IBERDROLA

Advanced Analytics for a Smarter Energy Management

Abstract

Advanced Analytics is a core area in Industry 4.0 and its use can lead into better, faster and more efficient decisions. When managing energy, it is crucial to understand the demand and generation capacity in order to offer the best and most sustainable option to the market. Using Artificial Intelligence and Big Data techniques, among others, can boost this performance.

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Co-funded by the
Erasmus+ Programme
of the European Union

Introduction

Having information is a key aspect when taking a decision and this intelligence is a core concept in industry 4.0. Advanced Analytics are composed of several fields of knowledge and Artificial Intelligence and Big Data are crucial to grasp tendencies and study the market to take more efficient and better decisions. The way of collecting and using the information is key and it presents different challenges but huge opportunities to all companies.

Challenges

The Global Energy Management (GEM) division in Iberdrola has as its main mission to manage energy resources in order to optimize the use of our power generation assets and the energy purchases to supply our customers. This efficient use will translate into better prices and a better service to our clients and partners. Predictions and analysis are crucial to achieve this goal and advanced analytics techniques have been used to improve our models.

These predictions and analysis need is one of the main challenges faced at GEM with very specific cases like demand forecasting as long as market prices prediction.

> *Better analytics are required to perform better while operating in the electric market in order to offer a better service to our clients and partners.*

This challenge can be divided in three main areas:

- **People & Culture**: relying in automatic decisions or processed data is not common in the energy industry and that is not a current scenario. Following a continuous and open communication is crucial to let every employee to feel part of this new adventure. Sharing results and learnings from mistakes culture is key. Everyone taking part in this kind of initiatives should have enough time to compare results and data obtained using these new processes with traditional systems and methods.

- **Security**: when collecting and using information it is mandatory to protect all this data and procedures, but not only the source data but the final decisions and intermediate information that is generated by the analysis. Final business and strategic decision will rely in this information and it cannot be leaked or accessed by third parties.
- **Technology & Knowledge**: exploring the market and looking at what others are doing in other sectors is important to understand the potential and best practices of advanced analytics.

How will solve the problem?

Iberdrola GEM has built a practice for Advanced Analytics taking into account all that three areas in order to address this challenge:

- **People & Culture**: Working this way will boost confidence and employees will be more comfortable facing these new challenges. Key actions:
  - Communities to interact between coworkers sharing ideas, questions and solutions boost their confidence and they become more engaged with the new initiatives.
  - Training: not only technical but theory training is required to feel conformable with these new changes.
  - Shared goals: these new technologies help companies, departments and individuals and all communications must be aligned with this message.
- **Security**: Cybersecurity teams are becoming more important in all companies and its policies should be embedded, not just in any development, but in all thinking and ideas. The value of data and decisions is an idea that is spread among the employees and this is a complete approach to face this problem. Key actions:
  - Secured environments and network connections: no external access is possible and data access policy is revised for each source and project. Internal data cannot abandon the company network.

    - Cybersecurity checkpoints and cybersecurity team involved in all stages of any development.
    - Anonymized data when working with external providers.
    - Internal and external cybersecurity audits.
- **Technology & Knowledge**: In this way our key actions have been:
    - Technology Radar: analyzing new technologies and interacting with different players (experts, providers, other companies, universities, startups, …) to understand features and capabilities, improving the way we can take advantage of those characteristics.
    - Best practices while learning: this is a new area and we are still learning from mistakes and successes, building best practices and knowledge that can be shared between projects and areas.

All these actions together allow us to face the advanced analytics challenge generating enough response capacity to create models, train them and implement as final solutions.

Demand forecasting is a great example where we have been working in order to improve our models. It is a great challenge because of its complexity but we have already results in our gas demand forecast reducing our prediction error dramatically comparing with our traditional model.

Market prices are not easy to predict but they have a very important impact when scheduling generation resources. We have applied different models obtaining a reduction in the prediction error compared to our former forecasting models.

Advanced Analytics techniques and technology has not been only useful to improve our models but for being able to do it quickly. Last example is the COVID-19 scenario where we were able to build a prediction model for demand loss in less than a week and results were highly impressive.

References

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