Public consultation

Paris, April 10th, 2012

Public consultation of the French Energy Regulatory Commission (CRE) dated April 10th, 2012 on the ten-year development plan drawn up by RTE for the electricity transmission network in France

The French energy code, transposing the Directives of the 3rd package “Internal gas and electricity market”, mandates the transmission system operator (RTE) to draw up each year a ten-year network development plan. In application of point I of article L. 321-6 of the energy code, RTE submitted on January 31st, 2012 its plan for the 2012-2021 period to the French Energy Regulatory Commission (CRE) for analysis.

The document submitted by RTE is the first of its kind. A similar and coherent approach is led on a European scale via the publication of a European network development plan every two years.

In accordance with the provisions of the energy code, CRE wishes to launch a public consultation in order to obtain the opinions and comments of the users of the public electricity transmission system on this document.

CRE will issue a deliberation on the national ten-year network development plan in July 2012. CRE will also publish a summary of the responses to this consultation.

COMMISSION
DE RÉGULATION
DE L'ÉNERGIE

Contents

1. Regulatory framework

1.1. European framework

The 3rd energy package "Internal gas and electricity market" on the common rules for the internal electricity market and the conditions for access to the network for cross-border electricity exchanges stipulates new obligations for transmission system operators (TSO) and new powers for national regulators with regard to the monitoring of investments on the network.

On a European level, Regulation (EC) No. 2009/714 introduced a coordinated planning approach for the network. The European Network of Transmission System Operators for Electricity (ENTSO-E) must therefore draw up every two years a non-binding ten-year network development plan for the entire Union including the European outlook for generation adequacy, after an open and transparent consultation involving all market players at an early stage. It aims to enable forecasting and technical cooperation between European system operators. The Agency for the Cooperation of Energy Regulators (ACER) must issue an opinion on this plan and monitor its implementation and its coherence with the various national plans.

ENTSO-E published a pilot version of the Ten-Year Network Development Plan, hereafter TYNDP, in June 2010. A new version of the TYNDP is currently being drawn up and is the subject of a public consultation launched by ENTSO-E[1]. Its publication is expected for June 2012. ACER will subsequently issue an opinion on this plan.

1.2. National framework

Directive 2009/72/EC transposed in the French energy code gives new obligations to the transmission system operator and new powers to CRE. Article L. 321-6 of the energy code stipulates that the public transmission system operator must submit each year a ten-year network development plan to CRE based on existing and projected supply and demand. This plan must inform market players of the main transmission infrastructures that must be built or brought up to standard in the coming ten years, list investments that have already been decided, identify the new investments to be made in the next three years and provide a provisional timetable for all investment projects.

The energy code also stipulates that CRE must launch a consultation among users of the public network on the ten-year plan, check that it covers all requirements in terms of investments and ensure its coherence with the European ten-year plan published by ENTSO-E. CRE can consult ACER in the event of any doubts with regard to this coherence. It can also ask the public transmission system operator to modify the ten-year network development plan.

2. Framework

2.1. Directions given by European regulators

Following the publication of the pilot TYNDP, European regulators issued recommendations[2] with the prospect of leveraging ACER's expertise. These recommendations included the harmonisation of planning methods, the development of economic studies and the creation of scenarios reflecting the challenges of the European energy policy. The analysis of the ten-year plan's coherence with the TYNDP has led CRE to consider these aspects.

[1] https://www.entsoe.eu/system-development/tyndp/tyndp-2012/
[2] http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/CEER_PAPERS/Electricity/2010/E10-ENM-22-04_TYNDP%20opinion_7-Dec-2010.pdf

2.2. Framework

The scope of the ten-year plan is defined in Article L. 321-6 of the energy code, which stipulates that the ten-year plan must include a section presenting the main infrastructures to be built or upgraded in the next ten years and a complete list of projects for the three coming years.

CRE and RTE launched studies in 2010 and 2011 in order to define the framework to be used for the ten-year plan.

For the ten-year section, a scope consistent with that of the TYNDP has been selected, including all 400 kV lines, interconnections and lines encouraging cross-border exchanges, direct current lines and main 225 kV lines. The creation timeframes for these lines are generally coherent with the ten-year plan. The time frame to achieve such infrastructures is consistent with their inclusion in a ten-year plan. A presentation of the projects in accordance with five main aims has been established in cooperation with CRE's departments (details in section 3). The breakdown follows that used by ENTSO-E in the TYNDP.

