



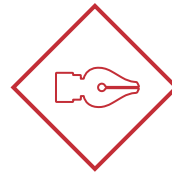
COMMISSION
DE RÉGULATION
DE L'ÉNERGIE

2017

Activity report



Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE



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“The CRE traces the new paths in the energy sector.”

JEAN-FRANÇOIS CARENCO, PRESIDENT OF THE CRE

**MISTER PRESIDENT,
HOW DO YOU SEE
THE ROLE OF THE CRE?**

Upon my arrival to the CRE, I wanted to give this independent authority a decisive impetus to make it a place of exchange and dialogue open to all the players in the industry. I consider that the activity of regulation must first express any opinions towards building a society where energy, as a vital commodity, becomes a matter of sharing rather than a conflict. Great transformations are underway; we must prepare ourselves all together.

The energy market is gradually opening up to competition since 2000. The European directives, which are the pillars, have marked the decisive stages of this dynamic. The CRE is the armed wing.

Very quickly, I realized that our mission should be supported by a strong political pedagogy. Of great technical, economic and legal complexity, the energy issues are not always perceptible, or even comprehensible, by the general public whereas they directly affect our daily life. It's our responsibility to make them accessible to as many people since, in recent years, the debate on social acceptability has taken precedence over the general interest to the point of failing successful projects for the energy system. Under the influence of the CRE, everyone must play its role: energy suppliers or producers, network operators and regulators, everything must be put into perspective with the well-being of consumers and the general interest.

More than awareness, the CRE must communicate to share. It is in this spirit that we have strengthened and modernized our communication with a new website, a blog and a twitter account.

“
The objective is to clarify the range of possibilities so that each actor is positioned knowingly.”

**WHAT IS
YOUR ASSESSMENT OF
YOUR FIRST YEAR AT CRE?**

With the college, we have placed dialogue and trust at the top of our priorities. Throughout our deliberations, we have begun working based on proactive consultation, through conferences, dedicated websites and open workshops. In September 2017, nearly a thousand people participated in our self-consumption debates to define a stable, sustainable environment for the benefit of all consumers and compatible with the balance of our electrical system.

This same determination governs measures taken to strengthen our presence at European and international level, thus engaging in a permanent dialogue with our counterparts. The doors of the CRE are wide open. These meetings produced constructive solutions, the first of which I will mention the interconnection projects. With the Spanish regulator, the CNMC, we have concluded a historic agreement for a new interconnection with Spain.

And for this very ambitious project, we obtained the financial support of the European Commission which will cover 30% of its cost.

**HOW DO YOU
PERCEIVE THE
ENERGY MARKETS?**

The competition in the energy market has triggered a real dynamic with a quarterly pace of significant progress in 2017.

The main explanation for these developments is certainly the construction of regulated sales tariffs. Certainly...

But can we reduce the opening of the markets to the tariff linkage while the competitive offers cover today about a third of the bill? The offer "low cost" suffice to attract customers?

Concerned about the ecological future, the interest of the consumer leaves his chrysalis. The evolution of technologies, in particular the development of digital technology, opens up new opportunities for competition to build service offerings that combine economic and environmental performance. Innovation is the main issue of a system in constant transformation.

**YOU HAVE CREATED
AN OUTLOOK COMMITTEE,
WHAT IS THE GENESIS?**

With experts from all backgrounds, academics, industrialists and elected representatives, the CRE Foresight Committee is conducting work aimed at enlightening the political and economic decision-makers of our country on the upcoming upheavals in the world of energy. From geopolitics and its impact on security of supply, to the energy mix integrating less expensive renewable energies, the performance of networks and their interconnections, energy issues cover a very wide scope, with online the new uses of energy. Capturing the major trends of the lifestyles of tomorrow is one of the main issues of the Foresight Committee. Nearly two hundred people work on these themes in the three working groups of the committee. To feed this work, we have commissioned a study which reports, at the international level, the various responses to structural energy issues. It is from this base of information that will be published in the summer of 2018 the first report of the Foresight Committee. The objective is to illuminate the field of possibilities so that each actor is positioned knowingly.

RECONCILING ENERGY TRANSITION AND EFFECTIVENESS OF PUBLIC EXPENDITURE

Technological innovations and digital development open up commercial opportunities to capture consumer interest in demand management.

An interest which we perceive the signs of the self-consumption. The increasing number of initiatives in this field have led the CRE College to seize this subject.

It has also engaged a substantial work on digital data. In particular, it compiled an inventory with legal and technical typology to identify issues on infrastructure management. It has also formalized fifteen recommendations to make digital data a lever for the efficiency of the energy system.

In cooperation with other regulators, the European work on the construction of the integrated market is continuing to define the common rules of operation.

In 2017, the CRE conducted major works to improve the functioning of the French electricity and gas markets and to bring visibility to all stakeholders: in electricity, with the definition of a balancing roadmap; in gas, with the preparation of the merger of the zones for entry into effect on 1 November 2018; but especially with the implementation of operator regulation following the reform of access to gas storage facilities. Operational since April 1, 2018, this reform has enabled the subscription of almost all storage for next winter and, thus, ensured the security of supply.

With regard to infrastructure investments, the development and optimization of interconnections facilitates the diversification of supply sources, enhances renewable energies and strengthens security of supply and system safety. Always very vigilant in cost control, the CRE intends

Energy holds a preponderant place in our societies where it emerges as a vital resource. Technological innovations, digital development and energy transition goals are driving profound changes. Through its work on the gas and electricity market network, the CRE College supports and anticipates these changes for the benefit of consumers and territories.

The year 2017 was marked by a significant acceleration of the competitiveness. Of the total volumes of consumption, the market share of alternative suppliers is 31% in electricity and 57% in the gas market. With 24 incoming and 30 offers for electricity and gas, a more active dynamic has engaged the market for residential customers.



to ensure the usefulness of new infrastructures for the consumer. In the particular context of Brexit, apart from ELECLINK and IFA2 in progress, the college decided to wait the exit conditions from the UK to engage any new interconnection project. On the Spanish side, the CRE and its counterpart, the CNMC, have reached an agreement for a new electricity link that will double the interconnection capacity between France and the Iberian Peninsula and will receive financial support from the European Union of 30%.

In a world in profound transformation, the development of renewable energies (wind and photovoltaic) is growing. Its concern for economic efficiency has led CRE to urge the use of tenders for mature sectors.

The results speak for themselves: with the competition, the prices of renewable energies have significantly decreased. The price of photovoltaic MWh, which peaked at € 600 ten years ago, is today for certain facilities around € 60.

This procedure used onshore wind for the first time in 2017, which also led to a significant drop in prices, which now stand at around € 64 per MWh. France finally gets prices close to its European neighbours.

In island territories not connected to the electricity grid in mainland France, geographical and climatic characteristics as well as infrastructure constraints increase the costs of energy production, which ultimately weigh on the bill for all consumers.

From left to right:
Jean-Pierre Sotura, Jean-Laurent Lastelle,
Hélène Gassin, Jean-François Carenco,
Christine Chauvet and Catherine Edwige.

But these territories must also, and as quickly as possible, meet the challenges of the energy transition, in particular to increase the share of renewable energy in their consumption by 50% in 2020 and become energy self-sufficient in 2030.

In this context, reconciling energy transition and efficiency of public spending is imperative. Imperative that the CRE provides to the accomplishment of all its missions.

3 MINUTES TO UNDERSTAND THE CRE

Following its creation, on March 24th of 2000, the Commission for Energy Regulation (CRE, for its acronym in French) ensures the proper functioning of the gas and electricity markets in France, for the benefit of end consumers and consistent with the objectives of the energy policy."



STATUS
Independent Administrative Authority

PRINCIPLES

Independence

from the energy industry and the government for the implementation of certain tasks defined by the law

Transparence

of the work and development procedures of decisions and opinions

MISSION OF CONTINUOUS DEVELOPMENT

Participate

In the construction of the European internal energy market.

Contribute

to the good functioning of the electricity and natural gas markets for the benefit of the final consumer.

Regulate the networks

Of gas and electricity, that are monopolies: set prices and ensure that they do not favor any user.

Ensure the right information

of the consumers.

Implement some devices

for the support of renewable energies, by calling for tenders.

OBJECTIVES

Ensure the independence

Of the network managers.

Establish harmonized rules

of operation of networks and markets, for the free flow of energy between the countries of the Member States of the European Union.

Ensure competition

between energy providers for the benefit of the consumers.

Ensure that consumers

receive the best service and pay the right price.

KEY DATES OF THE CRE

2000

- proposes the rates of use for the networks;
- advises on regulated electricity tariffs;
- assesses public service charges, implements renewable energy tenders;
- resolves dispute over access to networks.

2006

- oversees the wholesale electricity and gas markets.

2010

- oversees the wholesale CO₂ markets;
- implements the ARENH and the capacity mechanism.

2011

- establishes the rates of use for the networks;
- certifies transport system operators;
- clears the Linky and Gazpar deployment.

2015

- ensures 13 new missions resulting from the energy transition law (regulation of gas storage, smart grids experiments, etc.);
- may audit the information collected in the framework of its missions at the expense of the companies.

2016

- proposes the amount of the regulated tariffs of electricity (blue tariffs).

2017

- regulates gas storage under the hydrocarbons law.

2 INDEPENDENT ORGANISMS

The College

6 commissioners, on a parity between women and men, appointed on the basis of their legal, economic and technical qualifications, set the general guidelines and adopt decisions and opinions on the basis of the expertise of the directorates, placed under the authority of the President and General Manager.

The CoRDIS

4 members of the Dispute Settlement and Sanctions Committee, including two State Councilors and two advisers to the Court of Cassation.

They are responsible for resolving disputes over access to public electricity and gas networks and their use between managers and users, and to punish breaches of the energy code.

BUDGET

20.9

millions euros

The credits necessary for the functioning of the CRE are proposed by the commission to the Minister in charge of Finances in order to be registered in the law of finances. The credits allocated are entered in the general budget of the State. The CRE is subject to the control of the Court of Auditors.

20.7

milliards d'euros

Revenu autorisé des opérateurs régulés fixé pour le transport et la distribution d'électricité et des infrastructures gazières.


291
deliberations

12
college decisions


13
referrals from CoRDIS


16
consultations

106
market players auditioned by the college

9
Hearings of the President, the Director General and the CRE Services in Parliament

62
sessions of commission

12
Decisions from CoRDIS



For further information about the organization and missions of the CRE:
[Click here](#)

CRE, COMMITTED ACTOR IN EUROPE AND THE WORLD

The European Union has extended energy policy competences with the objective of providing consumers with safe, affordable and climate-friendly energy through a single energy market.



The European Union, an essential step in energy policy

DIALOGUE WITH THE EUROPEAN INSTITUTIONS

The CRE maintains regular relations with the Commission, the Council and the European Parliament.

The year 2017 was characterized by an intense activity with:

- negotiations in parallel to the Council and Parliament relating to a clean energy package for all Europeans. The CRE welcomed the ambition of the Package to facilitate the deployment of renewable, more variable and decentralized energy, by ensuring the flexibility of markets and networks;
- the publication of the revised gas directive in November;
- the publication of the list of Common Interest Projects for gas and electricity.



13 detailed sheets published by the CRE on the Clean Energy Package, including favourable:

- improving the functioning of ACER;
- call for differentiated tenders according to renewable energies;
- the appropriate use of congestion revenues;
- compliance with the principle of subsidiarity for the capacity adequacy study and the definition of network usage tariffs.



COOPERATION WITHIN THE EUROPEAN REGULATORY BODIES

The CRE participates in European regulatory bodies to further integrate energy markets:

- Council of European Energy Regulators (CEER),
- Agency for the Cooperation of Energy Regulators (ACER).

In 2017, their governance has been renewed.

GOVERNANCE OF CEER RENEWED IN 2017

Garrett Blaney, commissioner of the Irish Regulator, elected President of CEER and ACER Council.

Hélène Gassin, commissioner of the CRE, elected Vice-President of the CEER.

Fadhel Lakhoua of the CRE, Vice President of the CEER Market Integrity and Transparency Working Group.

Benoit Esnault of the CRE, Vice-President of the CEER Gas Working Group.

20 collaborators of the CRE mobilized on the European questions

125 collaborating missions in Europe and abroad

REGIONAL COOPERATION AND BILATERAL RELATIONS

The CRE contributes to the regional initiatives launched by the Commission and regulators to facilitate the integration of regional electricity and gas markets through concrete actions.

In November 2017, it organized a high-level meeting in Paris of representatives from the CWE region (Centre-West-Europe) to improve energy exchanges, based on real flows.

It also shares its expertise at conferences organized by European bodies, notably the Florence Regulatory School.

It maintains daily contact with its counterparts from neighbouring countries following the progress on common issues; for example, approval of interconnection access rules (Celtic, Bay of Biscay, FABlink), decisions to grant derogations or allocation of costs for cross-border infrastructure.

4 electrical regions (over 7) and

2 gas regions (over 3) are the subject of regional initiatives involving the CRE.

International
Cooperation:
enrich your
expertise, share
your know-how

A NEW INTERNATIONAL STRATEGY

Following 2017, the CRE significantly strengthens its cooperation with third States in the European Union, with two objectives: make them benefit from his experience and confront other models to improve its own practices.

Its expertise is especially sought after by states wishing to create a regulator or undertake reforms in their energy sectors. To meet these needs and participate in the international influence of France, the CRE has identified the different parts of its expertise.

3 FORMS OF COOPERATION DEFINED WITH THE PARTNERS

Study visits in France

- Reception of Japanese delegations, an Armenian delegation and a Burkinabe delegation on the CRE premises in 2017.

Expert missions on the field

- Diagnosis and proposal of solutions for a problem related to energy and the organization of markets and networks.

Twinning

Funded by the EU, twinning contracts are usually concluded for two years and require a strong commitment from both parties.

- Selection of the CRE in 2017 to intervene in Morocco alongside the Ministry of Ecological and Solidarity Transition within the framework of the twinning support to the strengthening of the energy sector.



MEDREG, 10 YEARS OF COOPERATION IN THE MEDITERRANEAN

The CRE participates in MEDREG, the association of regulators of the Mediterranean basin which, for a decade, takes into account the concrete problems of the countries of the South by publishing reports and studies and by organizing trainings.



34° General Assembly of MEDREG held on 29 November 2017, under the auspices of CERA, the Cypriot regulator. Benoît Esnault, President of the Electricity group, represented the CRE.

987,000 €

In financing by the European Commission in 2018, according to the grant contract concluded in December 2017

80 participants
on NER, regulators
European and partner
countries

REGULAE.FR IN FULL DEVELOPMENT

Created in November 2016 upon the initiative of CRE with Ivorian regulators (ANARE-CI), Belgian (CREG) and Quebec (Régie de l'énergie), the French network of energy regulators, RegulaE.Fr aims to strengthen collaboration between its members and to facilitate the exchange of good practices and the accessibility to training.

In 2017, RegulaE.Fr has strongly developed its activity and brought to its presidency Hippolyte Ebagnitichie, directorate general of ANARE-CI. By his side, Marie-Pierre Fauconnier (CREG) and Catherine Edwige (CRE), first and second vice presidents, conform the Coordinating Committee for the year 2018.

PARTICIPATION IN THE WORK OF THE OECD NER

The CRE participates in the work of the Network of Economic Regulators, (NER for its acronym in French) from the OECD chaired since 2017 by Jean-Yves Ollier, former CEO of the CRE.

In an intersectional approach (energy, telecommunications, transport, water, etc.), the participants in this forum discuss their regulatory practices and their governance.

In 2017, the NER has been the framework of exchanges on:

- the revision of the development of water tariffs in Scotland processes using experimental behavioural tools;
- the reform of the Irish energy regulator, through an analysis of the performance evaluation framework of economic regulators.



22 French regulatory authorities member of RegulaE.Fr

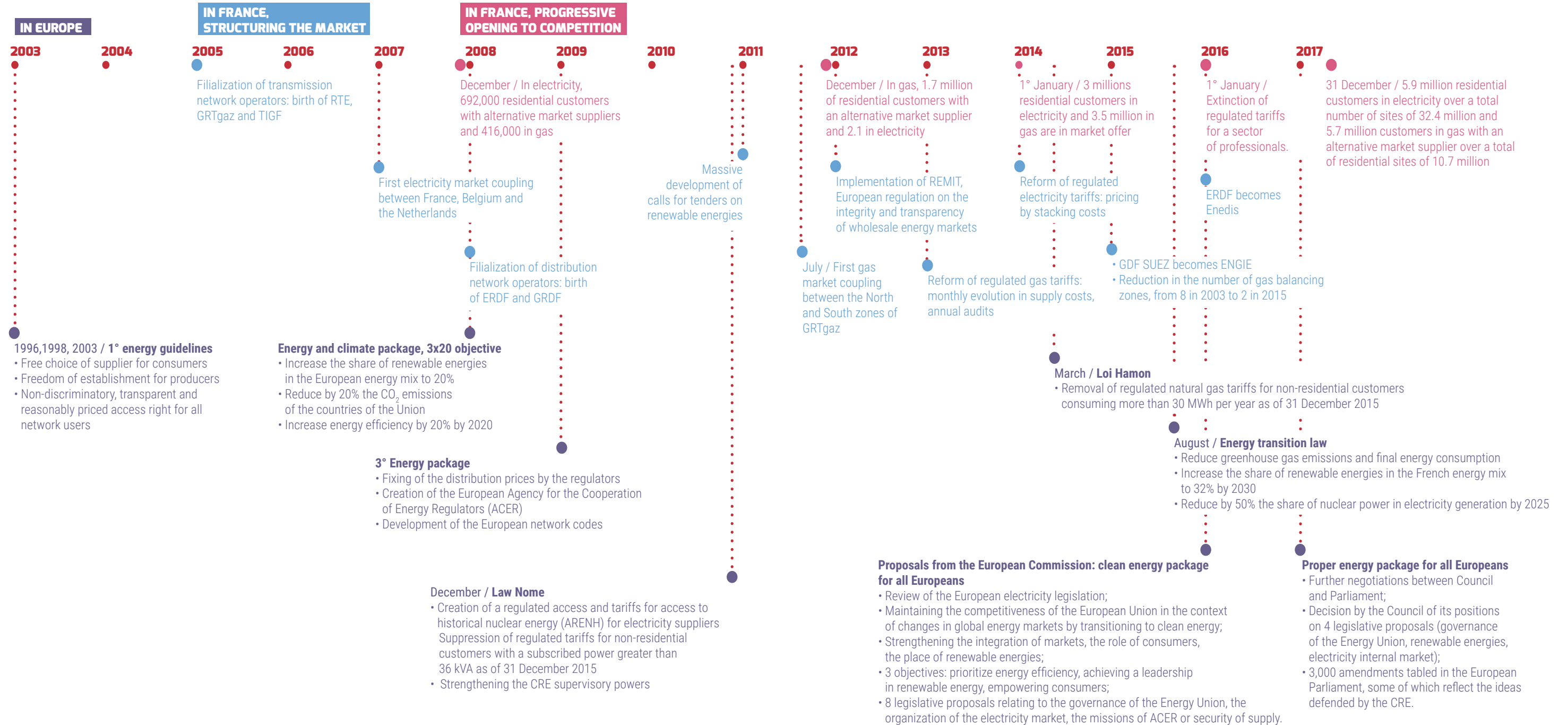
3 partners for the training concluded in 2017 with the School of the regulation of Florence, the BADGE program of the School of Mines (ParisTech) and the Institute of Francophonie for the sustainable development of the OIF.

HIGHLIGHTS 2017

11 July: workshop in Brussels upon invitation of the CREG on the subject of the independence of regulators.

11 and 12 October: General Assembly in Abidjan upon invitation of ANARE-CI and workshop on the construction of regional energy markets in Europe and Africa.

