Power Matching Algorithm for power exchanges

Optimize your energy and capacity markets by matching supply and demand in closed-gate auctions.

Maximize welfare with integrated energy market optimization

N-SIDE's Power Matching Algorithm for power exchanges is an auction optimization algorithm that can be integrated within new or existing energy market operations.

N-SIDE's Power Matching Algorithm is currently running in several markets, setting day-ahead electricity prices and transmission capacity allocation for market participants and grid operators.

Europe

10+ years experience in Europe with EUPHEMIA

N-SIDE is the provider of EUPHEMIA, the PCR algorithm used for the European single day-ahead market coupling since more than 10 years.

It calculates electricity prices across >25 European countries and allocates cross-border transmission capacity on a day-ahead basis.
On a daily basis, **EUPHEMIA** matches bids and offers for about 200M€ value and calculates the **day-ahead prices** and cross-zonal flows for the vast majority of **European countries**.

India

Partnering with the biggest power exchange in India on power matching

Since 2021, the Indian Energy Exchange *(IEX)* has started using the N-SIDE Power Matching Algorithm to determine the daily price and traded volume of electricity in the Day-Ahead Market. IEX expects to benefit from the Power Matching Algorithm as it enables the power exchange to offer complex bid types to meet the changing needs of the Indian Energy market.

IEX is the **biggest power exchange in India** with a market share of 95%.

Proven solutions

4 TWh daily volume traded

200M€ transaction value traded

1.8 billion people served

12 minutes resolution time
(EU Day-ahead market clearing)

How it works

INPUTS

The solution takes the order books *(single bids, block orders, etc.)*, network data *(topology, ATC, PTDF, losses, ramping, etc.)* and market rules *(pay-as-clear, tiebreak, etc.)*, and matches supply and demand in the most optimal way for maximum social welfare, while respecting various constraints.

ALGORITHM

The solution is able to cope with a large number of binary variables. This is done by integrating cutting-edge optimization techniques *(mixed-integer linear and quadratic programming)* into a robust algorithm relying on a high-quality mathematical solver, boosted with side heuristics.

OUTPUTS

The algorithm outputs market prices, activated volumes, allocated capacities, congestion rents and other relevant metrics. This optimization can also couple multiple periods *(e.g. 96 quarter-hours)* and order books from multiple markets.

Benefits

Optimal: Efficiently optimizes your market to maximize social welfare, relying on state-of-the-art technologies to return optimal quantities and market prices.

Fast: Enables fast resolution of complex auctions, enabling market growth. In Europe, where the technology is used with very large datasets *(i.e. all EU day-ahead)*, resolution time does not exceed 12 minutes.

Adjustable: Can be easily adjusted to meet your most complex requirements related to order type, network model, and pricing scheme.

Transparent: Power Matching uses a transparent algorithm. The technology relies on clear and publicly available market rules; input/output are checked to ensure clear understanding of results and reproducibility.

Integrated: Power Matching can easily be integrated within your environment via REST API, either on-premise or in the cloud.