With regard to the three-year section, the ten-year plan lists the projects according to their main aim:

- The list is exhaustive for projects concerning market integration and electricity quality, which are the most important aspects for users of the public electricity transmission system.
- For projects concerning supply and system security, only the most important are listed due to the number of projects under this category. For these projects, RTE has selected a threshold of €3m as the inclusion criterion.
  With regard to connections, those underway and that are due to be commissioned in the next three years are presented in the ten-year plan.

RTE's ten-year plan only provides a summary of its renewal strategy and highlights network development issues.

Q1 : Do you have any comments on the proposed scope for the ten-year plan?

2.3. Work assumptions on generation and consumption

Every two years, RTE draws up an analysis of trends in the electricity supply-demand balance taking into account trends in national electricity consumption, generation installations and exchanges with neighbouring countries.

Article L. 321-6 of the energy code provides that the ten-year plan "takes into account in particular the "generation adequacy forecast report", the multi-year planning of generation investments decided by the State, and the regional plans for connection of renewable energies to the network".

The projected consumption and generation trends presented by RTE in the ten-year plan are taken from the 2011 analysis, published last July.

The regional plans for connection of renewable energies to the network (S3REnR), pursuant to French Law No.2010-788 dated 1July 12th, 2010 presenting the national commitment to the environment (law known as Grenelle II), were not known when this initial version of the ten-year plan was drawn up and were therefore not considered in the hypotheses for renewable energy development. S3REnR plans are a major factor in the network developments necessary for generation connection. Their finalisation by the end of 2012 is set to bring about their inclusion in the following ten-year plans.

With regard to consumption, various structural or cyclical factors (increasing population and number of households, development of new electricity uses, low growth of industry consumption, management of energy demand, growth recovery) have led to an increase in consumption of on average 0.6% per year for

the reference scenario (i.e. 3.2 TWh/year) leading to the following consumption projections: 504 TWh in 2015, 523 TWh in 2020, 554 TWh in 2030.

Furthermore, peak power continues to grow in line with the development of residential consumption which is by nature more variable than industry consumption, the share of which is decreasing. The transfer of uses to electric solutions will further strengthen this trend. The trend for peak consumption at the reference temperature is as follows: 86.2 GW in 2013, 87.9 GW in 2015, 90.8 GW in 2020, 95.9 GW in 2030.

With regard to electricity generation, the following projections are stated in the "generation adequacy forecast report":

- Nuclear, stable installed facilities of 65 GW as of 2016. Coal, 2.9 GW by 2020 (decommissioning of 3.6 GW by 2016 in application of Directive 2001/80/EC dated 23/10/01 on the limitation of emissions of certain pollutants into the air from large combustion plants – known as the LCP Directive);
- Gas, installed capacity of 6 GW in 2015 and 6.5 GW in 2020;
- Fuel oil, installed capacity of 1.3 GW as of 2016 (decommissioning of 3.8 GW in application of Directive 2010/75/EU of the European Parliament and of the Council on industrial emissions – known as the IED Directive);
- Wind power, a development of on-shore installations of 1 GW/year leading to capacity (on-shore and off-shore) of 17 GW by 2020;
- Photovoltaic power, installed capacity of 8 GW by 2020 (growth from 0.5 to 0.8 GW/year);
- Combined Heat and Power, installed capacity of 1.25 GW by 2020 (erosion of 3.15 GW due to the expiry of purchasing contracts).

RTE's forecast analysis identifies a requirement of 2 GW in additional capacities for 2020.

The changes in the structure and location of installations, as well as their volume, have an effect on the network. The comparison of structures, volumes, locations and consumption and generation profiles is decisive in network studies. RTE draws up its "generation adequacy forecast report" on the basis of cautious generation development assumptions, with a view to assessing the electricity system's capacity to meet demand.

With regard to network planning, the creation of a body of assumptions is the result of a different approach aimed in particular at ensuring that the network is of the right size to accommodate generation capacity that is likely to be consumed. CRE has observed that going beyond the assumptions of the "generation adequacy forecast report", additional generation development assumptions considered for network development are not explicitly specified in the ten-year plan. The development prospects for thermal energy generation (in volume and location) and the assumptions with regard to the location of renewable energies considered for the next ten years for network development are not explicit. With regard to renewable energy, the S3REnR plans will definitely be an element that will increase transparency in generation development assumptions.

Q2 : Do you have any comments with regard to consumption trend forecasts?

Q3 : Do you have any comments with regard to generation trend forecasts?

Q4 : Do you find the level of information provided by the ten-year plan with regard to consumption and generation trends satisfactory?

