CHAPTER 2

Data Analytics

1) RWE bid estimation model: Optimizing auction behavior

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RWE is a German energy company active in electricity generation, building stor-age systems and energy trading. After the reallocation of its asset base with former competitor E.ON, the company specializes in generation. Its renewables business is expanding massively and is adapting to meet the new challenges that emerge within the existing, fossil fuel-based business.

This case demonstrates how to implement disruptive digital technologies with-out setting up an ambidextrous organization, but rather integrating it into the existing organizational context.

Background: We wanted a technology that could help us predict the results of wind and solar auctions

The technology we have is a bid estimation model, which helps us predict the results of wind and solar auctions. These can be governmental auctions, Power Purchase Agreements with direct consumers, or big off-takers of renewable energies who are auctioning long-term contracts in whatever area.

RWE used to be in a regulated business that was supported by the govern-ment with very few commercial risks. These fixed support levels were removed when deregulation started in 2010, not only in Germany, but in various Euro-pean countries. After that the auctions took place on a large scale and the levelized costs of energy (LCOE) went rapidly down. To estimate these cost reductions, a company's internal perspective was not enough. What we needed was the market perspective. In order to turn this external knowledge into a structured and transparent system for our organization, we developed this tool.

We use algorithms, but basically, it is a multi-regression model. Its estimates depend on previous auction results and the expected bid level for the next auction. Based on this our model evaluates the structural differences.

We started with a student project

We used one of the student projects of ESMT to kick-start this initiative and build up our database. We had five MBA students working on the topic for six to eight weeks. We employed them for conceptualization, but also to build up a first, excel-based model.

As with almost all algorithms, the database and the data quality is one of the main drivers and success factors of having a reliable tool and a functioning algorithm. Therefore, we hired external experts in our next step and brought them together with our commercial and IT people to develop and calibrate the tool and turn it into a format which allows people to comfortably use it. It's now part of our commercial analysis unit, which supports our board members to take solid commercial decisions. It is independent of the business units that bring the projects to the investment gate and start the stage gate process.

Later we went from excel to a proper database. At the moment, we are using different sources from global market analysis providers such as Bloomberg New Energy Finance and IHS Markit, who help us to get access to global auction databases. However, these are not always reliable. We have to tweak these data, before they go into our regression model.

The tweaking is done by a commercial analyst in my team. He checks the data quality, tests if there are outliers and helps with calibration. He does this needs-based, but at least once a month. However, since the number of global auctions increases, more and more data come in and our model gets more robust. So even if you check the data only once a month or every six weeks, you still receive robust results.

Convincing our stakeholders is a challenge

Our tool is in place and established within our organization – the latter was maybe the biggest challenge. To achieve data quality and robust results was not easy, but it was nothing compared to getting stakeholder acceptance. It took us months, before stakeholders started to trust our model.

To understand their attitude, you have to know where our business is coming from. We used to develop projects in order to maximize the output of an asset or project and ignored our external market. Therefore, our estimation model and its technology were something totally new and unusual.

However, we went with our stakeholders through all details of the model and were absolutely transparent. We explained how the regression model worked and discussed the results it produced. We made it clear that we did not have an algorithm providing us with perfect results, but would rather offer the basis

for a structured discussion and a sound comparison of auction results across global markets and technologies. We described how my team was going to interpret these results and deliver a value added.

In part, our stakeholders' questions helped to fine-tune our model. Plus, we learned from the auctions. It is a permanent updating and learning process, not only as far as the algorithm is concerned, but also how we interpret the results.

In practice, we have learning sessions after every auction and check if we predicted the bid range within the probability curve we have. This is usually followed by a discussion. Do we have to calibrate? Should we take some data out? Was it an auction where we could use our tool? Were there special effects, which made this tool in hindsight less useful. These could be regulatory changes in the auction that limited the comparability with the previous auctions. Afterwards we send a report to the board, describe the outcome of the auction and what we predicted. We explain what we have learned with regard to the next auctions.

By now we have been able to increase the acceptance of our model in our organization. People understand that we are actually enablers and support them in order to receive vital market signals. Based on our target pricing process we can give them a target price so that they can adjust their project design and be sure that the project they develop is actually marketable.

Our model turns into a support for our investment decisions

The application is a global database containing auction results. We document the bid prices and the patterns of an auctions. This includes the auction design, the size of the auction, the auction basket, the length of the contract, the commercial risks, plus the things that are not a direct part of the auction – i.e., whether it is a technology-specific or technology-neutral auction. In short, we collect and try to control a large number of factors in order to receive comparable bid results. This turns our technology into a major element of our investment decision process. And we are talking about investments from single-digit millions to single-digit billions, depending on the project, technology, and country, where our tool helps us to determine the bid level and then take the investment decision.

As our business is going more global, the complexity of our market increases. Consequently, we have to consider the structural differences of various markets. However, there is no other technology or tool in place offering a consistent view on different markets.

Boards want to invest their funds profitably into the most promising projects. They need an independent view on where the money should best go. We are a capital-intensive business and investment decisions always carry risk and the outcome is uncertain. With the help of our tool, we at least can offer an independent view, no matter if the project in question is located in South America, the U.S., Germany, or elsewhere.

In addition, we have by now developed a forecasting combination model. This is a sophisticated tool – a self-learning Artificial Intelligence – with which

we can discover patterns that help us to adjust our forecasts accordingly (see also Dominik Felske's contribution on the RWE Forecast Combination Model).

As you can see, our organization is getting used to sophisticated algorithms, and this is a plus.

It is still difficult to exactly measure the benefit for the organization

We can perhaps quantify the monetary results on the base of a single project. In order to win a bid, you want to bid the highest amount you can afford.

The value added is everything between our net present value and what we can gain in the market. We have used the tool in roughly 20 investment processes and made additional gains based on our tool. In a significant number of cases this meant a decision to not proceed with the bid. However, quantification is difficult.

We introduced our model 2016. Some projects are now basically going online, so there's still some kind of time to go when we see if it really turned out.

The interview was conducted in March 2020.

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Dominik has more than ten years of experience in management consulting and as executive within the energy sector with focus on renewables and commercial topics, and multi-stakeholder management.

Before he took over his current position in June 2022, he was Head of Commercial Optimization CE & APAC and Head of Commercial Analysis at RWE Renewables, working at the forefront of the energy transition by commercializing new and existing renewable energy projects across many geographies. Until 2019, Dominik was heading the Commercial Analysis at E.ON Climate & Renewables and responsible for the Carve-Out of the renewables business unit in the context of E.ON/RWE transaction.

Before joining the renewable business in 2016, Dominik did his MBA at the European School of Management & Technology (ESMT) with a focus on innovation and sustainability in Berlin.

Furthermore, Dominik has worked as management consultant at E.ON Inhouse Consulting focusing on business development and performance improvement and as economist in the energy department at the German cartel office. Dominik holds a Bachelor's & Master's degree in Economics from University of Mannheim & Cologne.