THE ENERGY MARKET: KEY DATES

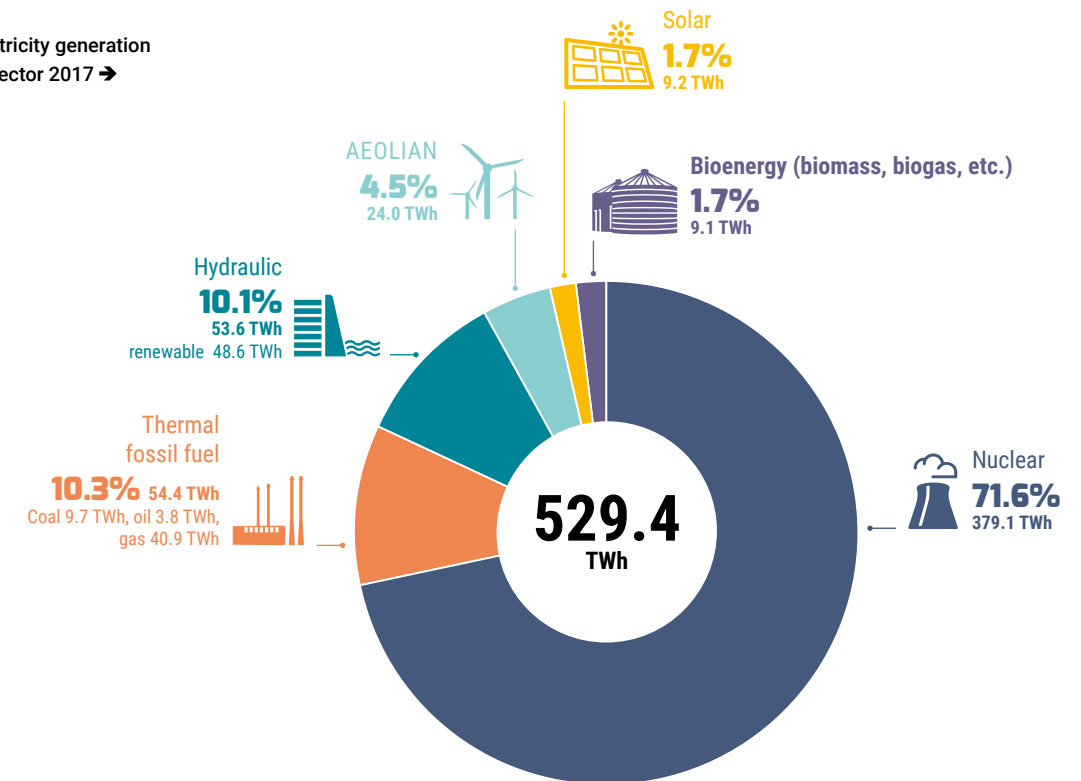


KEY FIGURES 2017

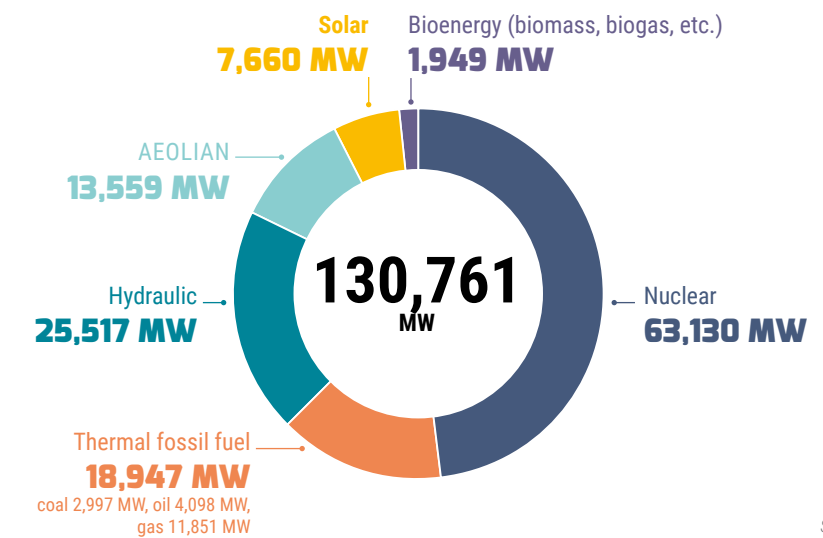
PANORAMA OF ENERGY IN FRANCE

ENERGY MIX

Electricity generation
by sector 2017 →

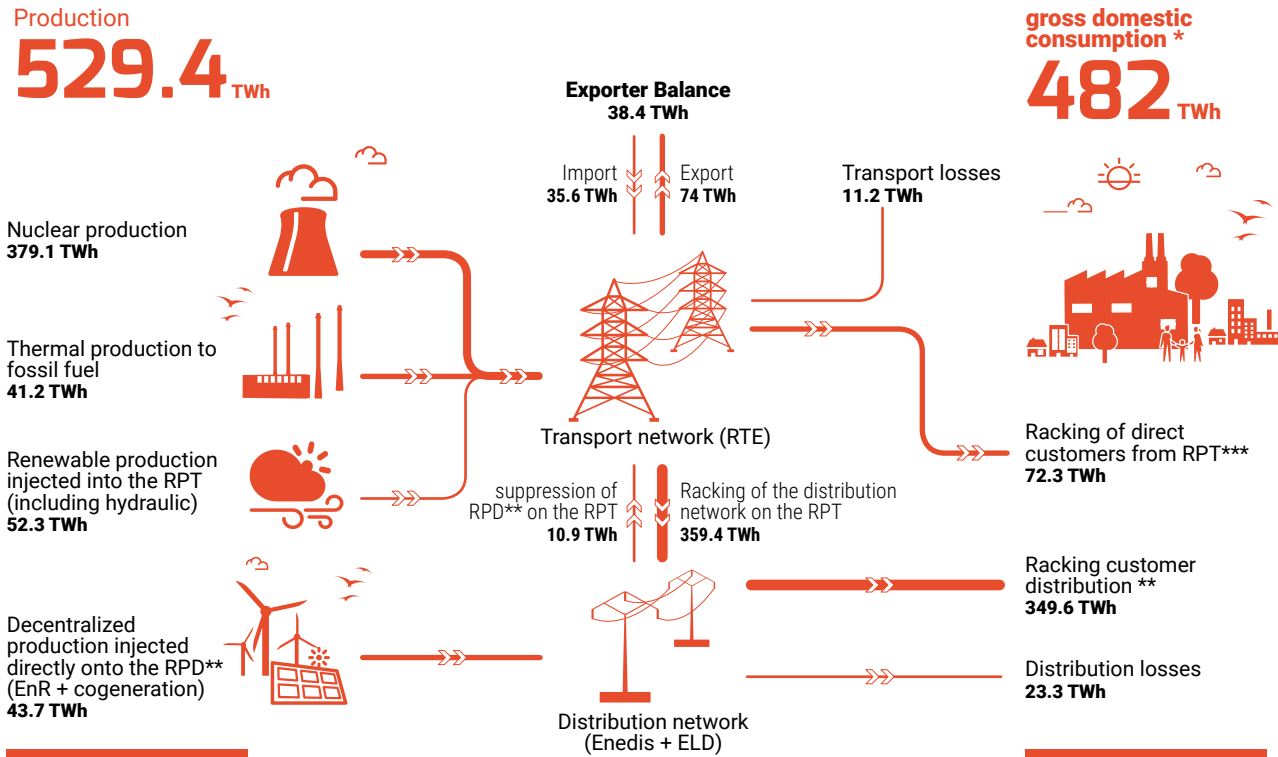


Power generation park
at 31/12/2017 →



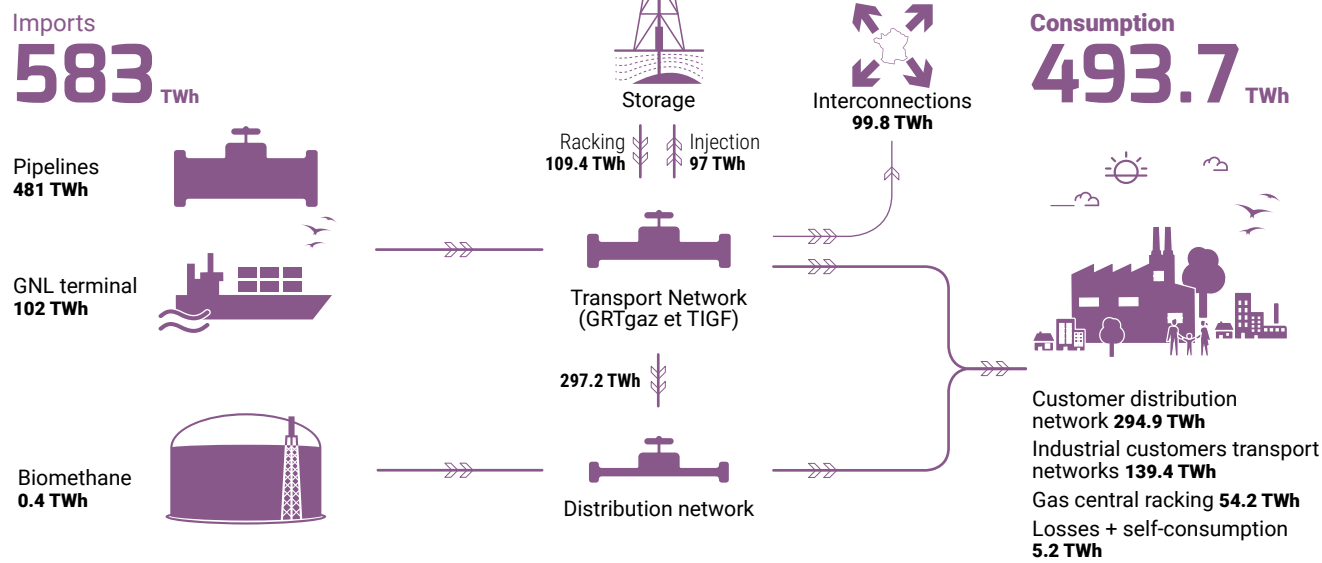
Source: Electrical balance 2017 RTE

ELECTRICITY: FROM PRODUCTION TO CONSUMPTION



* Metropolitan France, Corsica included. ** Excluding Local Distribution Companies (about 5% of the metropolitan area).
 *** STEP pumping included. RPT: public transport network. RPD: public distribution network.
 Sources: 2017 Rte electrical report, monthly electrical surveys 2017 Rte, monthly analysis 2017 Enedis

GAS: FROM IMPORT TO CONSUMPTION



RESIDENTIAL CONSUMERS

NUMBER OF RESIDENTIAL SITES & CONSUMPTION VOLUME

Electricity
32.4 Million sites,
 153.3 TWh (over 35% of total consumption in France)

Gas
10.7 Million sites,
 121.5 TWh (25% of total consumption in France)

NUMBER OF RESIDENTIAL SITES WITH AN ALTERNATIVE SUPPLIER

Electricity
5,880,000 sites
 including 5,800,000 sites with an alternative supplier (23.8 TWh vs 0.44TWh provided in market offer by historical suppliers)

Gas
5,758,000 sites
 including 2,799,000 sites with an alternative supplier (31.1 TWh vs 34.9 TWh provided in a market tender by historical suppliers)

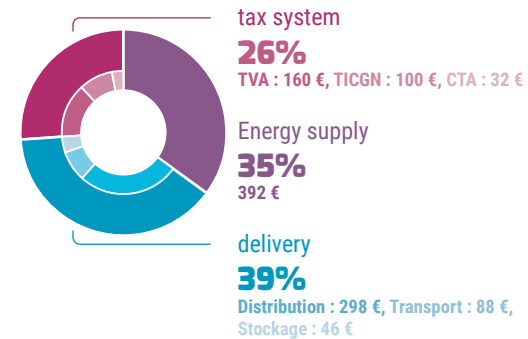
MARKET OFFER, IN GAS & ELECTRICITY, LESS EXPENSIVE IN RELATION TO REGULATED RATE

Electricity
 In the electricity market, the price of the market supply indexed on the lowest-cost regulated tariff proposed in Paris is 9% lower than the regulated sales price, including VAT, for an average customer at a base rate of 6 kVA consuming 2, 4 MWh / year and 10% for an average customer at the rate peak hours / off-peak hours 9 kVA consuming 8.5 MWh / year.

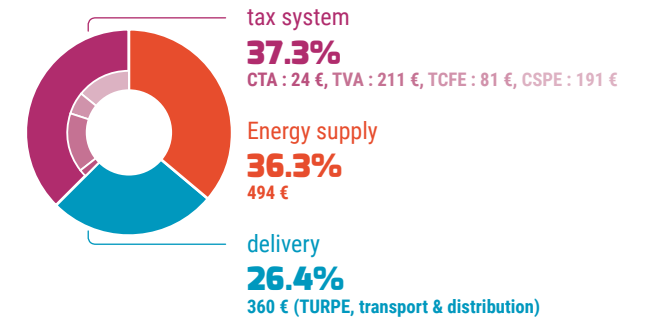
Gas
 On the natural gas market, the lowest variable-price market offer proposed in Paris, on the one hand to a typical customer consuming 750 kWh / year (Cooking) and on the other hand to a typical customer consuming 17 MWh / year (Gas heating) is lower, respectively, 10% and 8% from the regulated rate Plus, sales tax.

INVOICE BREAKDOWN

Gas
1,116 € TTC/an
 For a customer with B1 tariff consuming 17,000 kWh (heating use)



Electricity
1,360 € TTC/an
 For a customer 9kVA (customer consumption of 8,500 KWh, distributed in 54% full hours and 46% off-peak hours)



Delivery: part of the regulated sales tariff covering transport, storage and distribution costs. The transmission and distribution costs are determined by applying the tariffs for the use of the electricity (TURPE) and gas (ATRD for distribution and ATRT for gas) networks fixed by the CRE. / **CSPE:** The Contribution to the public service of energy (CSPE) is collected on behalf of the Customs and integrated, as receipt, to the budget of the State. It amounts to € 22.5 / MWh since January 1, 2016. / **CTA:** The Transmission Rate Contribution makes it possible to finance the specific rights relating to old-age insurance for personnel covered by the electricity and gas industry regime. / **Supplier:** portion of the regulated sales tariff covering supply and marketing costs. / **TCFE:** The Final Electricity Consumption Taxes are defined by each municipality and each department. They depend on the power contracted and a multiplier fixed and voted before 1 October of each year by the municipal and general councils for the following year. / **TICGN:** The Internal Tax on Natural Gas Consumption is collected on behalf of customs. Since April 1, 2014, the TICGN applies to all natural gas consumers, including residential customers (some industrial uses will still benefit from the exemption The contribution to the Special Solidarity Tariff, which enables the financing of the special solidarity rate, as well as the biomethane contribution, which enables the financing of the public service charges relating to the purchase of biomethane injected into the network of natural gas, are included in the TICGN since 1 January 2016. Since January 1, 2017, it amounts to € 5.88 / MWh (it was € 4.34 / MWh in 2016). / **TVA:** The Value Added Tax applies to: 5.5% on the fixed part (including the CTA); 20.0% on the proportional share.

THE NETWORK

BALANCE OF IMPORTS AND EXPORTS IN GAS

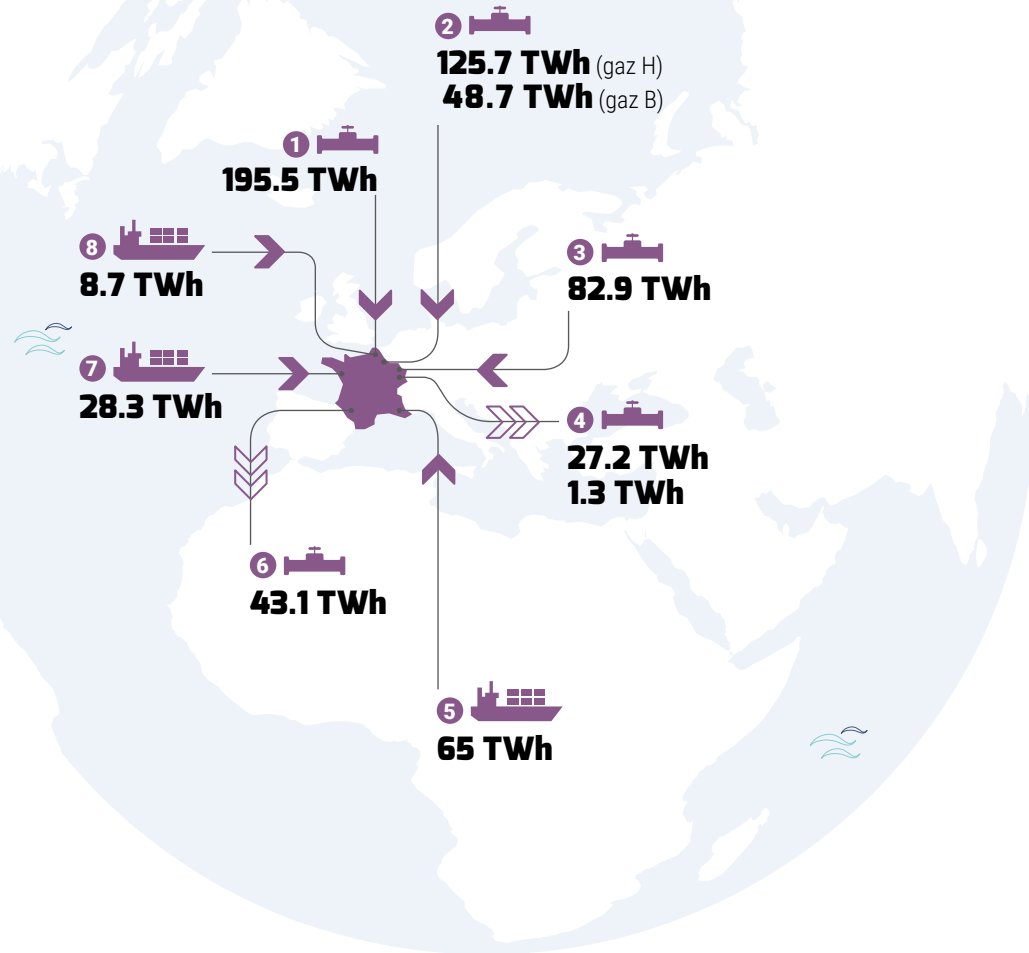
Net trade balance

483.2 TWh

Interconnection capabilities
3,585 GWh/j input and
658 GWh/j output

Imports 583 TWh
Exports 100 TWh

- 1 Dunkerque
- 2 Virtualys + Taisnières B
- 3 Obergailbach
- 4 Oltingue & Jura
- 5 Fos-sur-Mer
- 6 PIR Pirineos
- 7 Montoir-de-Bretagne
- 8 Dunkerque LNG



TRANSPORT NETWORK MANAGERS (GRT)

Electricity transport: 1 GRT, RTE

- Network of 105,961 km
- Distributed energy: 519.7 TWh
- 258 industrial customers in 2015

Gas transport: 2 GRT

GRTgaz

- Network of 32,410 km
- Distributed energy: 627 TWh
- 749 active industrial customers, with 13 gas plants

TIGF

- Network of 5,136 km
- Distributed energy: 136 TWh
- 116 industrial customers (no gas plant)

DISTRIBUTION NETWORK MANAGERS (GRD)

Electricity distribution

- 148 GRD including 6 with more than 100,000 customers (Enedis, Strasbourg Electricity Network, Gérédis, SRD, URM, GEG). Enedis covers 95% of France and serves 35 million customers.
- Total network length: about 1.4 million km
- Distributed energy: 403.1 TWh
- Total number of customers: about 36.9 million

Gas distribution

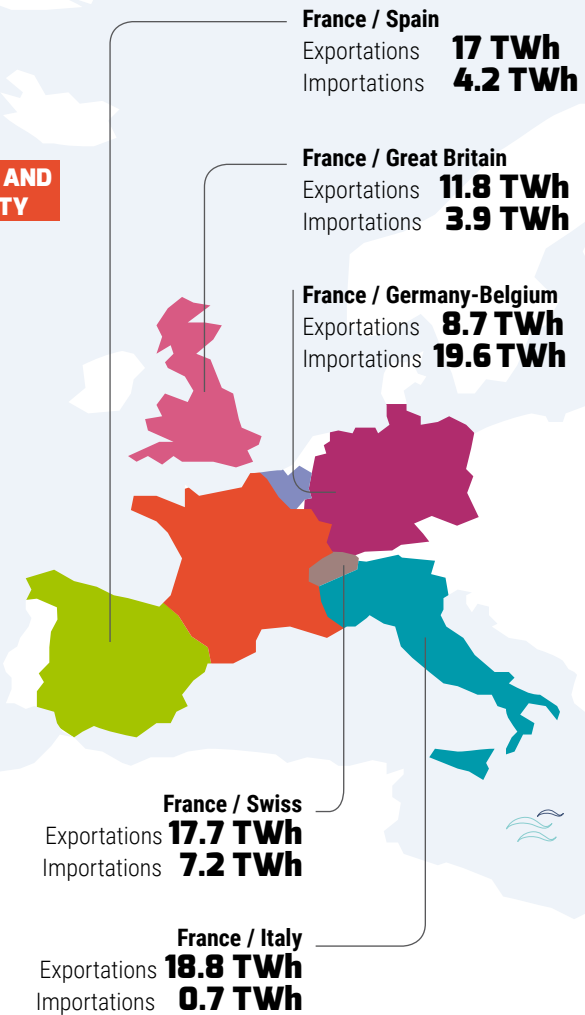
- 26 GRD > with 1 main GRD, GRDF, covering 95% of France and serves 10.9 million customers
- Total network length: about 205,000 km
- Total volume distributed: 305 TWh
- Total number of customers: about 11.4 million

BALANCE OF IMPORTS AND EXPORTS IN ELECTRICITY

Net trade balance

38.4 TWh

Interconnection capabilities
9.8 GW input
and 13.8 GW output



NUMBER OF METHANAL TERMINALS AND THEIR STORAGE CAPACITY

Montoir (Elengy) : regasification capacity of 10 billion m³ per year and capacity to LNG storage of 360,000 m³

Fos Tonkin (Elengy) : regasification capacity of 3 million m³ per year and storage capacity of 80,000 m³ GNL

Fos Cavaou (Fosmax LNG) : regasification capacity of 8.25 billion m³ per year and storage capacity of 330,000 m³ GNL.

Dunkerque (Dunkerque LNG) : regasification capacity of 13 billion m³ per year and storage capacity of 570,000 m³ GNL (in service after January 2017)

WHOLESALE MARKETS

EXCHANGED VOLUMES MONITORED BY THE CRE IN ELECTRICITY AND GAS

Total electricity and gas
1,618 TWh traded
or 49.3 billion euros

Electricity
1,030 TWh traded
or 39 billion euros

Gas
588 TWh traded
or 10.3 billion euros

AVERAGE PRICES OF ELECTRICITY AND GAS

Electricity
average spot price 2017
44.97 €/MWh

Gas
average spot price 2017 at PEG Nord
17.5 €/MWh

NEW TECHNOLOGIES FOR CONTROLLED CONSUMPTION

Accelerating competition, multiplying attractive and innovative offers focused on controlling consumption and lowering bills, boosting self-consumption: retail electricity and gas markets are evolving. New technologies are one of the factors.



01/07/2007

Openness to retail competition for all consumers.

01/01/2016

Disappearance of regulated tariffs for large and medium-sized business customers.

89%

of the consumption of natural gas in France is no longer at the regulated tariff.

**2 TIMES
MORE**

of domestic suppliers active in the residential electricity market in 2 years.

1,250,000

residential customers earned in 2017 by alternative electricity providers

**MORE
THAN 30**

offers of electricity or gas supply to residential customers by alternative suppliers.

OPENING OF THE MARKETS: INTENSIFICATION

As a result of the opening up to competition of the French markets for electricity and natural gas on 1 July 2007, customers can freely choose their energy supplier and non-historical alternative suppliers have entered the retail market.

Favourable Context for Competition

The market for energy suppliers is attracting new players as evidenced by the rise in the number of suppliers in France.

In the non-residential electricity and gas market, 8 new active¹ domestic suppliers (that is to say serving more than 90% of connected municipalities in mainland France) have registered on the website of the National Energy Ombudsman www.energie-info.fr in 2016 & 2017.

The trend is identical in the residential market, where the inflection is particularly clear for electricity with, in January 2018, twice as many suppliers as in January 2016.

The intensification of market opening is part of a framework that opens up the competition. The abolition on 1 January 1, 2016, of the regulated tariffs (TRV) of electricity and natural gas for companies and local authorities has given the opportunity to alternative suppliers to win new customers in the market. The TRVs are maintained for residential and small business customers (up to 36 kVA of electricity subscribed power and 30 MWh of annual gas consumption).

