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BEHIND THE SMART METER

Develop energy monitoring and management services for consumer welfare and energy system performance.

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WORKING GROUP 3 of CRE's Foresight committee

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Comité de prospective de la CRE

ÉCLAIRER L'AVENIR

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Message from the President

"*Behind the smart meter*". Underlying this intangible expression lies the main concern for the Energy Regulatory Commission (CRE): the consumer. As President of CRE, my mission is to defend their interests, whether they are professional or private consumers. This requires a fair price for energy, a high quality of service and a guaranteed security of supply. These are all objectives that cannot be achieved without making major changes in line with the energy revolution we are experiencing.

The energy sector is constantly evolving and undergoing rapid changes. A huge wave of changes is sweeping through our traditional energy system, modifying the relationship of citizens to energy through ecological awareness, the development of renewable energies in the territories, digitization and the multiplication of service offers, the rise of home automation, *etc*. At first sight, all these changes make the consumer-citizen the cornerstone of a low-carbon, resilient energy system.

However, things are not that simple. The French cannot change their consumption habits overnight and obtain the associated energy monitoring devices. This is truer as the multiplication of energy players and commercial offers makes the energy system more difficult to understand for many of our fellow citizens.

Identifying innovative ways to support consumers in the energy transition, encouraging their commitment while considering their great diversity is the mandate I have given to the co-chairs of this working group. Cécile MAISONNEUVE, Chairwoman of La Fabrique de la Cité, and to Fabien CHONÉ, Chairman of Fabelsi, the chairmanship of this working group. I would like to thank them and all the participants for this very useful report. Its proposals reflect the essential characteristics of the Foresight Committee: imagination and boldness, even if consensus can sometimes fall short.

Many of these proposals are fuelling the discussions undertaken by CRE these last few years, particularly in the topic of the fair and incentive tariff signals sent to consumer, the promotion of the consumption management and the fair and truthful information for consumers, the most precarious. The debates and the proposals will be highly valuable for the continuation of our work, and more widely, to fuel public debate on the future of our energy system.

This report highlights the need for consumers to better understand our energy system and to rethink the way economic signals are sent to them. Energy is a specific good for which the price signal alone is insufficient to guide consumer choices towards a resilient energy system adapted to the ecological transition. In addition, energy services have taken root in our citizens' daily lives. We should not expect our consumption patterns to automatically adapt to price changes: the French are not computers! Energy transition goes with powerful debates, which influence consumer choices, and this is commendable! The contribution of behavioural and cognitive sciences is therefore essential to provide insight into our energy future, within the Foresight Committee where they are most welcome.

"*In surrendering, the unhappy man consumes his unhappiness"* said Honoré de BALZAC. So let us use our optimism to sketch out, with the help of this report, a new future that meets the aspirations of our fellow citizens and leads to an energy transition that is both fair and ambitious.

Jean-François CARENCO

In conclusion, I wish to say and repeat that the ideas and proposals of the Foresight committee are not binding on CRE, and even less so on the public authorities. The debate on this topic focused on the matter of demand response management. To date, our system has not been able to find a way to enable each end consumer to have a significant impact on demand response during peak times or when they do not need to consume. Identifying proposals with respect to this issue is crucial, and this is what the Foresight committee has performed. This is none of my mission to express my opinion about these proposals here, except to say that I also have the great responsibility of giving specific attention to public finances. Personally, I believe we need to work to find solutions, in a context of free speech. This is facilitated by the Foresight committee, whom I acknowledge.

Foreword

The Chairman of the French Energy Regulatory Commission, Mr Jean-François CARENCO, created a Foresight Committee in autumn 2017, which gathers the major players in the sector of energy to enlighten the French regulator in France in the mid-term. In this framework, several working groups were formed, in charge of drafting public reports.

For season 3, the working group no. 3 was composed of representatives of the main companies in the sector and academic, associative and institutional players : its mission was to work on "*Behind the smart meter*". It held a meeting about once a month, under the co-chairmanship of Ms Cécile MAISONNEUVE (Chairwoman of La Fabrique de la Cité) and Mr Fabien CHONÉ (co-founder of Direct Énergie and Chairman of Fabelsi). The working group received the effective assistance of its rapporteur, Mr Cyprien CANNIVEC (Auditor at the Cour des Comptes) : many thanks to him.

The group composition and the list of interventions are presented below.

THE PRESENT REPORT – WHICH IS NOT BINDING ON CRE – WAS ESTABLISHED WITHIN THE FOLLOWING FRAMEWORK:

- this report, which aims to be accessible to all stakeholders – including non-specialists in the energy sector –, is intended to fuel public debate, drawing on the analysis of the main private, public and para-public participants of the energy sector in France;

- it is drafted under the sole responsibility of the two chairpersons, Fabien CHONÉ and Cécile MAISONNEUVE;

- the proposals presented in this report were not unanimously agreed on and the objections of certain members of the working group are therefore presented in the Annex.

Note: *the working group relied on many documentary sources not directly under the control of its members. Therefore, some charts or tables included in the report may not be translated into English.*

Message from the working group co-chairmen

French households are becoming equipped with a growing number of smart equipment for their pleasure, comfort or well-being. Smart energy uses are a profound social evolution, accelerated by the connectivity of domestic equipment, the ever-growing expansion of electric vehicles, and the generalisation of big data processing.

These transformations allow for new opportunities. They enable the deployment of new services for the benefit of energy consumers. The increase in home comfort, control of energy consumption, the economic gains and citizen commitment to an environmental approach are the advantages expected from the management services for equipment installed downstream of meters, particularly for electricity.

Demand-side management in households is also one of the levers for contributing to the soundness of the French electricity system and supporting the development in the energy mix, while facilitating the decarbonisation of uses. According to available projections, demand-side management services, and the flexibility thus provided, will be essential to meet the need of solutions for the stress in the electricity system which will appear progressively by 2035 and will intensify by that time because of the ecological transition particularly.

However, the potential for demand flexibility downstream of private consumers' meters is currently underexploited and France lags behind on its own objectives. It appears to be relatively less advanced in terms of service available for customers compared to certain European countries. Therefore, actions must be undertaken as of now to take full advantage of flexibility in the short term, but plans must also be made for increased flexibility needs for 2035. Taking immediate action is necessary to reveal and consolidate the industrial fabric and service solutions, but also to progressively support the change in consumption habits.

- **A reinforced price signal to better allocate energy resources**

The tariff system plays an essential role because of its dual influence on energy demand and supply. It encourages or discourages certain energy behaviour and reinforces or reduces the economic profitability space required for the development of business models. But the current electricity tariff system, largely structured by the regulated sale tariffs, does not encourage deployment of management service offers and incite behaviour that cannot be rational from an ecology point of view.

Thanks to the deployment of Linky-type meters, tariff regulation could therefore be revised in order to send appropriate economic signals by reflecting the reality of the costs incurred by the local authority to supply each type of consumption. While dynamic electricity pricing can be suitable for sending optimal economic signals to a minority of consumers perfectly informed and accepting volatility risks, it is not an effective solution applicable on a large scale. To be effective for a great majority of consumers, it is necessary for regulated electricity pricing to become more sophisticated than it is today. Building on the new tariff for the use of the public electricity distribution networks (TURPE 6), the working group proposes for the regulated electricity tariff to be seasonalised, for example by the year 2024. This approach means changes for the regulated electricity pricing if it is maintained at this horizon (conventional assumption by the working group). Defining as of now these seasonal adjustments in the regulated tariff would provide the visibility needed by consumers and economic players to ensure acceptability of the change in the tariff structure and adapt commercial offers.

- **Ensure fairness of the tariff system by supporting the most fragile consumers**

By reflecting the real cost of energy in its price of energy by revising the regulated electricity tariff, the price signal thus created will not be neutral on consumers' bills. Without a change in consumers' behaviour, and pending the development of sufficient management services, such a change would be accompanied by negative effects on households' purchasing power.

It is therefore essential to support consumer citizens with managing the change in their bills. In this regard, two household categories require specific attention: low-income consumers, whose solvency would probably be jeopardized by a significant increase in the price of energy, and tenants, whose capability to control their energy consumption items may be limited, particularly concerning heating and charging of VE.

The working group thus proposes two actions to ensure both the fairness of the energy system and the effectiveness of the energy price signal. On the one hand, it is important to accelerate and support energy-efficiency rehabilitation, by setting rigorous energy performance standards for homeowners and according to more assistance to modest households in their renovation projects. On the other hand, it seems necessary to adapt the terms of the "*energy cheque*" to consider, for the most vulnerable targets, the electric heating modality. *NB:* the proposal to change the tariff structure is indissociable with the proposal concerning the reinforcement of assistance for the payment of electric heating bills for consumers enduring financial difficulties.

- **Remove the other economic and organisational obstacles to the development of services downstream of the meter**

The reinforcement of the price signal is not a sufficient condition for ensuring optimisation of energy resource allocation. This signal, which must be clear, must be delivered to customers and interpreted by them or by third parties to whom they delegate the actions necessary to take full advantage of the price signal. It is therefore important to transform the price signal into a service for managing equipment downstream of the meter. This development, which has already begun in some of our European neighbour countries, implies removing the main economic and legal h that currently restrict the development of these services.

In economic terms the change in tariff signals proposed by the working group might be insufficient in the medium term for supporting the rapid development of management service offers, particularly distributed load shedding. The emergence of economically viable solutions for distributed load shedding (explicit or by price signal) is currently hindered by the insufficiency of the capacity price in the market compared to the level expected for guaranteeing the security of electricity supply (level that would enable the development of distributed load shedding). To reduce this gap, it is proposed to provide public financial support for distributed demand response capacity. This support, which would be temporary and transitory, would enable the development by 2035 of the services and field of distributed load shedding.

In parallel, it is important to estimate the potential benefits for the local network and the consumer of investments made beyond the meter. In this regard, as long as there is no infringement on the territorial planning goal pursued by the principle of tariff equalisation, it is proposed to enable CRE to adapt the TURPE tariff, to really take into account the advantages of equipment beyond the meter where they are beneficial for the network in terms of investment reduction and management. The purpose of this

proposal is to reduce the overall cost for the national community without at all changing the homogeneity of the distribution of the network expenses among all users.

On the legal level, and despite recent developments in European law, the current regulatory framework hinders the development of combined offers for energy supply and management of equipment beyond the meter by prohibiting a long-term commitment from the customer. However, multi-annual visibility is necessary to found business models based on high initial investments. It is even more necessary for demand management solutions requiring sufficient volumes to be a real lever for the electricity system. Therefore, the working group proposes to authorise long-term commitment to energy supply when it is combined with a solution for controlling or managing demand or with equipment enabling energy savings.

This commitment over time would be authorised only for the case of investments in high-quality infrastructure, which are useable and re-useable regardless of the energy supplier, for which the economic player would ensure the role of third-party investor. It would therefore be the responsibility of the supplier of combined offers, who would have greater visibility to ensure the viability of its economic model, to carry out the investments necessary for managing the equipment of households and small businesses. In this regard, a mandatory investment *quantum* could be set by the public authority.

- **Support consumers and facilitate their access to services**

Support for the structuration of a management services industrial field, and of distributed demand response, should enable the development of new offers favourable both to electricity system balance and the consumer's comfort. Such a development however implies that customers effectively have access to new service offers and that they have sufficient knowledge and information for their choice in terms of services and to be fully informed. In this regard, two proposals appear necessary for management offers to fully benefit residential customers.

First, it is necessary to prevent the risk of non-use of management offers for tenants that live in homes that are inadequately equipped. This obstacle can be lifted by setting, for landlords, a legal impossibility to refuse the installation or replacement of equipment enabling their energy management.

Then, efforts must be made to build consumers' trust in management services. This trust can be built only through pedagogy, information and training. Consumers must have easy access to the information concerning the energy consumption of their equipment, the applicable pricing and management actions they take or delegate voluntarily to third parties. All customers must have access to advice in order to make an informed decision regarding the energy management strategy of their household, acquire the most suitable equipment to their needs and ensure programming or delegation. Therefore, a dual approach involving pedagogy and individual support must be undertaken in order for the consumer to fully benefit from the advantages expected of the household energy management.

At the end of the day, the working group[1] calls for provisions, as of now, for a framework favourable to the acceleration of energy management services. Inaction would deprive France of many advantages for the security of the electricity system, decarbonisation of uses, the change in the energy mix, the potential for the creation of jobs that cannot be relocated, and consumers' comfort.

Cécile MAISONNEUVE Fabien CHONÉ

[1] The proposals made in the present report do not reflect the institutional position of each of the working group members, who, during discussions, expressed their reservations. Part of a foresight approach, the proposals made require an in-depth operational examination in view of their implementation.

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Introduction

Well-being at home, comfort of homes, the variety in the growing amount of domestic equipment, are important in the daily lives of French people, even more in the current health context which has increased demand for life quality at home. Residential habits change with the effect of new uses made possible by connected equipment called “smart”. At the same time, the progressive but profound transformation of the French energy system is continuing, in favour of the ecological transition based in particular on the development of renewable energy.

“behind the smart meter” theme lies at the crossroads of these fundamental transformations. The working group therefore endeavoured to give meaning to the “intelligence” of equipment and services behind the smart meter, but also to remove the economic and legal obstacles to their development in order to facilitate the energy transition. Therefore, two goals are pursued, one focused on private individuals, the other mainly focused on the electricity system.

These two complementary guidelines pursue the same objective of greater intelligence behind the smart meter for the dual purpose of consumption management and improvement in consumers’ comfort. The present report is therefore based on a win-win scenario, combining the need for a change in the energy system, behavioural change in clients-users-citizens and well-being of consumers.

The report therefore traces a positive future with a change in energy balance and individual behaviour which would be beneficial for consumers. While it aims to accelerate the development of management services for equipment behind the smart meter, it therefore also has a protective dimension for the consumer-citizen, who should have the information and tools enabling control and management of their consumption.

