



## **DELIBERATION NO. 2019-170**

Deliberation by the French Energy Regulatory Commission of 11 July 2019 informing on the estimation of the optimal electricity interconnection capacity and the new interconnection projects with the United Kingdom

Present: Jean-François CARENCO, president, Christine CHAUVET, Catherine EDWIGE, and Jean-Laurent LASTELLE, commissioners.

*Translated from the French: only the original is authentic*

On the border between France and the United Kingdom, in addition to the 2 GW currently operational interconnection, two electricity interconnectors are under construction and three projects are under consideration. The French Energy Regulatory Commission (CRE) and the British regulator (Ofgem) may soon need to express their views on the relevance of these three projects and, when appropriate, decide on a cross-border cost allocation between France and the United Kingdom, in accordance with the provisions of Regulation (EU) No. 347/2013 of the European Parliament and of the Council of 17 April 2013, on guidelines for trans-European energy infrastructure (as long as the United Kingdom is a member of the European Union).

The implementation of all these projects may increase the interconnection capacity between France and the United Kingdom up to 8.8 GW.

In this context, CRE has recently launched a study with a consulting firm, in order to determine the relevant level of electricity interconnection capacity between France and the United Kingdom from a socio-economic welfare perspective, i.e. the level for which the benefits for the last constructed interconnector exceed the costs associated to this interconnector. This study considers the legal framework as unchanged (i.e. considering that the United Kingdom is a member of the European Union), with the understanding that another study was already conducted in 2017 in order to identify the potential effects of Brexit on the value of new interconnections.

The present deliberation aims at informing all interested parties about the lessons learned from this study.

## 1. CONTEXT

### 1.1 British referendum of 23 June 2016 and previous work from CRE

Following the vote of the British citizens on 23 June 2016, the British government triggered article 50 of the Treaty on European Union on 29 March 2017, thus marking the beginning of the negotiations about the exit of the United Kingdom from the European Union (the “Brexit”). The involved parties had two years to find a withdrawal agreement. However, the negotiations have not yet succeeded and were extended until 31 October 2019.

The potential consequences of the Brexit on the energy markets and, in particular, on the rules for access and use of interconnectors between the continent and the United Kingdom are difficult to anticipate. The regulatory and economic framework in which new interconnector projects will be developed is therefore highly uncertain, as, consequently, are the socio-economic benefits of such projects.

CRE conducted a study in 2017 aiming at estimating the potential consequences of the Brexit on the relevance of any new interconnector project between France and the United Kingdom. Different Brexit scenarios were modelled. The study demonstrated that the Brexit may have a significant impact on the benefits of interconnector projects. Thereby, in the most favourable case, in which the United Kingdom remains in the internal energy market, but the Brexit has an impact on the electricity demand and the development of renewable energy production capacities, the value of a new interconnector could decrease by up to 10%. In the case where electricity markets are decoupled, the value of a new interconnector could decrease by more than 30%.

In this context, given the studies conducted by its services, CRE has until now considered that it is not in a position to determine whether a new interconnector project between France and the United Kingdom would be beneficial to the European Union before the Brexit conditions are clarified<sup>1</sup>.

### 1.2 Overview of the projects on the France-United Kingdom border

The current electricity interconnection capacity between France and the United Kingdom is 2 GW.

Two projects are under construction, increasing up to 4 GW the total capacity between France and the United Kingdom:

- the ElecLink project: this 1,000 MW project is developed by a private company, ElecLink Limited<sup>2</sup> and was granted a partial exemption from certain provisions of the European legislation in 2014<sup>3</sup>;
- the IFA2 project: this 1,000 MW project is developed by RTE and NGIH. CRE adopted a decision on 2 February 2017<sup>4</sup> approving this project and defining the parameters of the applicable incentive regulation.

Beyond these projects under construction and despite the uncertainties regarding Brexit, three other projects are under consideration on this border:

- the Aquind project: this 2,000 MW project submitted in 2017 an exemption request to CRE and Ofgem, pursuant to article 17 of Regulation (EC) No 714/2009<sup>5</sup>. CRE considered that it was not in a position to determine whether this project, and more generally any new interconnector project between France and the United Kingdom, would be beneficial to the European community<sup>6</sup>, taking into account the context of the withdrawal of the United Kingdom from the European Union. Referred to the case, the Agency for the Cooperation of Energy Regulators (“ACER”) decided not to grant the exemption request<sup>7</sup> on 19 June 2018; this decision was confirmed by the Board of Appeal of ACER on 17 October 2018<sup>8</sup>;
- the FAB project: this 1,400 MW project is promoted by RTE and the company FABLink;
- the GridLink project: this 1,400 MW project is promoted by the company GridLink Interconnector Limited.

