PARTICIPATION OF DEMAND RESPONSE IN FRENCH WHOLESALE ELECTRICITY MARKET

Country/region	**France**
Type of E1st approach	A – In front / General 1 – Allowing E1st (E1st in Network operation/Power markets)
Energy carrier(s) targeted	Electricity
Sector(s) / energy system(s) or end-uses targeted	Residential / Industry / Tertiary
Implementing bodies	RTE, the French Transmission System Operator
Decision makers involved	Demand response aggregators Industrial/Tertiary sector and individuals
Main objective(s)	The NEBEF scheme aims at organising financial flows between actors to allow for a participation of demand response on the wholesale electricity market, including by direct participation of aggregators
Implementation period	Operational since 2014

In France, the Block Exchange Notification of Demand Response mechanism, known as NEBEF[1] allows third party players (including aggregators) to offer demand response services at wholesale power markets. This mechanism was created in 2013[2] and defines the roles and obligations for the different market actors. A debated feature of the mechanism is the compensation system to electricity suppliers, who receive a payment for the electricity which was bought upfront but not consumed.

1. Background

Ensuring that demand response resources can access relevant power markets and compete on an equal footing with generation is part of enacting the Efficiency First principle (Enefirst, 2020).

In France, demand response has been supported by the use of dynamic tariffs since the 1960s. With the liberalisation of electricity markets, the end of some price schemes led to a reduction in the demand response

[1] "*Notification d'Echanges de Blocs d'Effacement*" in French.
[2] 2013: pilot scheme; 2014: first set of rules

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volume stemming from dynamic tariffs.[3] Since 2003, a number of market mechanisms have been opened to the participation of demand response. The situation is briefly described in Box 1 below.

Box 1 – Demand response in the French electricity markets

Among the mechanisms directly managed by the Transmission System Operator (TSO) to balance electricity supply and demand in real time, the primary and secondary reserves have been open to resources connected to the transmission grid since 2014, and to those connected to the distribution grid since 2016. This resulted in the participation of demand response resources in the primary reserve.[4] The tertiary reserves have also been gradually opened to demand response.[5] Industrial sites (since 2003) and individuals (since 2007) can also participate in a balancing mechanism.[6] An interruptibility mechanism is also in place as a last resort option and is available to industrial consumers connected to the transmission network. Since 2011, annual calls for tenders[7] are organised to develop France's demand response capacity and ability to participate in the different schemes.

Demand response is also able to participate in the capacity mechanism,[8] in operation since 2017. Each electricity supplier is required to provide evidence that its customers' consumption can be covered in the peak periods. They can use capacity guarantees based on their own means of production and/or (implicit) demand response, and/or purchase (explicit) demand response or generation capacity guarantees from other operators. Capacity guarantees are issued by the TSO both to generation and demand response capacities, following a certification process. Demand response can be valued in this mechanism either explicitly by being a certified resource, or implicitly if used to shave peak demand by a supplier.

ADEME, the French energy agency, notes that the French regulatory framework is rather advanced compared to other countries (CEREN & E-Cube, 2017). Industry association SmartEn describes the French market as "an almost fully open" balancing market. The following section looks at the situation regarding the participation of demand response in wholesale power markets.

[3] The authorities expect this trend to shift with the deployment of smart meters and the revised network tariff design (MTES, 2020).
[4] In 2018, the primary reserve had about 140 MW of demand response — almost 10% of this year's reserve, with a 12% average level and 20% at peaks in late 2018 (MTES, 2020). However, according to industry association SmartEn, low procurement volumes and rather large minimum bid size might affect demand response's participation on the secondary reserve (Smart En, 2018).
[5] Demand response capacity participation of 530 MW on average in rapid reserves (about 50% of the contracted rapid reserve) and 45 MW in complementary reserves in 2018 (MTES, 2020).
[6] In 2018, about 22.3 GWh of demand response was activated on the adjustment mechanism, for an average capacity of 727 MW deposited on the adjustment mechanism (MTES, 2020).
[7] The volume targets are: 2018: 2,200 MW; 2019: 2,500 MW; 2020: 2,900 MW; 2021: 2,000 MW; 2022: 1,800 MW; 2023: 2,000 MW (MTES, 2020).
[8] In 2017, demand response contributed to 2% of the capacity under the capacity mechanism (1.9 GW out of 92 GW) (MTES, 2020).