The current situation of the energy system does not require immediate transformation. In the short term, the progressive change in the energy mix and low-carbon uses will not translate to an imperative to significantly accelerate the development of consumption management and the operation of demand response potential.

Nevertheless, reluctance to provide, as of now, a framework favourable to the acceleration of management services is not relevant. This reluctance would deprive France of an increasing number of advantages: improvement in the overall balance of the electricity system, support for decarbonisation of energy consumption, individual and collective savings, additional comfort offered to consumers, etc. Based on circumstances, particularly during winter cold peaks, it is less costly to occasionally reduce consumption than to increase production, especially if load shedding does not impact the comfort of homes.

Most importantly, this reluctance would limit the progressive construction, in the national territory, of industrial and service sectors, which can grow only in the long term and which therefore require the implementation, as of today, of conditions favourable to the emergence of innovative players. In addition, system services cannot be deployed economically in the distributed and diffuse segment of customers, and therefore reduce consumers’ bills unless a certain volume of demand response is needed to ensure a remuneration.

Therefore, the report proposes to create, as of now, the context favourable to the development of services behind the smart meter and significant distributed demand response capacity. In focusing on the electricity system, it identifies regulatory and economic obstacles to be removed to promote the development of management and flexibility services for the welfare of the consumer.

In this regard, it must be highlighted that the proposals made in the present report do not reflect the institutional position of each of the working group members, who, during discussions, expressed their reservations or objections, presented in the Annex. Part of a foresight approach, the proposals formulated involve most of the normative evolutions, at national level (legislative and regulatory framework) and at European level (Union directives). Moreover, they call for a more detailed operational examination in view of their implementation.

First part: behind the smart meter, immediately useful for consumers and essential in the long term for the electricity system

Consumers are becoming equipped with a growing number of smart equipment for their pleasure, comfort or well-being. The increased use of connected equipment creates a potential for services behind the smart meter and equipment management services. This change in society should be mobilised to capitalise fully on the advantages offered, for the benefit of consumers and the electricity system. In the mid-2030s, the energy transition would effectively require[2] a greater need for flexibility, which should be anticipated today.

1. Services behind the smart meter, at the origin of new uses and comfort for the consumer

A set of changes observed these last few years, and which should intensify during the upcoming years, creates a context favourable for the development of equipment management services behind the smart meter. The underlying trend towards management is boosted by different phenomena such as the development of technologies enabling connection ("intelligence") of many household devices (from the heating system to mobile devices), the rapid expansion of electric vehicles, the need for electricity consumption for heating homes, the deployment of smart meters such as Linky to almost all households, the development of individual and collective self-consumption and the generalisation of big data processing tools.

This context enables the deployment of new services for the welfare of residential consumers and small businesses, provided that certain essential principles of trust, simplicity and clarity of offers are complied with.

1.1. Numerous advantages to be expected for consumers

A great diversity of players progressively develops a multitude of services behind the smart meter. The development of the sector sometimes called “smart home” is thus boosted by equipment manufacturers with a high value-added French and European industrial base, energy suppliers, large-scale distribution, telecommunications and digital players, and car manufacturers. This wide set of players participate in the proliferation of emerging offers, whose potential advantages for consumers are numerous: increase in home comfort, energy consumption control, the prospect of financial savings and participation in an environmental approach.

First, smart equipment and the associated services enable consumers to have more comfort This is particularly the case in terms of heat supply (heat as a service): transcending the usual pattern of energy supply on the one hand and the purchase of a heating device on the other, the consumer can buy a heat comfort service through a

[2] Based on RTE’s projection works, see developments below.

complete heating offer including the installation of material, its maintenance and management to generate a temperature defined by the consumer.

Second, the services being developed afford a better control of consumption. Digital tools enable individuals to follow their own energy consumption – gas and electricity –, to identify the most energy-intensive uses, and to possibly make comparisons. This knowledge of consumption paves the way for corrective action to make decisions for investment in new equipment (programming heat, changing the heating system, reinforcing the home's insulation, deferring consumption to a later time, etc.). It also makes it possible to detect shortcomings, and therefore to decide or anticipate measures for the repair or replacement of material to prevent overconsumption.

Third, understanding their consumption, controlling their equipment, adapting their consumption and choosing their uses, can lead to energy savings and a reduction in consumers' bills. The financial gains that may directly result from the drop in energy consumption and power subscribed, enabled by better understanding and control of the main consumption items: modulation of home temperature during absences, replacement of energy-intensive equipment, deferral of the powering on of certain equipment, etc.

Financial gains can also be obtained with the variation in the energy tariff, by deferring consumption outside of demand peaks. Management services enable, with the same level of comfort, optimisation of the price paid for electricity to consider its variation (peak times/off-peak times, or more elaborate). This deferral of consumption to other times of the day, which is beneficial for the electricity system (see below), could even be reflected by remuneration granted to the consumer for his demand response capacity, for the benefit of the community[3].

Illustration of the bill savings announced by a French demand-response aggregator

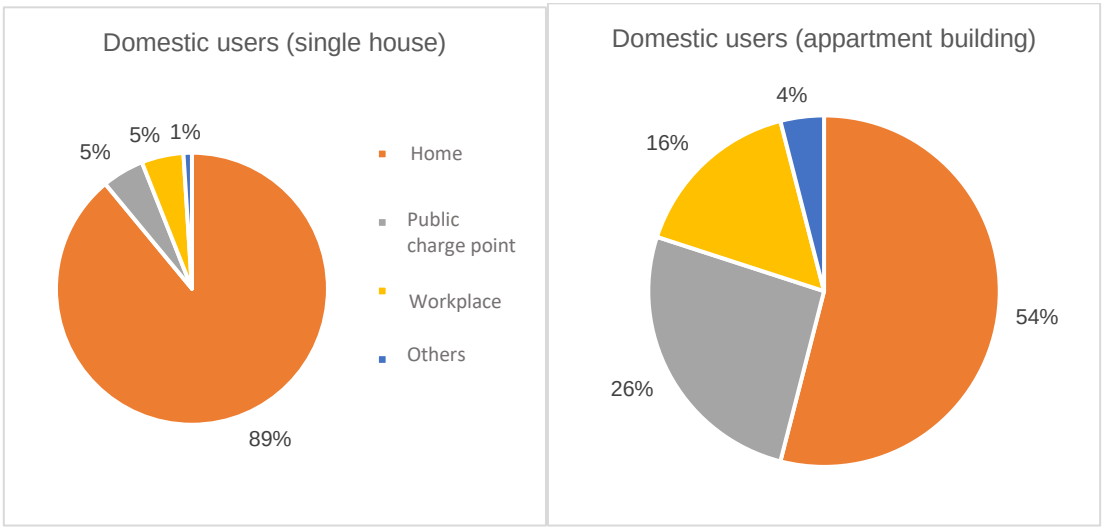
A French demand-response aggregator (see definition below) proposes an energy consumption control service to individuals. In this regard, it has units installed on consumers' electric panels (100,000 units deployed as at the end of 2020), in order to modulate, in particular, the consumption of radiators and domestic hot water cylinders. This unit collects information on the consumption of equipment and sends it via the home's internet box to the aggregator. According to the economic player, the service could generate up to 15% savings on bills for homes equipped, thanks to demand response and tools for monitoring and controlling consumption.

The economic player proposes, in addition, other automation services for the management of equipment thanks to programming. The management services would therefore simplify or automate "the right behaviour", suited to the consumer's living habits. According to the service provider, this additional programming service would generate consumption savings up to 30%.

[3] This development on demand response is illustrative. More generally, the report is geared towards reinforcement of consumption flexibility.

In this regard, the boom in electric mobility would reinforce the advantages previously listed. While the number of electric vehicles in France could reach one million by 2023, close to 5 million by 2028 and up to 16 million by 2035[4], controlling electric vehicle charging would mitigate the increase in energy bills (because of the substitution of a thermal engine by an electric engine) through the mobilisation of bill savings potential. Controlling energy bills is even more important given that the home is the main place of vehicle charging.

Graph no. 1: main place of electric vehicle charging



Source: Enedis, 2021, survey of the practices of electric vehicle owners

Several cumulative sources of bill savings can be identified for electric vehicles: the time deferral of the charging, control of power demand, maximisation of self-consumption, as well as redelivery of electricity to the network (in the case of bidirectional charging, see box below). Estimates of bill savings vary but could reach up to €1,000 thanks to bidirectional management for a vehicle covering 14,000 km per year[5] [6]. Charging management can also make it possible in the long term to promote the integration of renewable energy in the French electricity system.

[4] Projections by the French automobile platform and the multi-annual energy plan (PPE).

[5] *Source:* RTE, *Development of electric vehicles and the electricity system,* May 2019.

[6] Discussions with economic players of the sector with the working group (December 2020 – March 2021).

Several levels of electric vehicle charge management

There are several levels of electric vehicle charge management. The simplest consists in deferring monodirectional charging (from the network to the vehicle, termed V1G) on a suitable electrical outlet based on a traditional subscription and management by a tariff signal (e.g., peak times/off-peak times). A second level is still based on monodirectional charging but subject to dynamic pricing (see definition below). A third level corresponds to bidirectional charging, termed V2X for *vehicle to anything grid* (V2L for *vehicle-to-load*, V2H for *vehicle-to-home*, V2B for *vehicle-to-building* and V2G for *vehicle-to-grid*), allowing redelivery of energy to the home or to the network.

Fourth and last, new services behind the smart meter can take part in an environmental approach. The drop in consumption, the reduction in individual footprint on electricity system balance, as well as the positive effects of these two phenomena on the development of the production of decentralised renewable electricity production units and on the decreased use of greenhouse gas emitting productions, therefore meet an energy transition requirement.

1.2. A key matter of trust, simplicity and clarity

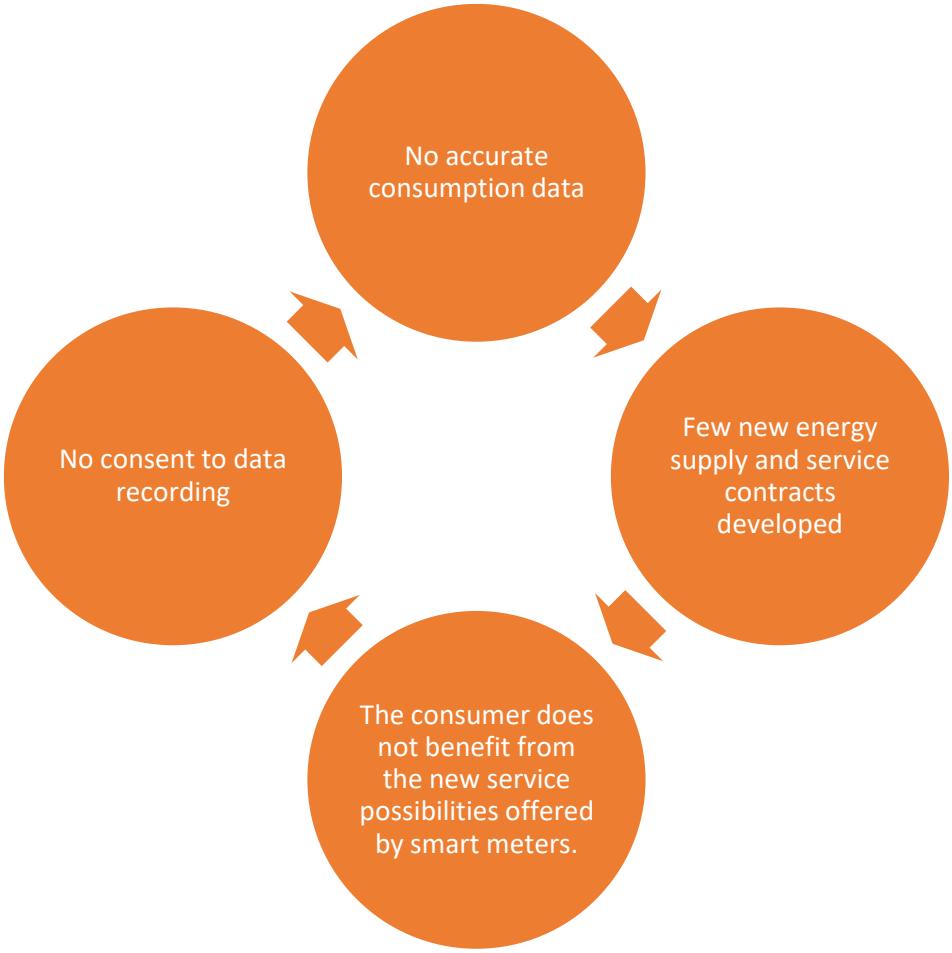
The previously listed advantages steer consumers towards new business models, based on services behind the smart meter. The progressive changes in consumption behaviour tend towards a more global trend – outside of energy-intensive equipment – of greater consumption of services and not of products itself (this is the case of mobility, accommodation, etc.).

Such changes in behaviour, however, can only be observed if consumers' trust in new services is guaranteed. In its report last year, entitled "*Give meaning to the consumer's data"* (December 2019), the Foresight Committee's working group[7] highlighted the reluctance and mistrust of consumers concerning the processing of energy data. The low level of trust is due in particular[8] to the lack of information on the benefits of the collection, sharing and analysis of data, which are tariff optimisation, energy savings and the reduction in environmental impact mentioned previously. The report also raised the need to easier access to the charging data of the vehicle battery in a non-discriminatory manner to enable their users to coordinate their travel needs with the most interesting periods for charging their electricity reserve. Transparency about charging is necessary to enable the consumer to act optimally.

[7] Report available on the website of the Energy Regulatory Commission: https://www.eclairerlavenir.fr/eclairer-lavenir-donner-du-sens-aux-donnees-du-consommateur/

[8] This is non-exhaustive, the lack of trust may be due to other phenomena.

