Case study 2
Dry winters in northern Italy and energy generation

Focus: A mild, dry winter 2015/16 due to a persistent, high-pressure system over the Mediterranean basin and southern France - the impacts on energy generation and demand

Boosting decision making

- The main objective of this case study is to illustrate the benefits of designing adequate decision support products to identify winter conditions in the Alps and Apennines that impact on the power system.
- How can ENEL and Alperia effectively manage the risks associated with extreme climatic events?

The seasonal forecasting context

- This case study focuses on seasonal forecasts of precipitation and hydrological balance. Seasonal forecasts of precipitation and snow pack will be used to forecast hydroelectric production and the amount of potential energy stored by snow and ice.

Sectoral challenges and opportunities

- Power price management and hedging of generation portfolio – when to hedge the power production?
- Prediction of gas price movements in a context of low hydroelectric power production and changing demand net of total renewables.
- Optimising efficiency in hydropower production management (Alperia).

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Grant Agreement n. 776868
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Weather conditions and the power system

Due to a prolonged drought with an extremely dry fall and mild temperatures, the end of 2015 and the beginning of 2016 were characterized on one hand by a low level of power and gas demand and on the other hand by a deficit in hydro supply production (Figure 1). During the first three months of 2016 the actual hydroelectric production (red line) was almost half of the energy produced during the same period of 2015 (red ellipse). It was even lower than the minimum of the 5-year range. There was a similar situation in the period of October to December 2016 (green circle).

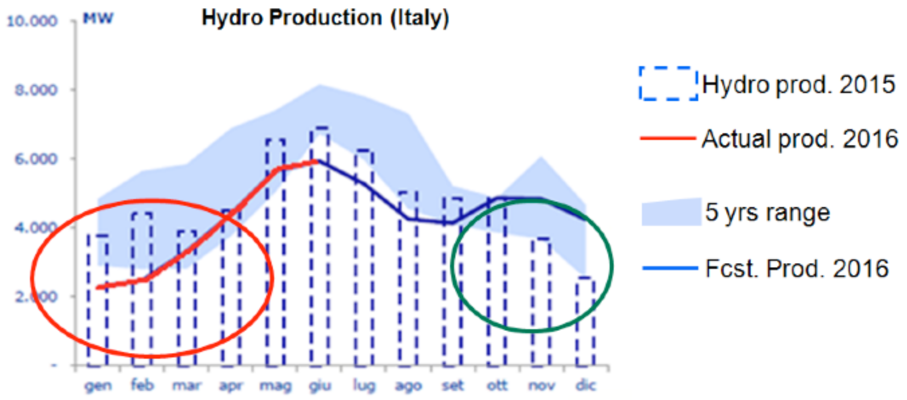


Figure 1: Italian hydro production

The combined effect of low demand (Figure 2) and hydro deficit led to an increasing Italian spark spread level. The spark spread level is the difference between power prices and gas prices. In other words the revenue of a power generator minus the costs linked to the power energy produced.

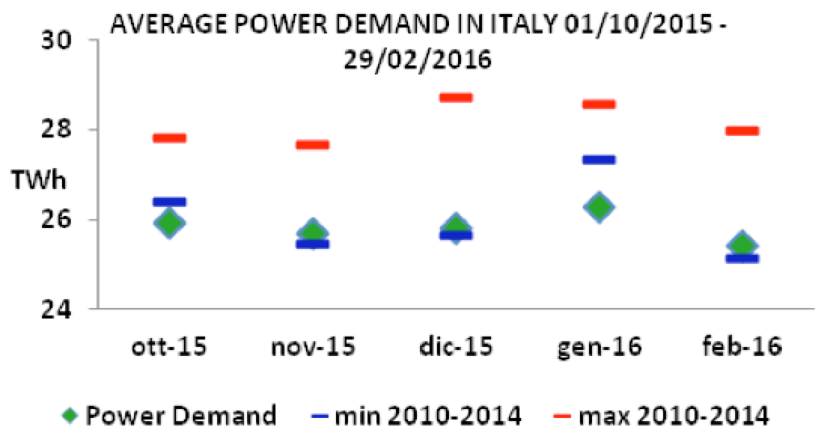


Figure 2: Monthly power demand in Italy from Oct - Feb 2016

Climate event

Mild and dry winter 2015/2016 in the Alps and Apennines

Sector impact

Gas price movements in the context of low demand and hydroelectric production

Industrial and research partners

The SECLI-FIRM project aims to demonstrate how improving and using long-term seasonal climate forecasts can add practical and economic value to decision-making processes and outcomes, in the energy and water sectors. To maximise success, each of the nine SECLI-FIRM case studies is co-designed by industrial and research partners. For this case study, the industrial partners are utility companies, ENEL and Alperia, and the research partners are ENEA and EURAC.

