Authority for Consumers and markets (Dutch regulator)	Robert Spencer	Energy Retail Markets Manager
	Jochen Smit	Data management and energy retail market models expert
Autorité de regulation des communications électroniques et des postes (ARCEP – French electronic communications and postal regulatory authority)	Stéphane Lhermitte	Director of Economy, Markets and Digital Affairs
Capgemini	Philippe Vié	Vice-President
Commission nationale de l'informatique et des libertés (CNIL – French national data protection authority)	Éric Peres	Vice-President and Commissioner in charge of the energy sector
	Joanna Masson	Legal expert with the compliance unit in the economic affairs department
Compagnie Parisienne de chauffage urbain (CPCU - Paris urban heating company)	Fabien Nesly	Marketing Networks Manager
Confédération syndicale des familles (CSF –	Lena Morvan	Economy and Consumption Sector Manager

Organisation	Participant	Job title
French confederation for families)		
Deepki	Emmanuel Blanchet	CEO and co-founder
Direct Énergie	Cyril Voirin	Regulations Manager
	Hélène Pierre	Institutional Relations Manager
General-Directorate for Competition Policy, Consumer Affairs and Fraud Control (DGCCRF) of the Ministry of Economy and Finance	Léonard Brudieu	Head of Energy, Environment and Raw Materials unit
	David Helm	Deputy Head of Media, Telecommunications, Cultural Goods and Services Unit
General-Directorate for Enterprise (DGE) of the Ministry of Economy and Finance	Sabine Bruaux	*Big Data* Project Manager, Digital Economy Department Data, Economy Unit
	Marc Glita	Head of Energy Industry Unit
	Pierre Sorlier	Deputy Head of Energy Industry Unit
General-Directorate for Energy and Climate (DGEC) of the Ministry of Environment, Energy and Maritime Affairs	Olivier David	Deputy Director of Electricity and Renewable Energy Systems
	Cédric Thoma	Project Manager for Green Industries – Smart Energy Networks, Hydrogen and Energy Storage
Directorate-General for Energy (DG ENER) of the European Commission	Anna Colucci	Head of Energy Retail Markets Unit
	Constantina Filiou	Smart Grid Task Force member, responsible for advanced metering matters and data protection
	Manuel Sanchez-Jimenez	Smart Grid Team Leader
EDF	François Gonczi	Digital Director, trade branch
	Tiphaine L'Hénoret	Regulation Department Project Officer
	François-Régis Monclar	Optimisation Division – upstream and downstream trading
	Sylvie Magois	Engineering Generation Department, Transmission Systems Engineering Centre
EDF Systèmes Energétiques Insulaires (EDF SEI – EDF Island energy systems)	Karine Revcolevschi	Finance Regulations Director
	Sébastien Ruiz	Smart Grids and Forward Planning representative
Elengy	Clément Douguet	Development Strategy
	Jean Lemonnier	Head of Marketing and Programming Department
Enedis	Yves Barlier	Head of Regulations Department
	François Blanc	Digital business development programme manager
	Christian Buchel	Deputy CEO – Chief Digital International Officer
	Chantal Genermont Laplantif	Director of Digital Affairs
	Jean-Luc Kébaïli	Representative of the Control and Compliance