Diagram no. 2: the vicious cycle of not sharing consumer data



Source: Working group no. 3 of CRE's Foresight committee (December 2019)

In order to strengthen the necessary trust in the collection and processing of data, last year, the working group recommended, by the end of the rollout of Linky-type meters, a simplification of consent rules for the collection of consumer data that can facilitate processing of hourly data, while allowing consumers to object, provided that this objection does not jeopardise the proper functioning of the electricity system and the organisation of the electricity market. As deployment of the smart meter is about to end, this proposal is still relevant.

In parallel, the working group proposed promoting experimentation through a regulatory "*sandbox*" under optimal security conditions for consumers and private players. CRE's recent deliberation[9] to grant derogations for nine projects falling partly or fully within its scope of competence shows the value of this procedure facilitating innovation. By way of illustration, this deliberation authorises, under certain conditions, the experimentation of a transmission tariff option giving incentive to consumers to

[9] CRE Deliberation no. 2021-59 of 11 March 2021 *deciding on the granting of derogations of dossiers submitted to CRE within the framework of the first window of the regulatory experiment mechanism provided for by the law relating to energy and the climate.*

exploit their flexibility potential by reducing or deferring their consumption during peak periods in the local network, based on a signal sent by Enedis.

It is therefore necessary to go a step further in the implementation of these experimental procedures, pursuing, as proposed by the working group in its previous report, innovative initiatives through a sandbox managed under the joint supervision of CRE on the one hand as part of its regulation powers in the energy sector, and CNIL (data protection agency) on the other hand, as part of its competence regarding the protection of personal data. This management by two regulators indeed appears important to enable the emergence of an ecosystem of innovative services and products to support the energy transition.

This trust issue adresses the deployment of smart meters, since they are useful for the development of new possibilities in terms of pricing, uses and business model. They indeed contribute directly to a better knowledge of the use of the network by the different users, as well as, for one and the same consumer, the consumption of their different equipment. Client tele-information associated with the Linky meter makes it possible to follow instantaneous consumption and control equipment dynamically provided that an energy manager (or equivalent) is installed. By way of illustration, client tele-information enables, thanks to the reading of tariffs, the deactivation, or the activation of certain equipment. At this stage, trust in the smart meter and the data it generates is not ensured for all clients, shown by the 90% of clients equipped who have not activated the reporting of their load curve to the distributor's information system.

The potential of the Linky smart meter

The Linky meter of the public electricity distribution system operator Enedis, measures consumption in ten-minute intervals and aggregates it in a maximum of ten "supplier indexes" allowing for different electricity pricing according to the time of day. Regulated tariffs (peak times/off-peak times, or EJP, see below) such as market offers can be based on this functionality. The meter also has a "production index", for measuring the energy injected by the consumer during a self-consumption operation.

The information "held" by the meter can be exported via client tele-information. This can be ensured by a wire or by a "*Linky radio transmitter*". In return, the energy manager transmits real-time information to the Linky meter, during the switch between tariffs periods.

This new generation of meters enables[10]:

- control of consumers' equipment (through an energy manager or equivalent), thus contributing to limiting their consumption during periods of high electricity demand;
- simplification of certain operations (telemetering and remote interventions);
- support for controlling consumers' expenses, in particular through new services, the transmission of more accurate and detailed information on their actual consumption, the possibility of comparing consumption;

[10] See CRE Deliberation of 2 July 2014 *deciding on the incentive regulation framework for ERDF's smart metering project in the BT ≤ 36 kVA voltage range*

- tariff offers by suppliers adapted to consumers' specific needs, with different prices according to the periods of the year or of the day;
- development of smart grids.

In March 2021, according to Enedis, 8 French households out of 10 are equipped with Linky meters. In total, 31 million meters are installed, out of a total 35 million. Enedis considers that consumers' positive assessment of the new Linky meter has grown, to reach 60% in October 2020. End 2020, 6.5 million households followed their consumption based on data from the Linky meter (compared to 4 million end 2019).

The need for consumers' trust requires simplicity and clarity of service offers proposed behind the smart meter. However, the diversity and interweaving of the services that could be proposed could very well make simple uses in the daily life of the consumer more complex. Due to the insufficient knowledge about the importance and precise conditions of offers, they also create a risk of making errors in the selection of connected equipment or services, undermining consumers' trust.

This dual requirement of simplicity and clarity involves technical challenges in terms of **telecommunication standards** enabling interconnection and interoperability of equipment. Certification of certain products is a second-level alternative to this approach. By way of illustration, to make management solutions more accessible to clients, the "*Linky Ready*" marking attests to the quality of reception of data from the Linky meter by downstream equipment. The client therefore has confirmation of compatibility between the Linky meter and the product they purchase.

The goals of simplicity and clarity of offers also require the development of **integrated solutions** for the consumer. In terms of electromobility for example, the consumer's reluctance to purchase an electric vehicle may be due to the complexity and accumulation of tasks going from the installation of a terminal to the selection of the electric vehicle. In this regard, economic players – energy suppliers, car manufacturers, etc. – seek, in France and abroad, an integrated solution covering a set of services, from the installation of a charging terminal in the home to management services and including electricity supply.

2. Greater need for flexibility by 2035, which must be anticipated as of now

While management services for equipment behind the smart meter can be the source of new uses and increased comfort for consumers, they are also one of the levers for ensuring the solidity of the overall electricity system and supporting the change in the French energy mix, while facilitating decarbonisation of energy consumption. In addition to the immediate advantages which would accompany the development of management services, it appears necessary to prepare, as of now, for the increased flexibility needs of the electricity system by 2035[11].

[11] This horizon is indicative and prospective, it is not a definite deadline.

2.1. A growing flexibility need, an essential acceleration in capacity to be anticipated in the mid-2030s

Two major fundamental trends in the evolution of the electricity system must be raised, both from the supply side and the demand side. From the supply side, the multi-annual energy programme (PPE) plans for a significant increase in the annual production of electricity from renewable sources, which would increase in ten years from 109 to 300 TWh, and sets for 2035 a 50% reduction in the portion of nuclear energy in electricity production.

In this context of energy with variable production profiles, new factors for the security of supply of the electricity system must be identified. In this regard, the change in demand should be accompanied by flexibility solutions, in particular to face electricity consumption peaks. This flexibility can originate from new uses and equipment contributing to the decarbonisation of the economy, especially in terms of heating, production of domestic hot water, hydrogen production and electric mobility.

Several foresight exercises conducted by RTE illustrate flexibility needs[12] based on the different time horizons.

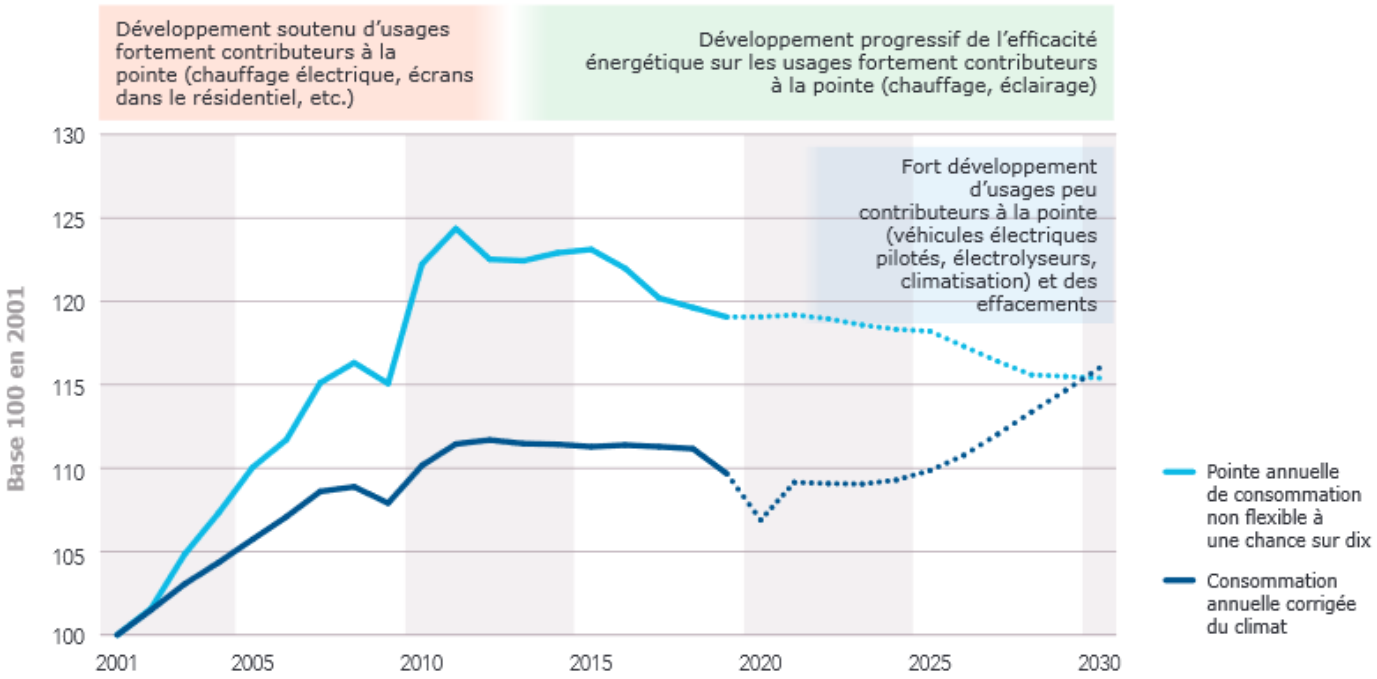
By 2035, to ensure management of the electricity system and based on these projections, flexibility needs[13] would not be significantly higher than the trajectory (already ambitious) specified by the PPE. On the one hand, security of supply would be reinforced by 2030, due to electricity production that will have become more abundant and diversified than today, and greater integration of the European electricity system. On the other hand, if the objectives of the PPE are reached, demand flexibility will grow significantly by 2030. It will be reflected by a drop in annual peak[14] consumption by almost 3 GW, even though annual electricity consumption would increase as from 2025 due to electrification of uses.

Graph no. 2: energy consumption and non-flexible consumption peak by 2030

[12] The forecast reviews for 2030 and 2050 (2021), and RTE's and IEA's report on *Conditions and requirements for the technical feasibility of a power system with a high share of renewables in France towards 2050*, January 2021.

[13] Faced with a given need, flexibilities do not all have the same value. The characterisation of flexibility (demand response, shifting, consumption triggering, etc.) is important.

[14] It is the "*1 chance out of 10*" indicator, which RTE uses to define the level of power that has one chance out of 10 of being exceeded for at least one hour in winter.



Source: RTE, 2021, forecast assessment. Note: non-flexible consumption means after activation of use management levers.

However, between 2035 and 2050, the transformation prospects for the French energy mix would require a major acceleration in the development of flexibility solutions. Moving towards 2050, flexibility needs could range between 40 and 60 GW of additional capacity to cover the consumption peak.

2.2. Service offers less developed in France, distributed demand response potential still largely unexploited

The development of management services for equipment behind the smart meter seems to be less advanced in France than in its main European partner countries. Investigations conducted by the working group illustrated the diversity of services that are emerging in north-west Europe (United Kingdom and the Netherlands, in particular), such as grouped offers associating the sale of equipment such as heaters and complete management services for the building's consumption (bundles).

France's relative delay in service offers is reflected by the distributed demand response potential that remains underexploited. Indeed, in addition to industry and the tertiary sector, demand response potential is particularly considerable in France, especially because of the predominance of electric heating in homes. However, all of the measures taken until now have prioritised the industrial and tertiary sectors but have proven to be unsuitable for the development of demand response in the residential sector. But capacity in only the industrial and tertiary sectors will not suffice to reach the ambitious goals set within the framework of the PPE, and which correspond to a growing need for flexibility solutions in a context in which the electricity system will have a greater need for flexibility with the development of variable renewable energies. In addition, distributed demand response contains a major environmental, social and

economic potential[15] related in particular to the decrease in peak consumption demand and the facilitated integration of renewable energy in the energy mix. It also offers electricity cost savings for the consumer (see above).

Demand response potential in the distributed segment is estimated at more than 20 GW in France, for a total of 160 GW in Europe by 2030[16]. Moreover, this potential is growing, due to new uses. Foresight work by Ademe illustrates the growing flexibility in electricity uses breaking them down into the main items.

Table 1: flexible portion of the electricity uses of residential consumers

Flexible portion by use (in %)	2025	2030	2035	2040	2050	2060
Domestic hot water	25 %	50 %	63 %	75 %	100 %	100 %
Electric vehicles	13 %	25 %	40 %	53 %	80 %	80 %
Heating	13 %	25 %	38 %	50 %	75 %	75 %
Small and large appliances	0 %	0 %	9 %	19 %	38 %	56 %

Source: Ademe, long-term scenarios, October 2018

Mobilisation of this potential would bring major individual and collective benefits. Apart from the advantages for the electricity system and the consumer, the development of the demand response activity should create jobs that are hard or impossible to relocate. The economic activity of building and installing equipment, and selling and operating demand response solutions, should thus result in recruitments in the national territory. The quantitative impact of the development of the activity on employment remains relatively uncertain. Nevertheless, the installation of one GW of distributed demand response was estimated at 200 temporary jobs during the manufacturing phase, 300 temporary jobs during the installation phase, and from 30 to 200 sustainable jobs in terms of operation and maintenance[17].

Illustration of a tool for the identification and use of flexibility potential

Developed based on modelling work, a tool aims to provide a reference for using buildings' energy flexibility potential. It consists mainly in an indicator, which combines a management system classification (A, B, C and D), real scalable power (in kW) and the contribution to flexibility (flexible power/power subscribed). The system classification (A, B, C and D) depends on the flexibility management (metering conditions, grid connection, demand response scenarios, tariff management), as well as the storage and production of local energy (storage management, forecasts or self-consumption).

