

THE NUCLEAR OPTION – LIFE AFTER ARENH?

The French government is already thinking about what type of mechanism could replace the current regulation of sales of nuclear power by EDF, when the existing intervention comes to an end in 2025. The proposals set out so far raise a number of interesting questions, some of which relate to State aid. We provide some initial thoughts on the factors which, we think, will need particular attention.

Random access?

In France, alternative retailers (i.e. those who aren't EDF) can currently secure regulated access to energy produced by EDF's existing nuclear fleet under the ARENH mechanism. It places an obligation on EDF to sell up to 100 TWh of nuclear power¹ annually (about 25% of its production in France) at a regulated price of €42/MWh. This is meant to represent EDF's cost of producing electricity from existing nuclear plants². The maximum volume of power available to each retailer under the ARENH mechanism is defined by the size of its consumer base.³ If the overall amount of ARENH power requested by retailers exceeds 100 TWh for a given calendar year, the French energy regulator (CRE) defines volume reductions for each retailer.

This mechanism traces its history back to the Champsaur Commission of 2009, whose recommendations were later translated into the NOME⁴ law in 2010. It came into force in 2011, and had three main objectives:

- Foster competition in the retail market by ensuring other retailers had access to existing nuclear power on the same price terms as EDF's retail arm;
- Ensure that French customers benefit from the historic investments made in nuclear power; and
- Ensure the financing of the French nuclear fleet.

Views on the success of the mechanism are mixed.

The ARENH volumes taken up by retailers have varied based on the expected wholesale price. When it has been below the ARENH price, it would appear retailers have relied on the wholesale market to source power (liquidity seems to have been higher in such periods).⁵ When the ARENH price has been below that on the wholesale market, retailers have taken up ARENH volumes, although the 100TWh threshold was only exceeded in 2019 and 2020.

¹ Excluding provisions for losses to network operators

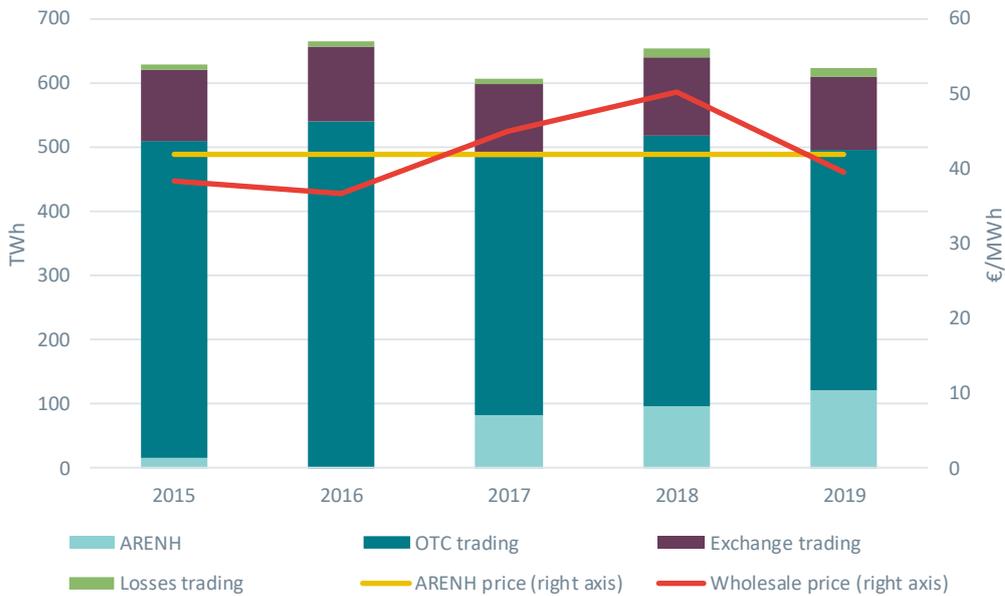
² CRE, Délibération de la Commission de régulation de l'énergie du 5 mai 2011 portant avis sur le projet d'arrêté fixant le prix de l'accès régulé à l'électricité nucléaire historique à 42 €/MWh à compter du 1^{er} janvier 2012

³ The cap is based on the retailer's provisional estimate of consumption over a reference period set by decree (arrêté du 17 mai 2011 relatif au calcul des droits à l'accès régulé à l'électricité nucléaire historique)

⁴ Law n°2010-1488 of 7 décembre 2010, relating to the Nouvelle Organisation du Marché de l'Electricité

⁵ Wholesale price reductions during the COVID-19 crisis led to disputes between EDF and ARENH counterparties.