2.4. Coherence with the TYNDP

Pursuant to point I of Article L. 321-6 of the energy code, CRE checks that the ten-year plan "is coherent with the non-binding European plan drawn up by the European Network of Transmission System Operators established by Regulation (EC) No. 714/2009".

A new version of the TYNDP is currently being drawn up and is the subject of a public consultation launched by ENTSO-E on the basis of the document published by ENTSO-E on March 1st, 2012. The TYNDP is based on scenarios of consumption and generation trends developed in the *System Outlook & Adequacy Forecast* (SOAF)[3] published by ENTSO-E in January 2011.

The outlook for the development of energy from renewable sources seems coherent with that envisaged in scenario B in the SOAF. With regard to thermal energy, the discrepancies observed by CRE for 2020 between RTE's analysis and ENTSO-E's SOAF are mainly additional generation development assumptions formulated as part of network planning (see above).

With regard to the developments identified by TSOs in the TYNDP, CRE considers at this point in its analysis that projects to develop interconnections presented in the ten-year plan are coherent with the TYNDP presented by ENTSO-E on 1 March 2012.

The network development challenges identified in the national ten-year plan seem coherent with those in the TYNDP. Both plans stress the increased role of the electricity transmission network against the backdrop of developed renewable energy generation on a European level and market integration. The TYNDP includes all projects of the French ten-year plan aimed at improving energy movements, the main projects with regard to security of supply in Brittany and Provence-Alpes-Côte d'Azur and the connection of offshore wind power generation.

ENTSO-E has identified on a European scale and for the decade to come requirements of €104 billion representing more than 50,000 km of projects. It should be noted that these requirements only correspond to projects with a European dimension, which only account for part of the investments made by the TSOs.

With this purpose, the TYNDP introduces pan-European economic studies aimed at demonstrating the advantages of exchange capacity development for the European Union. These studies convey the efforts made by TSOs since the publication of the pilot TYNDP in 2010 for a coordinated planning approach. However, with the exception of one reference to the economic studies conducted by TSOs in 2008-2009 for the development of exchange capacity between England and the continent, CRE observes that the level of information of the national ten-year plan on economic studies conducted as part of the TYNDP is low. Such information is however essential to assess the need to develop exchange capacity.

In addition, CRE has noted some differences between the ten-year plan and the TYNDP, either in terms of project status or in terms of commissioning dates for the following projects: Avelin – Gavrelle, Lonny –Seuil – Vesle, Havre – Rougemontier and Midi – Provence. Following an analysis, CRE observes that these differences come from the TYNDP and should be modified accordingly in the final version published by ENTSO-E.

Q5 : Does the ten-year plan seem coherent with the projected European generation and consumption trends presented in the SOAF 2011-2025?

Q6 : Does the ten-year plan seem coherent with ENTSO-E's TYNDP published on March 1st, 2012?

Q7 : Do you consider that the French ten-year plan sufficiently conveys the challenges of the European energy policy?

Q8 : Does the level of information in the ten-year plan enable you to properly judge its coherence with the TYNDP? And more generally does it seem satisfactory?

[3] https://www.entsoe.eu/system-development/system-adequacy-and-market-modeling/soaf-2011-2025/

Q9 : Do you have any comments on the coherence of planning methods between national and European levels?

3. Ten-year development prospects

The estimated investment amount proposed by RTE as part of the ten-year plan is approximately €10 billion over ten years, with regard to the main infrastructures presented in the ten-year section.

In order to facilitate readers' understanding of the ten-year plan and present the main underlying driver for each project, RTE has broken them down into five categories of objectives, as stated above.

These are coherent with the presentation used in the TYNDP and are as follows:

- France's exchanges with neighbouring countries;
- More fluid energy movements and backup between territories;
- Support for consumption trends;
- Accommodating generation;
- Ensuring the safety of the electricity system.

3.1. France's exchanges with neighbouring countries

The European Union's market integration and energy policy objectives for carbon-free electricity generation have motivated the European plan's approach to transform the juxtaposition of national networks with few interconnections into a pan-European network. It is with this in view that RTE is working to increase interconnection capacities with neighbouring countries in order to exchange renewable energy in line with European development, foster competition between all generation means according to an order of European economic precedence, and reduce systemic incidents on the entire network. These motivations support the aims to integrate renewable energy sources and markets, and to achieve security of supply as stated in the TYNDP.

On a European level, these objectives have led the European Commission[4] to propose the creation of five priority corridors for electricity transmission networks, two of which specifically concern France:

- *Northern Seas Offshore Grid*, to transport electricity from renewable offshore energy sources in Northern Seas to centres of consumption and storage;
- *North-South electricity interconnections in Western Europe*, to develop interconnections between Member States of the region and with Mediterranean third countries, to integrate electricity from renewable energy sources.