Apart from the identification of flexibility potential, a more advanced version of the tool could make it possible to associate the different flexibility players on a digital

[15] See Ademe's opinion, *Distributed load management,* September 2014.

[16] Discussions between the working group and a load response aggregator.

[17] E-cube, *Study of the advantages that load management provides to the community and their integration in a bonus mechanism,* 2013.

platform (capacity aggregators, system operators, energy suppliers, public bodies, etc.) by sharing the information of these players and buildings that communicate their flexibility data.

In sum, this tool intended for educational purposes is part of the emergence of markets, in terms of electricity or thermal storage, solar self-production, multi-energy co-generation, anticipation by use and automatic management of energy scenarios. By offering better visibility of the volumes of demand response capacity at different levels, the tool effectively enables system operators, aggregators and energy suppliers to develop new business models in buildings.

2.3. Act as of today, to allow the industrial field to emerge and build consumer trust

Given the growing needs, flexibility could develop thanks to several fundamental trends previously described: electromobility, development of heat pumps, management of demand by connected equipment, growing use of stationary storage devices, for example second-life batteries. These developments are levers for ensuring the security of electricity supply, but also means of optimising the balance of an electricity system doubly marked by the growth in the renewable energy portfolio and the decarbonisation of uses. As recently highlighted in a report by the general council on the economy[18], "*we will therefore switch from management of consumption peaks, occurring quite rarely and in winter (with demand response mechanisms in particular) to generalised flexibility, relying all year round, on management of demand and supply"*.

Taking full advantage of flexibility in the short term and planning for much higher needs by 2035 implies acting as of now to foster the emergence and consolidation of industrial fields and service solutions that will enable the identification, growth and full exploitation of flexibility potential. Undertaking today this set of actions is even more necessary since the electricity system and the industrial sector are marked by a certain **inertia**, although France already has an industry and recognised know-how on the subject. By way of illustration, roughly 15 years will have passed between the European directive of 2009 requiring, under certain conditions, Member States to implement intelligent metering systems promoting energy management and decentralised production and the full deployment of smart meters across the French territory.

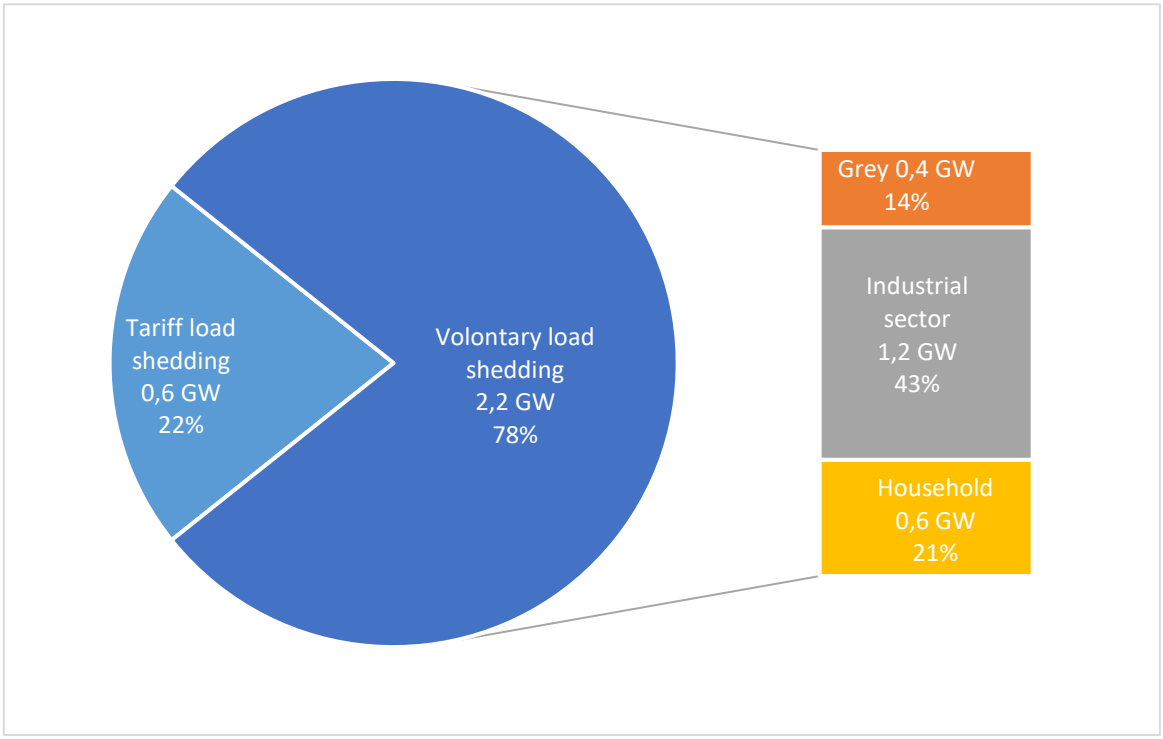
The inertia of economic and service sectors is reflected by the stagnation of distributed load shedding solutions in France. Load shedding capacity is estimated in 2020 at 2.8 GW, managed mainly by operators independent from suppliers and coming mostly from industrial or tertiary capacity (see graph opposite). This capacity, although on the rise, remains significantly below the objectives set by the PPE at 4.5 GW in 2023 and 6.5 GW in 2028. These load shedding capacities, particularly relating to tariff signals (0.6 GW), are lower than those held by France in the 1990s (6 GW). Capacity dropped because of the decline in French industrial production, but also because of the end of certain regulated tariffs as well as price signals that have become much less incentive.

[18] General economy council, *Flexibility of the electricity system: contribution of load management of buildings and electric vehicles*, May 2020.

load shedding, a voluntary act in response to an external signal

Load shedding refers to the voluntary act by a consumer to temporarily reduce their electricity consumption in response to an external signal. It is therefore different to energy efficiency, whose goal is the absolute reduction of the site's energy consumption. The external signal can be tariff-related, sent by the supplier (load shedding tariff) or can come from consumption management proposed by the supplier or an independent operator having previously signed a load shedding agreement with the consumer (explicit demand response). The legal framework of demand response is governed by Articles R. 271-1 and R. 271-2 of the energy code.

Graph no. 3: load shedding capacity in France in 2020



Source: CRE, Note: grey load shedding response corresponds to the powering-on of the generator.

Lastly, on the top of the inertia in the development of an industrial and service sector, the change in consumption habits is a key factor for promoting and using flexibility potential. However, behavioural changes, at the level of the French population, can only occur in the long term. In this regard, the change in consumption habits will be facilitated by the quest of a fair balance between the consumer's effort and comfort. Thus, the consumer's effort, whether psychological, physical or financial, must be limited, in order to ensure the freedom of choice of the consumer and prevent any feeling of disempowerment (calibration and control of consumption remotely for example), but also to make a change in habits attractive and favourable.

Building consumers' trust in new services and uses can only be achieved progressively. Examination of energy behaviour[19] reveals the need to move beyond energy (or costs) savings rhetoric to focus more on consumers' comfort and their citizen commitment to the energy transition. In parallel, the lack of trust in new equipment and services behind the smart meter creates the risk of opposition or even hostility against them, ultimately resulting in a delay in the change in consumption behaviour. This need for trust, shared by all consumers, can materialise differently based on the social and energy profiles (see box below).

Diversity of social and energy profiles

The variety of consumption habits responds to the multitude of individual profiles. Sociology and energy endeavoured to inventory several major categories of consumers[20]:

- **technology fans**: passionate about the novelty of connected objects and the data they produce, little interest in energy;
- **energiphiles**: understand the challenges associated with network stability of which they have a relatively detailed understanding, and a certain human ethic (the environment takes second place);
- **frugals**: interested in the reduction in their bills, finally there are not many, given the need for comfort;
- **ecophiles**: concerned by their environmental footprint, they are committed to a change in their behaviour;
- **powerless**: concerned by their environmental footprint, they do not know how to act to change their behaviour;
- **indifferent**: awareness not raised about this topic;
- **stubborn**: opposed to any form of reduction in their consumption.

It is sometimes considered, based on statistical and empirical studies, that 20% of the population would be driving forces towards sobriety, 60% would change opinion based on the projects and their state of mind, while 20% would remain stubborn.

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[19] This reflection draws on the work of Céline JULLIEN, heard by the working group.

[20] This reflection draws on the work of Stéphane LABRANCHE in particular, climate and energy sociologist, heard by the working group.

To foster the emergence of the industrial activity and reinforce consumers' trust, the working group recommended in its previous report[21] to remove the "legal and psychological" obstacles in terms of data. In addition, this year it formulated a set of proposals aimed at eliminating certain economic obstacles, by establishing suitable tariff signals (second part), and organisational signals, promoting the development of energy services (third part). Each of these proposals can be the subject of a detailed examination in order to be fine-tuned before its implementation.

Second part: remove economic obstacles

In principle, the tariff structure reflects costs: it must pass on to each user the costs they generate based on their consumption characteristics. It therefore involves a minimisation of explicit cross-subsidization between user categories. At the same time, it should allow consumers that adapt their behaviour, by using the electricity system less, see a reduction in their bills in line with the drop in costs they make possible[22].

However, the current electricity tariff system is rudimentary. It was developed in a context with two singularities : that of rudimentary diffuse or scattered measurement and metering technologies, within the framework of a top-down system where production adapts to demand. The evolution of the regulatory, economic and societal context seen since then has not been accompanied by the modernisation of the regulated tariff.

In particular, the regulated tariff does not reflect the different cost of consumption at different times of the day and of the year. These tariff conditions jeopardise the economic profitability of all energy efficiency investments, both passive, for example insulation, and active, for example management systems; and therefore, fuel non-rational behaviour from an ecological point of view. It also prevents consumers from having low electricity prices at times when renewable energy is abundant and consumption is low.

This situation results in the cross-subsidisation between certain types of uses. As a result, two clients under the regulated tariff for the sale of electricity who consume 1 MWh for heating in winter or to charge their electric vehicle throughout the entire year pay a comparable price for electricity. However, they do not represent the same impact for the community, in economic and ecological terms. And with the deployment of smart meters, the distribution of their consumption over the year is now perfectly known.

The tariff system should therefore adapt to this metrological "revolution" to send appropriate signals reflecting the reality of costs. These signals should therefore serve as incentive for certain investment choices (purchase of an electric vehicle, insulation work, heating optimisation, etc.) and create the economic profitability space required for the development of new services behind the smart meter.

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[21] Foresight committee, 3rd working group, *Give meaning to consumer data*, December 2019.

[22] This principle for example, was developed by CRE in its public consultation no. 2020-007 of 19 March 2020 relating *to the withdrawal component of the next tariffs for the use of the public electricity grid, "TURPE 6*".

The evolution in economic balances could concern, apart from the regulated electricity tariff (1), remuneration terms for distributed demand response (2), as well as the tariff for the use of the public electricity distribution networks (3).

1. Narrow the gap between the price of energy and its cost

1.1. Towards a seasonalised regulated offer

Unlike fixed tariffs that do not provide incentives to change consumption based on very short-term price fluctuations (related to the variation in production and consumption of electricity), dynamic pricing sends a signal aimed at steering a consumption choice: consume more when prices are low, consume less when they are high (and it is necessary to use more polluting production modes).

Dynamic electricity price contracts are defined by European law: Modulation of tariffs is encouraged by national and European law (see box opposite), particularly because of the positive effects on additional flexibility that it could offer to the electricity system and for the reduction of greenhouse gas emissions.

Recent evolution in European and national law concerning dynamic pricing

The European directive of 5 June 2019 specifies that "*Member States should assess the potential for making more dynamic or reducing the share of fixed components in electricity bills, and where such potential exists, should take appropriate action".* In addition, it states that consumers with smart meters can take out dynamic electricity price contracts with at least one supplier.

In national law, the order of 3 March 2021 laid down the obligation for suppliers having more than 200,000 clients to **propose to the client who so requests it a dynamic pricing offer** (offer reflecting price variations in the spot market). The conditions for reflecting market price variations in the offer proposed by suppliers of more than 200,000 clients must be defined by a deliberation by CRE.

In addition, the order specifies that the **conditions for informing clients about the risks and opportunities** of any dynamic pricing offer, proposed by any supplier, are defined by an order by the ministers in charge of energy and consumption.

Lastly, it states that suppliers must make available to their clients an **alert mechanism** for consumers in the case of a significant variation in market prices.

Dynamic pricing mechanically implies – in the absence of a change in consumption – a variability in energy expenses for consumers. **This volatility is therefore accompanied by exposure to price variations**, according to the contract terms, uses and capacity of clients to manage their consumption. If these risks are unknown and the price volatility is very significant, dynamic pricing can affect consumers' trust in their supplier, or the market. It is however useful to remember that price increases in the wholesale markets are also passed on in the long term on all electricity supply offers.

The risks related to dynamic pricing, when the consumer lacks information or flexibility, were recently illustrated by the exceptional cold wave seen in the American State of Texas between 14 and 18 February 2021. Putting the energy system under extreme pressure, causing major power outages, the cold wave also resulted in extraordinary bill increases for clients under dynamic pricing. This cold wave – and the associated

price peaks – remains an exceptional event, both in terms of its duration and the price levels reached. The context of the Texan electricity market and system is, moreover, quite different to the French and European context.

Real-time pricing and cold wave in Texas in February 2021

Within the framework of the competitive retail electricity market in Texas, two main suppliers propose dynamic pricing reflecting the real-time price. For some of these suppliers' clients, the cold wave of February 2021 was accompanied by very negative consequences.

While one of the two suppliers capped the prices passed on to consumers, the other stated that it was looking into a way to reduce its clients' exposure to price volatility, encouraged its clients to change supplier while suggesting they remain under a variable offer without a commitment period to be able to take out a new contract after the crisis qualified as "*an extremely rare event*".