The development of all these projects would increase the interconnection capacity between France and Great Britain up to 8,800 MW.

<sup>1</sup> [Deliberation of the Energy Regulatory Commission of 16 November 2017 establishing guidelines for new interconnector projects with the United Kingdom and deciding to transfer the exemption request submitted by AQUIND Ltd. to ACER](#)

<sup>2</sup> ElecLink Limited is a 100% subsidiary of Getlink, previously Groupe Eurotunnel

<sup>3</sup> Joint Opinion by CRE and Ofgem of 28 August 2014

<sup>4</sup> <http://www.cre.fr/en/documents/deliberations/decision/electricity-interconnector-france-great-britain2>

<sup>5</sup> <http://www.cre.fr/en/documents/deliberations/decision/interconnector-ifa2-project>

<sup>6</sup> Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity and repealing Regulation (EC) No 1228/2003

<sup>7</sup> [Deliberation of the Energy Regulatory Commission of 16 November 2017 establishing guidelines for new interconnector projects with the United Kingdom and deciding to transfer the exemption request submitted by AQUIND Ltd. to ACER](#)

<sup>8</sup> [Decision of the Agency for the cooperation of energy regulators No 05/2018 of 19 June 2018 on the exemption request for the Aquind Interconnector](#)

<sup>8</sup> [Decision of the Board of Appeal of the Agency for the Cooperation of energy regulators – 17 October 2018](#)

### 1.3 Objective of the study carried out by Artelys for CRE

In order to decide on the relevance of the different projects and the associated cross-border cost allocation, CRE intends to base its analysis on the costs and the benefits of these projects.

In the past, different studies indicated that the interconnector projects with the United Kingdom may bring significant socio-economic benefits. In that respect, the analyses carried out by the ENTSO-E as part of the 2016 version of the 10-year network development plan (TYNDP 2016)<sup>9</sup> indicated that the cost-benefit analyses of the new interconnector projects were favourable in most scenarios.

Nevertheless, as more and more projects between the United Kingdom and the rest of Europe are now being considered and as the prospective scenarios of the electricity supply and demand in Europe were updated, ENTSO-E revised its analyses. Consequently, the 2018 version of the 10-year network development plan (TYNDP 2018)<sup>10</sup> indicates that the benefits created by the construction of new interconnectors would be significantly lower than the costs associated to these projects, even without taking into account the potential consequences of Brexit on the use of interconnectors. Indeed, ENTSO-E estimates the monetised benefits of the new interconnector projects linking France and Great Britain between 24 M€/year and 38 M€/year<sup>11</sup>, depending on the considered scenario in 2030. Comparatively, annualised costs (capital expenditures, operational expenditures and losses) provided in TYNDP 2018 vary between 73 M€/year and 229 M€/year<sup>12</sup> depending on the considered scenario and project.

In this context, the CRE launched a study in early 2019 with a consulting firm, aiming at determining the relevant level of electricity interconnection capacity between France and the United Kingdom from a community perspective. This study has considered the legal framework as unchanged, that is to say that it considered the United Kingdom as a member of the European Union. The Artelys company was selected. The report is published together with this document.

## 2. RESULTS OF THE STUDY ON THE OPTIMAL ELECTRICITY INTERCONNECTION CAPACITY BETWEEN FRANCE AND THE UNITED KINGDOM

### 2.1 Hypotheses and scenarios

In order to determine the optimal electricity interconnection capacity between France and the United Kingdom, Artelys modelled different scenarios covering the years 2025, 2030 and 2040, and estimated the impact on social welfare induced by a variation of the interconnection capacity between 3,000 MW and 9,000 MW.

The scenarios defined by Artelys are intentionally contrasted, in order to cover a wide range of possible futures in terms of generation mix, electricity demand or macroeconomic environment. They are based on the most recent scenarios of ENTSO-E, as well as the recent political orientations, notably in France with the French strategy for energy and climate ("Programmation Pluriannuelle de l'Énergie" - PPE) and in Great Britain<sup>13</sup>. Four scenarios have been simulated:

- the **"Sustainable Transition" scenario**: this scenario is built upon ENTSO-E's "Sustainable Transition" scenario in TYNDP 2018 and allows to achieve the European objectives in terms of greenhouse gases reduction by 2030;
- the **"Conservative" scenario**: this scenario represents an environment with slower economic growth, notably where the development of renewables is delayed in comparison with the European objectives;
- the **"National Plans" scenario**: this scenario keeps up with the evolution of the "Energy Transition" scenario in Europe, but follows the most recent governmental plans for France and the United Kingdom;
- the **"DG + PPE" scenario**: this scenario is built upon ENTSO-E's "Distributed Generation" scenario in TYNDP 2018, which the European Commission considers as the reference scenario for the analyses of the projects, and upon the hypotheses of the PPE for France.