2. How has the E1st principle (or similar concept) been implemented?

Demand response participation in electricity markets reduces the amount of electricity and/or capacity procured and, in the long term, avoids unnecessary investment on the supply side. Demand response also benefits consumers by lowering clearing prices (i.e., lower energy bills for the same level of energy services) and allows for a larger share of variable renewables to be accommodated. Its participation in energy markets has been identified as enabling the Efficiency First principle.

In France, before 1 January 2014, demand response was only valued implicitly as part of a supplier's portfolio. With the Brottes law and the creation of the NEBEF mechanism, demand response resources can also be explicitly traded on the wholesale electricity market. This valuation depends on the wholesale prices and on the quantities actually withdrawn from consumption (not on capacity). NEBEF organises the roles of the different actors:

- All the consumption sites connected in mainland France can participate, either by contracting a third-party demand response aggregator (DRA), or directly if they have a minimum load reduction capacity of 100 kW.
- Demand response aggregators (DRAs) can sign contracts with consumption sites, including remuneration provisions, and sell "demand response blocks" on the electricity market over the counter or via day-ahead and intraday power exchanges. They do not need the authorisation from the energy supplier to activate demand response services. DRAs also have the obligation to be the Balance Responsibility Party (BRP) or to appoint a BRP for each demand response activation sold via the NEBEF mechanism.
- The transmission system operator, RTE acts as a trusted third party in charge of certifying the DRAs (who have to fulfil a number of criteria to participate in the mechanism), collecting demand response schedules from DRAs (ahead of the activation), and verifying the volume of energy actually reduced (after the activation).
- Energy suppliers of the concerned sites receive a compensation from the DRA for the electricity which was bought but not consumed based on a tariff grid established by the TSO (more information in Box 2 below). For market parties on the wholesale markets, the purchase of 1MWh of electricity produced is the equivalent of 1MWh of demand response.

Box 2 – Supplier compensation

Three compensation schemes are used.[9] The first one applies to contracts under regulated prices (a reference price[10] is set which reflects the energy share of the electricity supply price). The second one is a corrected model which applies to bigger sites in particular, and the third one stems from bilateral agreements between the Balance Responsibility Party/Supplier and the DRA.

The issue of compensation to suppliers has been the subject of a legal battle between supplier EDF and aggregator Voltalis over the fairness of the approach. The issue has also been discussed afterwards at the EU level during the revision of the EU electricity market legislation.

In its proposal of a recast of the Directive on the internal electricity market, the European Commission (2016) proposed that aggregators shall not be required to pay compensation to suppliers or generators, a proposal which was challenged[11] by Eurelectric, an organisation representing the electricity industry. It was argued that the valuation of demand response is only made possible by the fact that suppliers continue to purchase energy in anticipation of their customers' full demand.

Negotiations over the text has resulted in a compromise which states that "*Member States may require electricity undertakings or participating final customers to pay financial compensation to other market participants or to the market participants' balance responsible parties, if those market participants or balance responsible parties are directly affected by demand response activation.*"

This compensation shall however "*not create a barrier to market entry for market participants engaged in aggregation or a barrier to flexibility*" and be "*limited to covering the resulting costs incurred by the suppliers of participating customers or the suppliers' balance responsible parties during the activation of demand response.*"

The text further adds that the "*method for calculating compensation may take account of the benefits brought about by the independent aggregators to other market participants and, where it does so, the aggregators or participating customers may be required to contribute to such compensation but only where and to the extent that the benefits to all suppliers, customers and their balance responsible parties do not exceed the direct costs incurred.*" It is still early to evaluate how this method will be implemented by Member States (Baker, 2018).

[9] The principle of the compensation has been established by Law n° 2015-992 and is further explained in Article 9 of the NEBEF rules (RTE, 2019).
[10] Reference prices can be found on RTE's website in €/MWh, for the different types of contracts: https://www.services-rte.com/fr/decouvrez-nos-offres-de-services/baremes-versement-nebef.html
[11] See https://www.eurelectric.org/news/tapping-the-demand-response-potential-the-cost-efficient-way

The process is described by the RTE in Figure 1 below.