Nevertheless, apart from the power outages, a portion of consumers saw their bills increase extraordinarily (up to several thousands of dollars for a few days of consumption). These individual situations were heavily publicised during the crisis. Faced with the magnitude of numerous consumers' bills, the Texas House of Representatives has already started to examine a draft law to prohibit this type of dynamic pricing offer.

Dynamic pricing offers can certainly represent an opportunity for savings but must be chosen consciously by consumers, based on their appetite for risk, the flexibility of their consumption and their level of automation. Clear, objective and easy-to-understand information must enable consumers to apprehend and compare different dynamic offers.

Despite the benefits that can be expected from dynamic pricing, it appears complex for individual consumers and small businesses The Spanish example shows the limits attached to complex pricing for individuals. In 2014 in Spain, the regulated residential tariff switched to a dynamic price, considering the day-ahead price of the Spanish market and the first session of the intraday market. In the space of four years (2014 to 2018), 60% of eligible consumers chose to change offers[23], particularly in favour of non-dynamic prices, the online publication of day-ahead prices appearing excessively complex for certain consumers. While the fact remains that 40% of residential Spanish consumers are under dynamic pricing, consumers' appetite for such offers appears relatively uncertain. In conclusion, dynamic pricing should not concern, in the short term, a very significant portion of consumers.

Without switching in the short term to dynamic pricing, regulated electricity pricing could be more developed than it is today The "blue tariff" (integrating all components: production, commercialisation and use of the network) indeed only provides for a very limited variation in electricity prices based on the overall balance between supply and demand in the network, since the "basic option" has no modulation component while the "off-peak option" distinguishes between a "peak times" and "off-peak time" tariff. Although pricing termed "mobile peak" exists (see box opposite), the

[23] *Source:* Energy Regulatory Commission

main regulated offer remains “biennial”. It represents most consumers and therefore is decisive for market offers.

Regulated “mobile peak” tariffs proposed by EDF

Since 1982, EDF offers a “Peak day demand response” subscription (EJP) which provides for a variation in tariff during consumption peak periods. This tariff option, being phased out (it is no longer proposed), is characterised by a mobile peak of a duration of 18 hours, from 7.00 a.m. of day D to 1.00 a.m. on day D+1 and which is triggered 22 days per year, between 1 November and 31 March. During the mobile peak times, the price is almost two times higher than the price at normal times. Within the framework of the EJP tariff, the price signal is activated by EDF. The consumer is advised the day before.

In addition, EDF proposes the “Tempo” tariff, which is the combination of a shoulder time/off-peak time tariff (6.00 a.m. to 10.00 p.m. and 10.00 p.m. to 6.00 a.m.) and a mobile peak tariff with three distinct types of days: 22 red days, 43 white days and 300 blue days. The price of electricity is maximal for red days and minimal for blue days. The signal associated with the Tempo tariff is decided by RTE, thus enabling all suppliers to propose offers equivalent to the Tempo option (no supplier has taken up this signal for the time being).

Several intermediate solutions between time-of-day pricing and dynamic pricing can be identified to bring the price of energy closer to its cost for the end consumer. Some of them should be highlighted:

- two time periods: a basic tariff with a seasonal variation;
- four time slots: peak times/off-peak times, completed by a seasonal variation;
- eight time slots: peak times/off-peak times, completed by a quarterly variation;
- twenty-four time slots: peak times/off-peak times, completed by a monthly variation.

These different pricing schemes can also be made more “intelligent” by changing the time slots based on the seasons or months.

It appears interesting to provide visibility on the rationale of the consumers’ bills, by better reflecting costs and sending the right economic signals. In thisrespect, the generalisation of the four time-slot option for the tariff for the use of the public electricity distribution networks (TURPE) decided as from 2024 for individuals is an interesting development (see box opposite). The time/season variation of TURPE 6 thus contributes to making the tariff system more “intelligent”, even though the simultaneous increase in the fixed portion of the tariff tends to weaken the economic signal sent to the consumer. The price of electricity supply could follow this development. For example, by 2024 to correspond to the time/season application of TURPE 6, the regulated electricity tariff could be seasonalised[24].

[24] The (time)/seasonalised tariff will therefore succeed the currently existing tariffs.

TURPE 6: the generalisation of the four time-slot option as from 2024[25]

As a counterpart of the deployment of the smart Linky-type meter, CRE introduced in TURPE 5 HTA-BT tariffs with four time slots in the low-voltage range (≤ 36 kVA), while maintaining other less developed tariff options, without seasonal differentiation. Noting that the maintenance of these options "*does not provide incentive to suppliers and consumers to make efforts in terms of innovation and energy efficiency during peak periods in the network, which occur mostly in winter, and therefore, to contribute to controlling network costs in the long term*", CRE decided to generalise the four time-slot option as from August 2024.

The generalisation of the four time-slot options during the TURPE 6 tariff period results in a smoothed exit from non-seasonalised options. Therefore, between 2021 and 2023, CRE will gradually increase the tariff for these options and simultaneously reduce the tariff for the four time-slot options. According to CRE, this smoothing "*will result, through the progressive increase in the price of options with no time/season variations, in their gradual phase-out"*: the number of consumers who would benefit from taking out an option without time/season variation would drop gradually until 2024.

It must however be noted that this proposal will only enable a partial rationalisation of the electricity tariff since some of its components would remain fixed. This is particularly the case for the fiscal portion, which is only partly tied to the price of the kWh billed to the client. In particular, the public electricity service tax is based on the consumption of electricity and not on its associated price.

Defining as of now this stage in the seasonal adjustments to the regulated tariff offers the visibility needed by consumers and economic players to ensure acceptability of the change in the tariff structure and adapt commercial offers. This approach would progressively introduce a "dose" of rationalisation in regulated electricity pricing.

Proposal no. 1: rationalise the regulated electricity tariff by making it seasonal, for example by 2024.

The working group highlights that the proposal of this foresight report conventionally assumes the maintenance of a regulated electricity tariff in France by that time. This proposal is not the reflection of a group's stance for the continuation of this tariff arrangement: it aims to adapt the tariff if it remains.

This proposal was the subject of objections by the national energy mediator (MNE) in particular because of its impact on the electricity bill of certain consumers. These objections, supported by the Confédération française démocratique et travail (CFDT) and the Association familiale laïque (AFL) (secular association) of Paris, are presented at the end of the report. The proposal also received objections from Electricité de France (EDF), particularly on the formulation adopted.

[25] This box is based on CRE's deliberation of 21 January 2021 *deciding on the tariffs for the use of public electricity distribution grids (TURPE 6 HTA-BT).*

1.2. Offset the associated risk of a reinforcement of inequalities for the most precarious

By bringing the price of energy closer to its cost by the rationalisation of the regulated electricity tariff, the price signal thus created will not be neutral on consumers' bills. The progressive path towards a more "intelligent" pricing, even though contributing to reducing the overall cost of electricity, would be accompanied, without a change in consumers' habits or the development of adequate management offers, by negative effects on the purchasing power of certain households who could not react to this price signal.

It is therefore essential to support control over the change in bills. Tariff developments cannot only be progressive; they must also prevent the risk of an excessively high increase in bills and in particular consider the financial fragility of certain households. In this regard, two categories of households require specific attention: low-income consumers, very sensitive to any variation in the price of energy especially for food and heating, and tenants, whose margins for managing energy consumption items may be limited (especially for heating).

In the absence of sufficient thermal insulation of buildings, the price signal created by the rationalisation of the energy tariff would risk being both ineffective and unfair. It would be ineffective particularly because of households' inability to modulate the main energy consumption items. It would also be unfair, because it could affect the purchasing power of the poorest households as well as that of tenants who do not directly control the passive energy efficiency of their home.

It is important to highlight that of the 29 million primary residences, only 1.9 million are classed in energy-efficient categories A and B of the old energy performance diagnosis, while 4.8 million homes are labelled F and G, qualified more commonly as "thermal strainers"[26]. Because of this thermal situation, 36% of households find themselves in energy precarity in social housing, and 26% of tenants in private housing[27].

In this context, the legal framework has quickly evolved since the law on the energy transition for green growth of 2015 to set goals for the energy renovation of buildings and the reduction in energy consumption. In particular, the energy-climate law of November 2019 set the goal for the renovation of all "thermal strainers" by the next ten years, breaking down the period into three phases of encouragement, obligation, then sanctioning (as from 2028). Following the citizens convention for climate, the draft "*climate and resilience*"[28] law could prohibit the rental of thermal strainers as from 2028.

The working group agrees with these demanding objectives in terms of energy performance, which are essential for ensuring both fairness of the energy system and efficiency of the energy price signal. The particularity of housing should

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[26] *Source:* Ministry of the ecological and inclusive transition, *The housing stock by energy consumption classification*, September 2020. The data cover the year 2018.

[27] *Source:* National observatory for energy precarity, *Who are the tenants under energy precarity in private housing?*, 2020.

[28] The draft law on the fight against climate disruption and reinforcement of resilience to tackle its effects is still under discussion in Parliament at the time of drafting of this report.

be reminded - a long-lasting product of an atypical nature. Investment in rehabilitation increases the value of the property (first level) and enables savings in the short term (second level)[29]. Demanding renovation standards are therefore a priority for rental homes, in the interest of justice but also to enable tenants to better control their own uses, particularly heating and charging of their vehicle.

In addition to energy performance standards, support for households, especially the most precarious, in their environmental renovation approach should be given greater attention. In this regard, the action levers identified by the recent report by Olivier SICHEL, for "massive, simple and inclusive rehabilitation of private homes"[30], appear valuable for accelerating environmental renovation.

The conclusions of the report by Olivier SICHEL

Despite the public resources available (€5.8 billion in public national aid in 2020) and the involvement of numerous players, public, private or associative, global rehabilitation of homes is hindered by the lack of clear and accurate information and the lack of support, but also difficulties in (pre)financing work for the lowest-income households. More than two million low-income or very low-income households live in thermal strainers.

The report therefore proposes a set of solutions "to facilitate a maximum number of households committing to action, which requires the process to be simple, the contact persons or entities for households to be identified and certified to ensure their reliability, and the existence of financing for people in need". In this regard, three levers are identified: (i) support by a certified player, (ii) a single digital platform, and (iii) wider advances of aid and financing including all households.

In particular, the proposal aimed at bringing forward the payment of public aid[31] for poor households, or intermediate households, and co-ownerships, should facilitate and accelerate renovation projects. This measure, which would have almost no cost[32], would trigger and accelerate the energy rehabilitation of homes. In addition, the proposal by the same report to significantly reduce outstanding balances for low-income and very low-income households would remove the financial obstacle to thermal renovation.

Nevertheless, the effects of energy performance requirements should materialise only in the medium term, while the price variations that rationalisation of the regulated electricity tariff could imply would be seen as of its implementation.

[29] Nevertheless, certain local housing markets are not very liquid, which results in homes not being sold despite possible price adjustments to the property.

[30] Source: Olivier SICHEL, *For a massive, simple and inclusive energy rehabilitation of private housing*, March 2021. This report responds to joint mission statement, dated 30 December 2020, by the minister of the economy, finance and recovery and the minister attached to the minister of the ecological transition, in charge of housing.

[31] The report highlights that while low-income and very low-income households receive significant aid, they are generally paid after work.

[32] The measure consists mainly in a cash management effort by the national housing agency (ANAH).

It is therefore necessary to prevent the reinforcement of inequalities through financial support of the most fragile audiences. In 2017[33], 11.6% of French people devoted more than 8% of their income to their homes' energy bills.

Currently, this public support is based mainly on the energy cheque, a special payment document enabling payment of energy bills (see box opposite). This mechanism – which was created before the deployment of Linky-type meters[34] – currently benefits roughly 5.5 million households, for an annual cost of €800 million[35]. The amount of aid so allocated ranges between €49 and €277 and averages €200[36]. It was recently considered reinforcing this public aid[37].

The energy cheque

The energy cheque is a special payment document, in accordance with Article L. 124-1 of the energy code, enabling "*households whose income is, given the composition of the household, lower than a ceiling amount to pay all or part of the energy expenses for their home or expenses they incur to improve environmental quality or the capacity to control the energy consumption of this home*". In practice, the energy cheque can be used to pay bills for electricity, natural gas or liquefied petroleum gas, domestic heating oil, propane, wood, biomass or other fuel for heating or the production of domestic hot water, as well as for construction and renovation works.

Subject to income criteria, the energy cheque is granted to households whose annual income tax reference is lower than €10,800 per consumption unit. Households are not required to undertake any procedures; the tax administration draw up the list of persons meeting the eligibility criteria. The energy cheque is then directly addressed by the services and payment agency (ASP).

Given the fairness issues that accompany the change in the electricity tariff, it is necessary to adapt the terms of the "energy cheque" to consider the reinforcement of the energy price signal. The adaptation of the mechanism could take the form of a re-assessment of the maximum amount of the cheque for low-income beneficiaries who see a significant variability in their bill because of their electric heating arrangements. In order to preserve the support for low-income households who have other heating devices, this proposal would involve an upward re-assessment of the global energy cheque envelope.

[33] French strategy for energy and the climate, multi-annual energy plan.

[34] Therefore, it was not prepared at a time when electric consumption could be easily distributed based on use.

[35] *Source:* report by the commission on finance, the general economy and budgetary control for the National Assembly for the draft finance law for 2021, annex relating to the ecology, development and sustainable mobility mission, October 2020.

[36] The rate of non-use is 20%.

[37] See in particular the proposed law aimed at the exceptional attribution of an energy cheque to the poorest households, registered on 16 June 2020 at the office of the national assembly.

Proposal no. 2: accompany the poorest households to ensure fairness in the change of the regulated electricity tariff:

(i) adapt the energy cheque to take into account electric heating, by proposing an increase in the cheque amount if it is used for heating;

(ii) accelerate and support energy rehabilitation, by setting rigorous energy performance standards for homeowners and lending more assistance to modest households in their renovation projects.