<sup>9</sup> <https://tyndp.entsoe.eu/2016/>

<sup>10</sup> <https://tyndp.entsoe.eu/tyndp2018/>

<sup>11</sup> This corresponds to a range from 13 M€/GW/year to 27 M€/GW/year of benefits monetised by ENTSO-E

<sup>12</sup> This corresponds to a cost range from 52 M€/GW/year to 114 M€/GW/year as estimated by ENTSO-E

<sup>13</sup> [Updated Energy and emissions projections 2018](#)

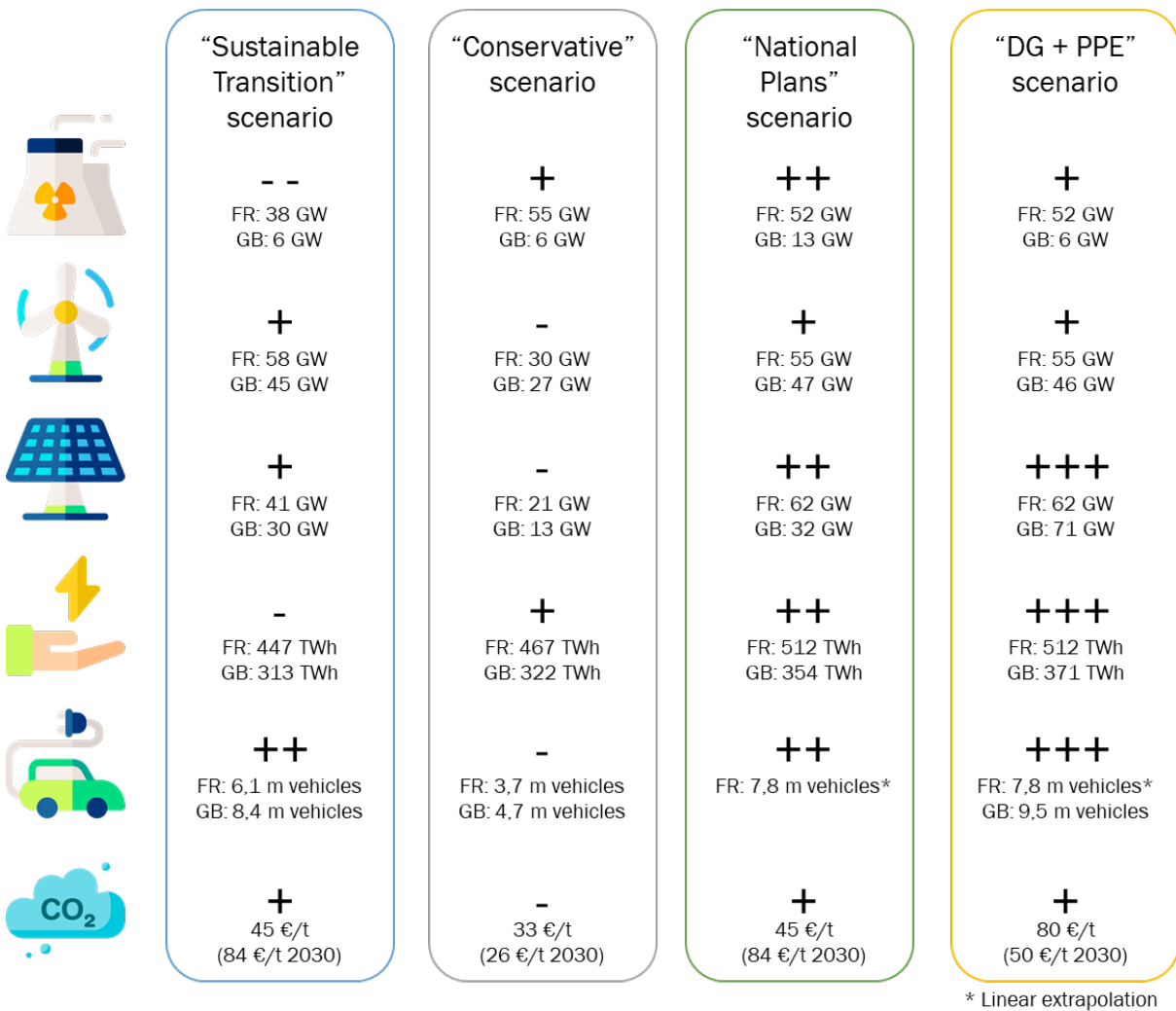


Figure 1 – Overview of the main assumptions underlying the different scenarios (2040 horizon)

Besides, numerous sensitivities were tested in order to identify the parameters which may significantly influence the value of new interconnectors between France and the United Kingdom.