The industry context

In Italy there is an open market system for power, where price is determined by the balance between offer and demand. The Italian power market is divided into six geographical zones that, in some situations, behave as insulated systems. In terms of the power market, electricity price correlates positively with demand and negatively with renewable production because, in the bidding curve, renewable power plants are offered at zero price. Therefore, a measure of tightness could be defined as the demand net of renewable production.

The business process

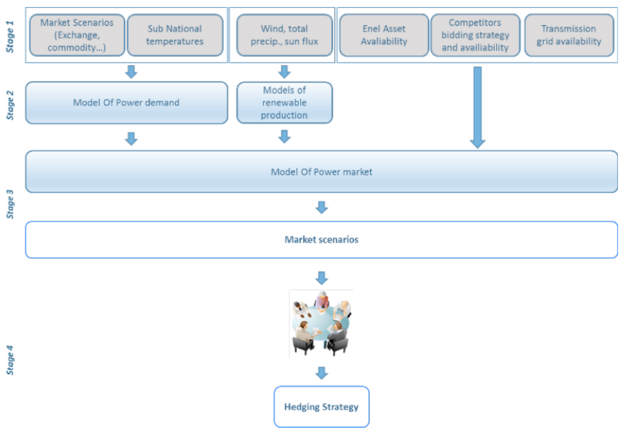


Figure 3: Flowchart for business process

Figure 3 shows the general framework of the decision process to manage the business within ENEL. In this broad context, Alperia, which produces renewable energy, cannot interfere directly with the market scenario, but it can only try to sell the energy at the most advantageous price.

A control group and a test group will be established by ENEL (see Figure 4 overleaf). In terms of climate conditions, the control group will only be able to access widely known climatological conditions (currently the most common approach) while the test group will also be given current tailored seasonal climate forecasts.

Co-designers

ENEL
EURAC
Alperia
ENEA

Industry context

Utility
Power generation

Business process

Data gathering (market and meteo)

Simulations of the power market

Hedging committee

Value assessment of seasonal forecasting

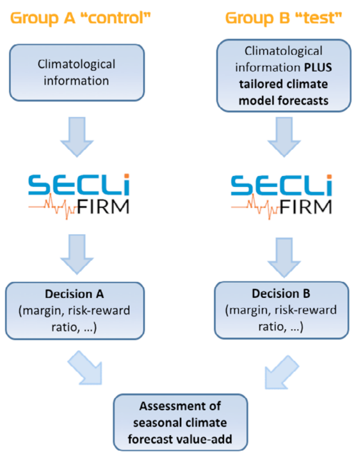
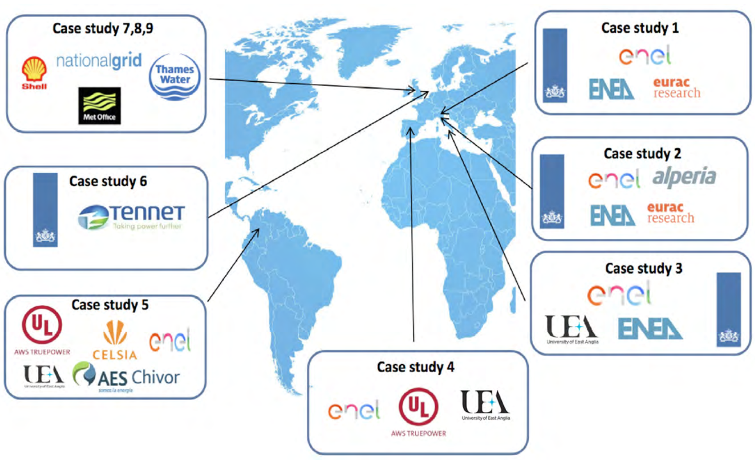


Figure 4: Flowchart for the evaluation process

The nine SECLI-FIRM case studies



The Added Value of Seasonal Climate Forecasting for Integrated Risk Management (SECLI-FIRM)

For more information visit:

www.secli-firm.eu

or contact the SECLI-FIRM team at:

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Value assessment

How will the value of seasonal forecasting be assessed?

Find out more

For more about this and other SECLI-FIRM case studies, visit www.secli-firm.eu

SFCS2: 09.2018

Grant Agreement n. 776868