Figure 1 Wholesale market volumes

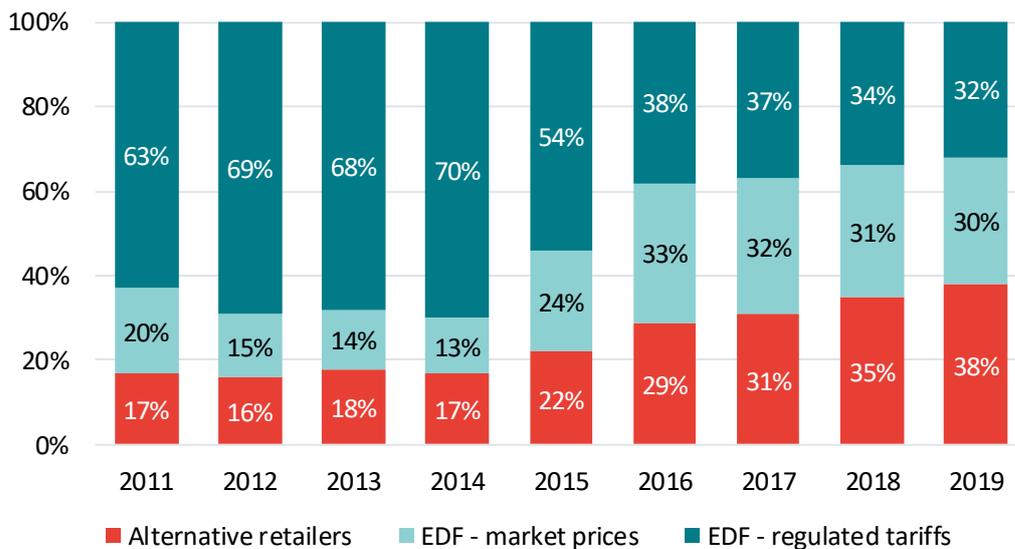


Source: Open Data Réseaux Énergies (ODRÉ)

Note: In 2019, the limit of 100 TWh sold to consumers was reached and some ARENH volumes were sold on top of that to TSOs in relation to losses

In a competitive retail market, since rights to ARENH volumes vary with customer numbers and load, the benefit of lower priced power should pass through to retail prices. However, the extent to which the mechanism has supported the growth of alternative retailers is open to discussion, particularly since the period of significant reduction in EDF’s market share coincided with the years in which there was little ARENH take-up (2015 and 2016). EDF’s overall market share (across regulated and non-regulated offers) remains significant.

Figure 2 EDF’s market share compared to alternative retailers over time



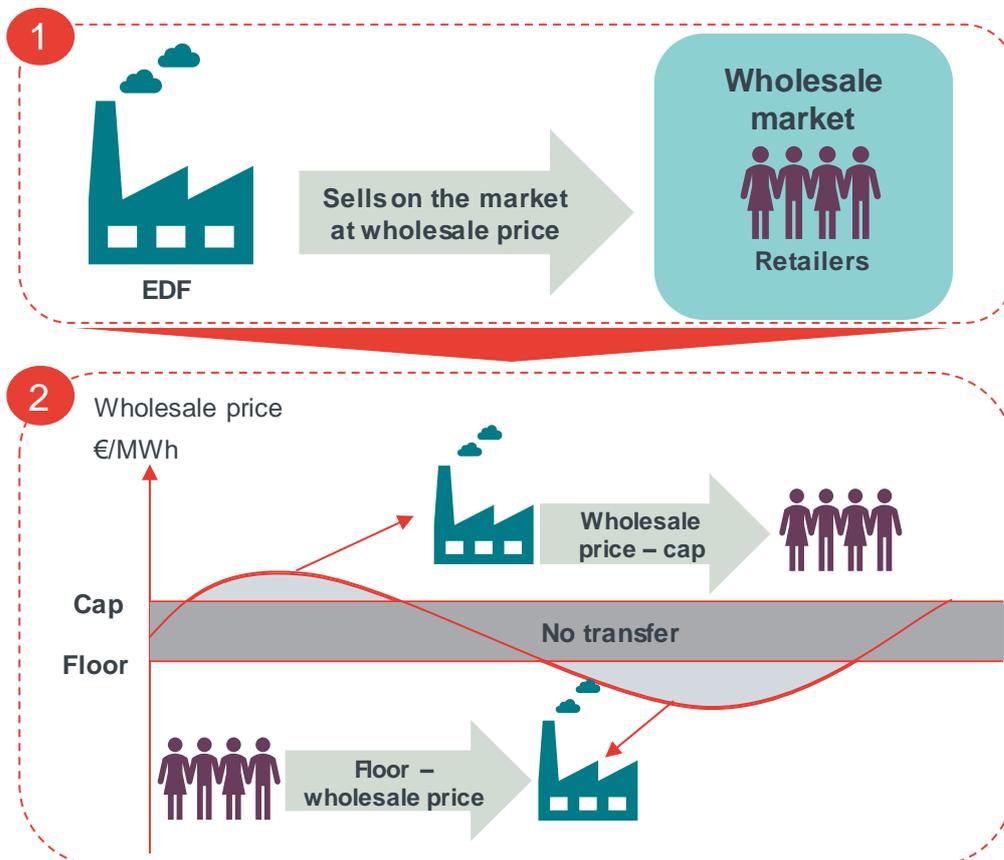
Source: Frontier Economics based on CRE, Retail market observation