(1) A supplier is said to be active if it meets at least one of the following conditions:
- it supplies at least one site with electricity or natural gas;
- it is responsible for the balance of at least one site in CARD / CART in electricity or CAT in gas;
- it is responsible for the balance and has delivered a portion of the consumption of a site during the previous year.



45
domestic suppliers
active in the non-
residential electricity
and gas market as of
1 January 2018.

23
active domestic suppliers
in the residential
electricity market as
of 1 January 2018
(12 to 1 January 2016).

In addition, the construction of electricity TRVs by "accumulating costs" ensures the contestability of the tariffs, for example, the possibility for a competing alternative supplier of EDF to offer a competitive tender. Coupled with the low price levels on wholesale markets, this calculation methodology has increased the economic space of alternative suppliers by taking market prices more into account, and not just the EDF accounting costs.

Business initiatives of alternative suppliers

This dynamic is also the result of the commercial initiatives of new suppliers, foremost among them their ability to offer consumers cheaper offers (up to 10% off the annual tax bill) than regulated tariffs, particularly during shopping campaigns grouped by consumer associations. Furthermore, their fixed-price offers, which are more numerous than those with variable prices, attract and reassure consumers who, in their essential argument, can anticipate the amount of their bill. They cover increasingly longer periods: up to four years for natural gas.

Innovative offers energize the market. New electricity suppliers offer green electricity offers to reduce consumption or for domestic green electricity. Also emerging offers dedicated to the owners of electric cars. In the residential natural gas market, innovative services are also available to monitor consumption and remotely control heating.

Innovation also focuses on the distribution channels of offers. Providers make extensive use of the internet and explore other vectors: partnership with subscription underwriting platforms during removals, bulk purchase at the level of a municipality, sale in a commercial zone, etc. The market entry of players in the retail sector, such as Casino and Leclerc groups could profoundly change the traditional approach to marketing of electricity and the perception of the product by consumers.

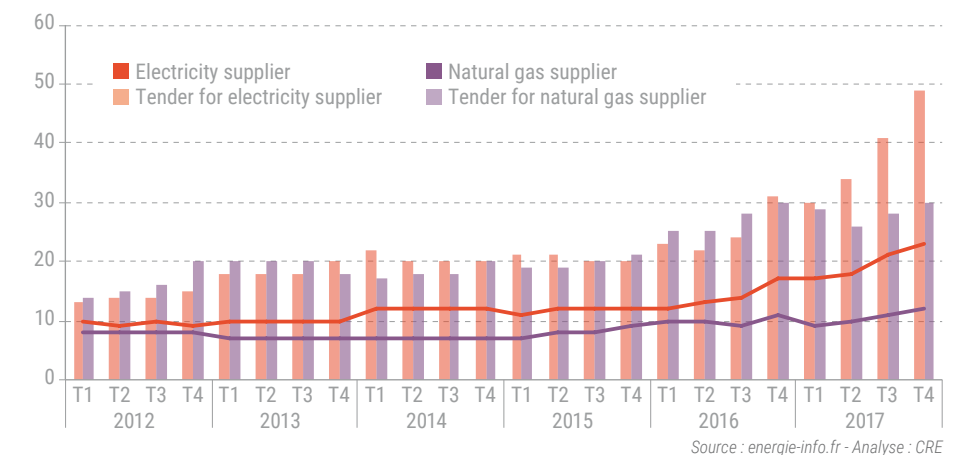


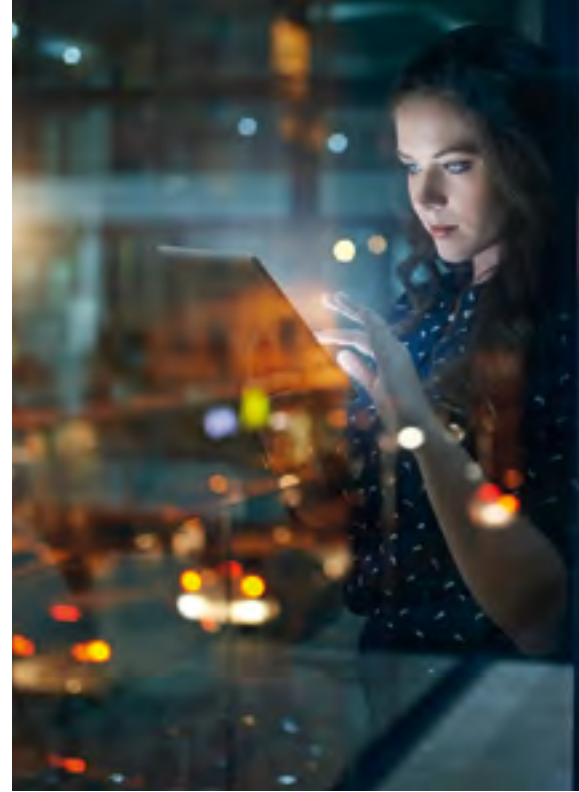
ACCUMULATING COSTS

In effect after the end of the year 2014, this method for calculating electricity TRVs aims to enable alternative suppliers to compete with TRVs by reflecting both EDF costs and market prices. Several components are added:

- ARENH (regular access to nuclear energy 42 €/MWh in 2017) cost;
- additional supply valued at market price;
- accumulating energy costs (TURPE);
- marketing costs;
- a normal return for the supplier.

Evolution of the number of active domestic suppliers for electricity and natural gas and of the number of tenders for Associated suppliers, for residential 20 Sites registered on the website: energie-info.fr 2012-2017





Increasing competition in the markets

While, overall, historic suppliers continue to dominate the electricity market and, to a lesser extent, the gas market, the share of alternative suppliers is steadily increasing, especially in the residential electricity market, where it accelerates substantially.

By the end of 2017, alternative operators provided electricity to 18% (+ 4% compared to 2016) of residential sites. In this market, ENGIE and Direct Énergie remain the main players with respectively 2/3 and 1/3 of the sites and electricity consumption. Other suppliers occupy a marginal position with 11% of the consumption in the market, including 4% for Total following its merger with Lampiris.

In the residential natural gas market, offers are more widespread. Their growth follows the trend of 2016 and alternative suppliers now supply 26% of the sites. Unlike electricity, more than half of the sites that subscribe to a natural gas alternative supplier remain with a historical supplier. ENGIE is thus the leading provider of the market for the residential segment in both energies.

On the non-residential market, the trend is identical. In 2017, the number of electricity customers of an alternative supplier has grown 25% faster than in 2016 (excluding the switchover from 1 January due to the end of the TRVs). On the other hand, since competition is already well established in this natural gas segment, the increase in the number of sites with an alternative supplier is limited (+5.4%). However, in 2017, historic suppliers continue to lose customers to alternative providers.



HISTORIC SUPPLIERS ON THE GAS MARKET 31 DECEMBER 2017

44%
of sites with regulated tariffs for 11% of consumption

29%
of bidding sites for 32% of consumption



HISTORIC SUPPLIERS ON THE ELECTRICITY MARKET 31 DECEMBER 2017

80%
of sites with regulated tariffs for 37% of consumption

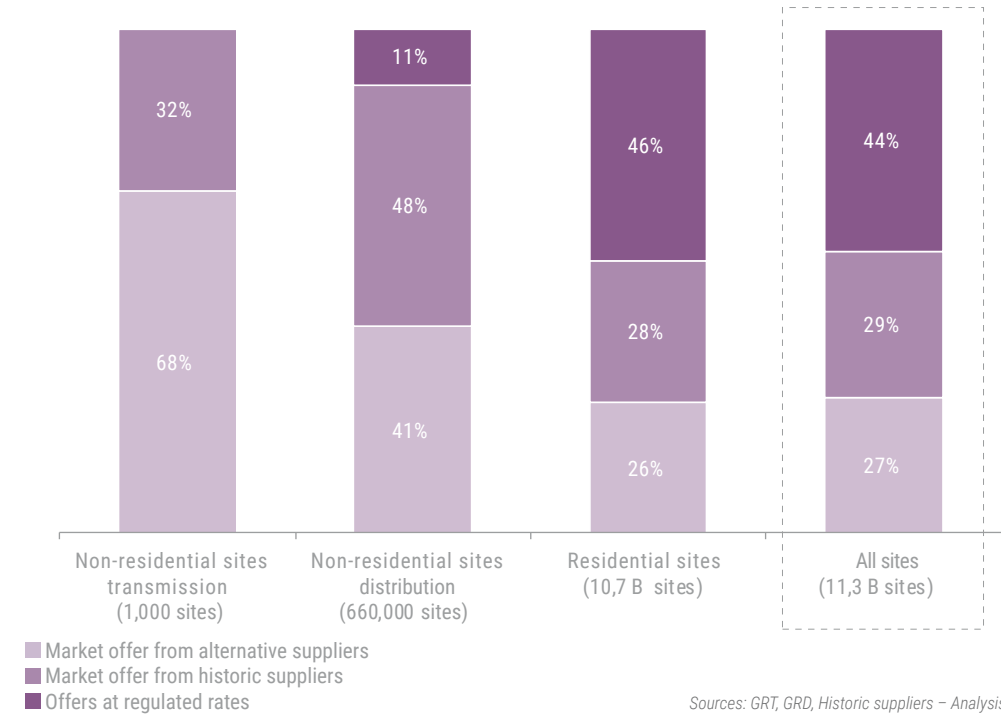
2%
of bidding sites for 32% of consumption

More than **70%** medium and large non-residential sites have selected market offers from historical suppliers after the removal of regulated tariffs on 1 January 2016.

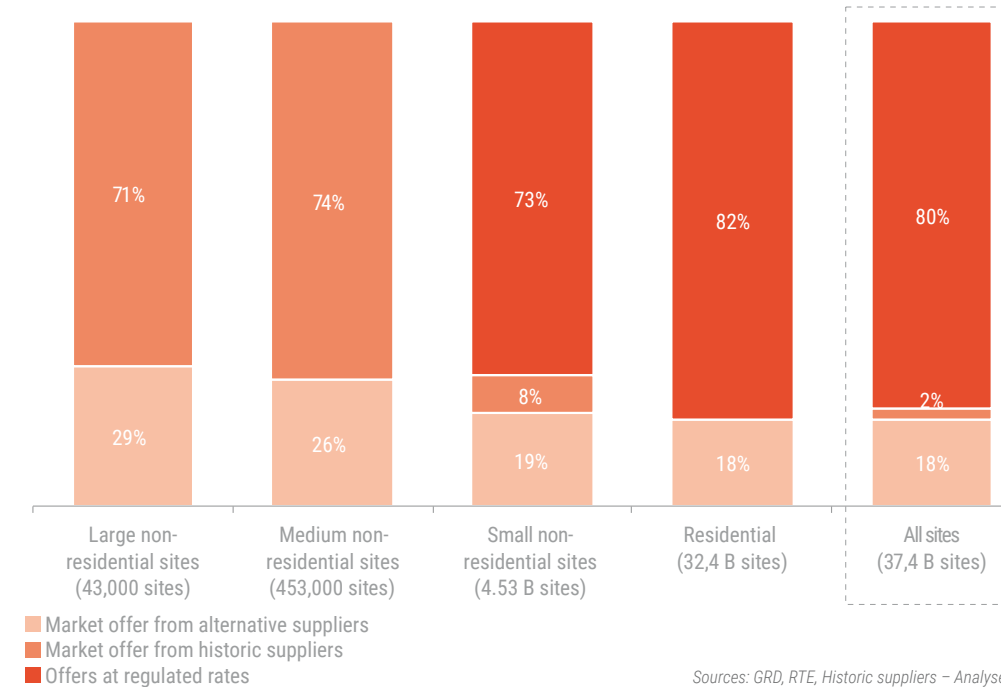
100,000 additional customers per month on average earned in 2017 by alternative electricity suppliers (72,000 / month in 2016, 54,000 / month in 2015).



Distribution of sites by type of offer on 31 December 2017 Gas



Distribution of sites by type of offer 31 December 2017 Electricity



For further information, consult the retail market report: [Click here](#)

TECHNOLOGICAL INNOVATION, LEVER LOWER CONSUMPTIONS AND COMPETITIVE ADVANTAGE

By providing consumers with new solutions, particularly in terms of better management of their energy expenditure, technological innovation contributes fully to market dynamics.

Advanced meters and offers for monitoring and controlling consumption

Currently being deployed in almost all European countries and in France, with Linky (Enedis) for electricity and Gazpar (GRDF) for gas, advanced electricity meters have several objectives: facilitate the life of the consumers and assist them in the reduction of energy consumption, optimize network costs and improve their performance, but also encourage the emergence of innovative energy services and new players.

In France, some suppliers offer tariff packages tailored to the specific needs of each; for example, weekend offers that claim a possible reduction of 30% on the variable price of electricity between full hours on weekdays and off-peak hours on the weekend.

Internet of Objects (IoO) is growing and many suppliers are offering their customers consumption monitoring and data historization tools to closely manage their budgets. Objective: assist in the optimization of their consumption and identify energy-hungry posts.

These innovative offers are based on the development of smartphone applications and the use of connected objects, such as thermostats, for example. In April 2017, the mobile operator Budget Telecom launched its Mint Energy offer, which allows consumers to measure their consumption in real time via a smartphone application, available for iOS and Android.

Digitized relationships, cost-effective

Another innovation, most visible in the market: 100% online offers, with fully digitalized customer relations. All exchanges between the customer and the supplier are performed via a web platform for the establishment of the offer and for any future exchanges, including the possibility of using an electronic mail. This customer management leads, according to the efficiency leading to cheaper supply offers.

700 millions

advanced meters in service
around the world

8 millions

homes equipped in France with a Linky
meter on 1st January 2018

700,000

homes equipped in France with a Gazpar
On 1 January 2018

ADVANCED METERS: ALSO IN LDC

The industrial deployment of advanced meters has been under way since the end of 2015 for Linky (Enedis) and since May 2017 for Gazpar (GRDF).

The CRE considers it essential to deploy such meters also in the territories of local distribution companies (LDC) to provide their consumers and partners, including local authorities, with adapted supply solutions, energy demand management services and access to richer consumer data.

In 2017, it accompanied the natural gas LDC in their advanced metering projects, in particular Régaz-Bordeaux and GEG in Grenoble, the first two to submit a project. Following technical and economic studies, the CRE proposed to the public authorities to approve the launching of these projects. For LDCs who have not yet initiated a project, it considers that it is necessary to seek to pool projects. The study conducted shows that the weight of fixed costs could compromise the profitability of projects involving less than 50,000 advanced meters exclusively in gas. The work with natural gas LDCs and SPEGNN, continues.

For electricity, the CRE accompanied the EDF SEI, manager of the distribution networks of non-interconnected zones, in its project of advanced meters. A public consultation was launched at the end of 2017.

It also initiated discussions with Gérédis, ELD of Deux-Sèvres. Work continues. As for natural gas, the CRE considers it necessary to analyse the relevance of project pooling.

15 RECOMMENDATIONS FOR MAKING DATA A LEVER OF EFFICIENCY FOR THE ENERGY SYSTEM

Data, for example on the consumption, production or operation of infrastructures, enables energy players to offer the consumers with a number of new services to ease their lives or to aid them in bill reduction, or to become actors in the industry of energy transition. They are, thus, vectors of innovation. The energy sector produces more and more, leading the legislature to frame this evolution.

The CRE seized the subject and published in June 2017 the state of play and the legal and technical typology of data issues addressed by the network operators and energy infrastructures. Its report made 15 recommendations for making data an energy efficiency lever.

A prerequisite for the consumer's informed consent and trust, the collection of data must follow simple and transparent procedures. Another major topic is the governance of data delivery platforms to be organized so that they streamline the functioning of the market, stimulate innovation and support actors in the energy transition. In June 2017, the entry into effect of new regulatory texts has widened the scope of available data.

Network managers continued their initiatives to make them available. In its progress report of January 2018, the CRE informs on these advances. A successful assessment is planned for the summer of 2018.



For further information, consult the site
and the smartgrid module:

[See the site](#)

[See the module](#)

FOR A CONSTANT AND PROGRESSIVE DEVELOPMENT OF SELF-CONSUMPTION

In innovations, the CRE places a special emphasis on self-consumption. This can be individual, the consumer produces for itself all or part of its electricity consumption, or collective, several consumers associating with one or more producers. By the end of 2017, Enedis accounted for approximately 20,000 consumer goods. Still a very small number, but a dynamic seems to be starting: nearly half of the new connection requests for production facilities are self-consumed and some suppliers, such as EDF Énergies Nouvelles and ENGIE, offer individuals self-consumption related offers. This dynamic is supported by the lower cost of photovoltaic panels and the desire of the consumers to favour short circuits. Moreover, in the current tariff and fiscal framework, it can find profitability in certain cases.

A broad consultation

In the second half of 2017, the CRE launched a broad consultation on self-consumption to examine the consequences that its development will, or could have, on the French energy model, in particular on the tariffs. This consultation was organized around a forum, five workshops, a call for contributions and a public consultation.

Two deliberations

Following this consultation and its own analytical work, the CRE has issued two resolutions. The first, from 21 February 2018, provides recommendations and guidance on support arrangements and the contractual framework. It aims at a twofold objective: first, to enable an optimal, simplified and controlled development of the self-consumption of renewable energy to reach the objectives of the energy transition at the best cost for the community; on the other hand, to guarantee the compliance with the rules essential for the safety and the proper functioning of the electrical system. The mandatory reporting of production facilities is an example. The second, in the second quarter of 2018, concerns changes in network tariffs related to self-consumption, CRE being responsible for defining network usage tariffs that reflect the costs incurred by consumers. For individual self-consumption, given the diversity of situations, it has not changed the TURPE, considering that the tariff must reflect the costs of networks regardless of the use of electricity. For collective self-consumption, it has implemented a tariff that reflects the costs avoided by local electricity generation by distinguishing a tariff for self-consumption flows, which do not pass through high voltage, and tariff for the allocated flows, which pass through the high voltage.

3 QUESTIONS TO

PAULINE HENRIOT,
Mission manager,
Network manager of the CRE

Why did the CRE choose to seize topics related to consumption?

Still marginal but booming, self-consumption re-examines various aspects of the electrical system: network pricing, support device, articulation with supply offers, security, etc. Hence the choice to approach the issue in a transversal way, involving many stakeholders. Faced with this new and protean phenomenon, it was necessary to avoid a piecemeal approach that would have risked leading to an inconsistent framework. At this stage, the CRE has issued a deliberation on network pricing for self-consumers and recommendations on the adaptation of support systems and the technical and contractual framework.

Is the work of the CRE complete?

No, self-consumption is just beginning. There is a lack of data on the behaviour of self-consumers, especially for collective self-consumption for which the first operation was launched in early 2018. A dozen others could be by the end of 2018: it will be necessary to assess the feedback of experience to possibly rehabilitate the framework in force.

Which are the next steps?

The consultation highlighted the sites to be treated, but in a framework that goes beyond the question of self-consumption. I'm thinking of network storage or pricing for injections. Generally, the best tariff response is to set up robust tariffs, adapted to changing uses. This shall be the goal of work on the structure of TURPE 6.



“Like the energy system, the energy consumer has also entered a transition phase.”

CÉCILE MAISONNEUVE,
PRESIDENT OF THE CITY FACTORY,
CO-CHAIR OF THE CONSUMER WORKING GROUP
OF THE CRE FORESIGHT COMMITTEE

[See the video](#)

You are the president of the City Factory, innovation and foresight laboratory dedicated to the city of tomorrow and particularly to energy consumption. Can you give us a snapshot of today's consumer? What are its expectations? Its habits?

The cities actually account for more than three-quarters of energy consumption and, as such, offer a revealing picture of our energy consumption practices. Like the energy system, the energy consumer has also entered a transition phase.

On the one hand, it is traditional in its habits: consider, for example, the wait-and-see attitude of individual French consumers regarding the possibility of switching energy suppliers. In its expectations of this system, he shows himself to be interested in the innovations brought by the energy transition.

It is only necessary to see the enthusiasm generated by, for example, collective self-consumption projects. He is aware that he has a key role to play in this transition but aspires to do so with some autonomy. A hard point remains: whether it is individual, industrial or tertiary, consumers pay extreme attention to the evolution of energy prices.

At the time of digitalization of services with the use of our smartphones, how do we assist the new consumer in the reduction of their electricity bill?

Digital is a revealer of our way of life. The collection and especially the processing of massive data make it possible to know, with an unprecedented precision, our uses in terms of energy consumption. Tertiary and industrial consumers have already taken advantage of this to reduce their bill.

With regards to the individual consumer, this appropriation of digital tools and services is slower but the movement has already launched. These new tools are like mirrors that enable the consumer to see his consumption behaviour in real time. Beyond this awareness, will it lead to habitual changes? It is still necessary for the consumer to find a clear financial interest. Digital alone is not enough to change the behaviour. It must be associated with economic incentive signals.

Do you think that the services associated with the supply of energy are adapted to the new modes of consumption?

In all sectors of activity, services associated with digitalization only interest customers if they meet their needs and focus on their uses. The energy sector, entering the era of services, is no exception to this rule. For this reason, the services associated with the supply of energy must obey the triple imperative that governs the life of digital services: simplicity of use, readability and individualisation of the offer.

What are the benefits of the digital transformation for the consumers? What are the possible obstacles?

The energy consumer today feels that he is in control of his energy choices: choice of supplier; choice of energy source; whether for heating or lighting (local, "green", etc.); choice of energy for mobility; choice of its Array of services, etc. It is still necessary that he can find his way in this inflation of offers and make informed choices.

And this is where the digital, including the economic platforms it creates, can aid. Better informed, he will be able to better control his energetic destiny, leaves besides to choose to ... not to choose. Because the next step in the digital revolution is the development of artificial intelligence that, in a way, will choose instead of the consumer the best way to optimize its consumption.

In such a system, the key word is trust. In this respect, nothing is won: consumers in all sectors are becoming increasingly attentive to the control of their personal data, as they demand greater transparency of the algorithms. This sensitivity to the question of the protection of privacy is even more acute in the energy field, which affects our daily lives, even in the sphere of intimacy when it comes to domestic consumption. In this respect, the energy transition is also a new social contract to be defined, which goes far beyond technological innovations.

