

Deliberation of the French Energy Regulatory Commission dated 26 June 2014 examining the ten-year electricity transmission system development plan submitted by RTE in 2014

Present: Philippe de Ladoucette, Chairman, Olivier CHALLAN BELVAL, Catherine EDWIGE, H  l  ne GASSIN, Jean-Pierre SOTURA, commissioners

1. Regulatory framework

1.1. European framework

Regulation (EC) No. 714/2009 of the European Parliament and of the Council of 13 July 2009 introduced a coordinated approach to system planning. Therefore, every two years, the European Network of Transmission System Operators for Electricity (hereinafter ENTSO-E) must draft a non-binding ten-year network development plan for the entire European Union. The goal of this plan is to enable forward-looking work and technical cooperation among European system operators. The Agency for the Cooperation of Energy Regulators (ACER) must issue an opinion on the plan and monitor its implementation as well as its consistency with the various national plans.

In July 2012, ENTSO-E published its ten-year European network development plan (hereinafter TYNDP). A new version of the TYNDP, which is currently being drafted by ENTSO-E, is scheduled for the end of the second half of 2014.

1.2. National framework

Article L. 321-6 of the French Energy Code, transposing Directive 2009/72/EC of the European Parliament and of the Council of 13 July 2009, requires the operator of the public electricity transmission system RTE, to draft a ten-year network development plan each year. This Article sets the framework for the drafting of the plan, defines its scope and specifies the conditions for its analysis.

Pursuant to Article L. 321-6 of the French Energy Code, the ten-year network development plan must be *"drawn up on the basis of existing supply and demand and of reasonable medium-term assumptions concerning changes in electricity generation, consumption and exchanges in cross-border networks"*. In order to do so, *"the plan takes into account in particular the forecast multi-annual supply and demand balance and the multi-annual investments planning for production approved by the State, as well as the regional plans for connection of renewable energy to the network mentioned in Article L. 321-7"*. Article L. 321-6 of the Energy Code moreover specifies that the ten-year plan must mention *"the main transmission infrastructure that must be built or upgraded significantly over the next ten years"*; and list *"the investments already decided and new investments to be made in the next three years, by providing a timetable for all investment projects"*.

Lastly, Article L. 321-6 of that Code sets out that *"each year, the ten-year plan shall be submitted for examination to the French Energy Regulatory Commission"*. In compliance with the provisions of that Article, CRE must verify whether *"the ten-year plan covers all investment requirements and whether it is consistent with the non-binding European plan drawn up by the European Network of Transmission System*

Operators for Electricity". Within this framework, "the French Energy Regulatory Commission shall consult the users of the public network according to conditions that it shall determine; it publishes the summary of this consultation".

On 3 February 2014, RTE submitted to CRE's examination a ten-year network development plan covering years 2013 to 2023. CRE ran a public consultation from 28 March to 18 April 2014. The present deliberation presents the summary of this consultation and CRE's analysis of the ten-year network development plan.

2. Summary of the public consultation

Pursuant to the provisions of Article L. 321-6 of the French Energy Code, CRE ran a public consultation from 28 March to 18 April 2014 to which eight market players responded: three generators-suppliers, one system operator, the Chairman of the Conseil général des Alpes-Maritimes (general council of the Alpes-Maritimes department), the mayor of a rural municipality and an SME in the energy sector. CRE has summarised players' main comments regarding the ten-year plan.

First, most players highlighted improvements compared to the previous year regarding the consultation process and or/efforts by RTE to answer their questions.

EDF and Direct Energie wished to have more details on the results of the economic assessments of the projects presented by RTE, on the methodology used and the assumptions adopted.

They also wished for more precise information on the increase in interconnection capacity. In particular, Direct Energie would like this information to be clearly identified in each national plan in Europe in order to check for consistency among the different plans. EDF wishes that the information on the increase in exchange capacity for each border would be broken down by time/seasonality period.

The Chairman of the Conseil Général des Alpes-Maritimes questioned the ability of the security plan of the Provence-Alpes-Côte d'Azur (PACA) region to secure that region beyond 2023, especially if the objectives of control of energy demands and of development of local production, approved by the State at the same time that the safety net of the PACA region, are not attained. He therefore requested additional information on the long-term solutions envisaged beyond 2023 by RTE.