Access all areas

In the run-up to the ARENH mechanism expiring in 2025, the French government has been designing a new intervention. A consultation, launched in January 2020, suggested the following new scheme:

- EDF's production and retail arms would trade at arms-length, with EDF's retail arm participating in the new mechanism on exactly the same basis as all other retailers (consistent with so-called Project Hercules which would see EDF's retail and production arms being split into two separate entities);
- Under a process and timeline defined by the regulator, EDF's production arm would sell its power on the wholesale market using standard baseload products. The price at which these volumes would be sold would not be subject to direct regulation;
- If the competitive price at which this power is sold:
 - Exceeds a pre-defined price ceiling, EDF's production arm would return the difference to retailers of French customers; or
 - Falls below a pre-defined price floor, retailers of French customers would pay the difference to EDF's production arm as a "top-up".

Figure 3 Overview of the intervention



Source: Frontier Economics

This mechanism again seeks to address the original objectives of ARENH. In particular:

- **Competition in the retail market:** EDF's retail arm would source (baseload) energy from EDF's production arm in the same way as all other retailers, contributing to a level playing field;
- **Benefits of historic nuclear investments:** If the wholesale price of energy is higher than the ceiling price (which is presumably intended to be in some way related to the cost of the existing nuclear fleet), retailers to French customers would only pay the ceiling price. Again, if retail competition works, this benefit (which, since it is on the entirety of EDF's expected baseload

production, rather than just 100TWh, should be bigger than that under ARENH) should pass through to French customers;⁶ and

- **Financing the nuclear fleet:** The exposure of EDF's production arm to fluctuations in wholesale prices should be reduced under the mechanism. This should reduce the cost of financing of the existing nuclear fleet, and in particular the large investment program planned to upgrade the existing fleet and extend its lifetime ("the Grand Carénage").

Liquidity in the wholesale market should also improve from having all of EDF's production sold on the market, as opposed to only part of it being sold through the ARENH mechanism.

This new intervention would have characteristics currently found in a number of existing mechanisms in the energy sector:

- Contract for differences granted to RES-E producers⁷, in that it secures a revenue for EDF's production which is more stable than wholesale prices;
- Cap and floor mechanisms for interconnections implemented in the UK⁸, in that it continues to provide some (limited) wholesale market exposure; and
- The ATS regime for underground natural gas storage in France⁹, in that there is a mechanism for a transfer between French consumers and an infrastructure operator to ensure a given level of recoverability.

Access denied?

While it may meet national policy objectives, the new mechanism will form part of the internal European energy market. And that means it will need to be consistent with State aid rules.

