

## **Analysis of the electricity supply-demand balance for the winter period 2009-2010**

**A situation significantly less favourable than in previous years. The risk of an interruption in supply nonetheless remains moderate, except in the event of an intense and sustained cold snap**

**For temperatures close to seasonal norms, the forecast outlook for the electricity supply-demand balance appears significantly less favourable than last winter until the end of January. Imports could be required between mid-November 2009 and the end of January 2010, to cover electricity demand in France and satisfy the technical security margin stipulated by RTE. To do this, suppliers would have to look to the European markets, in addition to activating demand response (load reduction) possibilities with their customer portfolios. In the event of an intense and sustained spell of cold weather, the technical limit for imports into the French network could be reached.**

Every year, RTE conducts a prospective study of the balance between supply and demand for electricity for the coming winter period, covering the whole of mainland France. This period of the year is looked at closely, primarily due to the high levels of electricity demand seen during cold snaps.

The study by RTE is used to identify periods where the supply-demand balance comes under strain; it explores the measures that can be taken by electricity market players and RTE to avoid any interruption in supply during peak demand periods in France.

RTE is responsible for managing the balance between supply and demand for electricity in mainland France, in real time. To do this, it anticipates potential risks that may supply may come under strain - well in advance - and informs market players.

If periods are identified where the supply-demand balance comes under strain, RTE works with the electricity generators to look at possible ways of altering the schedules for shutting down generating units, and takes account of the possibilities for demand response (load reduction) reported by suppliers.

As a last resort, if these pre-emptive measures prove insufficient and the situation becomes critical, RTE alerts the government of the risk that supply will be interrupted, and takes action in real time to limit the impact on the power system.

## 1- RTE's methodological approach

RTE conducts a technical analysis of forecast operating margins on the French power system, for the period between mid-November and late March. 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 winter period.

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

RTE then assesses the physical risk that supply will be insufficient to cover demand on the French power system, based on a technical criterion: the "1% risk" <sup>1</sup>. This equates to reserves corresponding to a probability of 1% that "exceptional" measures will be required.

These exceptional measures are as follows, activated in decreasing order of priority: exceptional offers on the balancing mechanism <sup>2</sup>, very rapid increases (even temporary overloading) in the power produced by certain generating units (conventional thermal and hydro-electric), decreases in voltage, and lastly, load shedding.

Forecast reserves are assessed in a probabilistic way, based on several hundred different scenarios, combining contingencies affecting generating facilities (rates of unavailability of various generating units, records of water stocks), with those affecting demand (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 (maximum exports and minimum imports) required to satisfy that criterion.

## 2- Demand forecasts

For the winter period 2009-2010, it is estimated that demand will peak at 83,500 MW during the first week of January. This estimate is based on the assumption that temperature levels will be close to the norm for the time of year. This forecast is in line with actual demand figures recorded last winter, adjusted for normal temperatures.

Figure 1 shows the weekly forecast for the electricity demand peak in mainland France, at temperatures close to the seasonal norm, along with the consumption recorded last winter and adjusted to take account of the effects of weather patterns and load reductions.

---

<sup>1</sup> See Appendix 1 "The Basics of System Operation / A.1.5 Operating margins and the balancing mechanism" to [the Power System Reliability Memento](#) – 2004 Version (page 214)

<sup>2</sup> See Appendix 1 "The Basics of System Operation / A.1.5.2 The balancing mechanism" to the [Power System Reliability Memento](#) – 2004 Version (page 215)