GDF Suez would like for the next ten-year development plan to provide more specific information on the medium-term impact of network development on its production units.

The distribution system operator ERDF requested that RTE "*further increases, including in the long term, visibility into developments of the network resulting from the implementation of S3REnR*" (regional plans for connection of renewable energy to the network). With regard to the scope of the plan, this player would also like the ten-year plan to be extended to include the requirements of the long-term development of the 63-90 kV network.

Lastly, Apis Mellifera, an SME in the energy sector believes that the only scenario to be considered is the "new mix" scenario; however, it feels that the underlying assumptions concerning this scenario do not sufficiently take into account the regionalisation and storage of renewable energy.

3. CRE's analysis

In this section, CRE presents its analysis taking into account notably comments from players.

3.1. Scope of the ten-year plan

Pursuant to Article L. 321-6, the ten-year plan contains two major parts, a ten-year plan and a three-year plan.

With regard to the ten-year part of the plan, the main transmission infrastructure mentioned in Article L. 321-6 of the Energy Code includes the installations for the 400 kV network, all of the interconnection links with neighbouring countries and the 225 kV installations that will bring structural changes to the supply of a

consumption area once commissioned. The long-term development requirements of the 63-90 kV network are not included in the ten-year part of the plan.

The three-year network investment plan lists RTE's investments for the next three years irrespective of voltage level. The list is exhaustive for projects relating to market integration and to the quality of electricity. With regard to projects relating to the security of supply and system safety, only the most important ones are described in detail because of the large number of projects concerned.

3.2. Inclusion of CRE's recommendations made in the deliberation examining the 2012 ten-year plan

In its deliberation dated 23 July 2013 examining the ten-year network development plan drawn up by RTE for the electricity transmission system in France, CRE made several recommendations.

The developments introduced in the 2013 version of the ten-year plan have met some of CRE's demands.

First, it is important to highlight the inclusion of information on regional plans for the connection of renewable energy to the network (S3REnR) within the 2013 version of the programme, for plans already validated. The very clear presentation of projects specific to SR3EnR in the three-year plan is a major improvement.

Similarly, RTE has clarified the methodology for analysing the economic surplus used for the TYNDP in the appendix of the ten-year plan, and has specified, in response to a recommendation by CRE made in its opinion on the 2012 version of the ten-year plan¹, the results of the economic studies carried out for each border within the framework of European work conducted by ENTSO-E. However, with regard to the analysis of the differences in interconnection requirements among the various scenarios, RTE mentions the drivers of the development of interconnections at each border but without any explicit connection with the scenarios. Moreover, CRE has noted that the assumptions concerning foreign electricity systems used for the simulation of constraints in the French system at the 2030 horizon could be broken down more precisely.

CRE had also requested RTE to better distinguish the time horizons both in terms of scenarios and of presentation of network constraints and selected projects, and to describe more clearly, for each time horizon, the impact of the changes in assumptions on the projects selected. In this new version, RTE makes a clearer distinction between projects that fall within the scope of the ten-year plan and those likely to be necessary in the longer term, mentioned simply for information purposes. Nevertheless, with regard to the ten-year part of the plan, CRE considers that the articulation between the horizon of 2030 used for constraints modelling and the list of projects selected over the next ten years must be explained in more detail. The ten-year plan thus only explains the assumptions used for simulating constraints at the 2030 horizon. On the sole basis of information in the ten-year plan, the types of scenarios that the network is said robust are not clear. However, the additional exchanges carried out with RTE provided overall answers to the questions raised by CRE.

3.3. Analysis of the ten-year part of the plan

RTE breaks down the ten-year development requirements based on five major objectives: interconnections, backup between territories, securing electricity supply during peak periods, connection of generation and ensuring the safety of the electricity system.

3.3.1. Interconnections

The analysis of interconnection requirements is based on economic studies carried out within the framework of TYNDP work whose major principles are presented in the appendix of the ten-year plan.

