



Réseau de transport d'électricité

FORECAST ANALYSIS - SUMMER 2013

MAY 2013

Forecast analysis of the electricity supply-demand balance in France for summer 2013

Under normal meteorological conditions, and notwithstanding localized risks associated with the vulnerability of certain regions, the forecast outlook for the electricity supply-demand balance in continental France shows no particular risk for the entire summer 2013 period.

Special vigilance is maintained in the Provence-Alpes-Côte d'Azur region, given the risk of forest fires and potential outages affecting the dual 400 kV link from Toulon.

This assessment is based on the assumption that forecast demand for summer 2013 will remain broadly stable as compared with summer 2012, given public economic indicators, but also that the forecast availability of the French generating fleet will increase by 1100 MW compared with summer 2012. This increased availability is based on information supplied by generators, and notably includes scheduled temporary outages of certain combined cycle gas turbines. Finally, growth in photovoltaic generation (3,700 MW of installed capacity currently in France) is continuing at a sustained pace, leading to a 700 MW increase in the mean availability rate for this generation technology as compared with summer 2012.

Moreover, the substantial investments already made by RTE or currently in progress to develop its network (voltage support measures, Cotentin-Maine line, etc.) have had a very positive impact on the reliability of the power system.

Forecast analysis of the electricity supply-demand balance in France for summer 2013

In the event of a heatwave during which temperatures remain 7°C above reference values for a period of several days, RTE's analysis indicates that no additional supplies of electricity would be needed from neighbouring countries this summer in order to cover demand in continental France, and the French power system will even remain a potential net electricity exporter throughout the period.

The expansion of renewable energy sources in mainland Europe has contributed to the high levels of generating capacity observed for this summer across the continent. During off-peak times in the afternoon and evening, neighbouring countries - particularly Belgium and the Netherlands - may even have generation surpluses for periods of a few hours. If this occurs, interconnectors will be used and dispatchable generation in Europe may need to be reduced.

I. Background

The real time management of the electricity supply-demand balance in continental France is the responsibility of the French Transmission System Operator, RTE. Based on information supplied by the various players involved in the French power network and in accordance with the government's "Heatwave Plan", RTE draws up a forecast study of the supply-demand balance during the summer period, in order to anticipate any difficulties that might affect French power system operation.

This document includes a summary of the work carried out by RTE in preparation for summer 2013.

II. Methodological approach

RTE conducts a technical analysis of forecast operating reserves on the French power system, for the period between mid-June and late September. This involves a study of the physical risk that the supply of power will be insufficient to fully satisfy demand. The extent to which this physical risk is covered is examined in terms of power levels, which are calculated at the demand peak for each week of the summer period.

RTE uses the information sent by all French market participants (availability of generating plants, demand response possibilities as set down in contracts between suppliers and their customers) and compares it with its own demand forecasts, based on statistical models.

Initially, RTE carries out a probability assessment, to determine the physical risk that supply will be insufficient to cover demand on the French power system, based on a technical criterion: [the "1% risk"¹](#). This represents operating reserves corresponding to a probability of 1% that "exceptional" measures will be required.

These exceptional measures are as follows: [exceptional offers on the balancing mechanism²](#), voltage reductions and, as a last resort if these measures prove insufficient, load shedding.

¹ Link to Annex 1 " *The Basics of System Operation / A.1.5.1 Operating margins and reserves*" to the Power System Reliability Memento – 2004 Version (p214)

²Link to Annex 1 "*The Basics of System Operation / A.1.5.2 The Balancing Mechanism*" to the Power System Reliability Memento – 2004 Version (P215)

Forecast reserves are assessed in a probabilistic way, based on several thousand different scenarios, combining various possible situations affecting generating facilities (rates of unavailability of various generation units, records of water stocks), with potential demand situations (based on historical temperature records).

The average reserve resulting from these scenarios, compared with the "1% risk", is then used to determine the "maximum" balance of cross-border exchanges required to satisfy that criterion.

Next, RTE evaluates the consequences of a heatwave, characterized by a sustained period of high temperatures, by means of a "stress test". This involves looking at the impact of such a situation on the level of demand (which rises due to the intensive use of air-conditioning), and also the supply of electricity (which falls due to limitations on certain nuclear and conventional thermal generating facilities to comply with environmental requirements, reductions in hydro-electric and wind generation).

For each weekly demand peak during the period studied, RTE determines the balance of exchanges on borders needed to satisfy network reliability criteria.

III. Forecast situation: probabilistic study

Based on information supplied by generators in spring 2013, the forecast availability of the French generating fleet is 1100 MW higher than the forecasts established last year for summer 2012, despite the inclusion of planned temporary outages affecting a number of combined cycle gas (CCG) facilities.