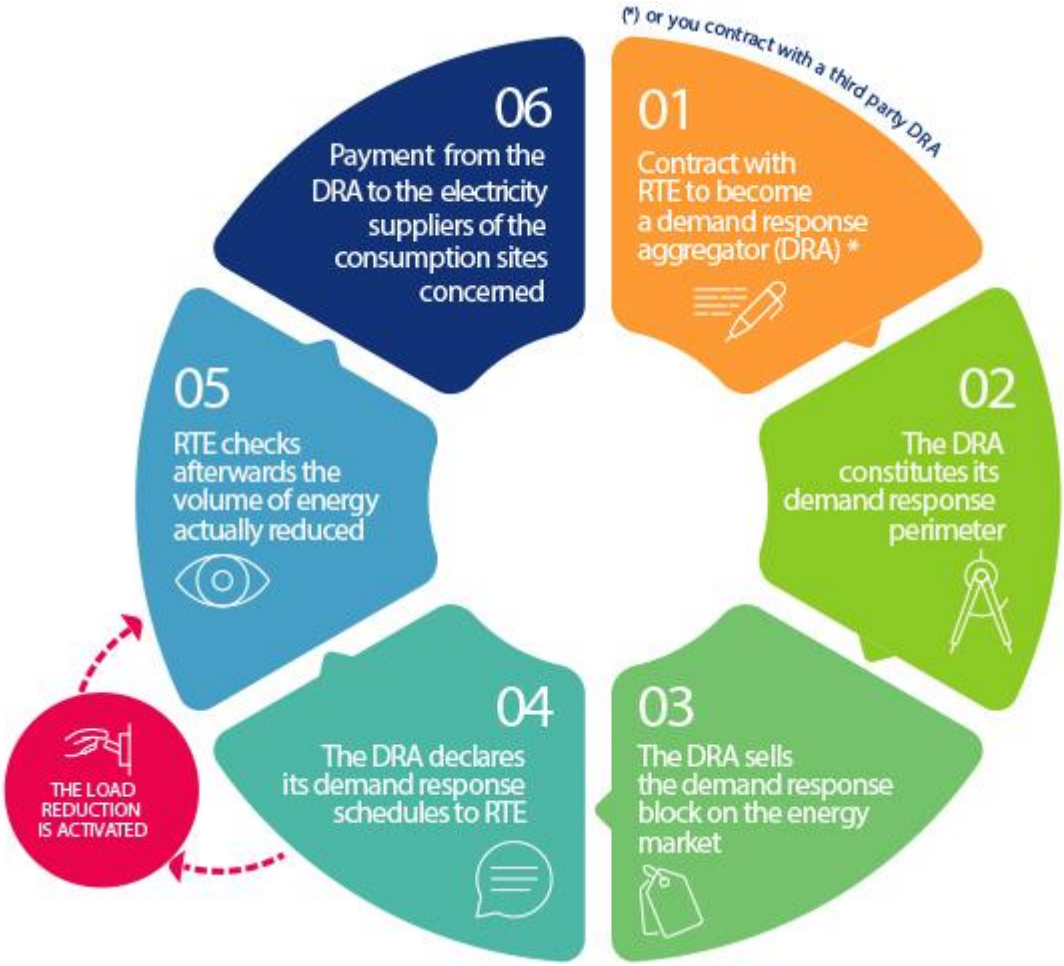

Figure 1 – The NEBEF process (Block Exchange Notification of Demand Response mechanism) (Source: RTE)

The role of the different actors is described by the French regulator, CRE in Figure 2 below.