RECONCILING ENERGY TRANSITION AND SECURITY OF SUPPLY

By exploiting the complementarities between Member States via the internal energy market, the interconnections play an important role in the energy transition, a major axis of the policy of France and the European Union.

The complementarity of the parks facilitates the development of renewable energies while strengthening the security of the supply and the safety of the energy system.

This is also the logic of the work of the CRE on the balancing of the electricity system; the creation of a single market for gas and the reform of natural gas storage.



02/02/2017

Approval of the project IFA 2

22/06/2017

Roadmap for the balancing of the French electrical system

01/11/2018

Creation of a single gas market zone in France

1,750 M€

Total investments for the project Golfe de Gascogne

74 TWh

Of exported electricity, 35.6 TWh imported

100 TWh

Of exported gas, 585 TWh imported

THE NET INCREASE IN ELECTRICITY FLOWS AT THE BORDER: THE EUROPE OF THE ENERGY EXISTS

For further information, consult the interconnections module:
[See the video](#)

With 38.4 TWh in 2017, the net electricity exports of France mark, compared to 2016 (39.2 TWh), a slight decline that should not hide the rise in exported (74 TWh) and imported (35.6 TWh) volumes. The balance of the border trade was strongly influenced by the increase in import requirements during the winter 2016-2017, due to the unavailability of several nuclear power plants due to a cold snap, particularly in January. Thus, the net trade balance was negative (-0.9 TWh) in January 2017 and, for the whole year, France was net importer for 52 days (46 in 2016) spread over the months of January, November and December.

A net exporter balance except with the west-central Europe region

The balance sheet differs according to the countries with which France is interconnected. With respect to the Central West Europe (CWE) region, e.g. at the border with Belgium and Germany, France has a net import balance, up from 2016. On the other hand, on all other frontiers, it shows a net export balance, down for the United Kingdom, up for Spain, Italy and stagnant with Switzerland. Towards Spain, net exports reached a historic



INTERCONNECTION: HIGH RATES OF USE

- 88%** with Italy
- 85%** with Spain
- 82%** with the United Kingdom
- 62%** with Switzerland

Annual average business capacity and total flows in 2017 at the French borders

	Capability (MW)		Flo (TWh) ¹		
	Export	Import	Export	Import	Net
Spain	2,559	2,294	17.0	4.2	12.8
Italy	2,528	1,019	18.8	0.7	18.2
Switzerland	3,007	1,180	17.7	7.2	10.4
Belgium & Germany ²	7,060	9,221	8.7	19.6	-10.9
United Kingdom	1,741	1,741	11.8	3.9	7.9
Total (outside CWE)	9,835	6,234	74.0	35.6	38.4

(1) Commercial flow (excluding closing loops, mutual relief between GRT and catch-up of losses and gaps. (2) Maximum net trades reported (Flow Based calculation no longer calculates a trading capacity per border).

high, despite significant imports in early 2017. These balances are significantly impacted by the availability of interconnection capacity, with an increase in capacity with Spain and the unavailability of part of the interconnection capacity with Great Britain in 2017 due to the pulling out of IFA link cables.

High demand interconnections, rising capacity

In general, the increase in border flows is the result of a high utilization rate of interconnections and a significant increase in commercial capacity, particularly with Spain, where the phase-shifting transformer is put into operation. of Arkale in June 2017 allows to take full advantage of the line Baixas-Santa Llogaia completed in 2015

After a slight increase in 2016, due to the implementation of a coordinated capacity calculation between RTE and Terna, the commercial capacities with Italy decreased slightly for export.

For the CWE Region, the trading capacity peaked at 7,060 MW in April and at 9,221 MW for import in November. However, French imports were particularly low in periods of tension, when the price spread between France and Germany is high, especially between November 2016 and February 2017, with an average import of 911 MW when the spread exceeded 50 € / MWh.

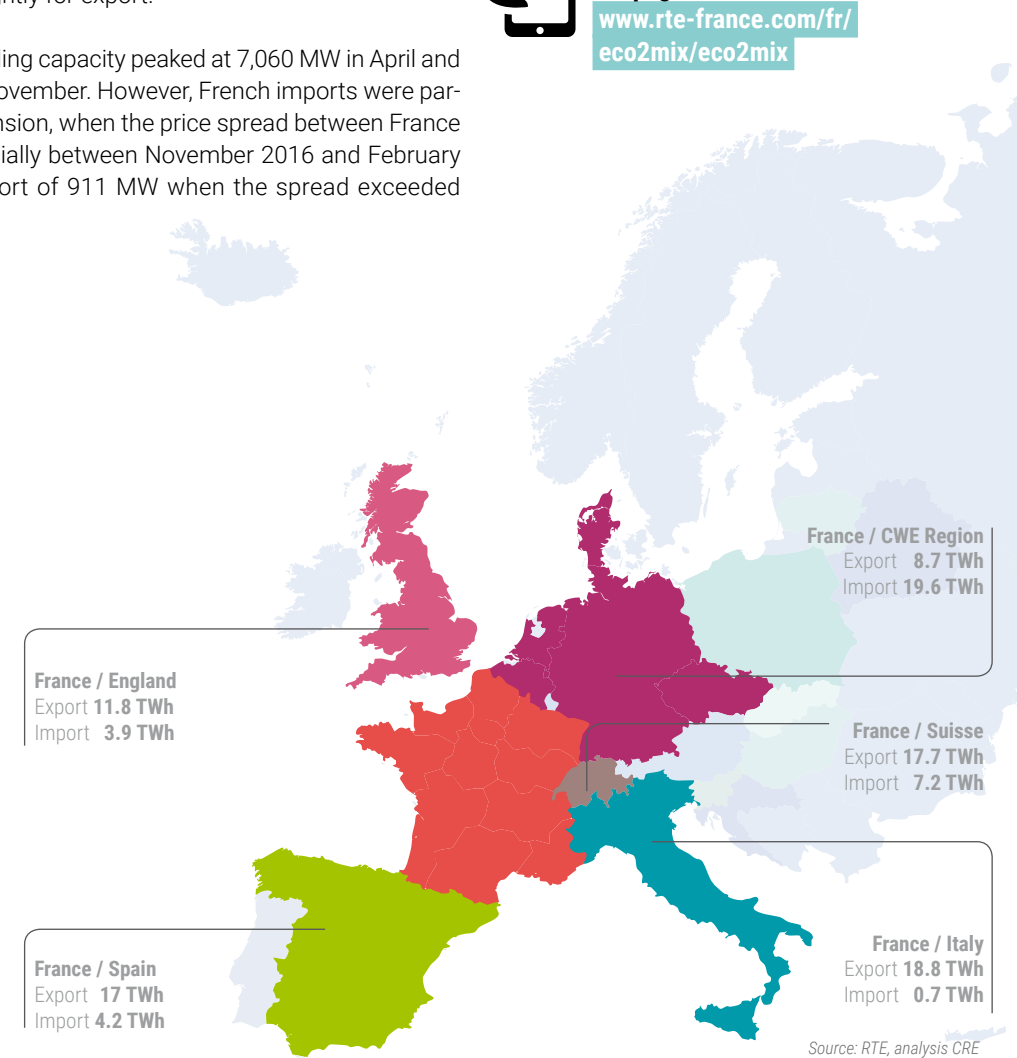
THE EUROPEAN NETWORK CODES

Intended to streamline and develop energy exchanges, these codes specify the conditions for access and management of European electricity and gas transmission networks. In 2017, the CRE continued to contribute to their development and application. Work continues in 2018 with the implementation of the Balancing Regulation.

For further information, consult the page eco2mix of RTE:
www.rte-france.com/fr/eco2mix/eco2mix

Trade balance with French electricity interconnections in 2017

Total commercial flow
Export **74 TWh**
Import **35.6 TWh**



THE EVOLUTION OF THE BALANCING TERMS OF THE ENERGY SYSTEM

To guarantee the safety of the energy network, the RTE has reserves that it must be able to quickly mobilize to modulate the levels of production and consumption, and that it activates by selecting the best offers at its disposal and at the best cost.

The energy transition and the cross-border integration of the balancing markets, initiated by the European regulation on balancing in force since 18 December 2017, required a change in the French model. To give visibility to the market players, the CRE requested the RTE in 2015 to anticipate these changes: the RTE submitted in July 2016 its Green Book on balancing the French energy system.

A roadmap and two objectives for balancing the French system

In 2017, the CRE noted that the French balancing model works in a satisfying manner. In its deliberation of 22 June 2017, it set a roadmap for balancing the French energetic system. It aims to contribute to the creation of a European balancing market and to facilitate the participation of new players, including renewable energy producers and aggregators. Several measures have been adopted, in particular an increase in demand-side incentives for consumption as well as the reinforced publication of balancing market data and the state of equilibrium of the French system. These developments will be concretely broken down over the next few years in the rules governing access to balancing mechanisms (frequency system services and adjustment mechanism).

The contractualization of the primary reserve by RTE and other European GRT

In parallel, the European initiatives for the exchange of equalization reserves are growing, in view of the early implementation of the European regulations on balancing.

Following the deliberation of 2 June 2016 on the modalities for setting up the primary reserve for frequency and power system services, since January 2017, RTE has constituted the primary reserve through a weekly cross-border call for tenders, jointly conducted with its German, Austrian, Dutch, Belgian and Swiss counterparts.

Further work on European exchanges in other reserves

For the secondary and tertiary reserves, the European regulators and the GRT have continued their cooperation and their voluntary work on several energy exchange platform projects: PICASSO for the secondary reserve (Platform for the International Coordination of the Automatic frequency restoration process and Stable System Operation), MARI for the fast reserve (Manually Activated Reserves Initiative) and TERRE for the supplementary reserve (Trans European Replacement Reserves Exchange).

3 TYPES OF BALANCING RESERVES

Primary:
automatically activated
between 15 and 30
seconds after breaking
the balance of the
network to stabilize the
frequency.

Secondary:
automatically activated
in 400 seconds to
restore the frequency to
its reference value.

Tertiary:
manually activated to
restore the secondary
reserve.

A GAS MARKET WELL INTEGRATED AT EUROPEAN LEVEL AND THE CREATION OF A UNIQUE MARKET ZONE IN FRANCE

France imports almost all the gas it consumes. In 2017, the net importer balance fell slightly compared to 2016. The import flows increased in Dunkirk and in the LNG terminals of Fos-sur-mer and Montoir-de-Bretagne, but they were reduced to Taisnières on the border with Belgium and Obergailbach on the border with Germany. For exports, the flow progression is sensitive to the Pirineos (with Spain) and Oltingue (with Switzerland).

Price convergence on wholesale markets

The available transport capacities in Europe and the harmonization of the allocation rules lead to a good convergence of prices on the wholesale markets, especially in north-western Europe. The prices at PEG Nord (gas exchange point, market place in the north of France) were very strongly correlated with the TTF (Title Transfer Facility, market place of the Netherlands), reference hub for gas prices in Europe.

However, tensions remain between the PEG North and the PEG TRS (Trading Region South, market place in southern France) with, at the beginning of 2017, a differential price close to 20 €/MWh during a cold wave and in a context of high LNG prices. The tension was exacerbated by exports to Spain, linked in particular to a greater use of combined gas cycles for the production of electricity while several French nuclear reactors were stopped.

A unique market area for the benefit of the consumers

With the creation of a unique market area in France from 1 November 2018, differential prices between North and South will disappear. The last step in a process for merging balancing zones that began fifteen years ago; this change will allow all French consumers to benefit from the same wholesale price. In addition, the Iberian Peninsula will be directly connected to a liquid marketplace with significant trading capacity with the North European market. This merger is made possible by the realization of the Val de Saône and Gascogne-Midi projects, which remove a large part of the North-South congestions as well as by mobilized market mechanisms in case of local congestion, such as the localized spread.

3 QUESTIONS TO

QUENTIN DE BREMOND D'ARS,
Project Manager at the CRE Networks
Directorate

What is the localized spread?

The localized spread is a contractual mechanism available to transport network managers (GRT) of natural gas to solve situations of congestion. Developed within the framework of the Gas Consultation between the GRT, the distributors and the CRE, it was instituted by the CRE in its October 2017 in a deliberation on the creation of a unique market zone in France.

How does it work?

In concrete, in the event of a congestion, the GRT will simultaneously purchase gas downstream of the congestion and sell it upstream of it. It can thus modify the flows programmed by the senders, while being neutral for the balancing of the network. The cost for the GRT is the price difference between gas purchase points and outlets.

These points of purchase and sale are interconnection points with adjacent countries, LNG terminals and underground storage facilities.

What will be the frequency of use?

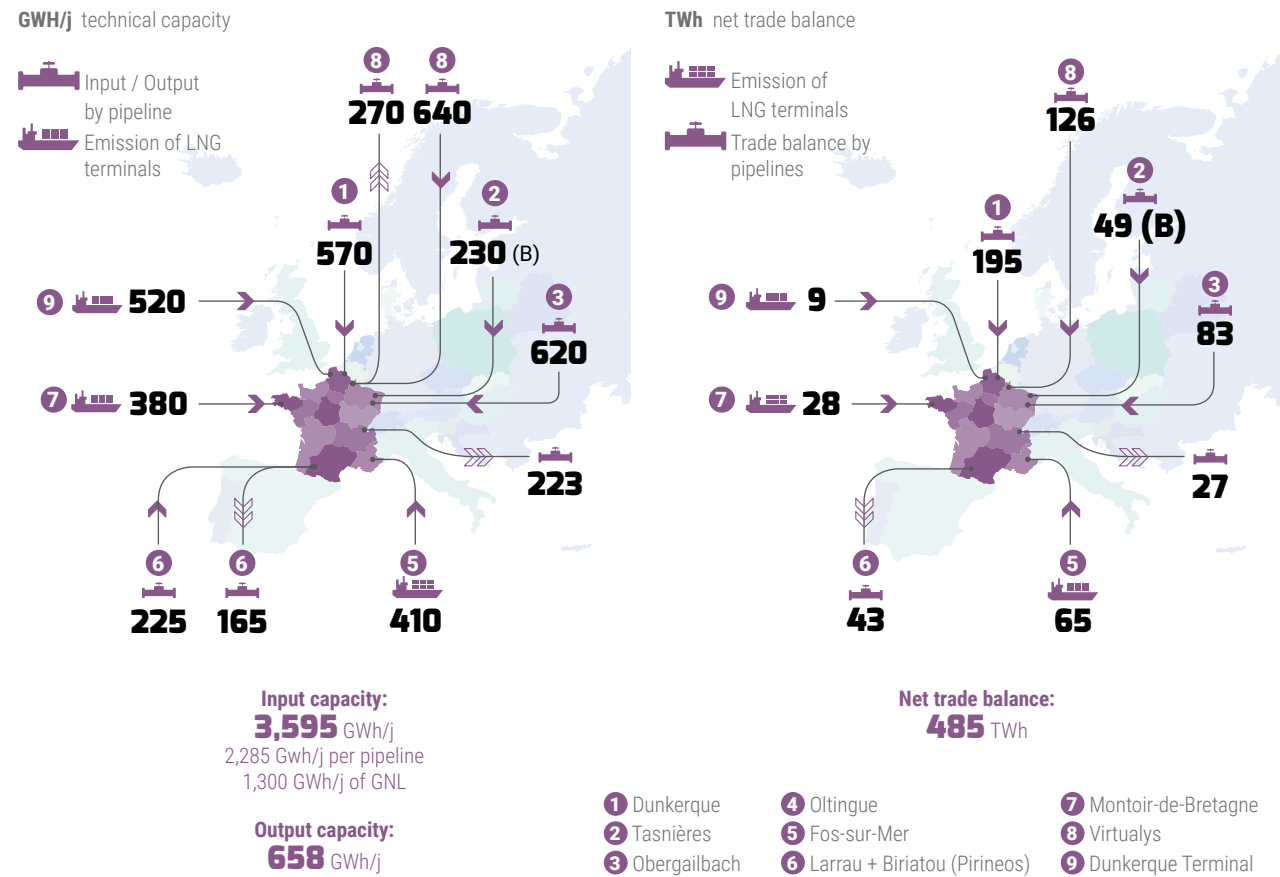
Once the unique gas market zone is created, it will depend strongly on the flow. We estimate that this mechanism will be used between 0 and 10% of the days to lift the North-South congestions. It could be used up to 1 day out of 3 in the event of total absence of LNG and a strong use of the gas power stations of the South. This mechanism has already been used this winter, successfully, to lift the congestion in the southeast.

Three deliberations on the reform of natural gas storage

In parallel with this project, a reform of third-party access to storage facilities was driven by the law of 19 December 2017, which puts an end to the research and exploitation of conventional and unconventional hydrocarbons in France. In particular, Article 12 provides that the income of storage operators will be regulated. The storage capacities will be auctioned and the difference, positive or negative, between the marketing revenue and the authorized revenue of the storage operators will be offset via the rate of use of the natural gas transmission network. This reform aims to ensure the filling of the storages required for the security of the supply, while ensuring cost transparency. The aim is also to put an end to the complexity of an individual bond system.

In its three deliberations of 22 February 2018, the CRE specified the conditions for the implementation of the reform of natural gas storage. These provisions will be applied from the 2018-2019 gas year.

French gas interconnection capacities (left) and balance of gas trade (right)



STRATEGIC INVESTMENTS

Border investments, internal reinforcements to streamline energy exchanges: France, in recent years, has led an ambitious policy to develop electricity and gas infrastructure. If gas requirements are being met, as shown by the convergence of wholesale market prices, investments will continue in the electricity sector,

Special attention to cost control and project utility

While ensuring the interest of the end consumers, the CRE fully participates in the objective of building the European electricity market. It pays particular attention to cost control and intends to ensure the usefulness of new infrastructures both for the consumer and for the completion of the European market and security of supply.

Given the often considerable investment costs, decisions must be based on sound cost-benefit analyses that take into account, in a relevant manner, the uncertainties related in particular to the development of renewable energies or the control of consumption.

Approval of IFA 2 project

Two of the interconnection projects with Great Britain, IFA 2 & Eleclink, are in process of implementation. In its deliberation of 2 February 2017, the CRE approved the IFA 2 project, underwater power line supported by RTE and National Grid, UK Network Manager. This line will connect the regions of Caen and Southampton.

The CRE matched its decision with an incentive regulation framework linking the network manager's level of remuneration to that of using the new line. The CRE matched its decision with an incentive regulation framework linking the network manager's level of remuneration to that of using the new line.

The current context on the border between France and Great Britain is marked both by the multiplicity of interconnection projects and by the British vote on 23 June 2016 in favour of Brexit which led to the activation



2020
IFA 2 commissioning planned

2025
planned commissioning of the Golfe de Gascogne project

280 km
underwater projects planned by the Golfe de Gascogne project

of Article 50 of the Treaty of the European Union by the United Kingdom on 29 March 2017. Following the studies performed by its services, the CRE considered in its deliberation of 16 November 2017 not to be in a position to decide on the interest for the European community of any new interconnection project between France and the United Kingdom before its conditions for leaving the Union are clarified.

It has therefore decided to transfer to ACER, the Agency for the Cooperation of Energy Regulators, the exemption request addressed to it by the promoters of the Aquind project.

Golfe de Gascogne project: a breakthrough

In September 2017, the CRE and the Spanish regulator CNMC concluded an investment cost sharing agreement for the Golfe de Gascogne project. This new interconnection will bring to 5 GW the capacity of exchanges between France and Spain (2.8 GW currently) and shall be a major breakthrough for the integration of the Iberian Peninsula into the European electricity market. It is in addition to recent investments to double the interconnection capacity between

France and Spain: Baixas-Santa Llogaia power line completed in 2015, Arkale transformer-phase-shifter commissioned in June 2017.

Other projects are under discussion, but their interest remains very uncertain with regards to the future evolutions of electrical systems. Moreover, given the need to cross the Pyrenees, we can anticipate that they will pose major environmental and social acceptability problems.



M. José María MARIN QUEMADA, President of the CNMC & Jean-François CARENCO, President of the CRE.

GOLFE DE GASCOGNE: INVESTMENT COST SHARING AGREEMENT BETWEEN CRE AND CNMC AND EUROPEAN COMMITMENT

On 21 September 2017, the CRE and the Spanish regulator CNMC concluded an investment cost sharing agreement for the Golfe de Gascogne project. Technological challenge for Network managers, the construction of the two high-voltage dc lines between Cubnezais in Gironde and Gatica in the Basque Country should represent a total investment of € 1,750m.

The CRE and the CNMC made their decision in accordance with the European regulation 347/2013 on the transeuropean network of energy which makes it possible to agree on a specific sharing of the costs in the event of imbalance between the profits and the costs borne by the project leaders. It is estimated that France will bear about 70% of costs for 30% of profits. Given the importance of the project for the integration of the Iberian Peninsula into the European electricity market and for the achievement of the Union's climate and energy objectives, the CRE and the CNMC have agreed on a breakdown of costs ensuring that the project is not deficient in the French perimeter.

Given the positive impact of the project in terms of innovation, security of supply, market integration and sustainability, the CNMC and the CRE encouraged the network operators to apply for a European grant under the mechanism for development of interconnection in Europe. Thus, € 578 million was allocated to the project.



“The Netherlands is one of the most interconnected countries Cooperation with our neighbours is therefore essential.”

REMKO BOS, DIRECTOR OF ENERGY, NETHERLANDS CONSUMER AND MARKET AUTHORITY (ACM), NETHERLANDS

In your opinion, should we continue to develop the electricity and gas infrastructure in Europe? What about the Netherlands and its neighbours?

It is crucial to continue to develop the electricity and gas infrastructure in Europe. The energy systems in the EU have intertwined in recent decades. The integration of renewable energies will only be possible if the transmission and distribution infrastructures are robust and the European network well interconnected, which will require significant investments until 2030. We can further improve the functioning of our regional energy markets and thereby increase our cross-border trade. The utilization rates of our interconnections would be significantly higher.

Thanks to market improvements and increased interconnectivity, we will be able to ensure security of supply for European citizens and industrial users. It must be kept in mind that the security of the supply is not only a national obligation; it is one of the pillars of the European and domestic energy policy.

