Webinar

Real-time battery optimizer

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Maximilian Kiessler - Powerbot

18 June 2024

KYOS PowerBot

Agenda

15:00 – Welcome and introduction

15:10 – Battery optimization

15:20 – Real-time battery optimizer

15:35 – PowerBot introduction

15:40 – Q&A and discussion

15:45 – End of the webinar

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KYOS Energy Analytics

- Activities started in 2002, founded in 2008
- 40+ people, head office in Haarlem, The Netherlands
- Specialists in energy & commodity markets: trading, valuation, risk management
- Combine quantitative background with practical solutions
- More than 100 corporate clients across the world using our software services

KYOS energy storage services

KYOS actively supports clients with energy storage projects

Software
battery valuation model KyBattery

Consulting
Valuation of future BESS revenues

Data
Flexibility market reports

21 May 2024

Press Release

KYOS advises GIGA Storage on the acquisition by InfraVia of a majority shareholding in GIGA Storage
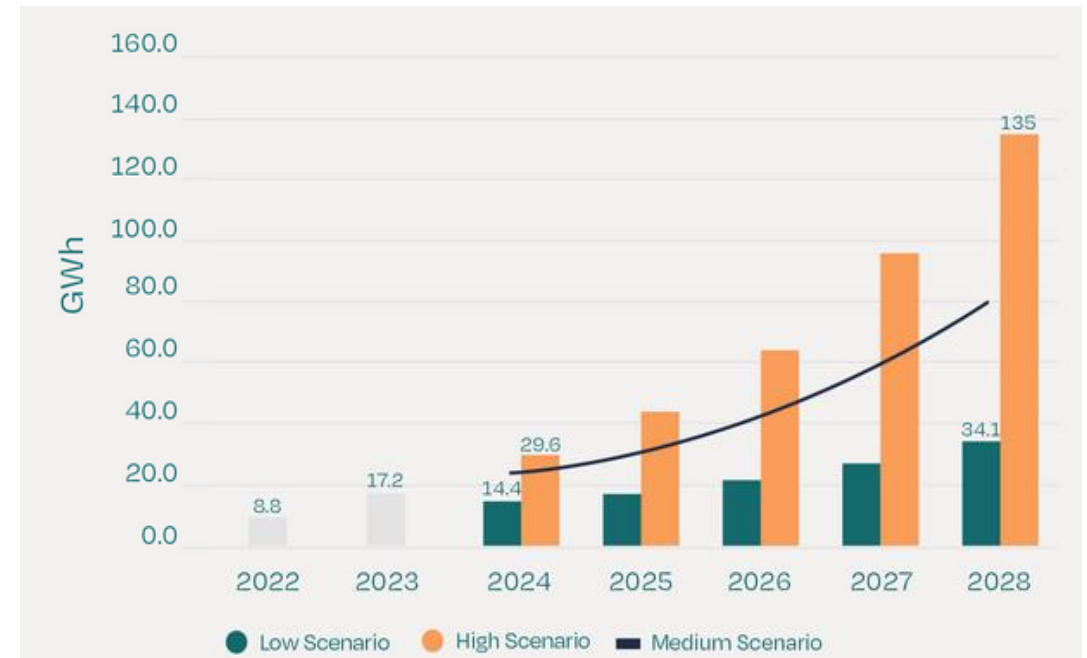
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BESS market