The French government is aware of this, and plans to define the obligations on EDF's production arm as a service of general economic interest (SGEI). This is defined by the Commission as "*an economic activity that public authorities identify as being of particular importance to citizens and that would not be supplied (or would be supplied under different conditions) if there were no public intervention*".¹⁰

It is worth noting that French authorities would need to ensure that the SGEI is consistent with EU legislation. While the Commission acknowledges that member States have a wide margin of discretion in defining a given service as an SGEI, when Union rules exist this discretion is bound by those rules.¹¹ In this case, Article 9 of Directive (EU) 2019/944 defines a range of possible public service obligations – arguably, the proposed SGEI could relate to security, quality and price of supplies, and/or environmental protection.¹²

SGEIs are subject to specific State aid rules. They are considered compatible with the internal market if four cumulative conditions are met:

- The recipient of the compensation must have public service obligations, and the obligation must be clearly defined;

⁶ We note that competition in the retail market may not be perfect and therefore that benefits may be passed on slowly, and perhaps in an uneven way. This may disproportionately disadvantage the most vulnerable customers, since they are often the least engaged in the process of competition, and so the most likely to be unattractive tariffs.

⁷ In a contract for differences, the RES-E generator gets the difference between a market reference price and a pre-defined "strike price" if the reference price is lower than the strike price, and it pays the difference if the reference price is higher than the strike price.

⁸ In this model, there is a pre-defined minimum and maximum rate of return for the interconnector investment. Returns above the cap are returned to customers (via the national TSO's tariffs), and when returns are below the floor, interconnector owners are compensated (again, via the national TSO's tariffs).

⁹ In this regime, storage operators sell their capacities on the market via auctions. If the market revenues are below a pre-defined level, the difference is paid to storage operators by the gas TSOs (it is in turn recovered via a term added to gas transmission tariffs). If market revenues are above this pre-defined level, storage operators give the difference back to consumers via the gas transmission tariff.

¹⁰ https://ec.europa.eu/competition/state_aid/overview/public_services_en.html

¹¹ Communication from the Commission on the application of the European Union State aid rules to compensation granted for the provision of services of general economic interest, (46)

¹² Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU

- The calculation of the compensation must be objective, transparent and established in advance;
- The compensation must be proportionate: it cannot exceed what is necessary to cover the costs of delivering the public service obligation whilst accounting for appropriate revenues and allowing for a reasonable profit; and
- If the recipient of the compensation cannot be chosen through a competitive process, the level of compensation must be determined on the basis of an analysis of the costs of a typically well-run company.

Given the sensitivity of nuclear energy, the Commission is likely to be keen to ensure a robust assessment of the French government's proposals. Interesting economic issues are likely to arise with the third and fourth of these conditions: ensuring that the mechanism is seen to allow only a reasonable profit, based on the costs of a well-run company. There are a range of questions to which the Commission may require answers.

First, there is a question of measurement

Numerous RES-E support schemes have considered the definition of a reasonable profit.¹³ Profit has typically been measured in terms of the rate of return on investment for new investors, calculated as the net present value of expected cashflows divided by the net present value of investments.

Here, neither part of such a calculation is straightforward.

The mechanism will require merchant revenue to be assessed against a cap and floor, and from this an outturn cashflow could be derived. But there will be other revenue sources. More revenue (and potentially cost) will result from buying and selling power to follow load, and from the provision of system services or redispatch to help manage network congestion.

Whatever definition of revenue is used, an equivalent definition of costs will be needed (which may make it difficult to envisage separating out modulation or system services revenue). There will also need to be agreed ring fencing and cost allocation arrangements between EDF's production arm and the rest of EDF.

Which cost and revenue streams fit in to an assessment of the profitability of the SGEI will need to be determined, along with how precisely they are measured.

Equally, absent the intervention, EDF's nuclear units would also be likely to secure revenue from France's capacity remuneration mechanism (CRM). Here some further questions may arise:

- **cumulation of State aid:** does the fact that the CRM is seen as State aid mean that EDF's power stations would no longer be eligible to participate? And how consistent is such a conclusion with the risk that the CRM's existence reduces the value of the baseload energy which EDF is selling?
- **liquidity of the CRM:** currently, the volumes of nuclear power sold through ARENH are automatically associated with a capacity certificate, implying that part of EDF's volumes do not compete in the CRM (representing about 10% of the certificates). Will volumes sold through the new mechanism also be automatically associated with a capacity certificate, and how detrimental could this be to liquidity in the CRM?
- **incentives:** depending on how the plants participate in the CRM, will a separate incentive be required to ensure that EDF still faces incentives to maximise availability of capacity on peak days?