The Netherlands is one of the most interconnected countries in the EU. The cooperation with our neighbours is, therefore, essential at the regulatory and operational policy level. A

concrete example: our work in the new CORE region. Our cooperation on market integration and security of supply at the Penta lateral Energy Forum was particularly fruitful.

Does the energy transition change the way in which interconnections are used?

Energy transition makes our systems more flexible. For this purpose, cross-border exchanges of energy flows play a vital role. They allow to preserve the stability of our transport networks. A closer coordination between national actors is needed to ensure the efficient operation and stability of the network within our markets: it is increasing the share of renewable energy and thus encouraging the decentralization of production while meeting demand. Policy makers and energy regulators should therefore work together to eliminate the market distortions that currently prevent the optimal use of transport network managers can play a crucial role in facilitating short-term existing cross-border physical capacity.

Another major consequence of the energy transition is the growing importance of the smooth functioning of short-term markets, particularly intraday and balancing markets. Our trade of market players. They should,

in my opinion, encourage them to contribute to the liquidity of our intraday and balancing markets, and refrain from becoming players in these markets. Regulators obviously have a role to play in encouraging this dynamic.

What do you think of Brexit and its consequences for the European unique energy market?

Dealing with the consequences of the Brexit decision is a challenge for all players in the energy market. This is a political process and it is the decision makers who will determine the degree of alignment of the UK on the European unique market. In this context, it is the responsibility of energy regulators to provide their technical recommendations on the future of market coupling between the UK and Continental Europe.

At the same time, regulators will have to protect the interests of consumers, that is, provide energy to consumers at a reasonable cost. They will be better served by a more developed internal energy market, with cross-border flows of electricity and gas flowing easily, including between the UK and Continental Europe. Today, there are many legal uncertainties regarding Brexit. Regulatory issues remain unanswered as they are crucial for market players, investors - and ultimately - consumers. These uncertainties must be solved quickly.

EFFECTIVE SUPPORT FOR MORE MATURE RENEWABLE ENERGY

The decline in renewable energy prices is game changer. The challenge now is not only to increase this energy potential; it is also, or even above all, to redefine a support framework adapted, legible and sustainable, in order to stay within the limits of controlled public spending and smooth functioning of the entire system.



32

recommendations
on public support
for RE in 2017

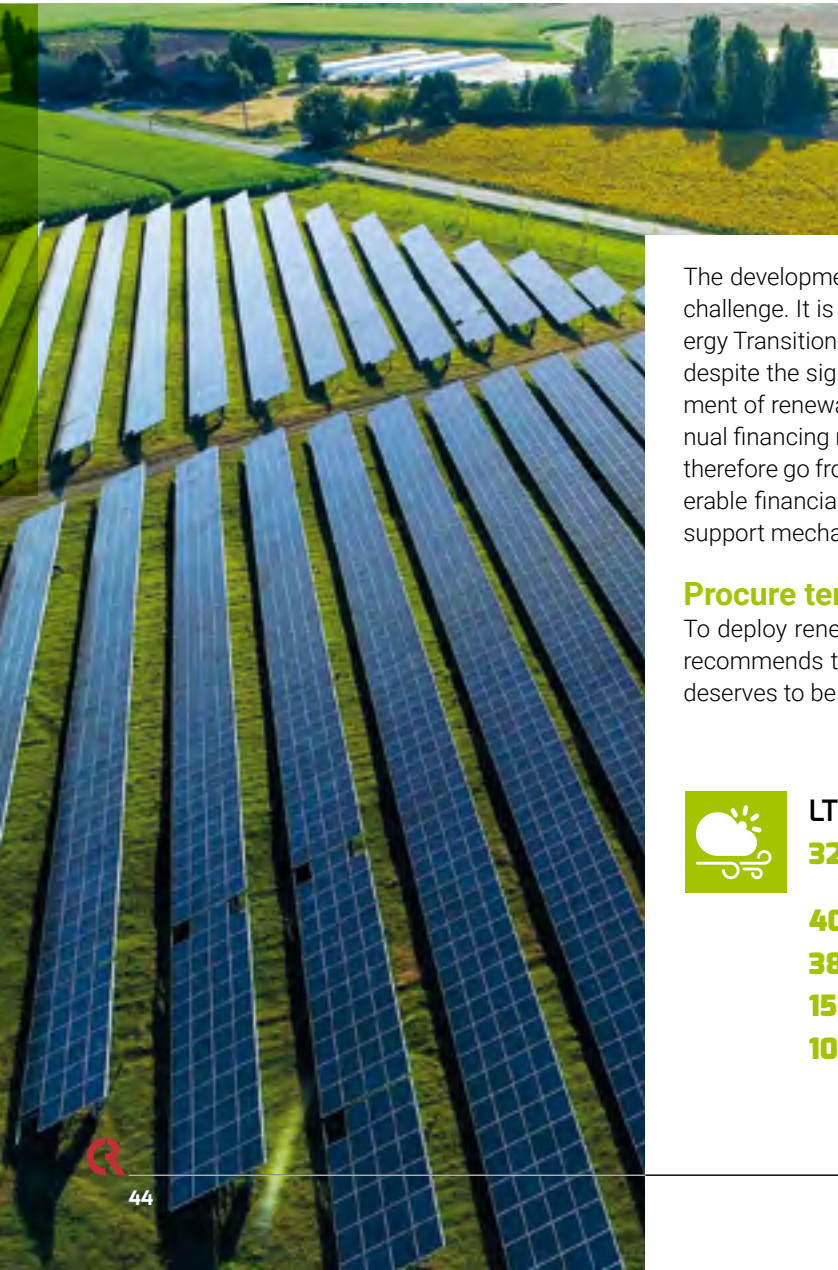
6.1 Md€

of public service charges
for support for RE
in 2017.
Forecast 2022: 8.3 B€

16

Call for tenders for RE
educated in 2017

DEVELOPMENT OF RENEWABLE ENERGY: PROPOSALS FOR THE ECONOMIC AND ENVIRONMENTAL EFFICIENCY OF PUBLIC EXPENDITURE



The development of renewable energies (RE) is a considerable financial challenge. It is a major axis of the French energy policy. The Law for Energy Transition and Green Growth (LTECV) set ambitious goals. However, despite the significant productivity gains of certain sectors, the development of renewable energies is based on growing public support. The annual financing needs of the corresponding public service charges should therefore go from € 6.1 billion in 2017 to € 8.3 billion in 2022. This considerable financial challenge requires reflection on the effectiveness of the support mechanisms. The CRE issued its proposals by the end of 2017.

Procure tenders for all mature sectors

To deploy renewable energy in an effective competitive environment, it recommends to proceed by tender, the most efficient procedure, which deserves to be extended to all mature sectors.



LTECV

32% of renewable energies in gross final energy consumption in 2030

40% of energy production

38% of final heat consumption

15% of final fuel consumption

10% of gas consumption

Another guarantee of efficiency: the competitive dialogue, which consists of adapting the terms of a call for tenders in consultation with pre-selected candidates to draw up the specifications. The CRE accompanied the Directorate-General for Energy and Climate during the competitive dialogue for an offshore wind farm off Dunkirk in 2017. The CRE recommends extending it to the most complex projects, some modalities having significantly improved the procedure.

Remove barriers to industry development

Controlling the cost of projects also determines the effectiveness of the renewable energy development policy. It involves removing non-economic barriers, such as the simplification of administrative procedures, and taking into account financial risks that are beyond the control of the producer. It is not up to the CRE to issue proposals in this area, but it is important to take corrective measures urgently.

Continue to integrate renewable energy into the electrical system, study their participation in balancing mechanisms

The efficient development of renewable energy passes through the integration of installations into the electrical system. Until recently, the contractual framework of support, with the obligation of purchase, did not encourage producers to adapt to the constraints of the network. On the other hand, the executive deployed since 2017, with the additional remuneration, integrates them into the electricity market. It's a first step. This approach needs to be deepened, as the CRE pointed out in June and December 2017 in its orientation on balancing the electrical system and when approving the management rules of the RTE. The participation of RE in the balancing of the electrical system, through the adjustment mechanism and the system services, must be taken into account for future deployment.

Limit the reduction of connection costs

The costs of connecting the electricity generation facilities from renewable energy to the grid and, if necessary, to reinforce the grid, are borne by the generators. However, the government has reduced the connection costs of installations below 5 MW. This reduction («refraction») is not without inconvenience. It could reduce the localization signal, thus going against the objective pursued by the regional connection schemes for the renewable energy network (S3REnR), and increase the needs for reinforcement of the network, leading to an increase in the TURPE for consumers.

In its notice of 13 April 2017, the CRE proposed limiting the reduction to the facilities least affected by these adverse effects to ensure the economic and environmental efficiency of public spending.

MARINE RENEWABLE ENERGY

COMPETITIVE DIALOGUE FOR WIND TURBINES IN THE SEA

The CRE participated in 2017 in the competitive dialogue for the installation of offshore wind turbines off Dunkirk. Organized by the Directorate-General for Energy and Climate, this procedure consists in drawing up the terms of reference in consultation with the preselected candidates by the CRE. Certain provisions have thus been improved and CRE considers that this positive step must be deepened before launching new projects, for example that of Oléron. To reduce the uncertainties of the candidates, the project could be pre-developed by the State before the call for tenders; completion of the technical studies necessary for the sizing of the installation, obtaining authorizations by the State on behalf of the future winner.

CASE SUPPORT FOR FLOATING MARINE TURBINES, TECHNOLOGY STILL IMMATURE

In early 2017, the CRE issued an opinion on an order defining a purchase price for floating marine wind installations. For this type of immature technology, the CRE considers that establishing a level of support on a case-by-case basis is the most efficient way to allow its development, while controlling the impact on public finances. It is also desirable to adopt mechanisms to downgrade the level of support if actual costs are lower than anticipated costs.

REDESIGN OF PUBLIC SUPPORT TO LANDWATER

The obligation to purchase at the single rate: a device that is now not very effective

Until 2017, the support to the onshore wind power sector was exclusively organized by the purchase obligation, according to which only EDF and The local distribution companies purchased the electricity produced, and at a fixed purchase price.

On several occasions, the CRE has pointed out the disadvantages of the single tariff, which is poorly adapted to the diversity of projects and their costs: wind conditions, technological choices, financial and logistical costs, etc. This device could indeed lead to overly generous grant support at the most competitive facilities. Moreover, since it has not been revised since 2006, the tariff level did not take into account the decrease in financing costs, nor the manufacturing costs related to technological developments and the growth of the wind industry in Europe.

New support mechanism, more mature

In 2017, the government proposed a substantial change in the support mechanism for the sector. Now the electricity produced by the new wind farms is not sold only to EDF and LDCs, but also on the markets, displaying a sign of maturity.

For projects with less than six wind farms, producers receive state support, or additional remuneration, in addition to the selling price of the electricity produced, so as to receive an overall remuneration, fixed by order, between 72 and 74 € / MWh according to the size of the blades of wind turbines.

As for projects with more than six wind farms, or a wind turbine with a unit capacity of more than 3 MW, they go through a tendering process where competition is played out in particular on the level of the additional compensation requested.

Falling prices for the first tendering period

Based on historical data (installed parks) and prospective (parks likely to be equipped), the CRE analysed the profitability induced by this tariff framework, in its deliberation of 23 March 2017. It found that, to achieve normal profitability, two-thirds of projects below 6 wind turbines require a price lower than or equal to € 65 / MWh. It also recalled that, given the diversity of projects, call for tenders is the best way to ensure the economic efficiency of public support. Its analysis was carried out after consulting the representative unions of the wind industry, the windmills, the ADEME, ENEDIS and Pöyry, and integrates the recent evolutions, in particular the increase of the power and the diameter of the blades.

Launched on 28 April 2017, the first tender period for larger projects revealed an average price of € 65.4/MWh for the winners. The decline in prices observed could lead to savings of € 0.9 to € 3 billion for the State, based on the development objectives of the sector provided for by the multiannual energy program.

3 QUESTIONS TO

TOMMY ELEOUE,
Project Manager
for the Market Development
and Energy Transition Directorate

In its opinions on new support mechanisms for onshore wind energy, how has the CRE taken into account developments in this sector?

The CRE has collected relevant information from numerous stakeholders (producers, grid operators, ADEME, wind turbine funders and manufacturers) and its teams have gone to the field to visit parks under construction and operation as well as the Enercon post plant.

Have the problems identified by the CRE in 2014 for this sector been solved??

Evolutions are going in the right direction: the first call for tenders has been launched and the new facilities will enhance their production on the market. However, in order to take full advantage of the effects of competitive bidding, the limit that determines how support is granted (open window or tender), and which is based on the size of the park or its equipment, should be lowered.

What are the current paths of progress?

To remain consistent with technical developments, open-window support will have to be adapted. It is the advantage of a tender that you do not have to lag behind the industry. It will also be necessary to monitor the impact of the regulatory changes proposed by Sébastien Lecornu, Secretary of State, to the Minister of the Ecological and Solidarity Transition in January 2017, and likely to remove non-economic barriers. In addition, many purchase contracts will soon come to an end, giving producers the choice to continue to operate or renovate their fleet. The relevance of a support framework adapted to the situation of these facilities must be assessed.

THE CRE, THE MAINSTAY OF TENDERS

Calls for tenders are one of the essential vectors of the energy transition. Responsible in particular for their instruction and the analysis of the results, the CRE is the main kingpin.

Continue and simplify

The economic efficiency of this method of allocation having been demonstrated several times, the CRE welcomes the development of calls for tenders, recalling however that the price must remain the paramount criterion in the rating. It is also in favour of new adaptations to improve the process and to limit costs, like the simplifications introduced in recent years.

Change the selection criteria

It would also be necessary to adapt the characteristics of certain calls for tenders to the constraints of the territories to better support their energy development. Some projects rely on local deposits and, to avoid conflicts of use, they must be adapted to the underlying equilibriums. This is particularly the case of the biomass.

Environmental criteria, such as the carbon footprint of photovoltaic panels for example, are sometimes included in calls for tenders. The nature of these criteria should be further developed. Their importance must be reinforced and their principle extended to other modes of support as they encourage the deployment of greener technologies and may indirectly favour French and European industries.

**2017 FIGURES
FOR CALLS FOR
TENDERS RECORDED
INSTRUCTIONS
BY THE CRE**

16

calls for tenders

5,100

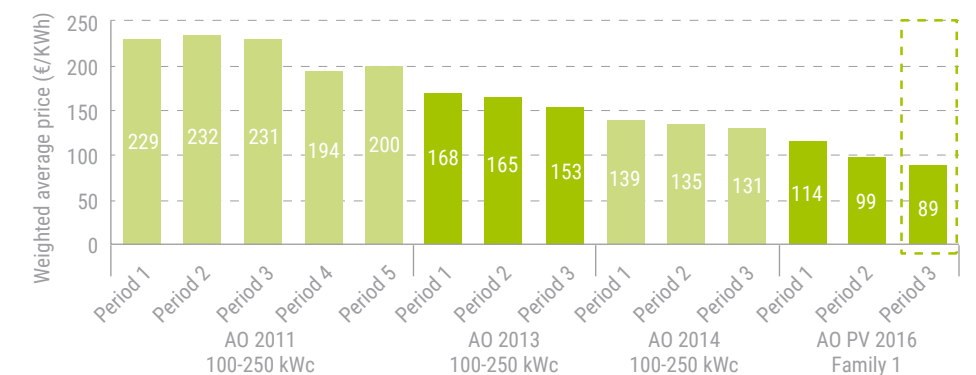
applications

1,620

winning projects

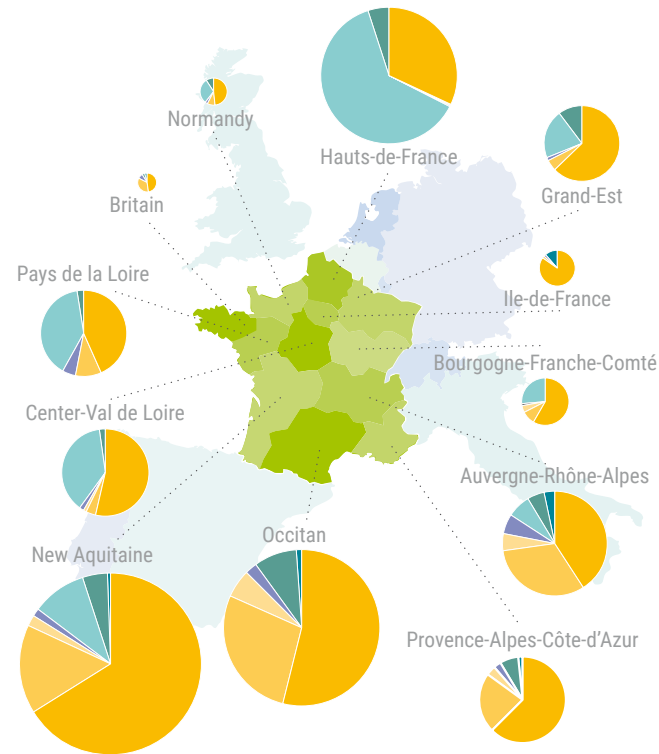
2,925 MW

allocated

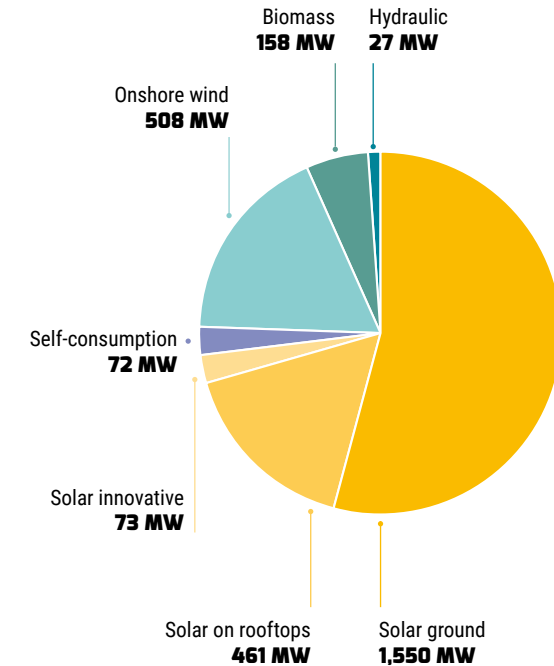


Evolution of purchase price attributed by call for tender for medium-sized rooftop photovoltaic installations between 2011 and 2018

Call for tenders 2017: regional distribution of laureates



Distribution of production by sector



On the other hand, it is necessary to avoid too specific technical criteria: the interest of the state is indeed benefiting from the productivity gains of the industry at European Level. As the equipment market is global by nature, a domestic industrial sector cannot emerge sustainably on the basis of a performance lower than that of its sector, in Europe or of products adapted for the domestic market. The calls for tenders concerned almost exclusively the photovoltaic sector

until the launch of the wind energy tender, apart from those relating to the development of the biomass and small hydropower sectors for smaller volumes. They have made it possible for the national community to benefit from the lowering of the costs of the sector, whether on installations on the ground or on a large building. For the latter, by way of illustration, the graph above shows the average prices of the winners for the families of calls for tenders for medium-sized building installations (between 100 and 500 kWp) between 2011 and 2017, representing a division by more than 2.5 of the requested level of support.

SUPPORT FOR RENEWABLE ENERGY: REINFORCE LONG-TERM BUDGETARY MANAGEMENT FOR WISE CHOICES

In its deliberation of 13 July 2017, the CRE estimated the amount of the public service charges of energy that engender, throughout their lifetime, the contracts signed or in the course of allocation by calls for tenders and by orders tariff. It differentiated the expenses incurred before 2011, which include in particular the photovoltaic installations supported by the 2006 and 2010 tariff orders setting a very high level of purchase price, charges incurred between 2012 and 2017. They are respectively €45 billion until 2036 and €82 billion until 2044.

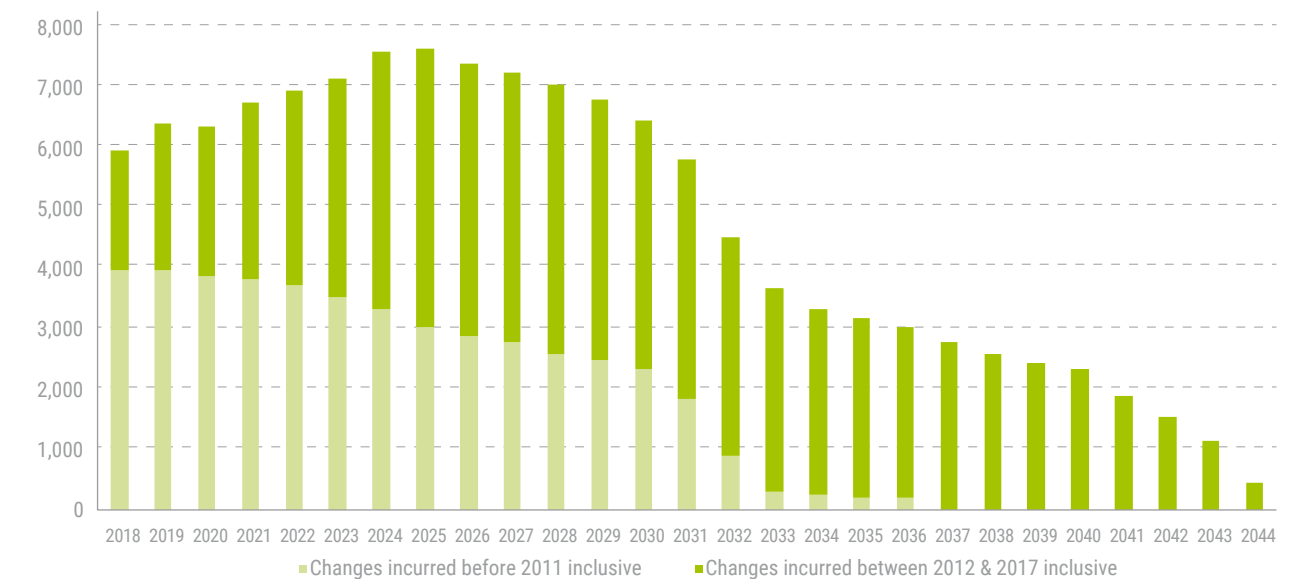
Anticipate the budgetary impact of the support on the term of the contracts

These data illustrate the importance of public expenditure incurred for several years by policies supporting renewable energies. The amount depends, in fact, on the duration of the purchase contracts, which sometimes reaches twenty years. The budgetary impact of a support framework



For further information, consult the interview with Mechthild Wörsdörfer, Director at the Directorate General for Energy of the European Commission, responsible for renewables, research and innovation, and energy efficiency: [See the video](#)

Prediction of the evolution by 2044 of public service charges already incurred (in M€)



should therefore be anticipated as soon as it is signed, and strictly supervised. The CRE recommends that a multi-annual expenditure envelope be established for multiannual energy programming in 2018, at least every five years. It would be up to the government to optimize their use in order to reach the objectives of development of value chains.

