Maximizing Renewable Project Revenue in Wholesale Markets

Many renewable projects are coming out of power purchase agreements (PPAs), losing their guaranteed revenue stream and having to deal with wholesale price volatility. New build renewable projects are often leaving some of their capacity open to wholesale markets. Even assets with PPAs still in place often have congestion risk that they need to manage. To maximize returns and increase profitability, renewables need to understand how to leverage these wholesale markets.

Gaiascope's bid optimization and forecasting software can help them do just that - showing the ability to increase returns by over 100%.

Case Study for a Wind Farm

As a case study, we'll look at the Rio Bravo Wind Farm, a nearly 240 MW facility located in South Texas.

Currently, this wind farm does not bid into the day ahead market (DAM) - it just takes real time prices for whatever MWs it generates*. While this strategy ensures the farm never underproduces day ahead expectations, it leaves a lot of money on the table. It can be worth locking in day ahead prices by bidding into DAM as these prices on average are higher than real time.

Using Gaia's day ahead nodal price forecasts and generation forecasts for the wind farm, a simple strategy leveraging DAM bidding shows the ability to double revenue over the roughly 9 month backtest period (July 1, 2021 through Mar 21, 2022), as shown in Figure 1.

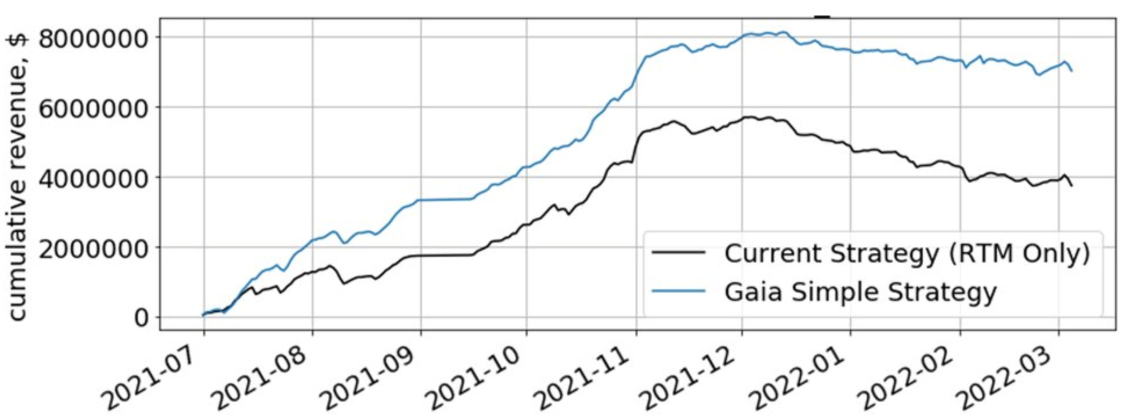

Figure 1. Cumulative Revenue for Gaia Simple Strategy vs. Current Strategy

This simple strategy bids Gaia's 50th percentile (p50, aka median) forecasted generation for the wind farm at the Gaia's mean expected nodal price. The bid clears if the bid price is greater than the day ahead price. If it clears, the generator receives the DAM price for all volumes bid into the DAM market. If the bid does not clear, all volumes produced in real time are paid the real-time market (RTM) price. We also consider the impact of real-time generation differing from the p50 generation forecast:

- If volumes in RTM > p50 bid in DAM, excess generation captures RTM
- If volumes in RTM < p50 bid in DAM, pay RTM price for under generation

MANAGING AND MITIGATING RISK TO FURTHER ENHANCE REVENUE

Leveraging point-to-point (PTP) trades - a hedging contract that can help assets manage and mitigate congestion risks that can drive prices negative at their node, can further increase returns.

Using Gaia's nodal price forecasts to place PTP trades between the Rio Bravo Wind farm and hubs whenever congestion is anticipated to further increase baseline revenue by 12-14%. Figure 2 shows the revenue potential from PTP trading around the wind farm's expected production using Gaia's strategy and algorithms.

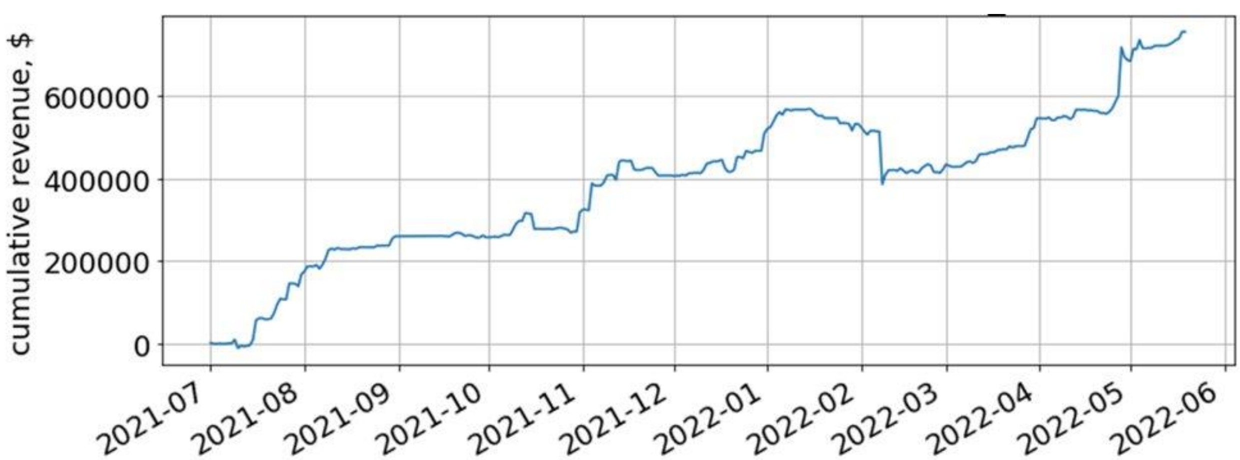

Figure 2. Cumulative revenue achieved leveraging point-to-point trades

About Gaiascope

Gaia has spent the last three years building models to lend transparency to complex electricity markets and developing bidding and hedging strategies to help maximize returns. At Gaia, it's our core belief that the best way to accelerate the clean energy transition is by making renewables and storage assets the most profitable options. We want to help you maximize your returns.