This second proposal is an absolute prerequisite for the first condition, relating to the reinforcement of the price signal. Regarding the energy cheque aspect, it would be increased only if it is used for heating, which is an expense requiring the greatest financial effort for households.

This proposal was the subject of objections by MNE in particular because of the social objective associated with the energy cheque. Its objections, supported by CFDT and AFL, are presented at the end of the report.

2. Support the structuring of a management and distributed demand response service field: towards "capacity" support

Compared to its European partners, France lags behind in terms of equipment management services[38]. The proposed reinforcement of the price signal should promote the development of new services.

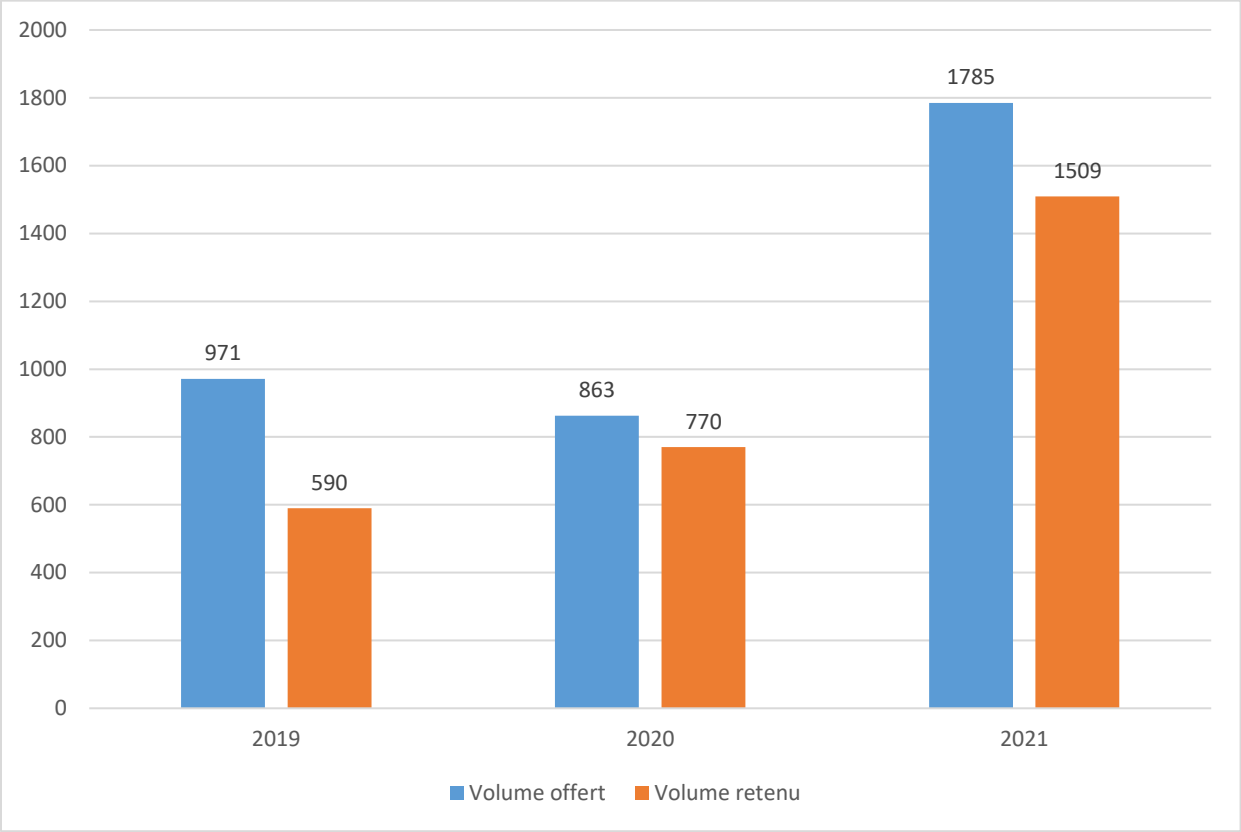
In the short and medium terms, tariff signals might be insufficient for the fast development of demand response. Because of the temporary overcapacity related to the highly subsidised development of renewable energy on the one hand, but also because of a market design still undergoing changes on the other hand, the capacity price is currently very volatile and significantly lower than the theoretical price for guaranteeing the required level of security of supply, hindering the emergence of economically viable solutions in the urban fabric.

In this regard, calls for demand response tenders (AOE) is a public support mechanism for the development of load shedding, in order to contribute to reaching PPE objectives. The conditions of the call for tenders are defined by the energy and climate directorate (DGEC) and implemented by the public electricity transmission system operator (RTE).

Nevertheless, the load shedding capacity adopted within the framework of these AOE is far below the objectives of the PPE in terms of demand response capacity available in France (4.5 GW in 2023 and 6.5 GW in 2028), despite the change in AOE conditions in 2020 (see box opposite).

[38] Interviews by the working group between September 2020 and February 2021.

Graph no. 4: offered and retained electricity consumption erasure's volumes (MW)



Source: RTE, October 2020, resulting from the calls for demand response for 2021. Note: the amounts are not definitive for 2021 and may be slightly higher than the final volumes.

A change in the conditions of the call for load shedding for 2021

Given the situation of the electricity system in winter 2020/2021, following the Covid-19 health crisis and the upheaval in nuclear plant maintenance schedules, in 2020 the DGEC doubled the remuneration ceiling associated with the call for tender. It went from €30,000/MW/year (€35,000/MW/year for the distributed segment) to €60,000/MW/year for the entire sector as from the call for tender of 2020 for delivery year 2021. The increase in the ceiling enabled a major growth in capacity contracted but remains way below objectives.

In 2021, the support envelope for the calls is estimated at roughly €31 million, up sharply compared to 2020 (€6 million), a change resulting both from the increase in the ceiling on the call for tender and the increase in the volume contracted. This amount remains lower than the maximum support envelope negotiated with the European Commission, between €40 and €60 million.

Moreover, in practice calls for tender benefit mainly industrial demand response and not distributed demand response, demonstrating the need for another public mechanism, complementary to the calls. By way of comparison, support for the solar sector illustrates the importance of having a different policy for industrial and distributed capacity. Calls for tenders for the making and operation of solar installations are led by public authorities and, at the same time, there is a support shop through subsidies for the installation of solar capacity for households.

This comparison illustrates the necessary distinction between public mechanisms to respond to the complementarity of necessary investments in terms of industrial and distributed capacity. To reach the demand response capacity objectives of the PPE of 4.5 GW in 2023 and 6.5 GW in 2028, it is necessary to go beyond industrial load shedding and exploit distributed load shedding. Support is necessary to launch the field. It should be noted that while distributed load shedding is activated more often than industrial load shedding, because of its lower cost, the development of new capacity is more expensive for the distributed segment.

Several terms were envisaged to provide specific public support in favour of distributed load shedding. But the different energy subsidy mechanisms (exemptions from payback, derogation schemes, bonuses) encountered much opposition challenging their legitimacy and were not even effective. The existing calls for tenders could also be adapted, pursuing the change in eligibility criteria or price caps, but are still unsuitable, for the distributed market.

Another way, more legitimate and effective, must therefore be preferred:

- **that of an open counter, like distributed renewable energies, or access to load shedding tariffs (EJP, Tempo), replacing a procedure not adapted to distributed load shedding;**
- and based on a temporary supplement in **capacity remuneration, and not energy remuneration**, provided by the public authority, consistent with the cost of the security of electricity supply in the long term.

This approach also complies with the comparison with distributed solar energy if it is considered that solar power is an energy contribution and not a capacity contribution (intermittence) while distributed load shedding is a capacity contribution (deferral of peak load) and not an energy contribution (low energy saving and already used elsewhere).

Support modes	Industrial	Distributed
Solar (excluding self-consumption)	Calls for tenders Guaranteed energy price	Counter Guaranteed energy price
load shedding	Calls for tenders Guaranteed capacity price	Counter Guaranteed capacity price

Such aid could offset the temporary deficit in capacity remuneration for load shedding. The amplification of intermittent renewable energy, whose development is supported by guaranteed energy prices, effectively requires major capacity contributions, thus justifying the development of a load shedding sector with guaranteed capacity prices (for lower additional costs, see box).

This public support should only be temporary and transitory. It should be progressively lowered with the gradual increase in the capacity price in the market and the growing maturity of the economic sector by 2035. This proposal would result in an increase in public spending initially, but largely contained as a whole. Based on an illustrative quantification (see box opposite), the measure can effectively be estimated at less than €50 million at its peak.

Proposal no. 3: set up access to a guaranteed capacity price for certified load shedding, which will enable the development by 2035 of load shedding services and a related sector.

This proposal is similar to an adaptation to the free market of implicit solutions which existed before in the Tempo and EJP tariffs. These precisely included implicit remuneration of capacity of roughly €60,000/MW (even though the level of risk for the security of electricity supply in the short term during this entire period did not require it at all). The capacity market allows for implicit remuneration (drop in obligations) and explicit remuneration (certification) of load shedding; in this proposal, it is a matter of simply transposing the same support to historical distributed load shedding mechanism (which was effective for the development of a form of distributed load shedding) in the current market organisation, and in so doing enabling all market offers to benefit in the same way.

Lastly, the working group highlights that this support for distributed load shedding does not aim to give preference to this type of management of equipment behind the smart meter over other flexibility sources. The report endeavours to remove certain regulatory and economic obstacles to encourage the growth of all management and flexibility services benefiting the consumer and the security of the electricity system.

EDF and Enedis expressed objections concerning this proposal, which are annexed to the present report.

NB: the authors of this report are concerned about the objections expressed during meetings seeing those public authorities in France:

- have always supported the logic of an open window for support to distributed sectors (see support for renewable energies in particular);
- clearly expressed their stance in favour of derogations from the principle of technological neutrality when it is a matter of support for a developing sector (even more so given that the proposal does not target any specific technology in terms of management of equipment behind the smart meter: load shedding, decentralised production management, optimisation of battery charging/discharging of electric or stationary vehicles, etc.);
- have perfectly taken ownership of the decorrelation between the level of support proposed and the reality of downstream meter costs in the case of the EJP and Tempo tariffs for several years.

In this regard, **this proposal is in fact a transposition of the EJP and Tempo tariffs to the free market.** Similar to what contributed to the undisputed success of these tariffs, the idea here is to again give to consumers that make the effort, the same benefit as if the security of supply for all depended on it (which therefore has not cost when this is the case).

Illustrative quantification of the temporary supplement

Today, the cost of theoretical security of supply stands between €60,000 and €80,000/MW. At the same time, the price of capacity in the market is currently at €20,000/MW. With a conservative assumption of a target price of €80,000/MW, the difference is therefore roughly €60,000/MW.

In anticipation of the year 2035, this difference should narrow, the capacity market price coming closer to the level necessary for guaranteeing the security of supply. In the short term, this implies offsetting the difference of €60,000/MW.

If two million clients[39] benefit from management of the equivalent of an average 1.5 kW of certified capacity[40], demand response capacity totals 3,000 MW. For a remuneration supplement of €60,000/MW, the total annual cost would therefore be €180 million.

This cost would increase initially with the growth in the number of clients managing their consumption. Nevertheless, approaching the 2035 horizon, the difference of €60,000/MW to be offset would diminish sharply, and by the end of the period, the temporary remuneration supplement would drop to reach 0.

Assuming a linear increase between 2021 and 2035 of the number of homes equipped and the price of capacity in the market (i.e. an additional cost decreasing progressively from €60,000/MW to €0), public spending would reach its maximum towards 2028 for €45 million (1 million homes, with €30 in compensation per kW multiplied by 1.5 kW).

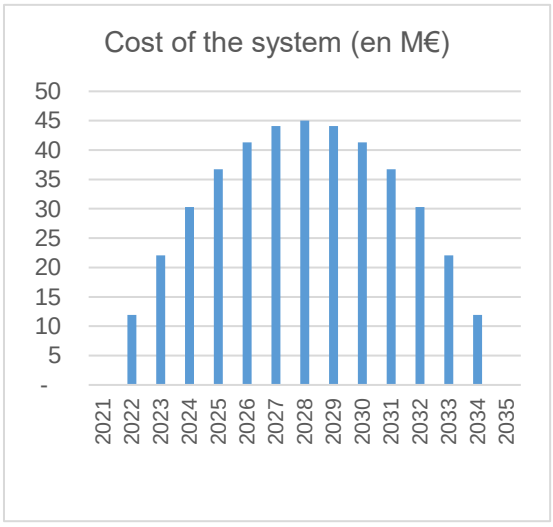
This support proposal for the development of a new industrial sector which cannot be relocated would therefore generate a cost less than 0.7% of the support for renewable energy in 2028[41].

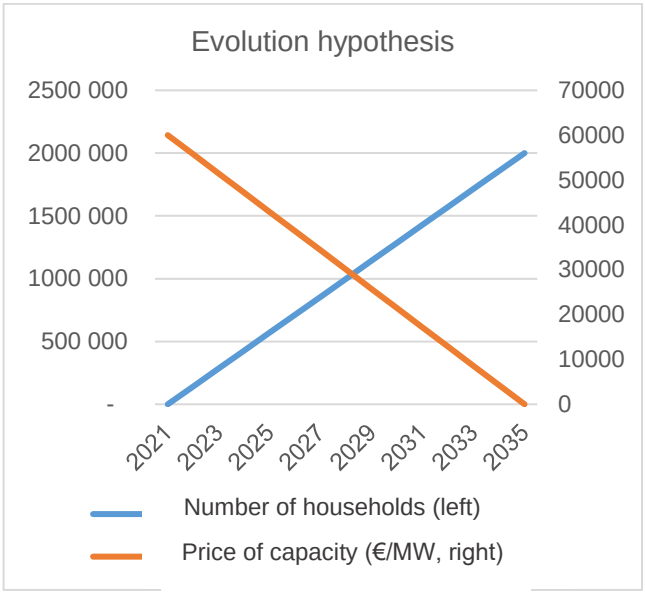
[39] An ambitious objective because it is almost two times higher than the households currently benefiting from the EJP and Tempo offers.