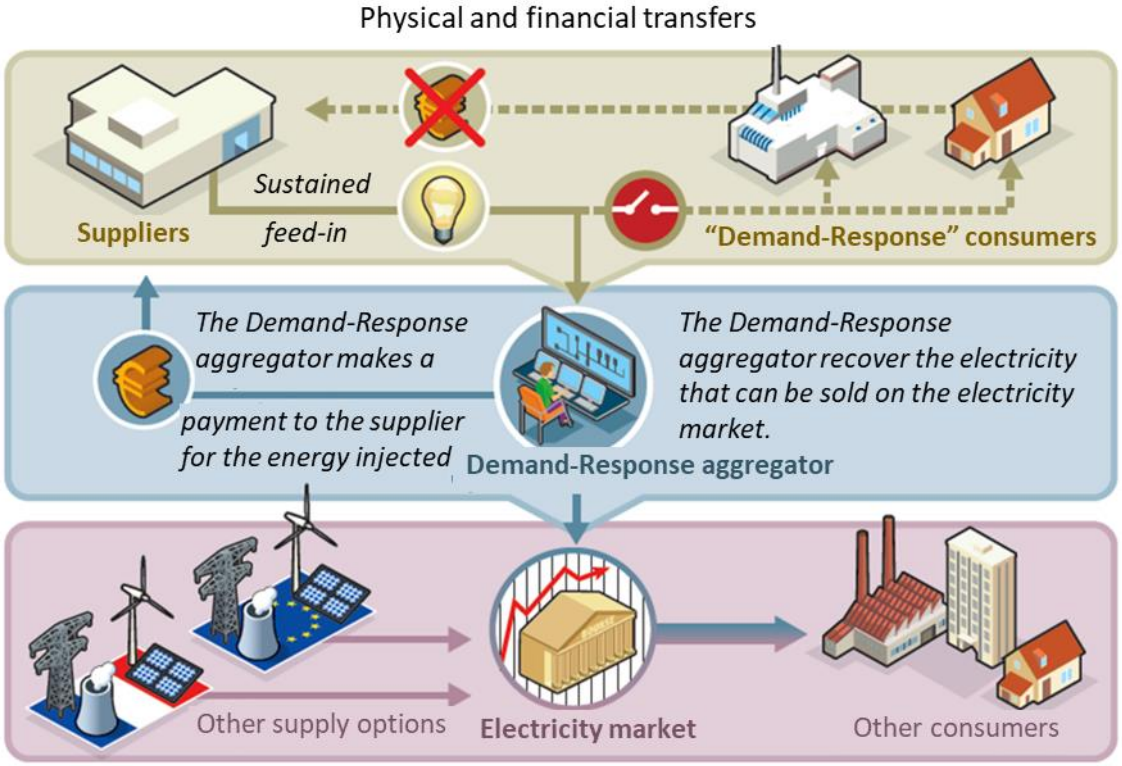

Figure 2 – How Demand Response can take part in the electricity market (Source: CRE (translated from French))

The implementation of the Efficiency First principle shall be assessed against different criteria.

First, are demand response potentials taken into account in planning? Flexibility targets are set in France's energy plan ("programmation pluriannuelle de l'énergie" currently under revision) (MTES, 2020).

Secondly, is the design of the electricity market allowing for the participation of demand response resources? Baker (2018) highlights that different barriers typically prevent the deployment of demand response in electricity markets. In France, several of these barriers were lifted and the NEBEF mechanism opens up the wholesale market to the explicit participation of demand response, which demonstrates the value of demand response beyond its capacity and balancing benefits[12] in line with Article 15-8 of the Energy Efficiency Directive (2012/27/EU).[13] In addition, demand response participants do not require the authorisation of the electricity supplier to activate demand response services. It should also be noted that the participation

[12] For more information about the start of the scheme, see (RTE, 2013): "(…) *les dispositions qui permettent aux effacements de participer aux marchés de l'électricité, c'est-à-dire d'être pris en compte de la même façon que les autres produits parmi les outils de production mobilisés pour répondre à la demande (et non uniquement pour corriger les déséquilibres résiduels), font sens d'un point de vue économique* [the provisions that allow Demand Response to take part in the electricity markets, i.e. to be taken into account in the same way as other products among the supply/capacity options used to meet the demande (and not only to correct the residual imbalances]."

[13] Article 15-8 states that "*Member States shall ensure that national energy regulatory authorities encourage demand-side resources, such as demand response, to participate alongside supply in wholesale and retail markets*." The Article refers to both balancing and ancillary services, and to direct market participation.

threshold is 100 kW for NEBEF, against 10 000 kW for the balancing mechanism. Industry association SmartEn states that the NEBEF mechanism has been "a key regulatory evolution" for developing a framework for independent aggregators, which is rated now as "quite developed" (SmartEn, 2018).

Finally, does the operation of the electricity market allow for the participation of demand response resources? On this last point, NEBEF's assessment is mixed. The energy regulator (CRE) notes that the adjustments of NEBEF's rules over time led to an increase in the volume and the number of actors involved.[14] Nevertheless, it is estimated that 95% of sector revenues are capacity related (MTES, 2020). A more detailed analysis of the financial results of aggregators would be needed to understand the evolution of the business models and the barriers preventing further expansion of demand response. Baker (2018), however, points that most European markets do not allow energy prices to reflect real value when resources are scarce. In such conditions, the supplier compensation mechanism (see above) can consume most or all of the revenues currently available to aggregators, seriously undermining the economics of explicit demand response and putting the associated potential benefits to customers at risk.