According to RTE, approximately 8 GW of international exchange capacity are under study or projected for 2020. This includes 2.8 GW of exchange capacity that is currently under permitting or construction.

At this stage of its analysis, CRE believes that the interconnection projects presented by RTE in the ten-year plan are coherent with the elements presented in the TYNDP. However, CRE has observed that in the TYNDP more information is given to players on the economic studies conducted as part of ENTSO-E for these projects. In the TYNDP, the summary tables for the projects present the results of analyses based on multiple criteria conducted by system operators and highlight an assessment of the economic advantages of increased exchange capacity.

[4] Proposal for a Regulation of the European Parliament and of the Council on guidelines for trans-European energy infrastructure and repealing Decision No. 1364/2006/EC, European Commission, 19 October 2011, COM (2011) 658 2011/0300/COD

Moreover, in the TYNDP draft version presented by ENTSO-E, clustering projects and assessing the overall impact of the cluster on transfer capacities provide a better understanding of interactions between upstream network developments and cross-border projects. The elements presented in the ten-year plan do not clearly illustrate these interactions.

1. France – United Kingdom

The studies conducted in 2008-2009 by the transmission system operators illustrate the advantages for the community in developing interconnections to achieve exchange capacity between Great Britain and the continent (France, Benelux) of at least 5 GW. These studies highlight the positive impact of exchange capacity development on the optimisation of generation facility operations in these countries, and favours market integration.

As a result, 2 GW are currently under study by transmission system operators in addition to the current interconnections (HVDC Cross-Channel 2000 – 2 GW and Britned – 1 GW):

- A project between England and Belgium – 1000 MW by NGIL and Elia set to be commissioned in 2018;
- A project between England and France – 1000 MW by NGIL and RTE set to be commissioned in 2019.

With regard to the latter project, RTE and NGIL have launched feasibility studies for the creation of an underwater interconnection of 1000 MW from Normandy.

RTE stresses that other projects may be considered if the advantages for the community of an interconnection level in excess of 5 GW between the United Kingdom and the continent were confirmed. The TYNDP in particular mentions an interconnection project between France and Ireland under study for implementation in the long term.

2. France – Benelux/Germany

There is intense exchange activity at the borders with Belgium and Germany, which is extremely variable due to the development of renewable energy sources and the fact that consumption in France is highly sensitive to temperature changes. By 2020, changes in the energy mix in Germany and Belgium, and more generally the development of terrestrial and off-shore renewable energy sources are likely to strongly influence the flows at these borders and on the Northern French network. In 2010, RTE strengthened the 225 kV Moulaine – Aubange line between France and Belgium. By 2020, various studies are underway on the new France-Belgium line, the creation of a new France – Belgium – Germany exchange point in Luxembourg as main changes in the Luxembourg's grid occur, and the integration of renewable energy sources from Northern Seas through the development of off-shore networks and their connections to terrestrial networks.

3. France – Iberian Peninsula

France's interconnection capacity with Spain is currently 1400 MW for the direction France to Spain, putting the Iberian Peninsula is a situation of isolation. Furthermore, the strong development of renewable energy sources in Spain, and the prospects of solar power generation projects installed in North Africa strengthen over the long term the need to develop exchange capacity with the Iberian Peninsula.

The French and Spanish governments confirmed in 2001 the objective to increase exchange capacity to 2800 MW in the mid-term, and to 4000 MW in the long-run.

- With regard to the 2800 MW objective, RTE and REE are currently creating an underground direct current interconnection via the East of the Pyrenees between Baixas and Santa Llogaia. The project is set to be commissioned in 2014. Following this project, RTE and REE presented projected exchange capacity for 2015 close to the 2800 MW objective for exchanges from France to Spain;
- With regard to the 4000 MW objective, RTE and REE have launched studies on the creation of an underwater interconnection between the Bilbao and Aquitaine regions by 2020.

4. France – Switzerland/Italy

Transalpine interconnections are very important as Italy's import capacity is mainly based on the Swiss and French borders.

With regard to the development of exchange capacity with Italy, RTE has presented the following projects:

- The reorganisation of 400 kV lines in the Albertville region (work under way, completion in 2012) aimed at increasing exchange capacity by 600 MW;
- The Savoy – Piedmont project for a 1200 MW direct current interconnection between Grande Ile and Piossasco via the emergency passage of the Fréjus tunnel (under consultation, target completion in 2017).