[40] See conclusions of the Modelec experiment backed by Ademe.

[41] The forecast cost of support for renewable energy in 2028 was assessed at 6.77 billion euros by CRE (see graph 9 on page 46 of the report by the Court of Auditors on the funding of renewable energy of March 2018).

Graph no. 5: indicative change in the cost of the measure





Source: working group (indicative change).

3. Value the potential benefits for the local network of investments behind the smart meter

The spread of smart equipment behind the smart meter and the resulting new uses and services could bring benefits for the public electricity networks. Distributed demand response, self-consumption or the management of electric vehicle charging, could thus enable a reduction in the size of certain networks and therefore lower certain investments for communities. This favourable change should, moreover, be accelerated by the proposals made in the present report.

However, the current terms for the implementation of the tariff equalisation principle do not enable these benefits to be fully considered. Access tariffs are therefore identical across the national territory in accordance with the principle of tariff equalisation. They apply to all users, irrespective of the system operator. This national tariff equalisation basis of the TURPE tariff limits the possibility of reflecting the national advantages of local virtuous behaviour.

However, the principle of tariff equalisation, which has a territorial planning vocation to which the working group is attached, does not oppose geographical adjustments in principle. The peak times/off-peak times slots are currently not identical based on geographical areas: times vary according to territories, if certain national principles are complied with (8 off-peak hours, 16 shoulder hours, tariff variation corridor between these two slots). Such territorial adjustments imply, for example, that the time slots for off-peak hours can be consecutive but also divided into two time slots (therefore with a break).

Therefore, if there is no infringement on the territorial planning objective pursued by the principle of tariff equalisation, it is proposed to establish adjustments to take into account certain local economic signals. While maintaining a uniform level of contribution to the funding of infrastructure, TURPE could provide for options and signals specific to local networks. It would therefore be possible

to preserve the fairness and territorial planning objectives pursued by tariff equalisation while facilitating local virtuous behaviour which benefits the public network. Thus, certain investments (reinforcement of transformer stations, laying of new cables) can be avoided by using flexibility which will reduce network constraints. These signals would make it possible to use the flexibility provided by equipment behind the smart meter. The purpose of this proposal is indeed to reduce the overall cost for the national community without at all changing the distribution of the financial burden. As for all of the proposals made by the working group, this development should also be examined in detail in order to fine-tune it before its implementation.

Proposal no. 4: Allow CRE to adapt TURPE to really consider the local benefits of equipment behind the smart meter.

This proposal is the subject of objections by MNE, which considers that it challenges the principle of tariff equalisation. Its objections, supported by CFDT, are presented at the end of the report. Enedis, on the one hand, and EDF, on the other hand, also expressed reservations about the wisdom of this proposal, annexed to the present report.

Third part: remove organisational obstacles

The reinforcement of the price signal provides an environment favourable to optimised resource allocation with a dual purpose: for the consumer (comfort, energy and cost savings, etc.) but also for the energy system thanks to the mobilisation of the flexibility of a large number of residential sites and equipment.

Nevertheless, the price signal is not a sufficient condition for ensuring this optimised allocation. This signal, which must be clear, needs to be received and interpreted by consumers or the third parties to whom they delegate its consideration.

It is important to accompany the transformation of the price signal into a service for managing equipment behind the smart meter, by removing the main organisation obstacles that currently limit the development of these services. At the same time, it is essential to support consumers to enable them to access these new offers, but also to protect them by establishing commitments in terms of transparency and assistance.

1. Enable the development of supply/service bundles

The development of management offers can occur only if the economic profitability of the services proposed is guaranteed. This profitability should be reinforced by the remuneration supplement previously proposed, but it also requires a certain multi-annual visibility to base all business models on the calculation of a return on investment.

But the development of combined supply and management offers implies that a set of equipment is installed beforehand. The Linky-type smart meter, whose installation is almost complete, is one of them. Other investments will however be necessary to enable the development of management services, such as devices for automated control of buildings' equipment (measurement, regulation and control devices[42]).

Three large categories of players are likely to fund these investments: consumers, public authorities and economic players. Given the initial costs associated with the investments and their technical and operational complexity, it does not appear adapted for these investments to be mainly at the initiative of households and small businesses. Moreover, it is not reasonable to place the burden on the entire community of investments that would directly benefit only certain consumers.

The economic players proposing a supply and management bundle are well-placed to finance investments because they have both the technical knowledge, the operational expertise and the financial resources necessary. On this last point, the client's commitment "over time" indeed offers the medium-term visibility necessary for developing a business model based on a calculation of the profitability of investments. In this regard, the particular nature of equipment necessary for the management of consumption for the economic player should be highlighted: in the

[42] Without the list being exhaustive, this could be for example, terminals installed in homes' electrical panels, communications systems, or connected equipment for heating, domestic hot water, electric vehicle charging, etc.

case of a termination of the contract, the initial investment is lost for the economic player, unlike with a cell phone, it appears difficult or less profitable to require the return of a connected water heater, a “smart” heat pump, a charging terminal for an electric vehicle or even a demand response device installed in the electrical panel and on heating equipment. Given the experience of telecoms packages, an exception to this principle could be provided for management *packages*. Management equipment must be able to be reused by another supplier. Specific contracts for homes (or small businesses) already equipped would also have to be implemented.

In order for the consumer to be able to easily compare offers, it could be interesting moreover, for stakeholders to agree on a standard package for minimum management services. In parallel, to facilitate the extension by the consumer to other equipment, it would be necessary to ensure interoperability of equipment installed with network data.

***“Enertechs”* in equipment management**

Economic players proposing supply and management bundles were traditionally energy suppliers. These last few years, other economic players have emerged who play the role of platform by collecting open data from meters and proposing both management and consultancy services concerning the choice of energy supplier. Often called “*Enertechs*”, they play the same role for energy as “*Fintechs*” for finance.

As the working group wrote in its 2019 report “*Give meaning to consumer data*”: “*In the banking sector, the proliferation of innovative companies, Fintechs, was boosted by the change in European legislation. The Payment services directive (PSD) in fact required all financial institutions established in Europe to offer APIs facilitating client data exchange. Applied to the energy sector, such legislation could enhance the liquidity of the market, facilitate supplier changeover and promote the development of innovative services, a sort of enertech in the same vein as fintechs”.*

In France, certain business models are based, for example, on an application that reuses the data from Linky-type meters and on solar equipment installation services in partnership with installers. Use of enertechs moreover facilitates the inclusion of offers for finding the best bid for energy supply.

However, the current legal framework prevents energy suppliers, in partnership or not with enertechs, to propose a combined consumption management offer by benefiting from this multi-annual vision. Given the commercial synergies between supply and management services activities, this obstacle is not negligible since it significantly limits the ability for bundled offers to develop. The legal European framework effectively specifies a right to switch suppliers in the shortest possible time and states that no fees can be required of the consumer only because they are changing suppliers.

The current legal constraints in terms of the commitment period in the supply contract

Article 12 of Directive 2019/944 of the European Parliament and of the Council of 5 June 2019 on the common rules for the internal market in electricity **specifies a right to change suppliers in the shortest possible time** and states that "*Member States shall ensure that at least household customers and small enterprises are not charged any switching-related fees*".

This same article species however that Member States "*may permit suppliers or market participants engaged in aggregation to charge customers contract termination fees where those customers voluntarily terminate fixed-term, fixed-price electricity supply contracts before their maturity, provided that such fees are part of a contract that the customer has voluntarily entered into and that such fees are clearly communicated to the customer before the contract is entered into.* ***Such fees shall be proportionate and shall not exceed the direct economic loss to the supplier or the market participant engaged in aggregation resulting from the customer's termination of the contract,*** *including the costs of any bundled investments or services that have already been provided to the customer as part of the contract. The burden of proving the direct economic loss shall be on the supplier or market participant engaged in aggregation, and the permissibility of contract termination fees shall be monitored by the regulatory authority, or by another competent national authority".*

These provisions of the European Directive of 5 June 2019 were transposed in French law by order no. 2021-237 of 3 March 2021. Article L. 224-14 of the consumption code on the right to change supplier (applicable to all types of consumers) reiterates the **client's right to change supplier in the shortest possible time**. Regarding electricity supply, this provision is also applicable "*to contracts entered into between electricity suppliers and non-domestic final consumers subscribing electric power equal to or lower than 36 kilovolt-ampere (kVA) and to non-domestic consumers subscribing power higher than 36 kVA, and the corresponding offers"* (Article L. 332-2 of the energy code).

In addition, Article L. 224-15 of the consumption code specifies that "*The supplier can charge consumers only the fees corresponding to the termination costs it has effectively incurred, through the system operator, provided that these costs were explicitly set out in the offer. These must be duly justified.* ***No fee can be required of the consumer only because they are changing supplier.*** This provision is applicable to domestic consumers. Regarding electricity supply, in accordance with the provisions of Article L. 332-2 of the energy code, this provision is also applicable "*to non-domestic consumers that employ fewer than 50 persons and whose annual turnover or annual balance sheet total or revenue […] is lower than 10 million euros".*

A derogation from the prohibition to charge termination fees for these non-domestic consumers is however specified in Article L. 332-2 of the energy code "*for fixed-term, fixed-price contracts terminated by clients voluntarily before their maturity*". In this case "*these fees are clearly communicated before the contract is entered into and cannot exceed the direct economic loss incurred by the supplier*".

These provisions therefore do not correspond to the proposals of the working group concerning supply contract – consumption management tool bundled offers for domestic consumers –.

This legislation enhances the liquidity of the electricity supply market by enabling consumers to quickly change suppliers, the investments of which are effectively modest. Nevertheless, it also applies to supply and management bundled offers, even though the investments necessary can be high (see considerations below).

In this regard, the legal framework for electronic communication service offers (telephone plans) provides an interesting point of comparison. Article L. 224-28 of the consumption code specifies, on the one hand, that a maximum contract clause of a period of "*24 months as from the date of conclusion of the contract or of its amendment*" can be defined, and on the other hand, that the termination fees as from 12 months are significantly limited "*to a maximum of one quarter of the amount due for the outstanding period of the minimum period of execution of the contract".* Article L. 224-30 of the same code specifies that these termination fees must be indicated "*in a clear, detailed and easily accessible form*" in the contract with the consumer. This legal framework offers a balance between market liquidity reinforcing its competitive nature and the visibility necessary for the economic profitability of telephone offers, particularly those bundling the telephone service (subscription) and the material investment (telephone).

Therefore, the working group proposes allowing long-term commitments – this period needing to be capped[43] **– of energy supply when it is combined with a demand control or management solution** or with equipment enabling energy savings. In the case of the termination of such an offer, the supplier can charge the consumer a balance related to costs not covered which it effectively incurred for the supply of this offer and provided that these fees are expressly specified in the offer. These must be regulated and duly justified. While this change in European and French law aimed at providing for a commitment period together with regulated termination fees in the contract for domestic clients and small businesses would imply making the supply market more rigid, at the same time it would enable the development of new services behind the smart meter. It should be highlighted that the implementation of a contract commitment duration and termination fees does not prevent the maintenance of different regulation and rules adapted to each of the two parts of the bundled offer, for supply on the one hand and for management services on the other.

This commitment over time would be authorised only for the case of investments in high-quality infrastructure (performance, electricity security, digital security, etc.) which are useable and re-useable regardless of the energy supplier, for which the economic player would ensure the role of third-party investor. It would therefore be the responsibility of the supplier of bundled offers, who would the visibility for its economic model, to carry out the investments necessary for managing the equipment of households and small businesses. In this regard, a mandatory investment *quantum* could be set by the public authority. Requirements concerning the

[43] Based on the expected depreciation duration for investments.

type of investments could be defined, to ensure the interoperability of equipment installed.

Proposal no. 5: update regulation to enable consumer commitment over time, associated with regulated termination fees, for energy suppliers in the case of bundled offers for demand control or management or coupling with equipment enabling energy savings, only in the case of investments in high-quality infrastructure, which are useable and reusable regardless of the supplier.

This proposal was the subject of objections by MNE, who considers that consumers' interests are less protected than those of economic participants. Its objections, supported by CFDT and AFL, are presented at the end of the report. EDF also expressed objections to the proposal, considering that complementary assessments must be conducted.

2. Facilitate access to services for consumer-tenants

Support for the structuration of a management services field and of distributed demand response should enable the development of new offers favourable both to electricity system balance and the consumer's comfort. Such a development however implies that customers effectively have access to new service offers and that they have sufficient knowledge and information for their service choice to be fully informed. In this regard, two proposals appear necessary for management offers to fully benefit residential customers.

2.1. Prevent owners from prohibiting modifications to the installation

Residential energy consumption management requires the installation of a set of connected equipment. Apart from the economic obstacles for ensuring these investments, which the working group proposes to remove (see above), the installation of equipment would risk being inhibited by owners that rent their homes to third parties. This third-party consumer being the actual energy consumer, the owner has little incentive to organise the installation of equipment necessary such as a connected domestic hot water cylinder or a controlled charging station for electric vehicles.

There is therefore a risk of inequality in access to offers for tenants who live in homes with few intelligent equipment and control tools. It is therefore necessary to remove this obstacle so that owners that rent their homes cannot object to the investments necessary for the development of energy consumption flexibility solutions. Such a change would, in no way, undermine the high level of requirements in terms of the safety of electrical installations. Any modification of the electrical installation will need to be conducted by a qualified operator.

Proposal no. 6: legally prevent owners from prohibiting tenants to modify installations to enable services behind the smart meter.