3. Effects / impacts

In 2019, 21 aggregators signed a contract with the TSO to participate in the NEBEF scheme (RTE, 2019).

Demand response volumes valued with the NEBEF mechanism reached 11 GWh in 2016 (RTE, 2017), 27 GWh in 2018 (RTE, 2019), and 22.2 GWh in 2019 (RTE, 2020). Most of the 2019 demand response came from the aggregation of small units (households or professional sites) (RTE, 2020).

4. Changes over time, if any

The original government's proposal for an Energy Transition Law had foreseen a premium paid to demand response operators (in €/MWh). This premium was meant to reflect on the system benefits and improve the business case for demand response. Consumers were to support this premium through a general contribution (from the energy bill). The design of this premium was challenged[15] by consumer associations who claimed it would not reflect the system benefits appropriately and would create competition distortion. Competition authorities also criticised the scheme, which has not yet been implemented. Debate related to the implementation of the Directive on common rules for the internal market in electricity might revive discussions.[16]

The Energy Transition Law of 2015 foresees a different compensation mechanism for certain DRA, under certain circumstances. In such cases, RTE could partially pay the compensation of the BRP/supplier of the site providing demand response services. Decrees and implementation acts, however, remain unpublished.

[14] Energy regulator website: https://www.cre.fr/Electricite/Reseaux-d-electricite/Effacements

[15] For explanation of the consumer association position, see (in French) https://www.quechoisir.org/action-ufc-que-choisir-electricite-l-ufc-que-choisir-saisit-le-conseil-d-etat-pour-effacer-la-prime-d-effacement-n12863/ https://www.quechoisir.org/actualite-effacement-electrique-diffus-le-gouvernement-s-obstine-aux-depens-des-consommateurs-n23245/

[16] For proposals on how to implement Article 17 of the Directive on common rules for the internal market in electricity, see Baker (2018).

The government considers that such a scheme would require the notification of the Commission with respect to State Aid regulation.

5. Barriers and success factors

The government is committed to organising additional tenders for demand response in case objectives defined in the energy plan are not achieved.[17]

The NEBEF scheme is relatively recent and has to be evaluated in the context of the overall framework for demand response in France. The French authorities have recently proposed to adjust the 2023 flexibility objective downwards[18] and provided a number of reasons for missing the target which was originally set, including a lack of maturity in the sector. It is unclear whether the overall organisation of the electricity market is in question.

Although this has not been explicitly brought forward by the authorities, the issue of the valuation of system benefits and the remuneration of demand response for bringing these system benefits remains open.

6. Replicability and scalability potential

Several measures are being examined to further promote demand response in France. This includes improving and simplifying the support framework for demand response to best meet the needs of the sector (MTES, 2020). MTES is working on a significant reform of this mechanism to allow for greater volumes. The new mechanism will require a notification at the Commission's DG Competition (for State Aid).

There is a large untapped opportunity to replicate the approach in the EU. Indeed, SmartEn (2018) has identified a number of Member States which are lagging behind in terms of valuing demand response in electricity markets. Regulatory safeguards already in place in France could serve as a good starting point for countries planning to rely on demand-side resources more in the future.

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[17] This tender (open for around 2 GW) in 2018 and 2019 ended up with roughly 700-800MW.
[18] 4,5 GW in 2023 against 6 GW in the initial plan.

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ABOUT ENEFIRST

ENEFIRST is a 3-year project funded under the Horizon2020 programme, which gathers a consortium of partners from across sectors and regions: IEECP, BPIE, Fraunhofer ISI, CEU, RAP, IREES, TU Wien.

From definition to implementation, ENEFIRST aims at making the "Efficiency First" (E1st) principle more concrete and operational, better understand its relevance for decision processes related to energy demand and supply, its broader impacts across sectors and markets, focusing on the building sector and related energy systems in EU Member States.

> ***E1st gives priority to demand-side resources whenever they are more cost-effective from a societal perspective than investments in energy infrastructure in meeting policy objectives. It is a decision principle that is applied systematically at any level to energy-related investment planning and enabled by an "equal opportunity" policy design.***

ENEFIRST combines policy analysis and quantitative assessments of E1st impacts to develop policy guidelines and recommendations, following a process with continuous exchanges with stakeholders.

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