Organisation	Participant	Job title
		Department
	Jean-Charles Monnet	"Digital Factory" Manager
	Jeff Montagne	Data Governance Officer
	Jean-François Vaquieri	Legal Affairs Director
Energinet.dk (Danish TSO)	Signe Horn Rosted	Retail Market Development Manager
Energitilsynet (Danish regulator)	Pia Rønager	Legal and Administrative Director
Enerplan	Christophe Thomas	Vice-President for Photovoltaic Energy
	Richard Loyen	Managing Director
Engie	Daniel Villefailleau	General Secretariat, Regulations Department
	Pierre-François Chenu	External Relations Director
	Daniel Villefailleau	General Secretariat, Regulations Department
	Pierre-François Chenu	External Relations Director
ENI	Naima Idir	Director of Institutional and Regulatory Affairs
Familles rurales	Romain Girard	Project Manager/Economist
Fédération nationale des collectivités concédantes et régies (FNCCR – French national federation of local licensing authorities and public corporations)	Charles-Antoine Gautier	Head of Energy Department
	Alexis Gellé	Head of Energy Transmission Network Development and Public Lighting Services
France Énergie Éolienne	Camille Bredoux	Technical Assistance and Grid Connection Project Officer
France Urbaine	Philippe Angotti	Deputy Managing Director
GEG	Nicolas Flechon	Deputy Director for Networks
GRDF	Pascale Bernal	Information Systems Director
	Isabelle Drochon	"Data" Programme Manager
	Xavier Furst	Legal Department – Data Protection correspondent
	Jacques Gérard	Customer Relations Director
	Jean Lemaistre	Deputy Managing Director
GRTgaz	Yves Brullé	Analyst in the Regulation Strategy Department
	Rémy Coin	Director of Legal Affairs
	Jean-Pierre Gory	Deputy Director of the business development department
	Jean-Pierre Madiec	Director of Strategy and Regulations
IBM	Philippe Sajhau	Vice-President of IBM France
	Alain Robert	"Energy & Utilities Industry" Business Development Director
	Joseph Sola	"Energy & Utilities Industry" Business Development Director

Organisation	Participant	Job title
Ijenko	Serge Subiron	President and co-founder
Médiateur national de l'énergie (French energy ombudsman)	Jean Gaubert	National Energy Mediator
	Frédérique Coffre	Managing Director of Services
Oracle France	Philippe Masset	Legal Director
	Caroline Franquet	Legal expert
	William Delbecq	Key Account Director
	Ludovic Gautier	Industrial Architect
	David Fernandez	Oracle *Dataraker* (*Smart metering analytics*) service – Europe Manager
Orange	François Richard	Partnerships and Regulations Director
RTE	Olivier Grabette	Deputy Managing Director for forward planning, expertise and solutions
	François Guillermet	Advisor to the Chairman of the Board
	Claire Niclot	Innovation Director
Strategic Information and Economic Security Service (SISSE) of the Ministry of Economy and Finance	Gilles Pennequin	Senior Advisor to the Commissioner for strategic information and economic security
	Philippe Lorec	Head of the information, review and risk analysis department
Syndicat professionnel des entreprises gazières non nationalisées (SPEGNN – French trade association of non-nationalised gas companies)	Serge Niva	Managing Director
Storengy	Nicolas Bernasconi	Marketing & Sales
	Éric Jourdan	Deputy Director of Value-added chain and optimisation
Suez	Thomas Perianu	Smart Water Managing Director
Syndicat des énergies renouvelables (renewable energy trade association)	Mathieu Gondolo	Electricity System Manager
	Mathilde Mathieu	Energy Markets Project Manager
TIGF	Gilles Doyhamboure	Head of Pricing, Economics and Regulation Department
	Virginie Mallet	IS Business Unit Manager
Total Énergie Gaz	Pierre Lefebvre	Competitiveness Manager
UFC-Que Choisir (consumer rights association)	Nicolas Mouchnino	Energy and Environment Project Manager
Union française de l'électricité (UFE – French electricity trade association)	Christine Goubet-Milhaud	President
	Damien Siess	Director of Strategy and Forward Planning
	Antoine Guillou	Networks Advisor

Organisation	Participant	Job title
Union nationale des entreprises d'électricité et de gaz (UNELEG – French trade association of electricity and gas companies)	Léa Rodrigue	Deputy General Secretary of the FNSICAE

4.5 List of industry players who wanted to contribute to discussions

- Association Hespul.
- Régions de France (association representing French regions).
- Syndicat intercommunal de la périphérie de Paris pour les énergies et les réseaux de communication (SIPPEREC – Greater Paris inter-municipal association for energy and communication networks).
- Association Think Smartgrids.