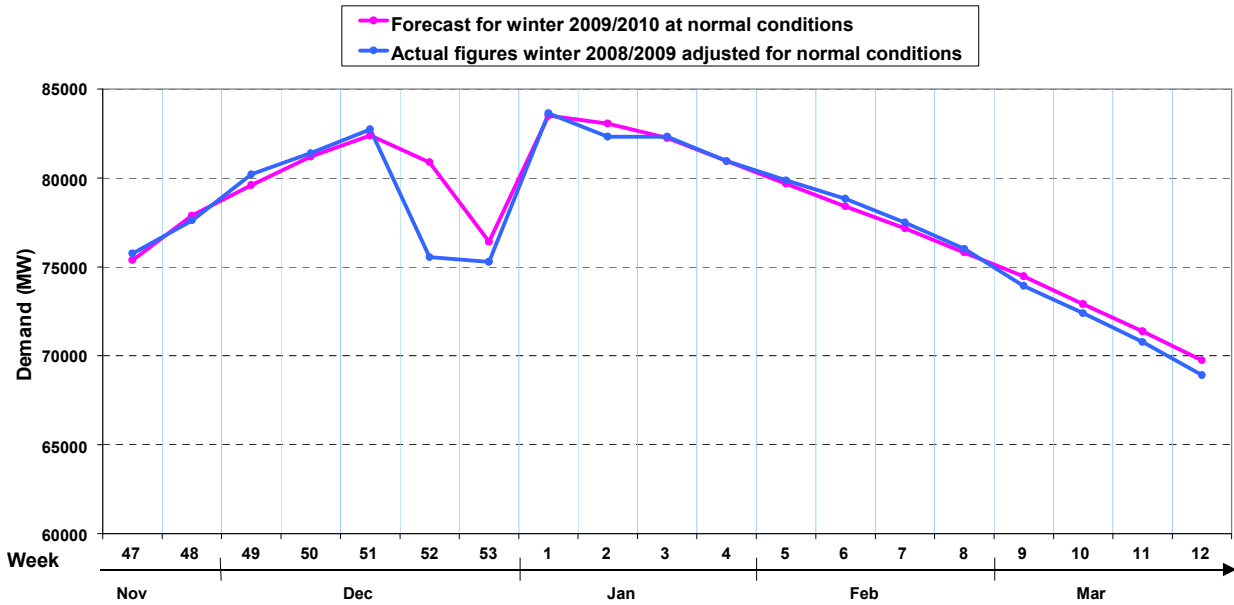


Figure 1: Electricity demand forecasts for mainland France at normal temperatures

For information, the level of [demand](#) varies significantly in winter when temperatures drop. During the cold snap observed in France in January 2009, the level of electricity demand reached almost 92,400 MW on Wednesday 7 January 2009 (7°C below the normal temperature).

For the coming winter 2009-2010, it is estimated that a 1°C drop in the average temperature could raise the electricity demand peak by around 2,100 MW.

### 3- Availability of generating facilities

Based on information provided by the generators at the end of October 2009, the availability of the French generating fleet for the winter period 2009-2010 is expected to be significantly lower than last winter during the months from November to January.

The arrival of new generating facilities (mainly wind farms and conventional thermal power plants) will be insufficient to compensate for the very marked temporary reduction in the availability of the French fleet

National water reserves are at levels close to the average seen in recent years.

For the coming months, available hydro-electric capacity is expected to be slightly lower than last winter, taking into account forecasts for water reserves and the schedule for shutting down generating units.

#### 4- Moderate risk of interrupted supply, except in the event of an intense and sustained cold snap between November and January

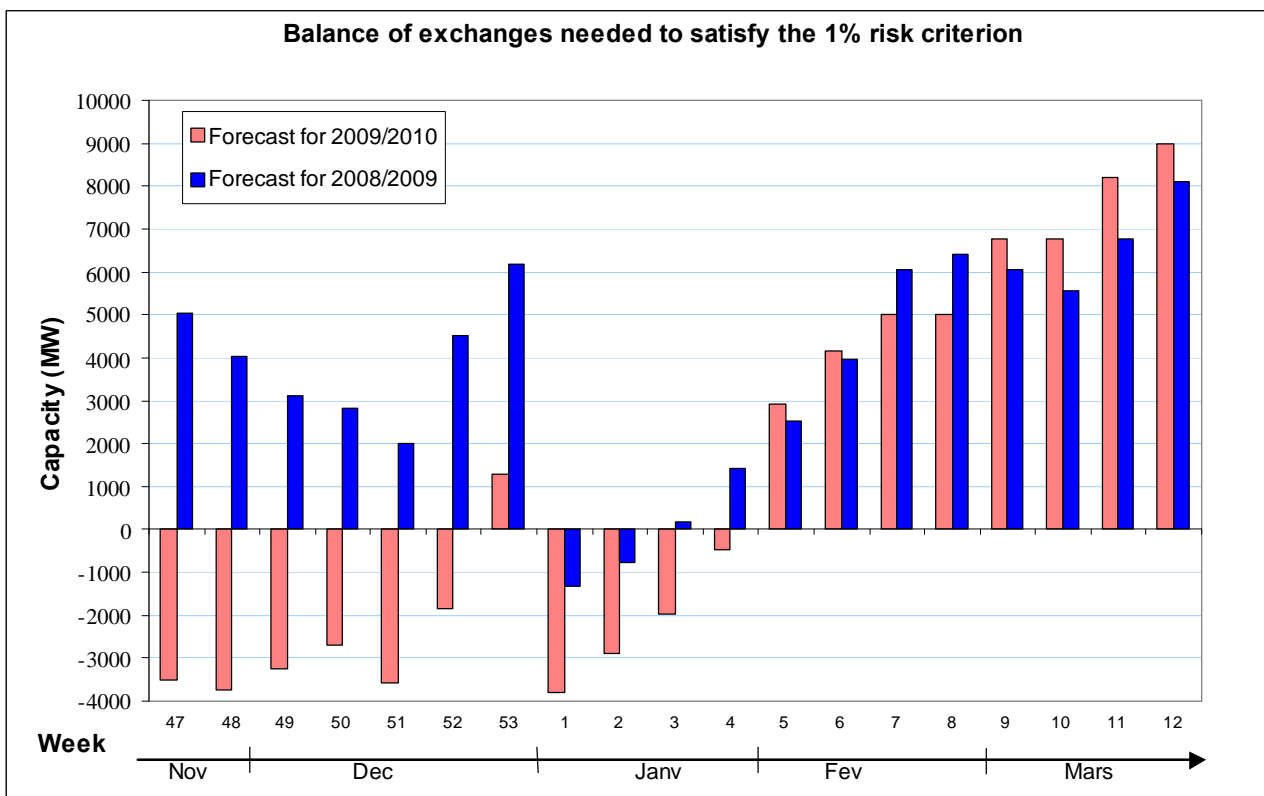
Figure 2 shows the maximum probablized balance of cross-border exchanges needed to satisfy the 1% risk criterion for every week of the winter period. This balance represents the maximum value of generation that could be exported (or the minimum value to be imported) whilst satisfying the 1% risk criterion, or the minimum additional value that need to be imported in order to satisfy the 1% risk criterion.

