



Webinar Hedging long-term price exposures in renewable power projects and PPAs- FAQ

April 2022

During our webinar on "Optimal value-stacking with batteries" of 5 April 2022, we were very happy to receive your questions! In this document we answer them.

Does the geographical location of a battery affect the business case? For example, batteries located at remote solar fields (Oost-Groningen) far from the high voltage grid. How does the location of the battery in the electricity grid influence the profitability of the battery?

It does not affect the business case, except that

- a) grid connection costs may differ,
- b) there could be local congestion problems limiting the optimal use of the battery,
- c) in case of local congestion problems, the local grid operator could pay battery owners to help solve it.

What is the most profitable configuration for batteries and does the profit maximalization objective also have a positive effect on the electricity grid? Can you define optimal battery duration? 2H vs 3H?

Most battery projects are currently with 2- or 3-hour duration. There are several parameters and expectations that determine the optimal configuration. In general, battery operations have a positive impact on the supply-demand balance in the grid, just by maximizing their own profit. However, on a more local grid level this may not always be the case (though in general probably too).

How to optimise the choice/trade off on which market to operate during operations?

This requires constant forecasting of the expected revenue streams of the different options. Part of this is done via relatively simple decision rules, but in other cases (e.g., passive imbalance trading) the expected revenue stream can be forecasted with more sophisticated methodologies. Optimization solutions are constantly evolving.

Are there possibilities of running the battery on two markets simultaneously? For instance, you sell your total battery capacity on frequency containment market, but the TSO/DSO just uses part of the total capacity. What can you do with the unused part?

In this case, you cannot do much with the unused capacity, because the TSO/DSO might still make use of it.

When stacking revenues, what happens physically to the battery if multiple services are called at the same time? I assume that the bids must take in consideration the reservoir capacity of the battery as a constraint in the optimization, i.e the reservoir capacity should be distributed across all bids and that the EMS will not allow the battery to be depleted more than what was offered in the bid. Is that the mechanism?

Yes exactly.

Could we use the solution in Germany on the live quarterly prices for trading signals?

The model is currently set up for valuations and assessments, not yet for live trading. Live trading functionality is under development.

Can you do intraday + imbalance in DE?

No, you cannot do imbalance in Germany.

Has the current market situation had a positive impact on the profitability of gas storages?

In general, yes. Price levels are higher, and intra-day volatility (in EUR/MWh) has become larger, allowing batteries to make more profitable cycles.

According to your experience, have utility scaled batteries (1-10MW) reached profitability in certain EU countries? If yes, for what countries and from which year have you spotted this trend and what IRR do you forecast?

In several countries batteries have certainly been profitable, such as in the GB and Dutch market.

What are the expectations for the French FCR market? How fast are prices expected to decline and to what level?

We don't have enough insight in the French FCR market to answer your question.

Are taxes included in the presented business cases? What is their impact?

Taxes are not included. They generally have limited impact on (utility scale) battery business cases.

Is it better to change the batteries after 5 or 10 years or is it better to install more storage capacity (MWh)?

It is difficult to give a general answer to that. It largely depends on longer-term price / volatility expectations.

How do you count a full cycle?

A full cycle means that the total MWh capacity has been discharged. So, the total number of cycles in a year is the total discharge (in MWh) divided by the storage capacity.

The numbers of cycles~7500 seem very high. Are guarantees of battery producers are taken into account?

The number of cycles of 7500 is over the lifetime of the battery (not per year). This is a typical number guaranteed by battery manufacturers.

We can share more in a personal conversation or demo, so feel free to contact us: info@kyos.com