The increased availability of the generating fleet is due to the generally more favourable maintenance schedule for power plants in 2013 as compared with 2012, and the arrival of new generating facilities (conventional thermal, wind, solar).

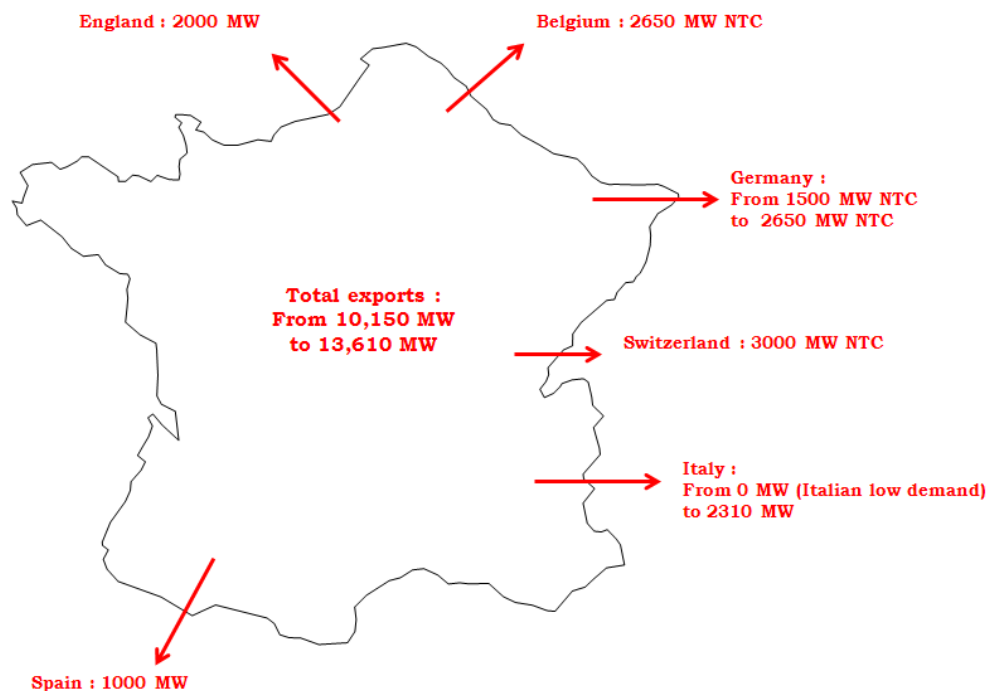
As regards demand, RTE has taken into account the slowdown in economic activity observed since the end of 2011, and the effect of demand side management measures. Demand side management measures to curb electricity use throughout the year, and including during the summer period, serve to limit increases in consumption and the use of additional generating facilities. Under normal conditions, forecast demand for summer 2013 is in line with actual demand recorded during the summer of 2012.

For information, demand is lower in summer than in winter. This is why the summer period is the best time for scheduling maintenance work at many power plants.

The balance of cross-border exchanges needed to satisfy the 1% risk criterion is positive (showing net exports) across the entire period, up to the maximum export capacity of the French network made available to commercial market participants.

Over the entire period studied, forecast generation capacities should be sufficient not just to cover demand in continental France, but also to give French market participants the option of exporting energy on the European markets.

The diagram below shows the forecast values for export capacity, for France and for each border over the summer period:



The forecast outlook for summer 2013 is more favourable than that for the previous summer.

Given uncertainties in forecasts for conditions, RTE has examined how its studies would be affected in the event that demand returned to growth: the conclusions would be unchanged.

IV. Heatwave stress test

To assess the consequences of a heatwave, RTE has developed a "stress" scenario, in which demand and generating facilities are affected in a similar way to that observed in August 2003 and July 2006. The scenario is based on information supplied by all generators. It identifies the sites at which generation was reduced to comply with legislation on the temperature of the cooling water released by plants (environmental restrictions).

The rest of the document focuses on the results obtained from the study of a specific "Heatwave" scenario, which entails the following factors:

- demand estimated for temperatures 7°C above reference temperatures;

- reduction in generation at nuclear and conventional thermal sites to comply with environmental restrictions;
- reduction in available capacity of hydro-electric units (drought) and reduction in wind generation.