Finally, considering that a study was already conducted in 2017 in order to identify the potential effects of Brexit on the value of new interconnectors, this study has not taken into account the potential consequences of Brexit. This is a strong and optimistic assumption with respect to the potential benefits of new interconnectors with the United Kingdom. The exact terms and conditions of Brexit will be taken into account when assessing the relevance of projects submitted to CRE’s approval.

**2.2 Summary of the main results of the study**

The analysis of the results of the study shows that the benefits generated by a new interconnector, beyond the 4,000 MW already operational or under construction, vary considerably depending on the considered scenario. Thus, the benefits of a new interconnector are the lowest when considering the “Conservative” scenario and remain very low with the “Sustainable Transition” scenario. On average over the four scenarios, the benefits generated by the first additional GW of interconnection beyond 4,000 MW are estimated to around 500 M€ in discounted value, and reach a maximum of 930 M€ when considering the “National Plans” scenario.

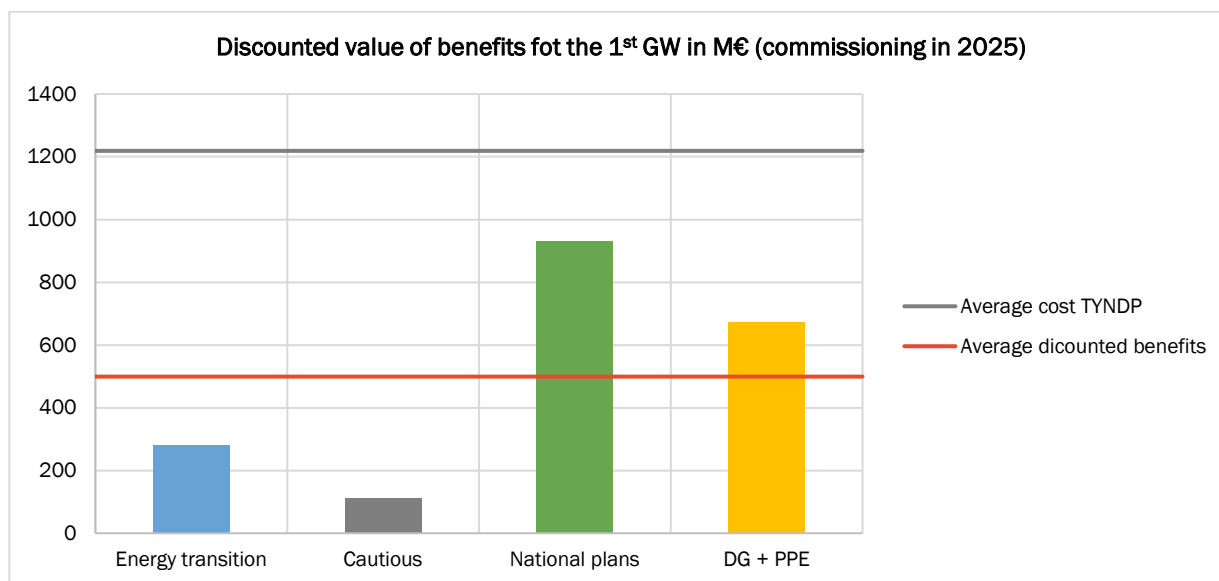


Figure 2 – Benefits generated by an interconnector project between France and the United Kingdom depending on the scenarios

In all considered scenarios, the benefits remain lower than the average costs of the three projects under consideration taking into account capital and operational expenditures as indicated in the TYNDP 2018, and additional losses resulting from a new interconnector, as estimated by ENTSO-E in the TYNDP 2018. The average benefits over the four scenarios are only comparable to half of the costs of a new interconnector.