Periodically audit the costs of the value chains

The CRE also considers that there should be a regular review of the conditions of remuneration for facilities benefiting from an open-ended (non-tender) support mechanism, such as a tariff order. The aim is to ensure that any cost reductions, expected with the growth of the renewable electricity industry in Europe, reduce the burden borne by the community without jeopardizing the development of the sectors. To shed light on this reflection, the CRE undertook, in 2017 and 2018, a priority for audits of hydraulic, wind and cogeneration installations exceeding the 100 kW. The creation of such a database, made possible by a regulatory obligation prescribed to the producer, will strengthen the expertise of the CRE on the cost of supply chains and feed analyses of the levels of support required for their development.



ASSESSING SEPARATE AIDS BY ENERGY VECTORS

France is committed to increasing its renewable heat production by 40 to 55%. An ambitious goal, especially since thermal renewable energies are developing at a rate currently insufficient to reach it and they are not very visible in the public debate. Yet, by substituting fossil fuels with a strong carbon dioxide emission, they constitute an effective lever to fight against global warming.

The valorisation of biomass in the form of heat and that of biogas in the form of injected gas is given priority over the production of electricity. This distinction of aid between different energy vectors deserves to be evaluated for all RE sectors, notably solar energy.

Indeed, the possibilities of local storage in the form of heat, whose technologies and costs are better controlled than for electricity, make it possible to envisage a more substantial contribution of solar thermal compared to photovoltaic self-consumption. In addition, solar thermal yields are better and the carbon intensity of heat production is high compared to that of electrical uses.



“ For the first time in our analyses, all the long-term electricity consumption trajectories of the forecast balance sheet are stable or in downward trend. »

FRANÇOIS BROTTES,
CHAIRMAN OF THE EXECUTIVE BOARD OF RTE

RTE has issued the 2017 provisional balance sheet of the electricity supply-demand balance in France. It provides a panorama of possible changes in the electricity mix by 2035. What are the main determinants of the evolution of electricity demand? The projected Balance Sheet is the result of the work and expertise of more than 100 RTE employees who worked for several months to establish five robust and contrasting scenarios allowing to define several possible paths for the energy transition taking into account the integration of France in an electricity system and a European electricity market. Nearly 50,000 simulations were tested on these scenarios. All these simulations are anchored in the possibility of running electrical mixes allowing the real-time management of the supply-demand balance and the maintenance of power supply security. For the first time in our analyses, all of the long-term electricity consumption trajectories of the projected Balance Sheet are stable or downward. These results, based on hypotheses built with all stakeholders in the electricity system and stakeholders (associations, NGOs, etc.), show that energy efficiency, thanks to regulations and equipment

less and less energy-consuming, should offset or exceed the bullish effects related population growth, economic activity or new uses. Significant transfers of use towards electricity are taken into account, particularly in terms of mobility, with a fleet compatible with the objectives of the Climate Plan announced in July 2017 in all paths, or even exceed them, and up to 15,6 million electric vehicles by 2035 in the most proactive path. How is the balance between renewable and nuclear energy? By 2035, different production mixes, with more or less nuclear and renewable energies that are conceivable, is being studied. For example, the Ampère scenario examines a logic in which the gradual reduction of nuclear power is necessarily accompanied by a development of renewable energies without building new thermal means until reaching the goal of 50%. Several variations on the pace of development of renewable energies have been simulated to put the results into perspective. This echoes, particularly, in the difficulties concretely encountered in the territories to develop new renewable production means and ensure their connection, which can lead to a delay compared to the public objectives posted for the development of renewable energies. This societal

context must be taken into account in the reflections on the evolution of the electric mix. How do you assess the economic impacts of the substantial electricity exports foreseen by the Ampère and Volt scenarios of the RTE projected balance sheet? The economic analysis of the scenarios is a novelty of the 2017 projected Balance Sheet. It is a necessary parameter for the public debate and for the actors of the electricity system insofar as the Europe of electricity is a very concrete reality of every moment. To obtain robust results, different interconnection paths have been simulated as well as several possible evolutions of the electrical mix of other European countries. In the Ampère and Volt scenarios, the French electricity mix is mainly composed of RE / nuclear, which are very competitive energies in the European electricity markets compared to thermal generation means. On this basis, the economic analysis carried out in the projected Balance Sheet shows that electricity exchanges with our neighbours have a positive impact of several billion euros a year on the trade balance of France.

ZNI TOWARDS ENERGY AUTONOMY

Non-interconnected areas in an electricity grid have set the course for energy autonomy and the valorisation of their local renewable resources. The CRE accompanies the evolution of the electric mix and consumption habits, with a particular attention to the security of the system and the control of public expenditure.



2
calls for tenders on ZNI
instructed in 2017

7
deliberations concerning
existing projects or
power generation plants

FPE
engagement of the work
to determine the annual
staffing levels at EDF SEI
and EDM for 2018-2021

30/03/2017
deliberation on the
methodology for the
examination of an
electricity storage project
in the ZNI

46
centralized storage
projects received in 2017
for instruction

**OBJECTIF
50%**
of renewable energies in
the energy mix in 2020

**ENERGY
AUTONOMOUS
OBJECTIVE**
FROM 2030

02/02/2017
deliberation on the
methodology for the
examination « small
actions » to control the
demand for electricity
consumption in the ZNI

6
Committees for « small
actions » MDE created
upon initiative of the CRE
in the ZNI

ELECTRICAL SYSTEMS STILL VERY CARBONACEOUS, EXPENSIVE, NOT VERY RESILIENT



In areas not interconnected to a continental grid, the ZNI, the electricity consumed is necessarily produced on site today, mostly from imported fossil resources (fuel, gas, coal), supplemented if necessary by renewable energies with guaranteed power (hydraulic, biomass, geothermal) or intermittent (wind, photovoltaic, run-of-river hydro, biogas, incineration).

Tariff equalization at the service of the territories

The climatic and geographical characteristics of these territories, the logistical constraints related to the insufficiency of road and port infrastructures and the small size of the electrical systems lead to much higher production costs (233 € / MWh on average in 2016) than in continental France (in 2016, on average 42 € / MWh, ARENH price). However, according to the principle of equalization at national level, consumers pay a level of electricity bill identical to that of continental France: the structural additional costs between production costs and tariff revenues of incumbent suppliers are offset against the energy public service charges (SPE).

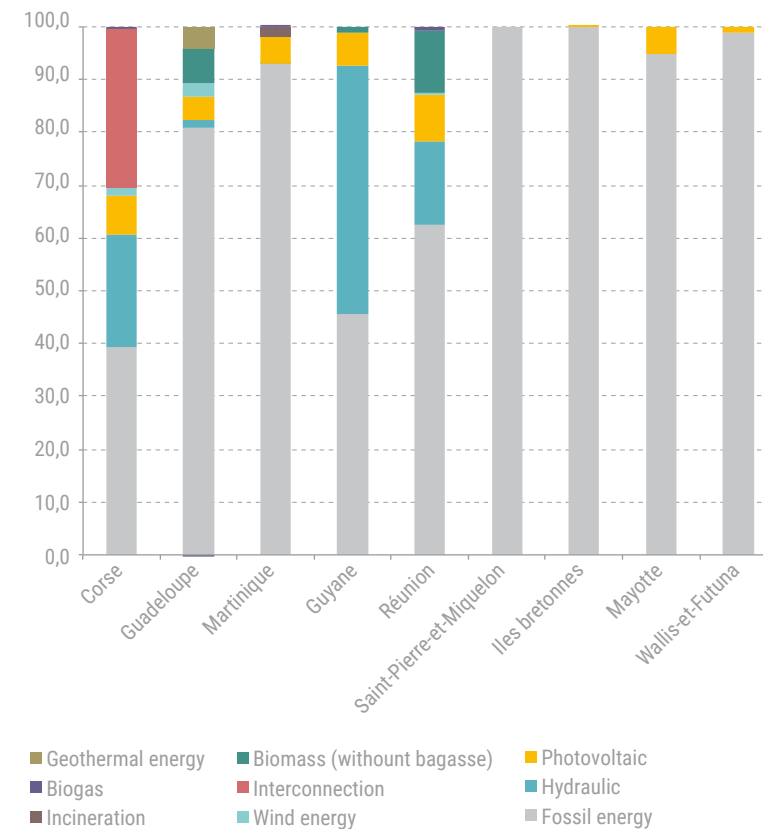
THE ZNI

Corsica, overseas departments and regions (Guadeloupe, Reunion, Mayotte), local authorities (Martinique, Guyana), Geothermal Biogas Incineration Biomass (including bagasse) Interconnection Wind Photovoltaic Hydraulic Fossil some overseas communities (Saint-Pierre-et-Miquelon, Saint-Barthélemy, Saint-Martin, Wallis and Futuna) as well as the islands of Ouessant, Molène, Sein and Chausey are not connected to the continental electricity network (or in a very limited way for Corsica). Have monitoring of the network by drone.

Innovative solutions that remain to be developed

In 2016, renewable energies cover 28% of the ZNI electricity mix. The Energy Transition Law for Green Growth (LTECV) set ambitious goals: 50% of RE in 2020, energy autonomy from 2030. To move from a centralized system, where the supply is mainly provided by fossil fuels, to a more decentralized system, based on renewable energies for some intermittent, supposes the development of more innovative solutions than the ZNI electric systems which, by their small size, are particularly sensitive to variations in production and consumption. Thus, to ensure the balance of the network, operators are led to limit the instantaneous penetration of renewable energies. In 2017, for example, EDF SEI had to disconnect the latest photovoltaic and wind turbine installations connected to the grid, for 220 hours in Corsica and 70 hours in Réunion.

An electricity mix mainly based on fossil fuels in 2016



The ZNI shows significant disparities, with a carbon mix lower than 50% in French Guiana and higher than 90% in Martinique and Mayotte.

ELECTRIC NETWORKS: REGULATION FOR MORE EFFICIENT OPERATION

Identical throughout the national territory, the tariffs for the use of public electricity networks (TURPE HTA-BT) are fixed from the level of charges borne by Enedis. But the network management costs can differ depending on the service area and in ZNI they exceed the TURPE revenue. Thus, from 2014 to 2017, the network charges borne by EDF SEI (approximately € 500 million / year on average) were covered, beyond the revenues of the TURPE (approximately 340 M € / year on average), by a transfer of Enedis of 152 M € / year. It was taken into account to determine the level of TURPE 4 HTA-BT.

The law for ecological transition and green growth has included in the energy code the possibility for network operators of ZNI to opt for an equalization mechanism based on the analysis of their accounts by the CRE under the Electricity Equalization Fund (FPE). The EDF SEI and Electricity of Mayotte (EDM) have chosen to benefit.

In 2017, the CRE initiated work to determine the annual EDF SEI and EDM under the FPE for the 2018-2021 period. The CRE will also define a multi-year regulatory framework encouraging these operators to control costs and improve their performance in terms of continuity of supply and quality of service to network users.



For further information, consult the interview with Guido Bortoni, President of the regulator in Italy (ARERA):

[See the video](#)

In this particular context, the CRE has four main missions

In its annual assessment of the amount of public service charges for energy, CRE calculates the costs borne by the historical suppliers EDF SEI, EDM and EEWf for the tariff equalization in the ZNIs. These expenses include the additional costs of production and purchase.

It also assesses the private contract projects will for power generation, storage and actions to control energy demand, contracts that exist in ZNI.

It defines regulated electricity sales tariffs, which, unlike France, apply to all consumers and regulates the network activities of incumbent operators. It will calculate, among other things, the annual allocations to be paid to the system operators under the Electricity Equalization Fund for the period 2018-2021.

As in continental France, it decides on the relevance and good sizing of renewable energy support mechanisms as part of the obligation to purchase and instructs calls for tenders. Except for the photovoltaic sector, where support by order (small power) or by tender (large power) is relevant, the CRE recommends, for these territories, to resort to the contracts by agreement.

THE SINGULAR ORGANIZATION OF THE ELECTRICAL SYSTEM

Historic operators: EDF SEI, Électricité de Mayotte (EDM), Eau and Électricité de Wallis et Futuna (EEWF)- are both producers, distribution network managers and suppliers. The other producers sell their electricity, about 70% of total ZNI generation in 2016, to incumbent operators.



3 QUESTIONS TO

CYBÈLE MOLLARET,
Project Manager at the Market Development
and Energy Transition Department
of the CRE

What is the future for electric vehicles in ZNI?

The electric vehicle (EV) is one of the ways to achieve energy self-sufficiency in 2030 and the PPEs have set quantified targets, including for charging stations. But it unfolds slowly.

What seems to be the problem?

The ZNI energy mix is 2/3 based on fossil fuels. Recharging EV batteries therefore leads to greater demands on thermal power plants and increased CO₂ emissions. In addition, the simultaneous charging of many vehicles could increase the demand for electricity at the peak, requiring new investments, both in production and the network, and at higher costs than in continental France. Thus, EV is not necessarily compatible with the objectives of autonomy and decline of CO₂ emissions.

What is the solution?

The EV can find its place in the ZNI if its rate of development is aligned with that of renewable energies and if its impact on the electrical system is controlled, in particular by a fine control prompting users to recharge or even inject on the network, at the right time. In addition, using EV batteries as a storage medium can facilitate the integration of renewable energies. More broadly, there is a need to question the efficiency and relative cost of other measures to limit energy consumption and the carbon footprint of transport. I am thinking of the modernization of the conventional fleet and the development of the public transport offer, still limited in certain territories.

PPE: ENSURE RIGOR AND CONSISTENCY

The PPE are the management tools for energy policy. According to LTECV, the local authorities of each territory, in collaboration with the public authorities, develop a multiannual energy program (PPE, for its acronym in French) adapted to their energy system. The PPEs allow the local authorities to become involved in the energy policy of which they constitute the management tool. They shall be revised before the end of 2018 and will cover the periods 2019-2023 and 2024-2028. After Corsica in 2015, Guadeloupe, Guyana, Mayotte and Reunion adopted in 2017 their PPE with energy targets in 2018 and 2023.

A governance still perfectible

By their choice of development, the PPEs impact electricity systems and public spending. To guarantee a rigorous planning and a coherent evolution of the electrical system, their governance can be further improved. In particular, it must mobilize all the available expertise and tools in a coordinated manner: projected balance of supply-demand balance, regional grid connection plans for renewable energies (S3RE), thermal regulation, deployment plan for electric vehicles, etc.

2018 Review: recommendations for optimizing the electrical system and investments

The CRE issued on 06/03/2018 a note formalizing the issues, and formulating the recommendations, it includes an appendix dedicated to each ZNI. Several recommendations directly concern the revision of the PPE. The planning and the pace of deployment of new investments must take into account the existing stock and consumption forecasts, the aim being to avoid overcapacity and to limit the remuneration of the plants that would be under-utilized. At minimum, the PPEs must integrate storage and MDE (energy demand control) projects, the impact of thermal regulations and the development prospects of electric vehicles. In addition, the optimization of the electrical system requires the definition of requirements for the technical characteristics of production, storage and network investments. Therefore, the analysis of the weaknesses of the system by the distribution network operator is a prerequisite for the establishment of the PPE.

It is also necessary to take into account the budgetary impact of each project to decide on its inclusion in the PPE and, more broadly, to quantify the impact of all the objectives of each of the PPE on the public service charges for energy.

Certain issues outside the strict energy field, such as biomass or water uses, must also be included in the planning to avoid conflicts of use.

THE EXPERTISE OF THE CRE TO CREATE AN INVESTMENT PROJECT IN NEW CALEDONIA

In March 2017, the government of New Caledonia solicited the independent expertise of the CRE for the project to replace two engines of the Népoui thermal power plant in 2020. This project, known as Népoui 2020, was led by Enercal, the New Caledonian transmission system operator and owner of the power plant.

The CRE performed the study of the supply-demand balance of the New Caledonian electricity system, in a context of strong uncertainties with regards to its evolution.

To understand the specificities and better appreciate the underlying social and economic issues, it went on site in June 2017.

In the light of the information gathered in this way, the CRE analysed several scenarios for the evolution of the electricity system in the 2022 and 2030 horizons. Demand-supply balance studies have confirmed a need for installed power in the short term, but they have revealed a situation of long-term overproduction.

The mission concerning the interest of the Népoui 2020 project concluded negatively, favouring the exploration of alternative. The conclusions were submitted to the government of New Caledonia in its report of 12 July 2017. The recommendations were presented on 13 July 2017 to the board of directors of Enercal who decided to postpone the launching of the project.

THE STORAGE, LEVER OF THE ENERGY TRANSITION OF ZNI

Storing electricity enables, at a lower cost for the community, to manage the intermittency of renewable energies and to insert them into the electrical system; on one hand by providing power reserves for the adjustment of the frequency in substitution of the thermal groups; on the other hand, by covering the peak consumption with stored energy, produced in off-peak hours and at a lower cost.

This storage helps to save production costs and postpone certain investments in the means of production and reinforcement of the network.



For further information, consult the interview with **Joan Groizard Payeras**, General Manager of Energy and Climate Change of the Government of the Balearic Islands:

[See the video](#)

A methodology to educate storage projects and retain the most efficient

In its deliberation of 30 March 2017, adopted at the end of the public consultation launched on 2 December 2016, the CRE defined a methodology for project appraisal aimed at ensuring the efficient development of centralized storage facilities.

This methodology allows the network manager to publish the technical requirements necessary to size the storage and optimize the projects with regards to the needs of the electrical system. Furthermore, in order to ensure the competition of projects and their collation, the CRE has planned to organize, yearly, a single referral window.

As for file processing, it is based on a case-by-case analysis of the costs and the gains made to the electrical system, so that the CRE can prioritize the most efficient projects. The compensation of these is calculated on the basis of their cost less any revenues and subsidies. It is capped at the value of SPE expenses avoided by the project.

MANAGING THE DEMAND, A PRIORITY

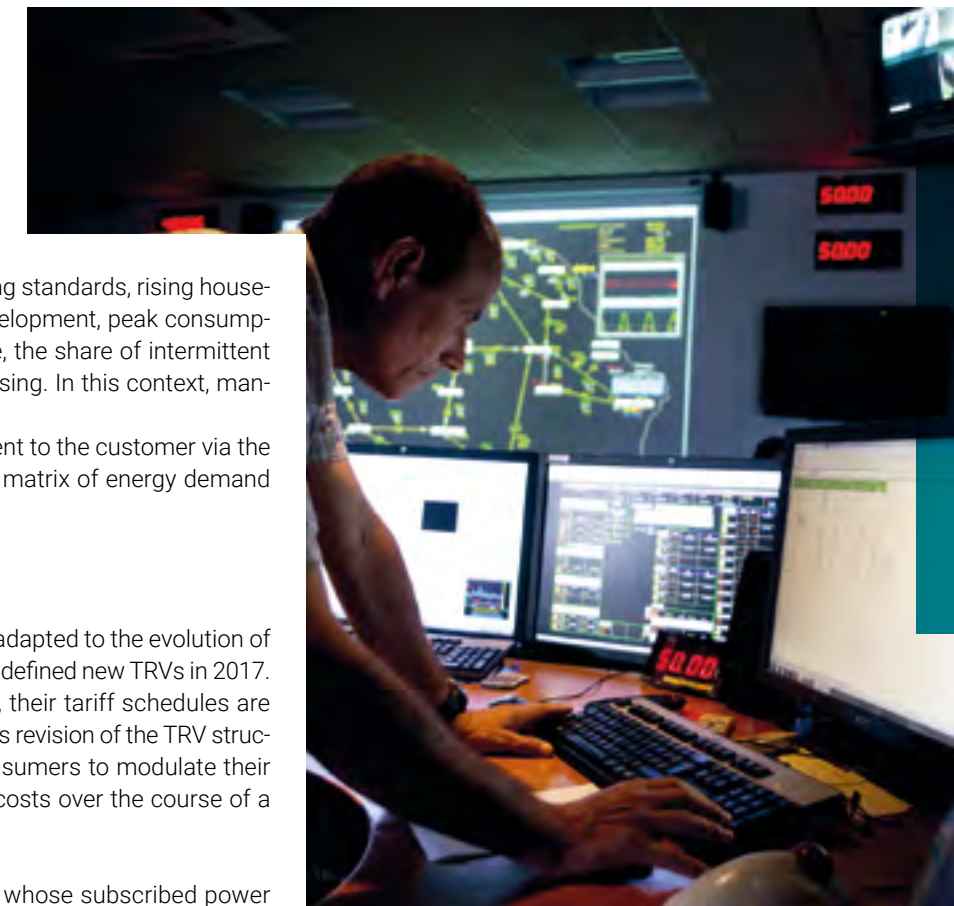
As a result of population growth, improved living standards, rising household equipment rates, and electric vehicle development, peak consumption is increasing in the ZNI. At the same time, the share of intermittent renewable energy in their energy mix is increasing. In this context, managing the demand becomes a priority.

Two tools can be mobilized: the price signal sent to the customer via the electricity sales tariff structure (TRV) and the matrix of energy demand (MDE).

New TRVs to encourage modulation of consumption

To provide consumers with economic signals adapted to the evolution of both generation and consumption, the CRE has defined new TRVs in 2017. While respecting the principle of equalization, their tariff schedules are adapted to the specificities of each territory. This revision of the TRV structure is aimed in particular at encouraging consumers to modulate their consumption according to actual production costs over the course of a day or a year.