2.2. Establish commitments in terms of transparency and assistance: information and training of consumers and their representatives.

The diversity of audiences and of their energy consumption behaviour described above requires strong involvement to establish trust in the new tools and services behind the smart meter (see first part).

This trust can be built only through pedagogy, information and training. On the one hand, consumers must have easy access to the information concerning the energy consumption of their equipment, the applicable pricing and management actions they take or delegate voluntarily to third parties. On the other hand, all audiences must have access to advice to make an informed decision about the most adapted energy management strategy, acquire the equipment most suitable to their needs and ensure programming.

Examples of an approach promoting knowledge and involvement in terms of energy

On an experimental basis, solutions have been developed in France and in certain partner European countries to favour familiarity with energy concepts and principles, as well as commitment to the ecological transition. Some approaches aim to spread knowledge about broad estimates, enabling the general consumer public to understand the issues attached to the energy transition, for example in order to distinguish between power and energy.

These approaches take the form, for example, of the provision of mechanisms to follow the consumption of electrical equipment locally or remotely, which enables individuals to know their energy consumption. They also concern professionals who are small energy consumers (hairdressers, commerce, medical practices, etc.), thus taking the form of raising awareness about the consumption associated with their jobs.

Therefore, a dual approach involving pedagogy and individual support must be undertaken. This can be based on generic and crosscutting information, but also illustrated and demonstrated by concrete examples. In this regard, consumer information and training obligations placed on economic participants proposing electricity supply and flexibility management bundles could be reinforced. Compliance with these obligations would be verified by the competent administration, which could be, for example, the independent administrative authority in charge of ensuring the proper functioning of the energy market (CRE) or the Directorate-general for competition, consumer affairs and prevention of fraud (DGCCRF). This solution would make it possible to reduce the information asymmetry between the economic participant and the consumer, thus reinforcing confidence in the informed energy supply and management subscription decision.

Alternatively, informing and training consumers could be ensured by institutions independent of economic energy supply and equipment management participants. This mission could thus represent a new competence of the public regulatory authority, or of MNE, or delegated under its supervision to private third parties.

Protection of bank clientele[44]

In terms of bank or insurance products, clients often have less knowledge than the professional: this is called “information asymmetry”. The client therefore is not always able to correctly assess the advantages, disadvantages and risks of a product. This can lead to commercial malpractice, to the detriment of clients.

It is the purpose of customer’s protection rules and the responsibilities of each professional to reduce this information asymmetry, so that each client can be proposed products adapted to their needs and expectations and can make informed purchase or subscription decisions. This is decisive for the public’s trust in the financial sector.

The matter of client protection and good commercial practices must be considered throughout the commercial process: from design of products – including digital interfaces – to the choice of partners and including marketing practices and all stages up to the execution of contracts and processing of claims.

Article L. 612-1 of the monetary and financial code entrusts the prudential supervision authority (ACPR) with the mission to ensure “*preservation of the stability of the financial system and protection of clients, policy-holders, members and beneficiaries of persons subject to its control”,* to ensure compliance by these same persons with “*rules intended to guarantee the protection of clients*” as well as “*the adequacy of the means and procedures it implements to that effect*”.

In addition, training could be organised for consumer representatives, the 15 national certified consumer associations. These training obligations could be extended to social landlords, because of their major influence on final energy consumption behaviour.

Proposal no. 7: set up real information, or training for consumers and their representatives through the reinforcement of the obligations of economic participants or the extension of the competence of the independent energy regulatory authority or the national energy mediator.

[44] This box is an extract from the official presentation of the prudential supervision authority.

MAIN PROPOSALS

	Proposals aimed at reinforcing and rationalising the electricity system	Proposals aimed at supporting the consumer
Remove economic obstacles	Rationalise the regulated electricity tariff by making it seasonal, for example by 2024. Set up access to a guaranteed capacity price for certified distributed load shedding, which will enable the development by 2035 of demand response services and a related sector. Allow CRE to adapt TURPE to consider the benefits of equipment behind the smart meter.	Accompany the poorest households to ensure fairness in the change of the regulated electricity tariff: (i) adapt the “energy cheque” to take into account electric heating, by proposing an increase in the cheque amount if it is used for heating; (ii) accelerate and support energy rehabilitation, by setting rigorous energy performance standards for homeowners and providing more assistance to modest households in their renovation projects.
Remove the organisational obstacles	Update regulation to enable consumer commitment over time, associated with regulated termination fees, for energy suppliers in the case of bundled offers for demand control or management or coupling with equipment enabling energy savings, only in the case of investments in high-quality infrastructure, which are useable and reusable regardless of the supplier.	Legally prevent owners from prohibiting tenants to modify installations to enable services behind the smart meter. Set up real information, or training for consumers and their representatives through the reinforcement of the obligations of economic participants or the extension of the competence of the independent energy regulatory authority or the national energy mediator.

CONTRIBUTIONS OF WORKING GROUP MEMBERS IN OBJECTION TO CERTAIN DEVELOPMENTS OF THE REPORT

The secular family association of Paris (AFL), the French democratic confederation of labour (CFDT) and the national energy mediator (MNE)

Concerning proposal no. 1, it should be noted that MNE expressed its disagreement with this proposal, on the grounds that seasonality of the regulated sale tariffs (TRV) would increase the bills of those using electricity for heating, who live in poorly insulated homes, and do not have the financial means to renovate them.

Rather than making the electricity TRV seasonal, MNE suggests changing the regulation so that each supplier is required to sell at least one offer at the market price with a seasonalised price structure. It also stressed the need to review the structure of the price of the regulated peak times/off-peak times tariff to give it greater incentive and was concerned about the feasibility of implementing a new structure for the regulated tariff for the sale of electricity within the framework of the European Union, unfavourable to the maintenance of these tariffs in the long term.

For its part, CFDT recommends not changing the TRV and to implement the innovations desired by suppliers within the framework of market offers.

Concerning proposal no. 2, MNE and AFL de Paris stated that they were not in favour of the proposal of adaptation of the energy cheque for those using electric heating. This would indeed consist in using social aid, aimed at assisting the poorest consumers to pay their energy bills regardless of their heating energy, to offset the increase in electricity bills, and to a certain extent, favour electric heating. Apart from the unfair nature of this measure, MNE expressed its doubts about the feasibility of its operational implementation, which will necessarily require complex file crossing.

CFDT does not wish for the treatment of energy precarity to be addressed and especially modified within the framework of this working group. Precarity raises ambitions other than those of this working group.

Concerning proposal no. 3, CFDT states that it backs RTE’s studies about the value of distributed load shedding.

Concerning proposal no. 4, for MNE, this proposal is very ambiguous and the TURPE adjustments which could result from considering local economic signals should be specified. It considers that any changes, however minor, of the tariff equalisation principle, is a political subject which must be discussed and decided by Parliament. This position is shared by AFL.

In this proposal no. 4, CFDT is clearly opposed to any change or challenging of TURPE. It is a valuable tool in territorial planning. Moreover, TURPE answers only to that for which it is called TURPE, the equalised cost of access to the networks.

Concerning proposal no. 5, the national energy mediator, CFDT and AFL de Paris wished to dissociate themselves. Its value seems evident for energy suppliers who can obtain the loyalty of their clients, but not for consumers.

Against the upsurge in particularly aggressive and misleading commercial practices, both in the energy supply field and that of energy renovation, they stressed the risky nature of contracts that would commit consumers to several years with the same supplier, especially when early termination fees for energy contracts (applicable today to contracts taken out by professionals) are the source of numerous disputes.

They highlighted that it was already possible, with the current state of regulation, to sell management tools associated with energy supply contracts without the two being linked. The supplier SOWEE who, for several years now, has sold connected stations associated with energy supply contracts illustrates this.

The national energy mediator stated that the comparison made in the report with electronic communication service offers which enable consumers to commit up to 24 months does not seem appropriate, especially since consumers who choose to commit with an operator to purchase a telephone pay more in the end than those who buy a telephone and subscribe to a plan separately.

Lastly, the national energy mediator stressed a certain number of points to be monitored carefully concerning bundles if they were authorised:

- bundled offers combining several products and services can be complex and opaque in terms of content and price, and consumers can find themselves committed in the long term without understanding or wanting, or even being aware of what they are committing to;
- the comparison of offers with each other will become a lot more complex, or impossible, except to compare the most common bundled services. Indeed, it will always be possible to compare energy supply, but this is not certain for the rest;
- in the event of payment defaults, it will be necessary to make sure that a default on a bundled service cannot trigger a power cut.

Electricité de France (EDF)

The *"Behind the smart meterR : Develop energy monitoring and management services for consumer welfare and energy system performance."* report includes elements for which consensual language was not able to be found. EDF wishes to provide a reminder of the three fundamental principles and make a few remarks about certain proposals in the report.

Fundamentals

EDF reiterates its attachment to three major principles:

- **guarantee the client's consent for the access and use of its data.** Clients' trust is a condition necessary for the sustainable development of offers based on consumption management. It is therefore essential to ensure the explicit gathering of their consent to access their data and use them;
- **ensure non-discriminatory treatment of the different forms of flexibility.** Distributed load shedding is one of the flexibility sources useful for the system. Its development and use must be done in seeking the best economic efficiency.Load shedding today receives direct support measures. There is no sustainable rational basis for additional measures likely to distort economic precedence among sources of production or demand flexibility.
- **preserve tariff equalisation across the territory.**

Proposals

Proposal no. 1: "Rationalise the regulated electricity tariff by making it seasonal, for example by 2024"

The term "rationalise" is poorly chosen for an action on the regulated electricity tariff which is more of an "*improvement*" (seasonalisation of the tariff). The approach aims for the tariff level and structure to better reflect the level and structure of costs.

This reflection on "seasonalisation" is to be placed within the general context of incentive signals, those to be developed in addition to what already exists such as the Off-peak times option (to be reiterated, with the services it provides). The intermediate solutions between the Basic option and dynamic pricing represent a wide range of possibilities, for which there should no hesitation to cite the option "*two daily time slots*".

More widely, the question of the relative prices including taxes of domestic energies could have been raised. The term "rationalise" could conveniently address rebalancing between domestic energies, in connection with their carbon content, with a view to the efficient decarbonisation of the building sector.

Proposal no. 4: "Allow CRE to adapt TURPE to really take into account the local benefits of equipment behind the smart meter"

TURPE is calculated to reflect the costs for the use of the network by consumer category, and it is not always transmitted to the end consumer as is, but to their supplier in the case of single contracts; the supplier passes it on within the global electricity price, which combines several signals not necessarily synchronous.

TURPE alone cannot send a signal encouraging a more virtuous electric use behaviour. It only aims to give a suitable signal regarding the cost generated in the network by consumption; in this regard it takes into account – and tomorrow more precisely than today, this is a relevant area of work – the physical consumption parameters, but it would not be able to promote a demand management model rather than another.

EDF reiterates its support for tariff equalisation, solidarity among territories and shares the concern for achieving a global optimum for the community, different to the sum of local optimums.

Proposal no. 5: "Update regulation to enable consumer commitment over time, associated with regulated termination fees, for energy suppliers in the case of bundled offers for demand control or management or coupling with equipment enabling energy savings, only in the case of investments in high-quality infrastructure, which are useable and reusable regardless of the supplier"

This proposal would significantly modify the current framework designed to protect customers from excessive commitments. The examination of such a proposal requires detailed arguments, the definition of "*irremovable infrastructure*" as well as an analysis of the risk of binding the client more firmly to a supplier. These points are key for preserving the "*trust capital*" of consumers and maintaining their commitment in innovative solutions.

Enedis

General remarks

Enedis shares the value in the long term of optimisation mechanisms at local level, whether they concern consumption or production. In this regard, Enedis wishes to reiterate that the Linky meter is an essential element for enabling and supporting these developments.

Enedis, moreover, is attached to tariff equalisation and would like the report to avoid presenting TURPE equalisation as a limit to the emergence of local virtuous behaviour (see Page 37 of the report "*This national equalisation basis of the TURPE tariff limits the possibility of reflecting the national advantages of local virtuous behaviour*").

Enedis regularly launches calls for tenders to financially acknowledge the local flexibility provided to the public distribution network.

Reservations

Enedis's reservations are focused on proposal no. 4 (adaptation of TURPE), but also on proposal no. 3 (guaranteed capacity price devoted to distributed demand response).

On proposal no. 4: "*Allow CRE to adapt TURPE to really take into account the local benefits of equipment behind the smart meter*"

Endis reiterates that:

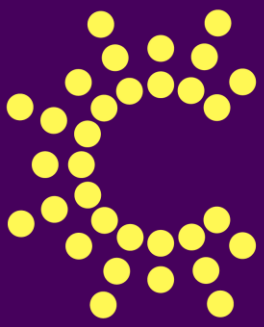
- TURPE is updated regularly to adapt to changes in network use, refraining from supporting a given business sector. TURPE already includes geographical differentiation in its Peak times/Off-peak times modulation;
- equalisation does not oppose the emergence of local virtuous behaviour.

Enedis therefore expresses its reservations about the rationale of this proposal and would like the formulation on page 46 to be modified.

On proposal no. 3: "*Set up access to a guaranteed capacity price for certified demand response, which will enable the development by 2035 of demand response services and a related sector*"

Enedis is more careful than the report about the matter of price signals sent by the capacity mechanism. This mechanism works, and the DSOs contribute to this. It is completed by calls for load shedding organised by public authorities. Enedis does not wish for these mechanisms to be perceived as being for the exclusive benefit of distributed load shedding, because there are other forms of flexibility and demand response that must also find their place in these competitive mechanisms (smart charging, storage, other types of demand response, etc.).

Enedis reiterates its attachment to the principle of technological neutrality when it is a matter of using a service provided to the network by a source of flexibility. Therefore, Enedis does not support the proposal for a public support mechanism that would be exclusively devoted to distributed load shedding.



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