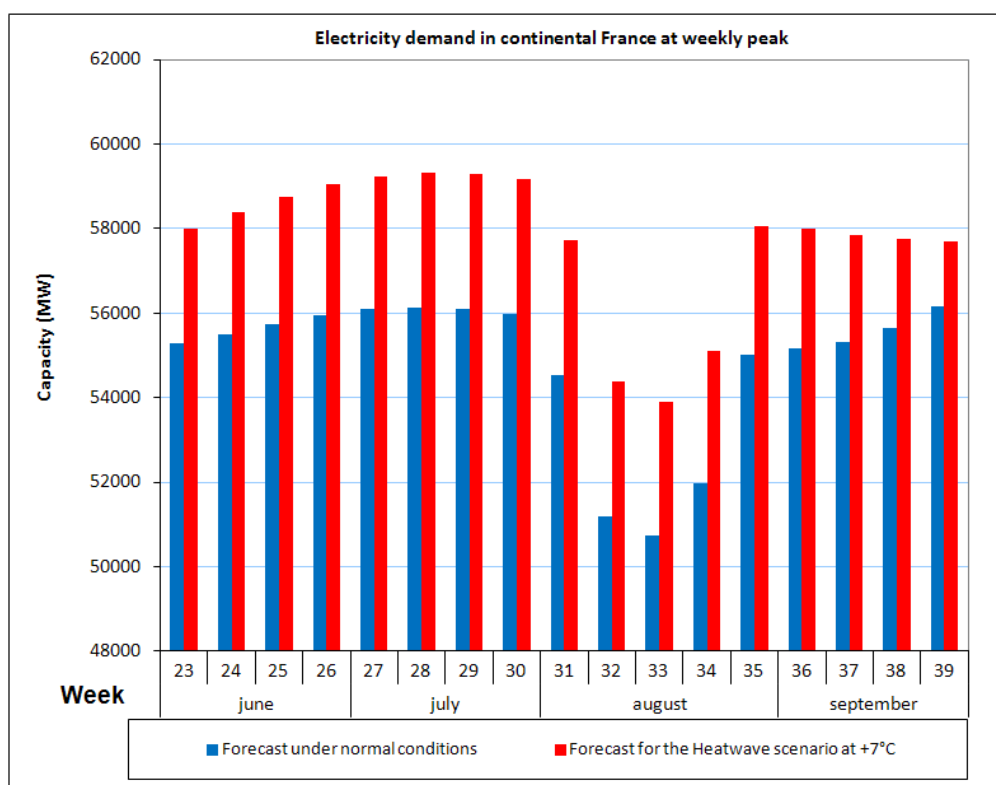
Impact on demand

Electricity demand is sensitive to temperatures (due to the use of air-conditioning and ventilation equipment), and so heatwaves lead to a rise in electricity demand. Consequently, at the daily demand peak around 1pm, a rise in temperature of 1°C causes demand to rise by approximately 500 MW (this value – gradient - is estimated on the basis of records from past summers).

The gradient value remains stable compared with the estimate for summer 2012. It reflects the continued intensive use of air-conditioning and ventilation equipment during the afternoon.

Demand response measures are a potentially useful lever in the event of electricity supply-demand balance constraints, notably at the demand peak.

The following graph shows weekly peak* demand forecasts for 2013 under normal conditions, and also at 7°C above reference temperatures, corresponding to the Heatwave scenario:



* maximum demand value forecast for the week

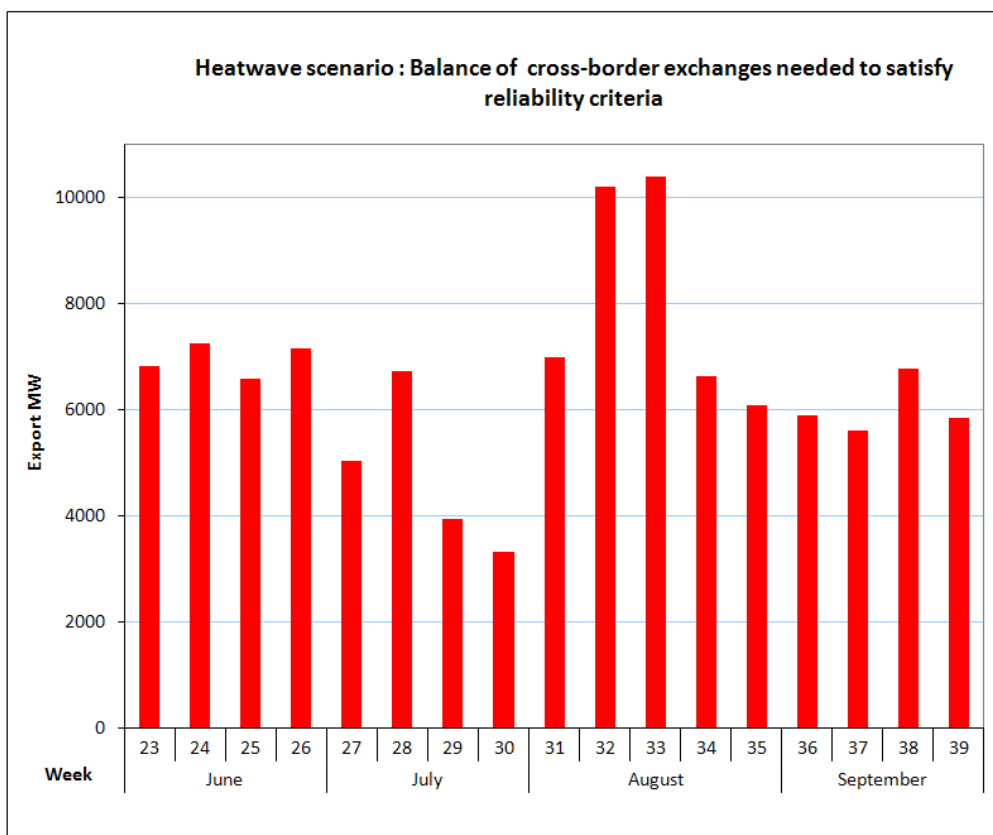
Impact on generation

In the event of a heatwave, output by certain thermal generating plants may be reduced to comply with local environmental requirements. Similarly, hydro-electric and wind generation may also be affected by drought or anticyclonic conditions. RTE has therefore put together hypotheses for drops in generation based on risk data provided by generators for their different sites.

On average, generation drops under the "Heatwave" scenario are estimated at 9500 MW.

Impact on the balance of exchanges

The following graph illustrates the results obtained under the determinist study for the "Heatwave" scenario. In this case, to guarantee that supply is sufficient to cover demand across continental France, imports will not be necessary during the summer period and France will even be able to export at least 5000 MW to other interconnected European countries, throughout the summer period.



V. Real time balancing mechanism for electricity supply and demand

In the event of contingencies affecting demand or generation in the short term, RTE calls on the balancing mechanism.

RTE can call for bids, to enable it to maintain the balance between supply and demand for electricity at all times, and to reconstitute the emergency margins needed to operate the power system in complete security.

The balancing mechanism, which was launched in April 2003, is governed by a set of rules approved by the French Energy Regulator (CRE) and has already shown itself to be effective. In accordance with legal requirements, the power available from technically operational generating facilities, which generators are not using for their own purposes, must be made available to RTE via the balancing mechanism.

In addition, RTE has given consumers the option of using the balancing mechanism to offer to reduce demand by their sites (demand response), thereby taking advantage of their flexibility. In 2008, RTE launched an experimental consultation of industrial consumers connected to the public transmission system, in order to guarantee the availability of demand response offers to reduce loads. The experiment was renewed in 2009, and RTE invited market participants to make the approach permanent by launching annual calls for tender. In accordance with CRE's deliberation of October 20th 2011, RTE launched a consultation on October 28th the same year, to contract demand response capacities for activation via the Balancing Mechanism, with consumer sites connected to the PTS and the PDS for the period 2012 to 2014. New contracts were agreed in 2012, representing an overall volume of close to 800 MW for the period January 1st to December 1st 2013.

Lastly, the French balancing mechanism is open to balancing offers from neighbouring countries. Following Switzerland and Germany, this possibility was extended in 2009 to include bids from the UK, thereby boosting the emergency reserves that RTE can potentially call upon if needed.

VI. Managing tight situations

During periods of tightness in the supply-demand balance, during which France is forced to import energy from neighbouring countries, French market suppliers could also invoke additional demand response agreements, asking their customers to reduce their electricity consumption further, in addition to making purchases on the European markets. At this stage, only demand response possibilities disclosed by suppliers have been taken into account by RTE. In addition, generators based in France could also alter maintenance schedules for their generating units to increase their availability if possible.

Finally, in addition to current balancing arrangements and before resorting to exceptional measures, RTE can also invoke emergency backup agreements with other European system operators.

If these preventive measures nonetheless proved insufficient, RTE would alert the government to the risk of an interruption in supply, and would take exceptional operational actions in real time to limit the impact on the power system.

VII. European situation

Since the European power system is by nature interconnected, the supply-demand balance needs to be examined not just in terms of each individual country, but also in terms of the wider European network. Using electric interconnectors to pool supply is a big advantage for ensuring demand is satisfied on an international scale.

A study similar to the present document is produced by all the transmission system operators for Europe. Through the Summer Outlook Report, RTE and its European counterparts provide all the players in the European electricity market with a forecast analysis of the supply-demand balance for the coming summer.

This summer 2013, unless a heatwave occurs, the overall supply-demand balance for electricity will be respected in Europe. The expansion of renewable energy sources (RES) in continental Europe has contributed to the high levels of generating capacity expected for this summer. During off-peak times in the afternoon and at night, neighbouring countries - particularly Belgium and the Netherlands - may even have generation surpluses for periods of a few hours. If this occurs, interconnectors will be used and dispatchable generation in Europe may need to be reduced.

In the event of a severe heatwave and drought, the situation would remain under control, although interconnector lines may need to be used.

The results of this study are published by [ENTSO-E³](#) ("Summer Outlook Report").

³ Link to Summer Outlook Report (www.entsoe.eu)