The work carried out by RTE since 2012 led to a requirement estimate between 7 GW and 14 GW for the 2030 time horizon. By 2023, RTE is studying the potential commissioning of nine projects, which would increase interconnection capacity by approximately 10 GW. This increase takes into account the following

¹ <http://www.cre.fr/documents/deliberations/approbation/schema-decennal-de-developpement-de-rte-soumis-en-2013>
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projects: three interconnection projects with the United Kingdom (IFA2, Eleclink, and France-Alderney-Britain), a France-Belgium project, a France-Switzerland project, a France-Italy project, as well as two interconnection projects with Spain.

The 2013 version of the ten-year plan specified the commissioning horizon for a certain number of interconnection projects entering the ten-year part of the plan. These are the France-Belgium, France-Switzerland and France-Spain (via the Bay of Biscay) projects. The commissioning date envisaged for the France Ireland project has however been postponed to after 2023.

The commissioning date for two of these projects has been postponed. On the Spanish border, the commissioning of the interconnection project at the east of the Pyrenees has been postponed to 2015, following a technical delay related to the architectural treatment of the buildings in the Baixas station. With regard to the border with Italy, the commissioning of the Savoie-Piémont project has been postponed to 2019 due to the launch of the call for tenders which was postponed by a few months. The joint studies conducted with Luxembourg did not confirm the need for new infrastructure with France and resulted in priority being given to strengthening the existing interconnections with Belgium and Germany.

3.3.2. *Backup between territories*

To determine the investments necessary for the 400 kV network for the next ten years, RTE realises flow simulations on the networks through to 2030. RTE has adopted four contrasting supply and demand scenarios for that horizon which enables it in particular to verify the robustness of its investments with respect to very different developments likely to occur in the long term. These simulations identified areas which, at the 2030 horizon, could experience major constraints. These areas were then analysed in more detail to determine the emergence of constraints based on the change of certain factors deemed key for the dimensioning of this area.

Four areas have been identified as critical for the long-term security of the system: the east, Normandy and south Paris, the Massif central and the Atlantic coast. For this 2013 version, RTE used the same flow simulations as for the previous year. The developments proposed are therefore based on additional studies conducted by RTE which served to refine the analysis of constraints in these zones and the probable date at which these constraints will emerge.

At the ten-year horizon, RTE confirms the need to restructure the Alsatian network to take into account the shutdown of the Fessenheim nuclear plant. Initial measures scheduled for 2016 will improve flow management and voltage control. A second set of measures concerns the doubling of the axis Muhlbach-Scheer axis. Compared to the 2012 ten-year plan, the commissioning date for this project has been postponed from 2020 to 2022 following the results of studies. Another important project in eastern France, identified within the framework of previous studies, is the reconstruction of the overhead Lonny-Seuil-Vesle line which will become a double circuit 400 kV line; this project is moving along as scheduled.

In the Normandy-south Paris region, the most important projects for the next ten years mentioned in the ten-year plan are the construction of a new 400 kV line between the Cergy and Persan stations and the strengthening of the 400 kV Le Havre-Rougementier axis set for commissioning in 2018. In addition, RTE has stated in the ten-year plan that other strengthening projects may be necessary based on the flow increase (from coastal regions and the north of the country to Ile de France), which will be highly dependent on developments expected in the generation facilities in the medium term. These additional capacity increases would essentially involve strengthening transformation stations and existing axes, which could be performed rather quickly. RTE has confirmed, within the framework of additional exchanges, that this type of work could be completed in five years' time.

In the Massif central (south-central France), the 2013 version of the ten-year plan specifies the shape of the project to strengthen the network of the Massif central present in the ten-year part of the 2012 version. For the ten-year horizon, RTE considers in the ten-year plan that, regardless of the long-term developments of the electricity system, the Gaudière – Rueyres axis will very likely be insufficient and therefore proposes to rebuild and create a second power line for this axis for 2023. However, the additional studies conducted by RTE to date, have not highlighted the need to strengthen the grid between the south of Auvergne and the Centre region by 2023. Nevertheless, if the Centre or the Pays de la Loire regions' electricity generation

capacity is reduced and if the hydraulic storage capacity increases considerably in the Massif central, this area's grid would have to be strengthened.

Lastly, studies conducted in 2013 identified a new fragile area for the 2030 horizon along the Atlantic coast. However, RTE has stated that with the lack of precise information on energy policy, it is too early to envisage new strengthening options at this stage.