Moreover, in addition to these interconnection projects, exchange capacity with Italy remains dependent on the interconnections with Switzerland given the meshing of the network and the distribution of hydro-power generation in the Alps. RTE has launched studies with Swissgrid with a view to strengthening the current 225 kV interconnections with Switzerland.

3.2. More fluid energy movements and backup between territories

Changes in thermal power generation installations, the development of fluctuating renewable energy sources and the variability of demand are strongly stimulating exchanges between regions. RTE has identified in particular the need to strengthen North/South movements (especially in the Massif Central, the Rhone corridor, Normandy and Northern France). These projects contribute to network safety, aim to achieve efficient management of the electricity system while limiting congestion, and some of them increase international exchange capacity.

The main projects identified by RTE under this category are as follows:

- The Cotentin – Maine project with the creation of a new double 400 kV line to accommodate electricity from nuclear generation and renewable energy sources (under investigation – completion 2013);
- The project to double the 400 kV Cergy – Terrier line, ultimately limited by generation developments in the north of the Ile de France region and environmental restrictions on the operation of the Porcheville plant (under study – completion 2018);
- The project to reconstruct the Avelin – Gavrelle line between Lille and Arras, given the intensification of exchanges with Belgium and generation development in Northern France (under investigation – completion 2017);
- The project to reconstruct the Lonny – Seuil – Vesle line between Reims and Charleville-Mézières, given the development of wind power generation and the need for electricity supply security in the area (under investigation – completion 2016);
- The development of a North/South line in the Massif Central given the development of renewable energy generation and the need to restructure the network in the area (under study, no date given);
- The strengthening of the Rhone corridor, given the development of generation in South-East France (gas combined cycle projects in the Fos area and development of wind and solar power generation) and changes in the area's industrial consumption, with:
    - The replacement of conductors on the 400 kV lines north of Coulange (work underway – completion 2016);
    - The creation of a 1000 MW direct current underground and underwater line between the Aude and Bouches du Rhône *départements* in order to strengthen exchange capacity between the South-East and the South-West, thereby contributing to security of supply in these regions (under investigation – completion 2018).

In addition to these projects, RTE has already identified lines that will probably require reinforcements if additional exchange capacity or generation developments were considered: between Haute-Normandie and

the South of Ile-de-France (between Penly and Villejust), South of Reims (Vesle – Mery-sur-Seine line), in the Rhone Valley (East of Lyon, South of Tricastin) and in Eastern France.

3.3. Support for consumption trends

For some regions or territories, changes in electricity consumption can impact security of supply. Brittany and Provence-Alpes-Côte d'Azur are already in vulnerable situations and are subject to tense operations. For both regions, the most important projects launched by RTE are also presented in the TYNDP. RTE has also identified four other areas requiring significant developments and has listed around twenty other one-off local projects to increase security in these different areas.

Brittany

Brittany's vulnerable situation is due to a combination of high consumption growth and low local generation together with a relatively loosely meshed network, structured by two 400kV lines only one of which is double and stretching to Finistère. The commissioning of a gas combined cycle plant in Montoir will increase security of supply in Southern Brittany in the medium term. However, additional developments are essential, both to ensure security of supply in Northern Brittany and to deal with the risk of voltage collapse in the region as a whole:

- Reactive compensation measures in Western France (1150 Mvar by 2013);
- Increased transformation capacities 400/225kV at the Plaine-Haute substation (in 2015);
- Phase-shifting transformers at the Brennilis and Mur-de-Bretagne substations (in 2014);
- 225kV underground line across Brittany (Lorient to Saint-Brieuc) (under investigation – completion 2017).

These projects are part of the provisions of the *pacte électrique breton*[5] (Brittany electricity pact), in addition to the connection of the gas combined cycle plant in the Brest region and efforts to manage electricity demand and the development of renewable energy sources.

Provence-Alpes-Côte d'Azur

The difficulties are also due to a low level of local electricity generation (10%) in the South-East of the region and the single 400 kV line from Marseille to Nice along the coast. The conversion of this line in 2010 to a 400 kV double circuit after Toulon and the accommodation of generation means in the Bouches-du-Rhône *département* have improved the situation in terms of saturation but do not solve the problem in the event of faults along this double circuit. RTE has committed to creating three underground 225 kV lines by 2015 (project currently under investigation):

- Between Boutre and Trans;
- Between Fréjus and Biançon;
- Between Biançon and Bocca.

RTE has also pointed out the installation of a phase-shifting transformer on the Italian border aimed at strengthening mutual backup measures between the two border areas.

