ETIP SNET

EUROPEAN TECHNOLOGY AND INNOVATION PLATFORM

SMART NETWORKS FOR ENERGY TRANSITION

# ENERGY STORY:

## Advance dispatching & LoadForecast : Accurate forecasting facilitates more clean energy

Advance dispatching & LoadForecast assist the system operators to make more accurate decisions, which enables to integrate more renewables into the Italian system and improves security of supply

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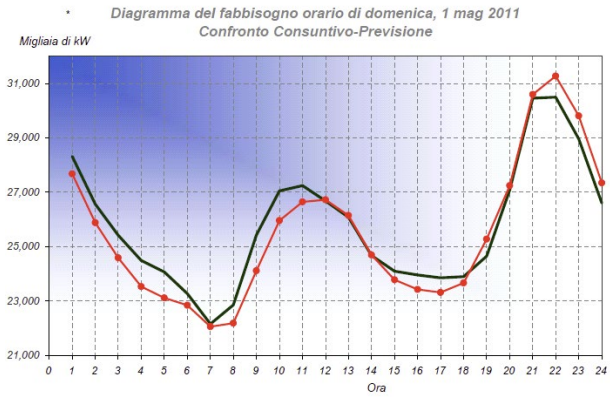
From the dawn of mankind to our modern era there is one constant goal humans try to achieve: the ability to predict the future. Though according to the law of physics as we know today, to predict perfectly what is going to happen is impossible, a few thousand people in the world put their best effort day by day to do so. What makes their job a little bit easier is that they only have to focus on future electricity consumption – as they are called the system operators.

In order to make their work more efficient however they don't turn to tea leaves, oracle bones or the observation of birds like our ancestors, but rather to artificial intelligence.

**Why is forecasting needed?**

Electricity is a commodity that is very hard to store at large scales. Hence system operators always have to make sure that the electricity supply in the system is matching the demand. For doing so, they need to forecast how much electricity will be consumers for the next days, the next hours or even for the next minutes.

To make this work – called dispatching – more efficient, Terna, the transmission system operator in Italy introduced a new platform. Advance Dispatching is an IT tool that uses complex algorithms to assist the control room operators to manage dispatching with the aim of optimizing the mix of power generation – mostly from economic point of view.




*•Italian load demand (red curve) predicted one day in advance*
*•Real-time load demand (green curve) calculated from actual measures*

The other algorithm helps system operators in forecasting the load. The aim of the so called LoadForecast is to estimate the electricity consumption along a future time horizon on the basis of the available information. This information means historical data on consumption, real time energy data, and also historical and real time data on weather combined with real time weather forecast.

Building on this huge amount of data, with the help of machine learning this algorithm made forecasting for Terna more accurate and based on this, their processes in the control room related to dispatching became even more reliable.

"We started the project in 2011 and introduced it to our system step by step. We applied the whole platform into our everyday work in 2015" – said Cristiano Martarelli, who is specialist at the Rules, Systems and Defence Testing. But the platform is always under further development, like a "neverending story". According to Mr Martarelli, there is

always room for deploying new and better algorithms to make the platform able to adopt new techniques.

**Impact**

If you are that kind of a person, who likes polluted air, stronger effects of climate change or old, dusty power plants, than you should not be happy about this project at Terna. While, if you prefer clean energy, zero-carbon economy and would like to see more renewable sources to be exploited, then you should consider it as a very positive achievement. Because Advance Dispatching and LoadForecast is on the path for the Italian power system to integrate more wind, solar or other kind of renewable energy. Though these sources are clean, they are very unpredictable as we cannot control the wind and the sun. But with increasing the accuracy of forecasting energy needs it becomes easier to connect more of these kinds of generators to the system as this platform can mitigate their negative impact on stability.

**Project Benefits**

- Improved network management
- Decreased carbon emissions
- Decreased network costs

The platform also further improves the security of supply, which is also a very important aspect – if you don't think so, just try to remember how you felt the last time there was a power outage at home even only for a couple of minutes! System operators work twentyfour-seven to "keep the lights on" and to develop tools which would help to keep the balance between demand and supply.

The effects of the Advance Dispatching and LoadForecast could also be measured moneywise. According to Cristiano Martarelli, since the first deployment the cost efficiency has been one of the key driver of the development. First it appears on the books of the transmission system operator, but then it circles down to the energy prices as well. And at the end of the day that is tangible for every energy consumer..

**Keywords:** system operation, load forecasting, artificial intelligence

**More info at**: Advance Dispatching & LoadForecast

**Note:** Project benefits based on specific criteria outlined in ETIP SNET monitoring exercise

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