Another important project for facilitating flows between regions is the Midi-Provence project. In long-term studies, this project is considered operational and no residual constraints emerge once this infrastructure is taken into account. This project was decided based on previous studies to address constraints that may emerge before 2020. It is an underwater 230 km direct current line crossing the Gulf of Lion. The project is progressing as scheduled and the public enquiry is set for 2015. RTE also underlined the importance of work to secure and optimise the existing network between Lyon and Montélimar in order to ensure both the security of supply in France and electricity supply of the Vallée du Rhône.

In conclusion, the analysis of the 2013 ten-year plan shows that the important projects already decided to address constraints before 2020 (such as the Lille-Arras, Charleville-Reims, Cergy-Persan, Midi-Provence and Lyon Montélimar projects) are, according to the studies conducted by RTE, essential for inter-regional flows over the next ten years regardless of the supply and demand scenario in question. They are therefore the minimum set of major projects to be carried out in the upcoming years to ensure electricity supply in France. Moreover, RTE identified the value of two new projects, i.e. the strengthening of the Muhlbach-Scheer and Gaudières-Ruyères axes. Lastly, for each of the areas likely to experience electricity constraints, RTE has identified several projects that may be decided in the upcoming years, based on the development of renewable energy generation and nuclear energy in France, and also on the development of foreign generation and consumption in France.

3.3.3. Other objectives

With regard to the other objectives, the ten-year part of the plan includes 14 new projects. Eight of those aim to secure supply to regions. RTE has therefore included four projects involving the addition of transformers (two in Midi-Pyrénées, one in Rhône Alpes and one in Poitou Charentes), three projects involving the creation of substations with grid connection (two projects in the PACA region and one in Brittany) and a project to improve the quality of supply in the Colmar-Sélestat area.

The reasons for including these new projects in the ten-year part are not systematically mentioned. A more systematic presentation of the impacts of the changes in assumptions on the development of the project portfolio is desirable.

The six other new projects are connection projects: connection of the Landvisau plant (2017); connection of two rail stations in the Poitou region; connection of the Eleclink project; connection of two offshore wind power plants.

Most of the other projects associated with these objectives are progressing as scheduled. However, the commissioning date for six projects has been postponed due to worksite delays, changes in study assumptions, and difficulties encountered during consultation or with administrative decisions.

Among the major projects to secure supply which will be carried out in the upcoming years, it is important to cite the PACA security net, the Brittany security net, the "deux Loires" project, the Haute-Durance project and the south Pays de Loire project.

3.4. Analysis of the three-year part of the plan

For this 2013 version, RTE adopted a new format for the presentation of the three-year part by breaking it down according to regions. This better highlights the regional challenges. The 2013 ten-year plan therefore highlighted a certain number of regions for which the increase in consumption is a factor of weakness for the networks. In those sections, the approved regional connection plans (S3REnR) are presented.

In terms of project follow-up, 36 projects have been postponed compared to the previous version and four projects have been abandoned. Three connection projects were abandoned following a client request while

the fourth project, which was to improve the security of supply of Saint-Etienne, was abandoned following a review of consumption forecasts.

CRE analysed the causes for these project delays and abandonments indicated by RTE and considered that the reasons provided by RTE are satisfactory.

3.5. The process for selecting projects in the ten-year part of the plan

In order to ensure that all the investment requirements are covered by the ten-year plan, CRE verifies that RTE's approach for network investment planning adequately anticipates network needs over the next ten years.

RTE stated that it draws on a long-term vision of constraints to identify important projects that must be commissioned over the next ten years. This approach applies both to the 400 kV network used for exchanges between territories and the important infrastructure of the regional networks. The fifteen-twenty year visions are reviewed at certain intervals.

With regard to the 400 kV network, RTE presented in the 2012 ten-year network development plan its methodology for assessing flows through France over the next fifteen to twenty years. These flow simulations are used to identify areas that may experience constraints at that time horizon. More detailed network studies are then performed on these areas. These detailed studies serve, for example, to identify for each area the nuclear decommissioning assumptions which would be particularly constraining for the network and to estimate the impacts.

With regard to the regional networks, a similar analysis is being conducted. However, the networks require much more studies over a much longer period of time. All of these long-term studies on the regional networks must be completed for the 2015 version of the ten-year plan.