Four areas will also see large-scale projects with a view to ensuring security of supply:

- The North of the Champagne region, Reims and the Ardennes, reconstruction of the Lonny – Seuil – Vesle 400 kV line as a double circuit, as it is close to saturation (see above);
- Deux-Loires, reconstruction of the 225 kV line between Puy-en-Velay, Yssingeaux and Saint-Etienne given changes in consumption and the need to accommodate generation;

[5] http://www.bretagne.pref.gouv.fr/fre/Les-actions-de-l-Etat/Amenagement-territoire-energie-logement/L-energie/Pacte-electrique-breton

- Haute-Durance, replacement of the 150 kV network with a 225 kV line, and restructuring of the 63 kV network, given the obsolete nature of the current line and its insufficient capacity as of 2016;
- South of the Pays-de-la-Loire region, creation of a 400 kV injection at the Les Mauges substation, creation of a 225 kV line between Clisson and La Roche-sur-Yon, to resolve local saturation on the network.

3.4. Accommodating generation

1. Electricity from renewable energy sources

Pending the finalisation of the S3REnR regional plans, the developments planned by RTE are based on regional prospects for the development of renewable energy sources and work underway as part of regional climate, air and energy plans (SRCAE). The validation of SRCAE and the creation of S3REnR will enable RTE to specify the network development requirements in future versions of the ten-year plan, particularly in terms of the location and volumes of renewable energy sources.

On-shore and off-shore wind power projects represent the largest impact on the main transmission grid out of all renewable energy sources.

The call for tenders concerning the development of 3000 MW of off-shore wind power enables RTE to consider the development capacities required to accommodate this generation.

The requirements in terms of the development of on-shore wind power identified at this point by RTE for the main transmission grid mainly concern Champagne-Ardenne (reconstruction of Lonny – Seuil – Vesle and strengthening of transformation capacity at Mery-sur-Seine), Picardy and Nord-Pas-de-Calais (Fruges substation connected to the Argoeuves – Mandarins line and creation of a substation connected to the Argoeuves – Penly line), and the *départements* of Aveyron, Tarn and Hérault (creation of a substation connected to the Gaudière – Rueyres line).

The development of photovoltaic generation, which is less localised, does not significantly affect the development of the main transmission grid and should concern regional networks and the interfaces with distribution networks.

RTE continues to monitor the impacts that some pumped storage station projects may have on the development of its network, in the Massif Central in particular.

2. Centralised generation

Given the development outlook of centralised generation projects, RTE has identified the following requirements:

- The Le Havre generation area, with the replacement of conductors on the Havre – Rougemontier line in order to accommodate thermal power generation (work underway – completion 2018);
- The Cotentin generation area, through the Cotentin – Maine project and in addition the circuit-breaker replacement to create available capacity of approximately 2500 MW (under investigation – completion 2013);
- The Fos generation area, with the creation of a 400 kV Feuillane – Ponteau – Réaltor line, to accommodate up to 3100 MW of generation in the Fos area (work underway – completion 2012).

Furthermore, RTE has included in its analysis the requirements concerning the connection of a gas combined cycle plant in Finistère following the call for tenders launched by the government.

3.5. Ensuring the safety of the electricity system

Ensuring the safety of the electricity system is a major part of TSOs work. It aims to prevent major incidents that could prove to be very harmful for society. As the projects for lines presented above contribute to the

network's meshing, they are directly involved in the grid's resilience. The following is a presentation only of the facilities specifically devoted to security (mainly substation equipment), facilitating withstand voltage, the management of short-circuit intensity, or grid stability.

1. Withstand voltage

With regard to the voltage collapse risk, RTE has identified the following requirements in terms of reactive power compensation:

- For the West, a programme to install 1150 Mvar under the provisions of the Brittany 'safety net' package (work underway – completion 2013);
- For the North, a programme to install 1500 Mvar given the unavailability of groups and reactive energy limitations observed by RTE and the heightened exchanges with other countries (under investigation – completion 2014);
- For the South-West, a programme to install 2500 Mvar given the risks of voltage collapse for exports to Spain, major cold spells or degraded generation plans (work underway – completion 2015);
- For the East a programme to install 300 Mvar (studies underway – completion 2015).

In the longer term, RTE has identified additional compensation requirements that may be necessary after 2015.

Conversely, periods of low consumption, and the development of underground facilities, contribute to power surges, which lead to total requirements of more than 1000 Mvar of self-induction coils by 2015.