These new rates are effective for consumers whose subscribed power exceeds 36 kVA. To smooth their impact, they coexist with current tariff options. The CRE continues its dialogue with the communities and suppliers to define the deadline, methods of smoothing towards new options and compensation measures for the most impacted customers. It will study the opportunity to create new tariffs for small consumers, consistent with the deadline for the deployment of smart meters.



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storage projects carried by 11 operators were filed in October 2017 for the first referral window organized by CRE: 9 in Corsica, 10 in Guadeloupe, 7 in Guyana, 8 in Martinique, 12 in Reunion.

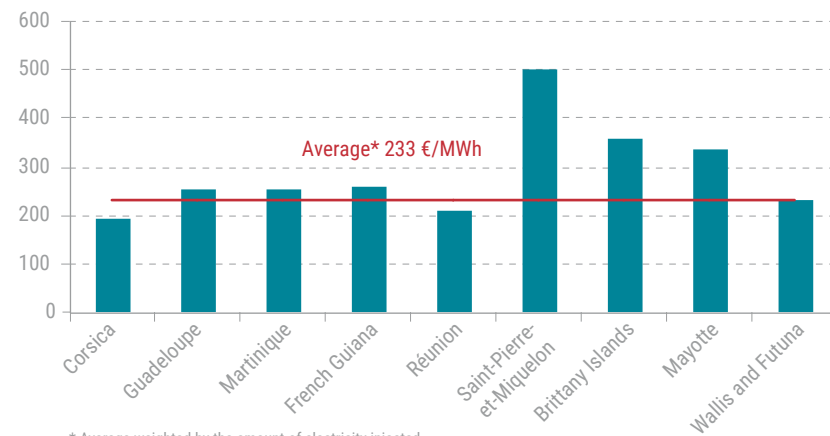
An assessment methodology for MDE « small actions »

By reducing consumption, the actions of the MDE reduce the use of the most expensive means of production and limit future investments. To guarantee that they generate savings for SPE expenses, the compensation is capped by the additional production costs that they allow to avoid.

The CRE has defined two methodologies for examining these actions: a first on 10 June 2015 for those that require an infrastructure costing more than € 1 million, a second on 2 February 2017 for MDE « small actions » de MDE which bring together the distribution and installation of efficient energy equipment both for residential and business customers.

In each ZNI, a territorial committee devoted to these « small actions » brings together the local authorities, the ADEME, the incumbent operator and the services of the State. It provides the CRE with the elements of analysis on the energy policy orientations, the additional production costs avoided by each action and the optimal level of subsidy. The initiatives being very diverse, the terms of their compensation are defined by a framework document submitted to the CRE for approval and which serve as a basis for the contract. The CRE should be seized of all territorial compensation frameworks by June 2018.

Very high costs of electricity
production (in €/MWh)



* Average weighted by the amount of electricity injected



“The issue of energy transition in the transport and mobility sector is a top priority. »

ARY CHALUS,
PRESIDENT OF THE REGIONAL COUNCIL OF GUADELOUPE

The Energy Transition Law for the Green Growth (LTECV) as defined the objectives for the ZNI: 50% renewable energy in the final energy consumption from 2020 and energy independence from 2030. What do you think about these?

In view of the economic development needs of overseas territories, these objectives are proportionally more ambitious than those applied to the metropolis.

Most ZNIs are engaged in economic growth dynamics designed, in particular, to absorb significant unemployment rates (in Guadeloupe, 24% of assets over 15 years in 2016, INSEE), but also to make up for structural needs (roads, utilities, housing). Under these conditions, the effort required from the ZNI is proportionally harder.

Nevertheless, the ZNIs have very favourable RE deposits that must be valorised, in addition to the implementation of energy demand management actions. Thus, the objectives displayed by the LTECV should be interpreted as indicators towards the future. The energy transition is also an important source of activities that we need to value.

Regarding the 2030 objective, the notion of energy autonomy having not

been precisely defined, each island territory can interpret it in its own way either as a reduction in the dependence rate on imported energies, which is equivalent to maximizing the valorisation of locally sourced resources, aiming towards a goal of 100% coverage with renewable energy.

To meet these objectives, it is necessary to massively develop renewable energies whereas in each ZNI, there are thermal means of production that can work for many more years. We therefore run the risk of obtaining vastly overcapacity generating stations and remunerating plants that are not called for.

What do you suggest to avoid these extra costs in the ZNI?

Island territories are today in a paradoxical situation. There are two possible answers: either the choice of stranded costs related to the non-use of thermal means is assumed by the community, without prejudice to the principle of equalization of tariffs, or the remuneration conditions be renegotiated with the operator. In both cases, it is a national-level political decision to be quickly settled.

We envision an alternative scenario: the decrease in photovoltaic electricity production costs to enable an

accelerated development of the electrification of the car park by connection to the grid, likely to lead to a significant increase in consumption. It would be possible to direct the load towards the hours when the electricity is predominantly carbon-free. This raises other questions: how to amortize the impact on the fiscal resources of the region given the importance of the fuel tax?

The planning role of the development of the means of production falls under the Multiannual Energy Programs (PPE). In 2017, almost all ZNIs have adopted their PPE, which will have to be revised in 2018. What do you think are the focus points during this review?

The issue of energy transition in the transport and mobility sector is a top priority. The stabilization of the long-term energy demand, the rate of development of RE and their level of contribution to the final energy mix will have to be approached with the greatest attention so as not to reproduce the errors of the last PPE. In any case, the transition to the use of less carbon-intensive energies will have to be accompanied by a strategic project on the evolution of taxation associated with hydrocarbon consumption, which has not started today.

This issue, as it impacts directly on the income of local and territorial authorities, must be addressed urgently.



THE PROSPECTIVE COMMITTEE TO BRIGHTEN THE FUTURE

The CRE has engaged energy stakeholders in a collective prospective action to meet two challenges: achieve the energy transition and place the digital revolution at the service of all electricity and gas consumers. Multidisciplinary forum for exchanges and analyses, its Projected Committee began its work in October 2017. Objectives: to provide its expertise to the CRE, all industry players, governments and consumers to aid in the understanding of the changes under way and their impact on the energy sector and society.

“

« The CRE must become a place of exchange to enlighten the future. It must allow a better understanding both of the present and the future, in the medium and long term, to develop a collective reflection and, eventually, to carry a collective word ».

JEAN-FRANÇOIS CARENCO

A COLLECTIVE REFLECTION

Institutions, companies and associations, consumers and citizens defend their own visions of the energy sector, sometimes with divergent positions on the commitment to transformations or the preservation of balances. They often express their ideas, predictions or opinions with enthusiasm, resolution and rigor.

The CRE wanted to gather, within its Foresight Committee, the talents, the intelligence and the dynamism that share the taste for building the future of energy. A future that, in the medium term, appears to be full of innovation promises. It is important to focus the changes at the service of social principles and the well-being of the people, in a world more serene, more durable, and more solidary.

Why the CRE? Because it is the place of independence, neutrality, public service, equality and general interest. Because it is also the place for hearings, collective debates and imagination; the common house of energy. By engaging in its forward-looking approach, it bets that divergent opinions could, together, build the energy future, concretely shed light on collective needs and efforts in a rapidly changing world. Not to reflect on our common future would be indifference, an indifference qualified by Gramsci's « inert matter where enthusiasts often drown ».

A MANAGING GROUP

Chaired by the President of CRE, the managing group of the Foresight Committee has 37 members, business leaders, institution representatives

and industry associations, intellectuals and academic figures. It held its inaugural session on 17 October 2017, and will meet early in the summer of 2018 to validate the reports of the working groups and to decide on the future themes of the work of the Committee.



For further information, consult the site of the Foresight Committee, and the interviews with public stakeholders: <http://prospective.cre.fr/>

TWO MAJOR EVOLUTIONS

Today, two major evolutions invite and constrain the reflection: the energy transition and the digital revolution.

The energy transition

The Paris Agreement from December 2015, the 2015 Green Energy Transition Law and the 2016 European Clean Energy Package outline the collective actions to be taken. But we must go further, we must understand, deconstruct and integrate all industrial, social and economic issues. Lifestyles, habits, proximity to the environment and industrial orientations will evolve. Universal awareness imposes its effects on energy policies. The need to reduce CO₂ emissions leads to limiting the share of fossil fuels in the energy mix while the consequences of Fukushima impose, in the public opinion, to diversify the sources of energy.

A major industrial evolution is engaged. On the one hand, it showcases how renewable energies are succeeding in lowering some of their production costs, on the other hand the network is becoming aware of the urgency to adapt to upstream control of the increased intermittency of production and, the downward trend in energy demand. The world of energy has all the tools to design an industry and consumption respectful of a preserved planet. Subject to an energy policy of ample control, producing and consuming non-polluting energies is possible in the medium term and on a large scale without declining prosperity or calling into question collective progress.

The digital revolution

The pace and magnitude of digital integration in society reveals a crucial stage in the history of industrial revolutions. The digital age is not only that of the creation of new tools: it is one of an upheaval of the productive structures and the faculties of consumption.

The entire energy chain will be affected: from more affordable renewable generation, backed up by innovative storage technologies, to the new power of the consumer who can have the means to control consumption (and production) that which the recent past would have described as utopian. All shall benefit from these industrial innovations.

For further information, consult block chain forum video with the intervention of Brice Bohuon: [See the video](#)



THE EARLY WORK

A preparatory study

To prepare its prospective approach, the CRE has commissioned an external study, a survey revealing the major trends. This general survey, published in the spring of 2018, feeds the work of the Foresight Committee and reflects major global reflections on energy structural issues. The world changes: it is only appropriate that France does not undergo these heavy tendencies.

The CRE also conducted two international observation and study missions in locations representative of an ambitious investment in the energies of the future.

"A mission in California, around Silicon Valley"

In the fight against climate change, California has set ambitious goals: by 2020, CO₂ emissions reduction to a level of then 40% in 2030 compared to 1990, 50% renewable energy and 5 million electric vehicles in 2030. The mission was able to confront the uncertainties of the « duck curve », graph of daily electricity production. The management of the balance of the Californian electric system must indeed accommodate large solar production surpluses in the middle of the day, followed by a peak in electricity demand in the evening, when the sun sets. A difficult situation for the network managers whose response requires efficient storage.

A mission to Beijing

A few weeks after the creation of a national carbon market in early 2018, the XIIIth Five-Year Plan of China intends to significantly increase the production capacity of non-fossil energies.

China is by far the largest producer of photovoltaic power and wind. It is also characterized by a strong desire to develop the electric vehicle and to lower the price of batteries, which could impact all global energy systems by reducing the cost of electricity storage.



For further information, consult
the storage on Smartgrid :
[See the dossier](#)



Three work groups

The managing group set up three working groups.

The first deals with the evolution of the energy mix. A major public policy goal for the future, the balance between the different energy sources drives the debates. France, a historic nuclear power, is developing scenarios in which gas, nuclear energy and renewable energies are articulated according to proportions whose levels have considerable industrial and financial consequences. Co-chaired by Olivier Appert, President of the French Energy Council, and Olivier Pérot, President of French Wind Energy, it has particularly studied the clean mobilities (electric vehicles, NGV, bi-oGNV) and their consequences on energy systems.

The transport sector is the largest emitter of greenhouse gases, in many countries including France. The main trend of the first work of this working group is the extraordinary growth of electric mobility in the coming years, anticipated by the actors at the international level. Such a development is not without raising environmental, industrial and social difficulties, and will lead regulators to work without delay to the best possible integration of electric vehicles in the electrical system.

Natural gas and hydrogen also have significant potential for transportation, particularly for land and sea transport applications.



THE POINT OF VIEW OF

**OLIVIER APPERT,
PRESIDENT OF THE FRENCH
ENERGY COUNCIL, CO-CHAIR OF
THE ENERGY MIX WORKING GROUP**

We invite ourselves without bothering to discuss the advantages, the disadvantages, the costs ... The CRE Foresight Committee is a serene and neutral place where it is possible to

discuss the multiple dimensions environmental. of the energy / environment challenges without giving in to politico-media time.

The working group on the impact of clean mobility on the energy mix addresses a central theme, at the intersection of economic, social, energy and environmental issues.

The debates on energy are often emotional and Manichean. We are for or against nuclear power, renewables, diesel ... Reflections must be initiated in the context of sustainable development integrating all three dimensions: economic, social and environmental.



For further information,
consult the electric vehicle folder
on the site SmartGrid:
[See the video](#)

In recent years, mobility has been marked by « game changers »: COP 21, technological progress, growing involvement of territories, digital revolution, etc. There is no miracle solution that meets all the challenges of sustainable development. In addition, the energy and transport sectors present high inertia. Thus petroleum products represent 92% of the energy mix of the transport sector. In twenty years, the mobility sector will not be completely upset, but it will be more decentralized, more efficient, less carbon-intensive.



THE POINT OF VIEW OF

FRÉDÉRIC GONAND,

Professor of Economics at Paris Dauphine,
Co-Chair of the Working Group on the Future
of Energy Systems and Networks by 2030

The second working Group of the Foresight Committee began its work in November 2017 on the future of energy networks and systems by 2030. It gathers around thirty actors in the energy networks (natural gas and electricity), companies or institutions. By mid-2018, it is preparing a public report on energy storage for the regulator. This report will have the originality to express and summarize the analyses of actors instead on the subject.

The scalability of renewable energies will strengthen the need for flexibility of energy systems in the next 20 years, particularly for electricity. The current means to manage this flexibility no longer suffice. Different ways of storing energy, meanwhile become economically viable, should see significant development. This report shall examine, by 2030 the conditions of profitability and sustainability of the business models of electric batteries on The network and chemical storage technologies (with transformations involving electricity and gases such as hydrogen or methane). In connection with working group n° 1 on the energy mix, it will examine the conditions of development of the decentralized storage linked to the batteries of electric vehicles.

The second group, co-chaired by Frédéric Gonand, professor of economics at Paris-Dauphine University, and Ghislain Lescuyer, President of Saft, are dedicated to energy networks. It examines the key issue of energy storage and its consequences for the network. By enabling the integration of high proportions of intermittent renewable energies into electrical systems, the development of storage is undoubtedly the key to the success of the energy transition.

Rapid progress in the storage of electricity, mainly in batteries, will meet many of the new flexibility needs that will emerge with the growth of intermittent renewables in the electricity mix. Battery storage is a competitive activity that will develop in centralized or decentralized form and, in the latter case, the batteries of electric vehicles could have a major role to play.

Since batteries are not suited to inter-seasonal storage, gas, especially of biomethane or power-to-gas origin, should continue to play a major role in passing the winter consumption peak.

The third group, co-chaired by Cécile Maisonneuve, President of the Fabrique de la Cité, and Jean Bergougnoux, President of Équilibre des Energies, study the links between consumer trends and the digital revolution. Potential players in the energy transition, consumers now have tools to control their energy demand, control their uses, know the trends and constraints of the system and the network.

Their role goes beyond the consumption of a centralized service to achieve a social function to build. Digital, combined with the energy transition, will offer the energy consumer of tomorrow new possibilities to control its consumption: erasure, self-consumption, storage, home automation, electric vehicles, « peer to peer » platforms, etc.

Regulation must foster innovation and experimentation so that consumers benefit from innovative and diversified offers. It must also, and above all, strengthen the confidence in the energy system, so as to avoid the risk that consumers will miss the transformations needed to fight climate change and the energy transition in our country.



THE POINT OF VIEW OF

JEAN BERGOUGNOUX, PRESIDENT OF ÉQUILIBRE DES ENERGIES, CO-CHAIR OF THE CONSUMER WORKING GROUP

Organize the meeting between the expectations of simplicity-conscious

consumers and the harsh institutional and technical realities, economic, environmental, which apply to large energy system is a difficult but exciting task. Personally, I had the satisfaction, as CEO of EDF, of seeing the new options in « real time » meet the expectations of a growing number of consumers, while offering the manager of the electrical system flexibility (6,000 MW of tariff elimination) never equalled since.

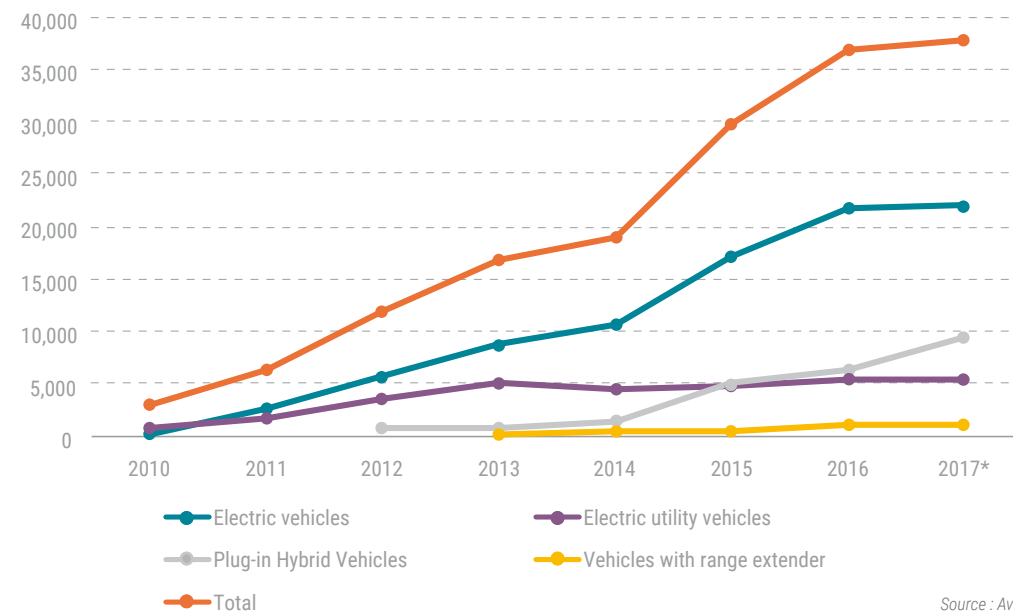
But all this is ancient history.

Today, against the backdrop of the inevitable imperative of the energy transition, in a completely renewed institutional context whose actors are still far from having explored the full

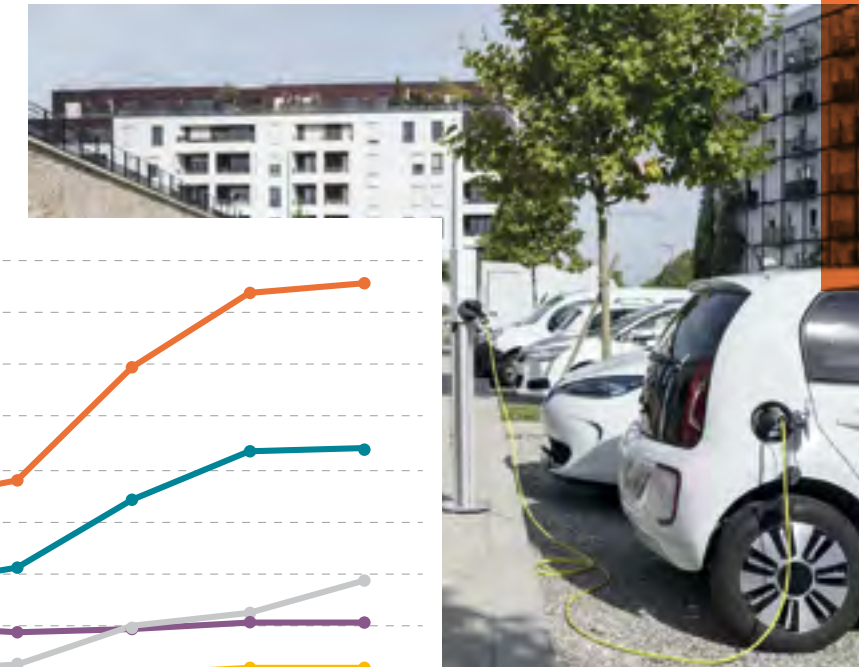
potential, in a world where the digital revolution has upset not only technical solutions, but even more individual and societal visions and practices, everything seems open to be reinvented.

This is why, when I was asked to manage, along with Cécile Maisonneuve, a prospective reflection on the energy consumer in the digital revolution, I did not hesitate: trying to discern, within the framework of a collective approach, what could be the guiding force of evolutions that will always improve our energy systems for the benefit of our fellow citizens is an even more stimulating challenge than those we have known in the past.

The progress of the use of the electric vehicles in France



Source : Avere



SOUNDING BOARD FOR THE ENERGY FUTURE IN 2030 AND 2050

At the end of 2017, the CRE carried out a strategic study on the evolutions and changes in the energy sector and on the foreseeable trends in the medium and long term, in France, in Europe and in the world. In the framework of this Sounding Board, more than 80 French and international experts were invited to comment on 16 theses describing what could be an energy future in 2030 and 2050.

The experts interviewed were from France (20%), Europe excluding France (15%), America (20%), of the Asia-Pacific zone (25%) and other countries (5%). The rest of the panel (15%) consisted of experts from international or European entities. A significant diversity of actors in the sector was represented, academic or institutional profiles, which a priori have a more limited bias in relation to the issues addressed, were targeted in priority. They represent about 70% of those consulted.

CONSENSUS

A large majority of the panel is convinced:

- the major role of transport and heat electrification in the evolution of final demand, both total (lower demand for petroleum products) and electricity (compensation for energy efficiency efforts);

- the long-term emergence (2050) of decarbonised electricity systems, more than 80% based on renewable energies, and their competitiveness compared to fossil thermal including in interconnected zones;

- the need to review market design to introduce long-term signals;

- network and distribution transport managers on the one hand, and the development of production resources and networks, on the other the development of the means of production and networks on the other hand, to optimize the development of future electrical systems and the exploitation of new sources of flexibility;

- the need to develop interconnections to integrate renewable energies.

The majority of the panel seems unconvinced, including in the long run, by the growth of an economy and a significant role for hydrogen in the future energy mix. This thesis is the only one to obtain a majority of negative opinions by 2030 and a majority of respondents do not take a stand by 2050.

POINTS OF DEBATE

Opinions are particularly divided on two important points:

- the decline in network energy consumption (gas and especially electricity) in Europe. For electricity, opinions differ in particular on the compensation effects between energy efficiency efforts and the electrification of uses;

- the long-term role of the gas system and its infrastructure in the energy mix. By 2050, positive opinions remain the majority on the important role of gas infrastructure, but uncertainties emerge with 45% of respondents not convinced or not pronouncing (28% by 2030).



