Pool Price Model – Case Study

EKON strategy consulting

*The following Case Study provides a summary of the work, which consisted in the provision of long-term Spanish wholesale electricity prices, carried out by EKON experts for our client (in this case a large EPC company) during the sales process of a large PV plant*

Our client, one of the biggest companies in the EPC sector with a relevant international presence, was looking to sell one of the 490 MW PV plant which was awarded in one of the Spanish Renewable Capacity auctions of 2017 and requested external expert advice in order to assist them in the divestiture process.

Assumptions

As a starting point, EKON reviewed and discussed the inputs with the Client that define the Central Case (CC), highlighting where these vary for the High (HC) and Low Case (LC). Also reached an agreement on general modelling assumptions include the mapping of Calendar Years (CY) to Run Years (RY), inflation and exchange rates, the treatment of interconnectors and demand growth assumptions. Furthermore, EKON identified the technical and commercial characteristics of existing PV plants, dispatch constraints and firm closure timelines together with the commodity price assumptions and treatment of the generation tax.
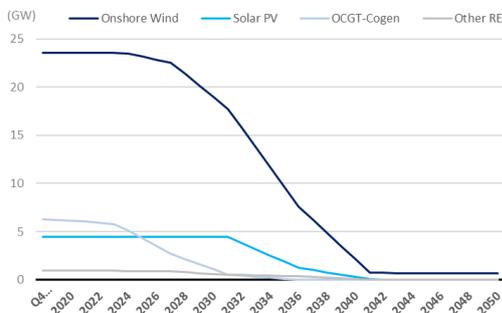

Firm closures

To reach an accurate picture of the capacity mix in the future EKON calculates the replacement timeline for technologies, we tracked the online year for each and applied an assumption regarding the technical lifetime.

Similar analysis was performed for the coal plants which are required to comply with the European Industrial Emissions Directive, which has accelerated their closure.

Sensitivities Analysis.

EKON, once the assumptions were agreed with the Client, delivered quarterly market modelling results covering the period 2018-2045 including:

- Seasonal or quarterly load duration curves.
- Baseload wholesale price.
- Capacity and generation mix.
- Average capacity factor by capacity types.
- Projected development of new builds identified by technology type and vintage.
- Merit order curves.
- Reserve margin.
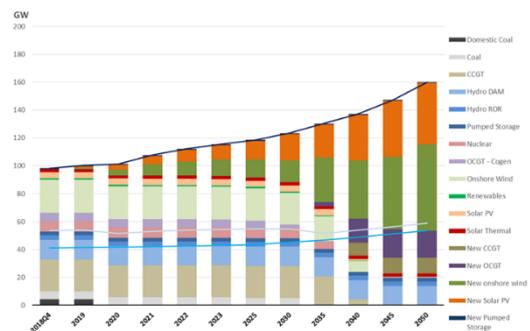
EKON also developed two Additional Cases, High and Low, which were designed to assess the impact of changes in the main variables that can be expected to affect the Project such as demand forecasts, fuel and CO2 prices, treatment of the IED, the cost of Economic New Builds, different profiles for Firm New Builds, technical life limits of existing plants, etc...

PV Capture Price

EKON as part of the follow up to this Assignment provided an explanation of one of the key terms that needs to be understood in the Solar PV sector, the Capture Price Spread and the risk of cannibalization of the capture price of PV associated with a massive deployment of additional solar PV capacity in Spain (50 GW expected in the next 20 years).

The Capture Price Spread is the difference between the base-load pool price (operating all hours of the year and receiving the average hourly price) and the actual hourly price realized by a specific technology from the energy sold into the wholesale electricity market (pool).

Although it currently has a positive impact on the solar PV project revenues, since the PV capture price spread is positive, it is a factor that will become very relevant over the next ten to twenty years in which it is expected to change from positive to negative figures.

The Model

The PMM is designed to simulate the developments of the actual power systems about which one is concerned. By incorporating the economic and environmental constraints facing power system participants in the real world, PMM replicates how decisions are made when subject to a slate of operational constraints, irrespective of whether these constraints are physical, economic, or environmental.

The model is based on a deterministic dynamic linear programming approach with the objective of minimising the present value of fuel, maintenance, and capital investment costs across the whole forecast horizon. Resulting prices, dispatch, fuel use, and capacity expansion are optimal for each set of input parameters. This model is developed as a bespoke application in Excel with a compatible LP optimiser (What'sBest! from LINDO Systems) and designed for fast turnaround to enable consideration of multiple scenarios. Conceptually, it is possible to think of the model carrying out a series of discrete tasks. This is graphically depicted in the following picture.
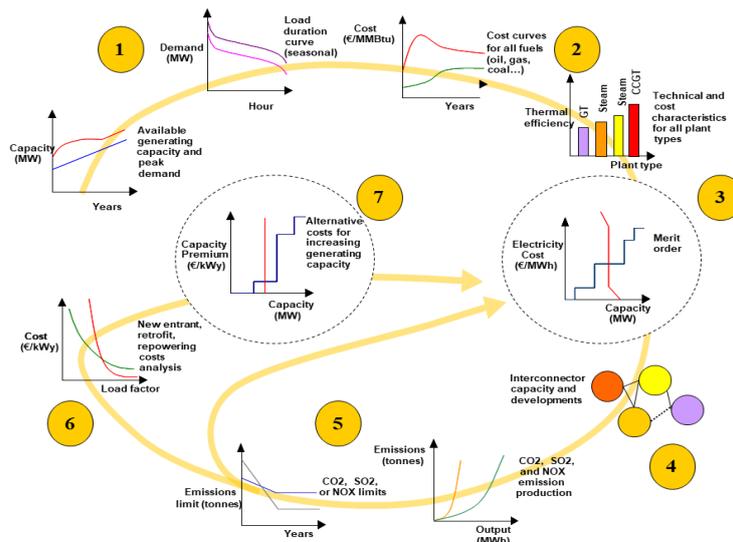
The Result

Having carried out a thorough analysis, and having developed a number of different scenarios, EKON delivered a full pool price forecast for a 30 year period. In the end, our client successfully completed the sale transaction to an International Investment Fund.

EKON provides a full range of consulting services split into 4 general groups.

EKON has a strong track record of providing Arbitration services and M&A support during complex commercial transactions.

One of the keys to our success has been the full-time involvement of the experts from the very start of a project through to completion, to our clients' full satisfaction.

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