2. Management of short-circuit intensity

The development of generation and the strengthening of network meshing increase short-circuit intensity and are likely to require the resizing of electric substation devices. RTE has identified requirements to increase withstand capability to short-circuit currents in the 400 kV substations of Tavel and Tricastin (2016), Villejust (2015), Avelin (2012), and Henri-Paul (2015).

3. Stability

RTE has identified regions that are at risk of instability. The risks identified concern areas with loose meshing: Cotentin, Brittany and South-West France. The main ways of dealing with these risks include the creation of new main lines to considerably increase network meshing. RTE also plans to replace circuit-breakers in order, to a lesser extent, to defer the risk of stability loss by reducing fault clearing times.

Q10 : In your opinion, does the level of development of exchange capacity resulting from the implementation of RTE's projects correspond to renewable energy integration, market integration and security of supply requirements?

Q11 : Do you consider that the projects presented by RTE are in line with national generation development prospects and renewable energy integration objectives?

Q12 : Do you think that the projects presented by RTE meet requirements in terms of security of supply of the territories?

4. Three-year section

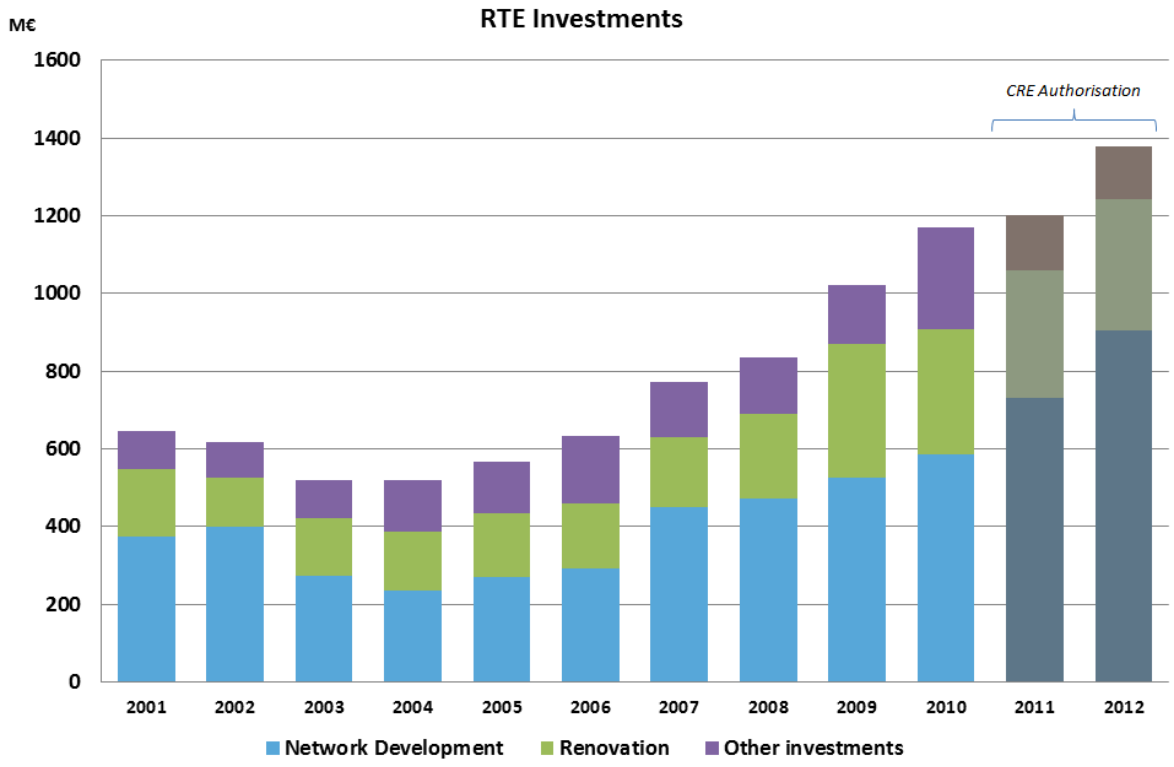
In the next three years, the investments devoted to developing the transmission network represent a total amount of approximately €3 billion broken down as follows according to the main purposes:

- 32% for system safety;
- 27% for security of supply and increases in electricity consumption;

- 21% for international interconnections;
- 19% for connections and accommodating generation.

In addition to the investments for the development of the transmission network, RTE will allocate approximately €1.6 billion in the next three years to renewing and mechanical security, of which more than €1 billion will be devoted to renewing lines and installations.