“California is at the forefront of innovative energy policies supporting the rapid reduction of greenhouse gases.”

INTERVIEW WITH MICHAEL PICKER,
PRESIDENT OF THE CALIFORNIA ENERGY REGULATOR
(CPUC)

In California, The Energy Regulator (CPUC) controls the three main private utilities, ensures the reliability of the local transmission and distribution network, and monitors retail market rates. The federal government is responsible for the inter-state regulation of energy markets, which involves various organizations including the FERC, which regulates interstate transport network and monitors wholesale markets. Michael Picker, President of the CPUC, tells us more about the energy challenges California faces and the answers it provides.

California is driven by a real political will to fight against climate change. The California Legislature has enacted legislation to strengthen this commitment: it established the goal of reducing CO₂ emissions to the 1990 level by 2020 and then reducing them by 40% in 2030, in comparison to 1990. The challenge is daunting, but for the regulator «California is at the forefront of innovative energy policies supporting the rapid reduction of greenhouse gas emissions (GHG).» To meet these goals, the CPUC has implemented several action plans like the cap and trade program that encourages companies across all sectors, to reduce the cost of their greenhouse

gas emissions by forcing them to pay for their resources intégrées (PIR), offre une approche coordonnée de la

emissions exceeding the CO₂ threshold. In parallel, the Integrated Resource Plan (IRP) provides a coordinated approach to energy generation and transportation planning in the state through a 10-year projection of network requirements and the necessary flexibility. Finally, there is the Distributed Energy Resources Action Plan (DER), a roadmap for the deployment of distributed resources, such as energy storage and erasure to ensure the reliability and efficiency of the electrical system.

Increasing the share of renewable energy in the California electricity mix to 50% by 2030 is ambitious, but achievable for the Golden State.

«The three main utilities are on track and even ahead of schedule to achieve their goals», ensures the California regulator. Indeed, to date the intermediate milestones have been exceeded, the share of renewable energies in the Californian electric mix already reaching 40%. When production is at its peak, California produces up to 70% of its energy from renewable resources. In this context, the storage of energy represents a

primary asset and plays a key role, particularly to offset the intermittency of renewable production. «The price of storage has fallen by a third in recent years, its potential contribution to a profitable energy system has increased», estimates the president. California plans to commission 1,300 MW of electricity storage capacity by 2020.

To limit its GHG emissions, California is betting on electric mobility.

The transportation sector alone is responsible for half of the state's GHG emissions. For Michael Picker, «without the electrification of the transportation, California will not be able to achieve its climate goals». The California Senate, which shares this position, passed a law placing transportation electrification at the centre of GHG emission reduction and air quality standards. The CPUC has approved a massive deployment plan for charging infrastructure for passenger cars such as transport vehicles, including trucks.

The digital opens new perspectives in the energy sector, but also imposes new challenges.

With Silicon Valley nearby, California companies are taking advantage of digital opportunities. Real-time data access and the promise of instantaneous power management empower consumers, but forces regulators and utilities to manage millions of individual players.

Collecting these huge amounts of data is a valuable opportunity to better understand consumer energy behaviour. The regulator does not forget the threats surrounding this wealth of information: «We pay special attention to cybersecurity threats in order to keep the privacy of this information.»

APPENDICES



GLOSSARY

3rd ENERGY PACKAGE: issued in August 2009, the third energy package aims to create a level playing field in the EU Member States for the completion of the internal energy market. It consists of two directives on the electricity and gas markets (2009/72 / EC and 2009/73 / EC), two regulations concerning network access conditions for cross-border electricity exchanges. (Regulation (EC) No 714/2009) and the conditions for access to the natural gas networks (Regulation (EC) No 715/2009) and Regulation (EC) n ° 713-2009 creating the Agency for the Cooperation of Energy Regulators (ACER).

3X20: see climate energy package.

AGENCY FOR THE COOPERATION OF ENERGY REGULATORS (ACER): The Agency for the Cooperation of Energy Regulators (ACER) is an Agency of the European Union with legal personality, established by Regulation (EC) N° 713/2009 in 2010. ACER has been operational since 3 March 2011. Its headquarters are located in Ljubljana in Slovenia. The objective of ACER is to help national regulatory authorities to exercise and coordinate their regulatory tasks at European level and, if necessary, to complete their actions. It plays a key role in the integration of the electricity and natural gas markets.

Its competences include, particularly:

- develop and submit to the European Commission non-binding framework guidelines;
- participate in the development of European electricity and natural gas network codes in line with the framework guidelines;
- make binding individual decisions on the terms and conditions for access and operational security of cross-border infrastructure when national regulatory authorities cannot reach an agreement or jointly request ACER intervention;

- decide on exemptions, if the infrastructure concerned is located on the territory of more than one Member State, when the national regulatory authorities cannot reach an agreement or jointly requests the intervention of ACER;
- provide advice to ENTSO-G (European Network of Transmission Managers Gas Network) and ENTSO-E (European Network of Transport Managers Network for Electricity), including network codes, and the drafting of the network development plan throughout the European Union;
- monitor the execution of the tasks of ENTSO;
- monitor the regional cooperation of ENTSO;
- advise the European institutions on issues related to the domestic electricity and natural gas markets;
- monitor, in cooperation with the European Commission, Member States and national regulatory authorities, the internal markets for electricity and natural gas, including retail electricity and natural gas prices, access to the grid, including access to electricity produced from renewable energy sources, and compliance with consumer rights.

ARENH: regulated access to historical nuclear energy (« ARENH ») was created by Law n° 2010-1488 of 7 December 2010 with new organization of the electricity market (NOME) and the implementing Decree N° 2011-466 of 28 April 2011, now codified in Articles R. 336-1 and following the energy code. It was established on the basis of the conclusions of the report of a commission chaired by Paul Champsaur, who had noted that, in the context of the time, namely the year 2009, access to electricity was necessary for the development of competition in the retail market.

Following the 1 July 2011, and for a period of 15 years, ARENH allows alternative suppliers to access, at a regulated price, the electricity produced by EDF's historic nuclear power plants in service at the date of enactment of the NOME law. The ARENH volumes

subscribed by alternative suppliers cannot exceed 100 TWh over one year, or about 25% of the production of the historic nuclear park.

Article L.337-14 of the energy code states that in order to ensure fair remuneration to EDF, the price must be representative of the economic conditions of electricity production of its historic nuclear power stations over the term of the device. Initially fixed at 40 €/MWh on 1 July 2011, consistent with the transitional regulated market tariff (TaRTAM) in force on 31 December 2010, this price has been since 1 January 2012 at 42 € / MWh.

INDEPENDENT ADMINISTRATIVE AUTHORITY (AAI): an independent administrative authority (AAI) is an institution of the State, responsible on its behalf of the regulation of sectors considered as essential and for which the government wants to avoid intervening too directly. The AAI has three characteristics:

- authorities: they have a certain number of powers (recommendation, decision, regulation, sanction);
- administrative: they act on behalf of the State and certain powers of the administration are delegated to them;
- independent: controls both sectors and public authorities.

AAIs are placed outside traditional administrative structures and are not subject to hierarchical power. The public authorities cannot order, instruct or even advise them. Their members are not revocable.

CERTIFICATION: The certification of the transmission operators network (GRT) aims to ensure compliance with rules of organization and independence from companies engaged in the production or supply of gas and / or electricity. The main purpose of separating transport network management activities from production or supply activities is to avoid any risk of discrimination between the users of these networks.

In France, GRTgaz and RTE are certified under the model « independent transmission system operator » (« ITO »): they act independently from other parts of their vertically integrated business. Teréga has been certified since 2014 under the model of « patrimonial separation » (« OU »): as the GRTno longer belongs to an integrated group since 2013, there is a complete separation between energy production or supply and transmission activities.

EUROPEAN NETWORK CODES: developed by the European association of transmission operators network for electricity and gas (ENTSO), the European network codes are common rules on different cross-border issues listed in the Community Regulations. They can become legally binding through comitology if the Agency for the Cooperation of Energy Regulators (ACER) makes a recommendation along these lines to the European Commission.

ADVANCED COUNTING: Advanced metering is intended to allow, at least, the provision to consumers, each month and not every six months, exact information on their consumption of electricity or gas, with the aim of improving the quality of the billing and better control of energy consumption by customers. An advanced metering system stores data (indexes, load curves), stores information (supply

interruption, power overflow), can be optionally parameterized, interrogated and remotely operated (bi-directional operation). Advanced metering involves the establishment of communicating meters capable of storing the information resulting from measurements and the establishment of data transmission systems allowing the rapid and reliable flow of information contained in the meters between users, network operators and suppliers.

COUNCIL OF EUROPEAN ENERGY REGULATORS (CEER): The Council of European Energy Regulators (CEER) is an association created in 2000 at the initiative of the national energy regulators of the Member States of the European Union and the European Economic Area. The structures of CEER include a general assembly, the only decision-maker, a board of directors, working groups specialized in different fields - electricity, gas, consumers, international strategy, etc. – and a secretariat based in Brussels. A work program is issued every year. In accordance with the statutes of the association, decisions are taken by consensus and, failing that, by qualified majority vote.

CONTRIBUTION TO THE PUBLIC ELECTRICITY SERVICE (CSPE): established by Law No 2003-8 of 3 January 2003, the contribution to the public electricity service (CSPE) aims to:

- offset the public service charges for electricity, which are borne by the incumbent suppliers, mainly EDF, Électricité de Mayotte and local distribution companies (LDC);
- offsetting part of the charges related to the transitional regulated Market Adjustment Tariff (TaRTAM), once the compensation of the public electricity service charges has been made (in practice, the CSPE no longer offsets the charges related to the TaRTAM since 2009).

Electricity utility charges cover:

- the additional costs resulting from the support policies for cogeneration and renewable energies and the additional costs resulting from the contracts « flexible tender »;
- the additional production costs, the costs of electricity storage work and the costs related to the implementation of energy demand management actions in areas not interconnected to the continental metropolitan electricity grid, due to tariff equalization (Corsica, Overseas Departments, Mayotte, Saint-Pierre and Miquelon in particular). The rates in these areas are the same as continental France even though the means of production are more expensive there;
- the revenue losses and the costs that suppliers incur due to the implementation of the special basic product tariff (TPN) and their participation in the scheme set up for people in precarious situations;
- the management fees of the Caisse des dépôts et consignations.

COUPLING MARKETS (EXPLICIT, IMPLICIT BIDDING): the coupling of several markets means the common treatment of their supply and demand curves according to their economic relevance, e.g. the matching of the highest buy orders with the lowest sell orders, regardless of the market where they were placed, but taking into account the daily interconnection capacities. In other words, within the limits of the interconnection capacity made available, the consideration for a transaction on an exchange may be from a foreign exchange without the participants being obliged to explicitly purchase the corresponding capacity at the relevant border. This is a form of implicit auction, as opposed to explicit auctions at which cross-border energy traders must purchase the corresponding interconnection capacity.

CLEAR CONSUMPTION: consumption clearance is the ability of a consumer to adjust his consumption level (by giving up certain consumption or by shifting it over time) according to the external signals he receives. These signals can be automatic (remote control of consumer appliances) or economic (price modulation encourages consumers to change their behaviour). In both industrial and residential consumers, consumption derailments introduce flexibility in the demand for electricity, making it possible to adjust the level of consumption according to system needs or price levels.

RENEWABLE ENERGY: renewable energy sources are wind, solar, geothermal, aerothermal, hydrothermal, marine and hydro, as well as energy from biomass, landfill gas, sewage treatment plant gas and biogas.

LOCAL DISTRIBUTION COMPANY (LDC): company or authority, also called non-nationalized distributor, which ensures the distribution and / or the supply of electricity or gas on a determined territory, not served by ERDF or GRDF.

FLOW-BASED: cross-border trading capacity calculation method based on flows. It makes it possible to take advantage of the interdependence between cross-border trades by dedicating the physical capacity of lines to the most economically valuable trades (e.g. where the price differential is the most important). The offers are indeed accepted considering their impact on the lines in addition to their price and their volume.

SUPPLIER: a legal person who holds an authorization that supplies at least one final consumer with electricity or gas, either from energy he has himself produced or from energy he has purchased.

ALTERNATIVE SUPPLIER: Suppliers who are not historical suppliers are considered alternative.

HISTORIC SUPPLIER: a supplier is considered historical in an energy if it markets or markets regulated selling prices (see Regulated Sales Prices) in that energy. A historical supplier is not considered an alternative supplier outside its historical service area.

OPERATOR OF TRANSMISSION (GRT) OR DISTRIBUTION (GRD) NETWORK: company responsible for the design, construction, operation, safety, maintenance and development of a transmission or distribution system for electricity or natural gas, ensuring the performance of contracts relating to third party access to these networks.

NOME LAW: law N° 2010-1488 of 7 December 2010 on the organization of the electricity market, known as the NOME law. The NOME law, resulting from the work of the Champsaur Commission, must:

- provide alternative suppliers with a regulated right of access to historical nuclear power, ARENH (see ARENH), transiently and limited in volume on terms equivalent to those enjoyed by the historical supplier EDF;
- allow the preservation of EDF's historic nuclear fleet (ensure the financing of the existing fleet by allowing EDF to secure its long-term commitments for the decommissioning and management of waste and also make the necessary investments to extend the period of operation of the reactors of its historic park);
- maintain competitive prices in France for final consumers.

GROSS MARKET: Wholesale market refers to the market where electricity and gas are traded (purchased and sold) before being delivered on the network to end customers (residential or business).

RETAIL MARKET: the electricity and natural gas retail market is the market on which the supply of electricity and natural gas to end customers.

ADJUSTMENT MECHANISM: RTE has power and energy reserves that can be mobilized when the balance between generation and electricity consumption is at risk (loss of a generating unit or part of the grid, bad estimation of level of consumption, etc.): system services (primary and secondary reserves) and the adjustment mechanism (tertiary reserve). The primary and secondary reserves are activated automatically in a few seconds after the break in equilibrium. The activation of the tertiary reserve is done manually by asking the producers and the consumers connected to the network to activate offers of adjustment of their production or of their consumption, upwards or downwards, in order to maintain the balance between production and consumption. Any actor submitting an offer on the adjustment mechanism has the free choice of the activation price of the offer (with the exception of the setting of a ceiling for tenders submitted by consumers under contract with RTE). When RTE activates an upward adjustment offer, for example an offer that resolves imbalances of the type « production lower than consumption », the RTE pays the actor who offered this offer. On the contrary, when the RTE activates a downward adjustment offer, it receives from the player the price of the offer. The expenses and products related to the activation of the adjustment offers are managed by the RTE within the Adjustments-Variations account, a management account which aims to be balanced: the costs of the imbalances are attributed to the actors who are at the origin during the process of calculation and settlement of the deviations.

NATIONAL ENERGY OMBUDSMAN: independent administrative authority, the National Energy Ombudsman is responsible for recommending solutions to disputes relating to the execution of electricity or natural gas supply contracts and for helping to inform consumers of their rights. It can only seize disputes arising from the performance of contracts concluded by a non-professional consumer or a professional consumer belonging to the category of microenterprises mentioned in Article 51 of Law N° 2008-776 of 4 August 2008 on the modernization of the economy.

ENERGY MIX: or Energy Bouquet. Distribution, usually in percentages, of primary energy in the consumption of a country.

PURCHASE OBLIGATION: legislative and regulatory framework forcing EDF and local distribution companies (LDC) to buy electricity produced by certain production sectors (wind, photovoltaic, biomass, etc.) under imposed pricing and technical conditions.

REGULATED SALES RATES: Regulated sales tariffs (TRVs), whose changes are set by the public authorities, can only be offered by historical suppliers.

In continental France, since 1 January 2016, are no longer eligible for regulated sales tariffs:

- prohibiting market manipulation and insider trading;
- forcing market players to publish the inside information they hold.

MARKET TENDER: Market tenders are offered by all suppliers, alternative and historical. Prices for market tenders are set freely by suppliers under a contract.

ENERGY CLIMATE PACKAGE: Issued on June 2009, set of 3 Directives (2009/28 / EC, 2009/29 / EC and 2009/31 / EC) and a Decision (No 406/2009 / EC) aims to reduce greenhouse gas emissions (GHG) of the Union and the strengthening of its energy security and competitiveness through the development of renewable energy sources. It is commonly associated with the so-called goal of « 3x20 by 2020 »: Increasing the use of renewable energies to 20% of the primary energy consumption of the Union, reducing its greenhouse gas emissions by 20% compared to 1990 levels and increasing its efficiency on 20% by 2020.

GAS EXCHANGE POINTS (PEG): trade in the wholesale natural gas market takes place on virtual points of the French gas transmission network called gas exchange points (PEG). It operates the exchanges between gas suppliers and the gas supply of gas transmission network operators for the equilibrium of daily balances. There is a PEG in each of the market areas of the French network: the PEG Nord and the TRS (Trading Region South, which groups the balancing zones of GRTgaz Sud and Teréga). On 1 November 2018, the two marketplaces will merge to form the TRF (Trading Region France).

COMMON INTEREST PROJECTS: projects for the development of electricity and gas transmission infrastructures, the list of which is adopted by the European Commission after a selection procedure. In particular, these projects will benefit from facilitated authorization procedures and, if necessary, from specific incentives and will be eligible for financing assistance.

REGULATION RESPECTING THE INTEGRITY AND TRANSPARENCY OF THE WHOLESALE MARKET FOR ENERGY (REMIT): UE Regulation n°1227/2011 of the European Parliament and of the Council of 25 October 2011 on the Integrity and Transparency of the Energy Wholesale Market (REMIT) entered into force on 28 December 2011. It establishes the rules prohibiting abusive practices on wholesale markets of energy:

- prohibiting market manipulation and insider trading;
- forcing market players to publish the inside information they hold.

Insider trading consisting in particular of using inside information (e.g. non-public information whose publication would likely have an impact on the price of the energy concerned) by acting on wholesale energy markets. Privileged information must also be published.

Market manipulations, in particular by giving a misleading signal on the price or the balance of supply and demand in the energy markets.

This approach is inspired by financial regulation, and adapted to the energy markets. The notion of privileged information refers in particular to information relating to physical production, transportation, storage and LNG terminals. It is linked to the transparency obligations provided for in the 3rd energy package.

THE EUROPEAN NETWORK OF TRANSMISSION SYSTEM OPERATORS (ENTSO):

there the ENTSO (European Network of Transmission System Operators) for electricity (ENTSOE) and for gas (ENTSO-G). Transport network managers cooperate at ENTSO level with the European Union to promote the implementation and operation of the internal market for natural gas and electricity and cross-border trade and to ensure optimal management, coordinated operation and a sound technical evolution of the natural gas and electricity transmission network. In this context, the ENTSOs elaborate the European network codes, based on the framework guidelines established by the Agency for the Cooperation of Energy Regulators (ACER) and in close consultation with the latter.

TRANSPORT NETWORK AND ELECTRICITY DISTRIBUTION:

network designed for the transit of electrical energy between production sites and places of consumption. It is composed of power lines that provide connections to voltage levels given and compounds voltage transformer stations, connection and cut-off devices, measuring instruments, control and monitoring and reactive energy compensating means. There are three hierarchies of networks:

- the large transmission and interconnection network which supplies large quantities of energy, 400 kV or 225 kV, over long distances with low losses;
- The regional distribution network that allocates energy to the regions that power the public distribution network as well as large industrial customers in 225 kV, 90 kV and 63 kV;
- the distribution network at 20 kV and 400 kV serving end consumers in medium voltage (PME and PMI) or in low voltage (domestic, tertiary, small industry customers)).

INTELLIGENT ELECTRICAL NETWORKS: The smart electrical networks are also called smart grids. These are the public electric network to which the features from the new technologies of information and communication are added (NTIC). The goal is to balance electricity supply and demand at all times and provide a safe, sustainable and competitive supply for consumers. Making the intelligent network is to improve the integration of energy systems and involvement of network users. These networks need to be deeply reconfigured to integrate decentralized generation of renewable sources on a large scale, and to promote demand-driven supply by providing the final consumer with tools and services that allow them to know their personal consumption, and therefore to act on it.

SECURITY OF SUPPLY: ability of electrical and gas systems to continuously meet predictable market demand.

COST OF USE OF THE TRANSPORT AND DISTRIBUTION NETWORK:

to deliver energy to customers, a supplier pays transmission and distribution system operators for the use of their networks. The method of establishing these tariffs is fixed by the CRE. They are calculated in a transparent and non-discriminatory manner, in order to cover all the costs borne by the network managers insofar as these costs correspond to those of an efficient network manager.

LNG TERMINAL: a port facility that receives, stores liquefied natural gas (LNG) and sends the liquefied natural gas to the main transmission network after re-gasification.

ACRONYMS

ACER: Agency for the Cooperation of Energy Regulators

ADEME: Agency for the Environment and Energy Management

AMF: Financial Markets Authority

AMM: Automated Meter Management

ANODE: National Association of Energy Retail Operators

ARENH: regulated access to historical nuclear energy

ATRD: Third party access to the distribution network

BT: Low tension

CE: European Commission

CEER: Council of European Energy Regulators

CNIL: National Commission for Information Technology and Civil Liberties

CoRDIS: Dispute Resolution and Sanctions Committee CRE: Energy Regulation Commission

CSPE: Contribution to the public electricity service

CTA: Transmission tariff contribution

DGEC: Directorate General for Energy and Climate

LDC: Local Distribution Company

ETP: Full time equivalent

ETPT: Full time worked equivalent

GRD: Manager of distribution network

GRT: Manager of transportation network HTA: High tension A

HTB: High tension B

LTECV: Law n°2015-992 of 17 August 2015 on the energy transition for Green growth

NOME: New organization of the electricity market

PEG: Gas exchange point

PPE: Multiannual energy programming

REMIT: Regulation on Wholesale Energy Market Integrity and Transparency

TPN: Basic rate

TTF: Title Transfer Facility

TURPE: Rate of use of the public electricity networks

ZNI: Non-interconnected areas

The purpose of this document is to inform the public of the CRE activities.
Only the deliberations of the CRE are authentic.

This document can be downloaded from the CRE website:



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