RTE has stated that the studies on constraints for the twenty-year horizon enable it to characterise the factors likely to generate constraints in the long run in the areas studied. If, within the ten-year horizon, one of these factors or the combination of several factors are likely to occur, RTE has stated that it would conduct decisional studies aimed at defining the project that would most likely eliminate these constraints.

This process for selecting projects is not clearly described in the ten-year plan. For the next version of the ten-year plan, CRE therefore wishes for RTE to include an annex specifying its method for identifying constraints at the ten-year horizon based on the vision of 2030 constraints. Moreover, CRE requests RTE to identify, both for fragile areas on the 400kV network and the regional networks, structural assumptions which, within the ten-year horizon, could occur and make additional network developments necessary.

3.6. Consistency with the TYNDP in terms of investment and information level

In the absence of a version of the TYNDP for the current year, analysis of the consistency between the national plan and the European plan was based on the comparison between RTE's 2013 ten-year plan and the 2012 TYNDP published at the end of 2011 by ENTSO-E. Differences mainly cover the updating of studies conducted by RTE for the 2013 version of the ten-year plan. Two projects present in the 2012 TYNDP have been removed from the 2013 ten-year network development plan: the first is the Marne Sud project which was abandoned due to a lower increase in local production than estimated. The second is an interconnection project which was abandoned by Luxembourg. Six internal projects were also commissioned between the 2012 version of the TYNDP and the 2013 ten-year network development plan, while the commissioning of two projects was delayed, the interconnection project being built with Spain and the Savoie Piémont project. The last difference is the clarification on the project to strengthen the Massif central through the selection of the Gaudière-Rueyres project and the postponement beyond 2023 of the potential strengthening in the north of Rueyres.

With regard to interconnections, European studies on exchange capacity development requirements are to be updated for end of December 2014 when the European ten-year plan is published. In the meantime, RTE has included in this version its estimate made in 2012 for interconnection development requirements according to the scenarios envisaged. In response to a recommendation by CRE made at the time it issued its opinion on the 2012 version of the ten-year plan, there should be a better explanation of the difference in

interconnection capacity requirements between the different supply and demand scenarios considered for the 2030 horizon. CRE also notes that the descriptive assumptions of neighbouring countries are not clearly stated.

4. CRE's requests

CRE requests RTE, for the next version of the ten-year plan, the following changes:

- Systematically present the main consequences of changes in assumptions on the selection of projects and the development of constraints for the three-year and ten-year horizons.
- Present flow model update work for the 400kV network for the 2030 horizon and the main results available from long-term studies on regional networks.
- In 2014, carry out an additional network study in order to better specify the strengthening project that may be necessary in the Massif central if major hydraulic storage capacity is increased in that area.
- Include in the ten-year network development plan an appendix explaining RTE's method for identifying ten-year constraints. This appendix shall specify, in particular, the connection between the analysis of long-term constraints and the analysis to identify constraints that may occur within ten years. If applicable, RTE shall specify whether there are different approaches for the 400kV networks and the regional networks.
- Identify, both for each fragile area on the 400kV network and for the regional networks, structural assumptions which, within the ten-year horizon, could occur and make additional network developments necessary. RTE shall also specify to what extent the network is robust with respect to developments in the energy portfolio that result from energy policy goals as broken down in the draft law on energy transition, in particular within the 2025 horizon.
- Better explain the difference in interconnection capacity requirements between the different supply and demand scenarios considered for the 2030 horizon.
- Explain the supply and demand assumptions in foreign countries used for the simulation of constraints in the French system within the 2030 horizon for each scenario considered.
- Explain the differences likely to emerge between the 2014 ten-year network development plan and the 2014 TYNDP.

5. CRE's decision on the ten-year plan

Given the elements presented by RTE in the 2013 ten-year plan and subsequent clarifications provided by RTE, CRE considers that the ten-year network development plan covers all investment requirements and is globally consistent with the 2012 TYNDP. The few differences observed with the 2012 TYNDP in terms of projects are due to updates in supply and demand assumptions because of the different publishing dates for the two reports.

Paris, 26 June 2014

For the Energy Regulatory Commission,

The Chairman,
Philippe de LADOUCETTE