Measuring the net present value of investments is no easier. Since the initial investments, the nuclear plants have been earning money initially in a monopoly context and then through a competitive wholesale market (with various regulatory interventions). And obviously EDF has made further capital investments as the plants have aged. This makes establishing a reasonable value for the assets complex.

And finally, there is the question of determining how EDF's costs relate to those of a well-run company. CRE, in common with other European regulators, is well used to assessing "efficient" costs for network infrastructure owners. Assessing operating and capital costs for a major nuclear owner (including the

¹³ For example, in relation to purchase prices from small solar installations in France (https://ec.europa.eu/competition/state_aid/cases/257105/257105_1878112_146_2.pdf, para 26 *et seq*)

costs of the “Grand Carénage” as well as Flamanville¹⁴), where there are many fewer benchmarks, is a further challenge.

Then there is then the question of **defining reasonableness**

Regulators are also used to determining the reasonable returns for particular activities: for example, assessing a reasonable allowed return for networks or other infrastructure businesses. This typically involves reference to the return on debt and equity observed for quoted comparators with a similar risk profile.¹⁵

There are companies with major existing nuclear assets which can be used as comparators. But do they have a similar risk profile? Some operate in more classically regulated regimes, others in more merchant settings. For EDF’s production arm, under this new regime, the risk to which it is exposed will depend critically on the parameters of the regime itself. For example:

- In determining the volume of baseload energy to be sold, how will the expected availability of the fleet be treated? And if outturn availability is lower (necessitating a buyback of power), how will the resulting costs be treated?
- How far apart will the floor and the ceiling be? The further apart they are, the more merchant risk EDF’s production arm faces; and
- How will the absolute level of the floor and ceiling be calibrated? If they are set for long periods at a time, and the market moves decisively in one direction, EDF’s merchant risk may change significantly.

And even if the conditions for an SGEI are met, this may not be the end of the story. A key objective of the scheme is to ensure that French customers benefit from a repayment if French nuclear energy is cheaper than the wholesale price resulting from the internal electricity market. As European wholesale prices increase (for example, as a result of rising carbon prices), this could mean that, as a result of the operation of the cap and floor, some French industrial customers would face lower costs than their competitors in neighbouring Member States.

In this sense, a fundamental objective of the policy may itself be incompatible with general European State aid rules.

In the past, tax or network tariff reductions have been granted to industrials by member States. In France for example, electro-intensive companies benefit from a reduction of the tax on electricity consumption which was used to finance renewables.¹⁶ They also benefit from a reduction on the electricity network tariff component of their energy bill if they implement energy efficiency measures. However, these discounts are linked to specific objectives – for example the compatibility of the tax reduction was assessed under the EEAG guidelines¹⁷, which allow for the safeguarding of the international competitiveness of electricity-intensive companies.

But in other cases, the Commission has ruled against measures which gave an advantage to large users. For example between 2011 and 2013, full network charge exemptions were granted to large German customers with stable consumption. The Commission’s investigation concluded that this constituted State aid incompatible with the internal market. In particular, the Commission noted that releasing electro-intensive companies from having to pay any network charges could have an important distortive impact on competition, since competitors in other member States remained under the obligation of paying their respective network charges.¹⁸ An important part of this decision was the finding that the full exemption bore no relation to any network cost savings to which large customers contributed.

While not directly targeted at large users, it is therefore plausible that the intervention envisaged by the French government could, as a result of its overall effect, raise concerns in relation to aid to French

¹⁴ Which is a first of a kind EPR

¹⁵ For example, see CRE, Délibération n°2019-270

¹⁶ The CSPE, or “Contribution au service public de l’électricité ».

¹⁷ The Guidelines on State aid for environmental protection and energy 2014-2020

¹⁸ Commission Decision of 28.5.2018 on aid scheme SA.34045, page 54, (214).

industry. This will critically depend on how the cap and floor are defined relative to expected wholesale prices: if the cap and floor result in electricity costs to French customers which are materially below the level of the wholesale price, the Commission may see reason for concern.

In any case, a lot of work is to be done before this reform is implemented. Much of it will need be done in Paris. But it looks like a fair amount of work will also need to be done in Brussels to ensure that the Commission is comfortable with it all.