This level of investment can be compared to that of RTE over the 2001-2012 period:



The plan submitted by RTE presents for each of the seven electricity regions the context behind trends, regional electricity assessments, and the main projects to be conducted over the 2012-2014 period before giving an exhaustive list. RTE will conduct 155 projects over these three years.

The commissioning of some key projects is also expected by the end of 2014:

- Avelin 400 kV (2012 – work on the substation – improvement of system safety following increased exchanges in Northern France);
- Optimisation of the 400 kV grid of La Maurienne and Albertville Grande Ile 400 kV No.3 (2012 – replacement of conductors and network restructuring – increased exchange capacity with Italy);
- Fos-Lavéra generation area (2012 – restructuring of the network and creation of substations – accommodating generation);
- Gaudière – Rueyres 400 kV and Baixas-Gaudière 400 kV (2012 and 2013 – replacement of conductors – improvement of system safety and contribution to international exchanges);
- Programmes to install reactive power compensation means in the North, West, South-West and Paris region (2012 and 2013 – withstand voltage);
- Fruges 400 kV (2013 – creation of substations – accommodating wind power generation in the Pas-de-Calais *département*);
- Cotentin-Maine 400 kV (2013 – new line – accommodating generation in Cotentin and system safety);

- Strengthening of electricity supply in Mayenne (2014 – Laval and Oudon substations);
- Interconnection France-Spain via the East of the Pyrenees (2014 – increased exchange capacity with Spain).

Q13 : In your opinion, do these three-year projects presented by RTE meet the requirements of the electricity system?

5. Consultation by RTE

RTE drew up this plan by giving players in the sector regular opportunities to express their opinions on its progress via the *Commission Perspectives et Réseaux* (outlook and networks commission) of CURTE (Electricity transmission system users' committee).

Before submitting its project to CRE, RTE launched a consultation on this version of the plan, in order to include any comments if necessary. The comments and requests of the players who responded can be broken down into four categories:

- The acknowledgement of the development of renewable energy sources by RTE (development scenario, coherence with S3REnR regional plans, consequences on the creation or improvement of source substations);
- Details on RTE's projects (gains in transmissible power, cost factors, commissioning dates);
- The renewing of RTE installations (inclusion in the plan, renewal strategy);
- Connection potentials (regional location of potentials, data on costs per region).

Q14 : Do you think that the consultation method used by RTE is satisfactory? In your opinion, are players involved sufficiently early in the writing of the ten-year plan?

6. Questions

CRE would ask interested parties to submit their contributions by May 10th, 2012 at the latest:

- By email to the following address: dare.cp3@cre.fr;
- By contributing directly on the CRE website (www.cre.fr), in the section "Documents / Consultations publiques";
- By post to the following address:

Commission de régulation de l'énergie
Direction de l'accès aux réseaux électriques
15, rue Pasquier
75379 Paris Cedex 08
France

A summary of the contributions will be published by CRE, subject to the confidentiality measures provided for by law. Contributors are requested to specify in their contribution the elements for which they wish to remain anonymous or which they would prefer to keep confidential.

Interested parties are requested to answer the following questions, providing arguments if possible.

Q1 : Do you have any comments on the proposed scope for the ten-year plan?

Q2 : Do you have any comments with regard to consumption trend forecasts?

Q3 : Do you have any comments with regard to generation trend forecasts?

Q4 : Do you find the level of information provided by the ten-year plan with regard to consumption and generation trends satisfactory?

Q5 : Does the ten-year plan seem coherent with the projected European generation and consumption trends presented in the SOAF 2011-2025?

Q6 : Does the ten-year plan seem coherent with ENTSO-E's TYNDP published on 1 March 2012?

Q7 : Do you consider that the French ten-year plan sufficiently conveys the challenges of the European energy policy?Q8 : Does the level of information in the ten-year plan enable you to properly judge its coherence with the TYNDP? And more generally does it seem satisfactory?

Q9 : Do you have any comments on the coherence of planning methods between national and European levels?

Q10 : In your opinion, does the level of development of exchange capacity resulting from the implementation of RTE's projects correspond to renewable energy integration, market integration and security of supply requirements?

Q11 : Do you consider that the projects presented by RTE are in line with national generation development prospects and renewable energy integration objectives?

Q12 : Do you think that the projects presented by RTE meet requirements in terms of security of supply of the territories? Q13 : In your opinion, do these three-year projects presented by RTE meet the requirements of the electricity system?

Q14 : Do you think that the consultation method used by RTE is satisfactory? In your opinion, are players involved sufficiently early in the writing of the ten-year plan?

Q15 : Do you have any other comments?