It should be noted that mean values displayed are obtained from simulations involving a large number of different scenarios for climate conditions and the availability of generating units. They do not in any way represent a forecast of real time cross-border exchanges, which may differ considerably from this balance, due to a number of factors

- actual meteorological conditions, the actual availability of generating facilities,
- on-the-spot decisions made by the various players, in particular between the options of requesting more power from French generating facilities, invoking demand response load shedding and obtaining supplies on the international markets via the capacities offered by RTE on interconnectors.

The forecast outlook is compared with that taken from last year's equivalent study.

Figure 2: Maximum probablized balance of exchanges needed to satisfy the "1% risk" criterion, taking into account suppliers' possibilities for demand response (load reduction) with their customers portfolios, and of which RTE has been made aware.



Until the end of January, imports could be required to cover electricity demand in France and satisfy the technical criterion stipulated by RTE. To do this, suppliers would have to look to the European markets, in addition to activating demand response (load reduction) possibilities with their customers portfolios. The estimated level of imports could therefore reach 4,000 MW for several weeks between November 2009 and January 2010.

From February, the overall forecast situation should be more favourable.

If the availability of the French generating fleet proves lower than expected, forecast margins would be reduced.

In the event of a sustained and intense spell of cold weather, forecast margins will fall due to the increased demand for electricity and the reduction of water reserves, which are used intensively in this type of situation.

To maintain their balance, French market suppliers could apply extra load shedding measures, and ensure their supply commitments are fully covered by purchasing electricity on the European markets, thereby leading to a substantial rise in imports.

In the event of a sustained and intense spell of cold weather with temperatures between 7 and 8°C below the seasonal norm, in order to maintain equilibrium and guarantee the margin needed to cover contingencies, the level of imports could reach 9,000 MW. That value represents the acceptable forecast limit for the French network under the most favourable conditions. In the event of further significant and sustained contingencies affecting the French generating fleet, this maximum import limit would be reached at lower temperatures.

The value of the maximum import capacity is recalculated daily. It depends on power system conditions in France and other countries. It will be higher if imports are spread across all France's borders.

In such circumstances, French market suppliers could apply extra load reduction measures to their customer portfolios. If necessary, RTE will have to activate exceptional measures and initiate actions to safeguard the system: voltage reduction of 5%, or even load shedding as a last resort.

In winter, the daily peaks usually occur at around 7pm. All other things being equal, the rise in the demand peak acts to reduce the power system's operating safety margins.

As a result, demand side management actions taken to control or reduce electric loads at peak demand times, will help to improve the condition of the electricity supply-demand balance and thus strengthen security of supply for the country.

## 5- European situation

Since the European power system is heavily 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, insofar as the French network's maximum imports capacities are not reached.

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

The results of that study are published by [ENTSO-E](#) ("Winter Outlook Report").

## 6- Real time balancing mechanism for electricity supply and demand

In the event of contingencies affecting demand or generation, 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.

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

Nonetheless, it is worth bearing in mind that margins are intended to cover contingencies that occur in real time or close to real time.

Consequently, the balancing mechanism, which is a pool of bids that can be used to establish operating margins for dealing with short term demand or generation contingencies, is not intended to cover imbalances within the scope of responsibility of commercial players.