Sensitivity analyses were performed on the basis of the most favourable scenario, namely the “National Plans” scenario. These analyses highlight the significant impact of some factors on the estimation of the benefits:

- the **electricity demand in France**: the electrification of final usages expected in the French low carbon strategy (“Stratégie Nationale Bas Carbone”) may have consequences on the use of interconnectors. In this context, two sensitivity analyses were performed considering an increase by about 15 TWh (respectively a decrease by about 15 TWh) of the electricity demand, in order to take into account the potential higher development (or on the contrary the potential absence) of Power-to-gas. As a result, reaching the national objectives in terms of Power-to-gas would reduce considerably the benefits of a new interconnector in the “National Plans” and “DG + PPE” scenarios (by around 30 % for the “National Plans” scenario); on the contrary, the absence of Power-to-gas has a positive impact on the value of interconnectors;
- the **fuel and CO<sub>2</sub> prices**: in comparison with ENTSO-E’s assumptions, the use of the most ambitious scenario from the International Energy Agency (IEA) in terms of decarbonisation (“Sustainable Development” scenario from the 2018 World Energy Outlook) increases the estimated benefits of a new interconnector by about 10%; on the contrary, the use of the “New Policies” scenario<sup>14</sup> from the IEA decreases the benefits of a new interconnector by more than 25%;
- the **development of interconnectors on other UK borders**: the construction of the different projects under consideration in the TYNDP and labelled as projects of common interest would have a negative impact on the interest of new interconnector on the France – United Kingdom border;
- the **evolution of the production mix**: the production mix has a strong impact on the results, as highlighted by the variability of the results between the four scenarios; in particular, a lower renewal of British nuclear capacity or higher objectives in terms of wind capacity compared to what is expected in the “National Plans” scenario may slightly increase the benefits of a new interconnector.

Finally, the sensitivity analyses performed by Artelys on the commissioning year show that the benefits are maximised if the commissioning year is delayed by a couple of years in comparison to the dates currently scheduled by the projects’ promoters.

<sup>14</sup> The “Sustainable Development” scenario from the World Energy Outlook 2018 is the most ambitious scenario modelled by the IEA and aims to achieve the commitments of the Paris Agreement. Under this scenario, the CO<sub>2</sub> emissions of the energy sector may be divided by two at the world scale in comparison to 2017. In this scenario, the price of the ton of CO<sub>2</sub> reaches €130 in 2040. The “New Policies” scenario of the IEA takes into account the public policies and the objectives of the governments, in order to contain substantially the growth of demand and emissions compared to a trend-based scenario. In this scenario, the price of the ton of CO<sub>2</sub> reaches €40 in 2040.

### **2.3 Conclusions of the study**

The results of the study call for caution and suggest not to rush the decision on new projects.

Indeed, the benefits of the construction of new interconnectors, beyond the 4,000 MW that are to be operated from 2021/2022 on this border, would not cover the costs of these projects, in all the considered scenarios. These projects would therefore have a negative socio-economic impact, and this even without considering Brexit.

In this context, delaying investment decisions by a couple of years would *a priori* allow to remove, at least partly, the uncertainties in relation with the terms and conditions of Brexit.

**CRE'S COMMUNICATION**

Deciding on the relevance of the electricity interconnector projects is part of CRE's missions. In addition to the 2 GW interconnection capacities already operational on the border between France and the United Kingdom, two interconnector projects are under construction: the interconnection capacity will therefore reach 4 GW in 2021. Moreover, three additional projects are under consideration.

In this context of strong development of interconnector projects on the border with the United Kingdom, CRE launched a study with a consulting firm in order to determine the optimal electricity interconnection capacity between France and the United Kingdom considering the legal framework as unchanged (i.e. considering that the United Kingdom is a member of the European Union), bearing in mind that another study was already conducted in 2017 in order to identify the potential effects of Brexit on the value of new interconnectors.

The study concludes that the benefits of the projects under consideration are not high enough to justify new investments beyond the projects already under construction, even though the potential negative consequences of Brexit on the value of the interconnectors are not considered in this study. As CRE already identified in its previous works in 2017, the risks upon potential benefits are even higher when considering Brexit.

In particular, in all considered scenarios, benefits remain lower than costs taking into account capital and operational expenditures, and additional losses resulting from a new interconnector. On average over the four scenarios, benefits are only comparable to half of the costs of a new interconnector.

Consequently, and considering the available cost assumptions, CRE considers that the conditions are not met, for the time being, for an increase of the interconnection capacity between France and the United Kingdom beyond the projects already under construction, and that it appears necessary to wait for more clarity on the terms and conditions of Brexit, as well as on the evolution of the market fundamentals and on the implementation of public policies that may favourably impact the value of these interconnectors.

The present deliberation will be published on CRE's website and sent for information to ACER, to the European Commission and to Ofgem.

**Paris, 11 July 2019.**

**For the Energy Regulatory Commission,  
the President,**

**Jean-François CARENCO**