Energy storage -> strong growth

- Strong increase in renewable generation

- Phase out of conventional generation

- European Market Outlook*
  - Annual growth up to 135 GWh/year
  - Cumulative up to 404 GWh in 2028
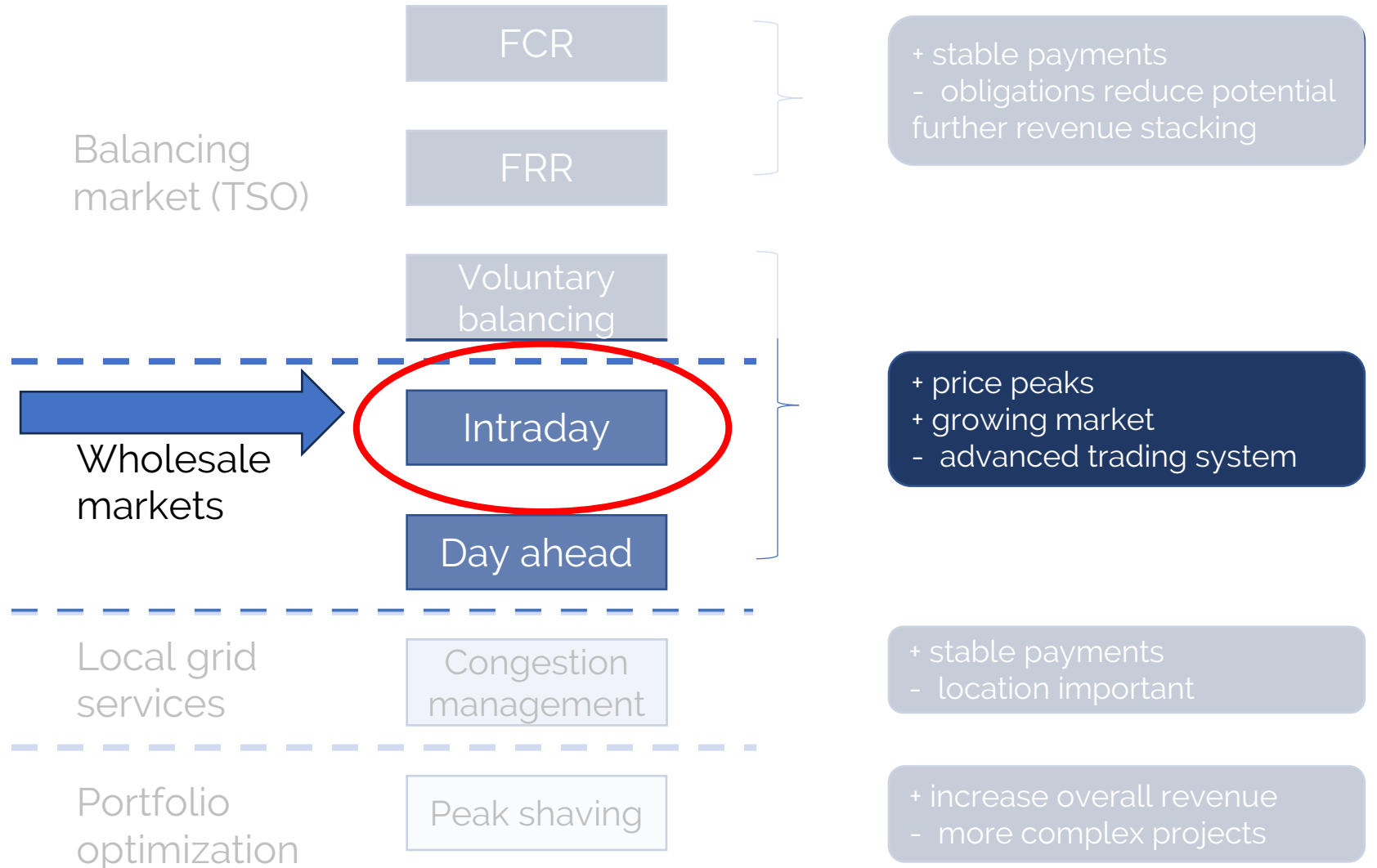 - 35-45% utility scale

* SolarPower Europe (2024): European Market Outlook for Battery Storage 2024-2028

Energy storage – revenue streams

Battery business case typically combination of revenue streams

Balancing market (TSO)
- FCR
- FRR

+ stable payments
- obligations reduce potential further revenue stacking

Wholesale markets
- Voluntary balancing
- Intraday
- Day ahead

Increasing role

+ price peaks
+ growing market
- advanced trading system

Local grid services
- Congestion management

+ stable payments
- location important

Portfolio optimization
- Peak shaving

+ increase overall revenue
- more complex projects

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Energy storage – market access

Market access for BESS assets:

- Classical: utilities/aggregator

- New: specialized short-term optimizers

- Profit sharing
  - Floor?
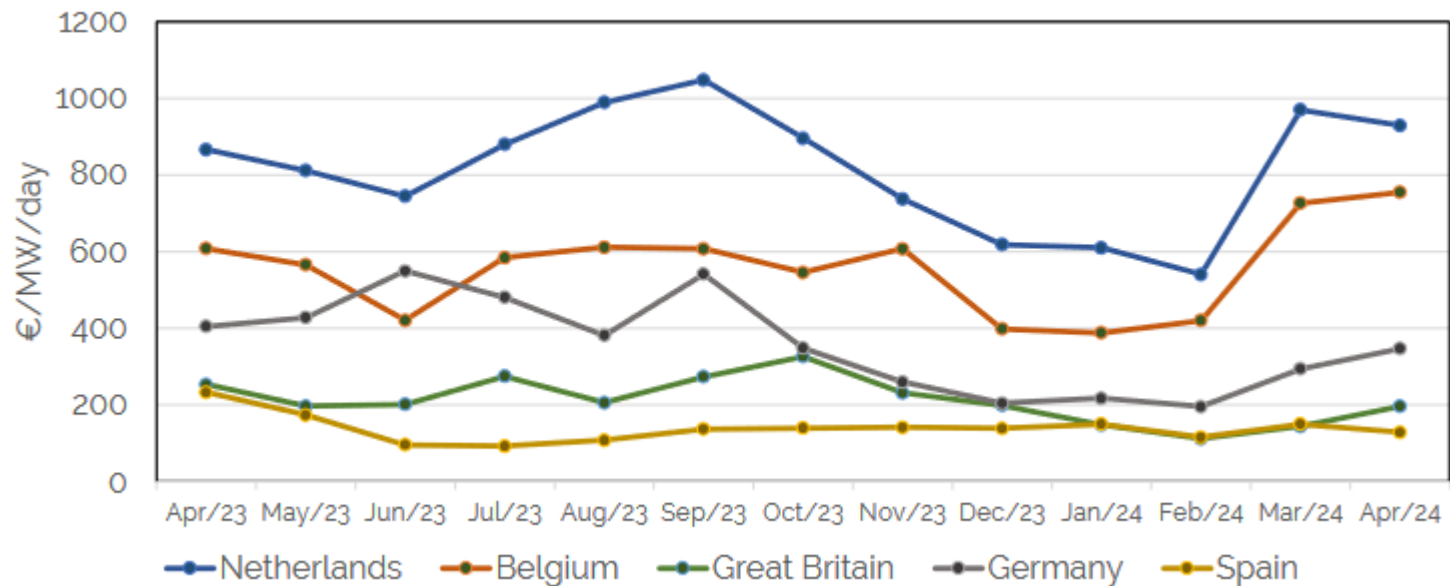 - Based on predefined formulas?
  - Open book?

- Fixed price?
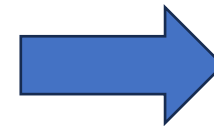
Need for independent BESS benchmark!

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Energy storage – benchmark

KYOS launched the **KYOS Battery index**

- Clear methodology
- Various countries
- Against actual (index) prices

Energy storage report

KYOS benchmark – assessments of battery energy storage value

No 5 – May 2024

www.kyos.com/energy-storage-report

Real-time optimizer

From index to real-time optimizer

- Battery index based on within day index (ID1)
  - Realistic?
  - Virtual trading?

introducing:
KYOS Real-time optimizer

Real-time optimizer – methodology

- Use actual (historical) order book information to decide about trades

- Only allow asset-backed net positions

- Take detailed battery characteristics in account
  - Energy and power capacity, RTE, cycle limits

- Select the most valuable combination of buy and sell orders from the continuous intraday market
  - XBID and local
  - Hourly, half-hourly, and quarter-hourly

- Submit matching orders into the (shadow) trading environment

- Update net positions based on executed (shadow) trades

- Reoptimize at fixed time intervals

- Within PowerBot infrastructure

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Real-time optimizer

Use cases

- BESS owners
  - New projects: compare to future revenue calculations
  - New projects: benchmark different BESS optimizers
  - Existing projects: benchmark performance of BESS optimizer

- BESS optimizers
 - Benchmark your own trading strategies

Real-time optimizer – case study

- 1 MW, 2-hour battery, 90% RTE, 2 cycles / day on average
- Assume no day-ahead positions
- Optimize once in every 5 minutes
- Expect a certain minimum margin from a cycle to limit churn rates
- Assume that only the best bid and best ask quantities are available for trading at the corresponding prices
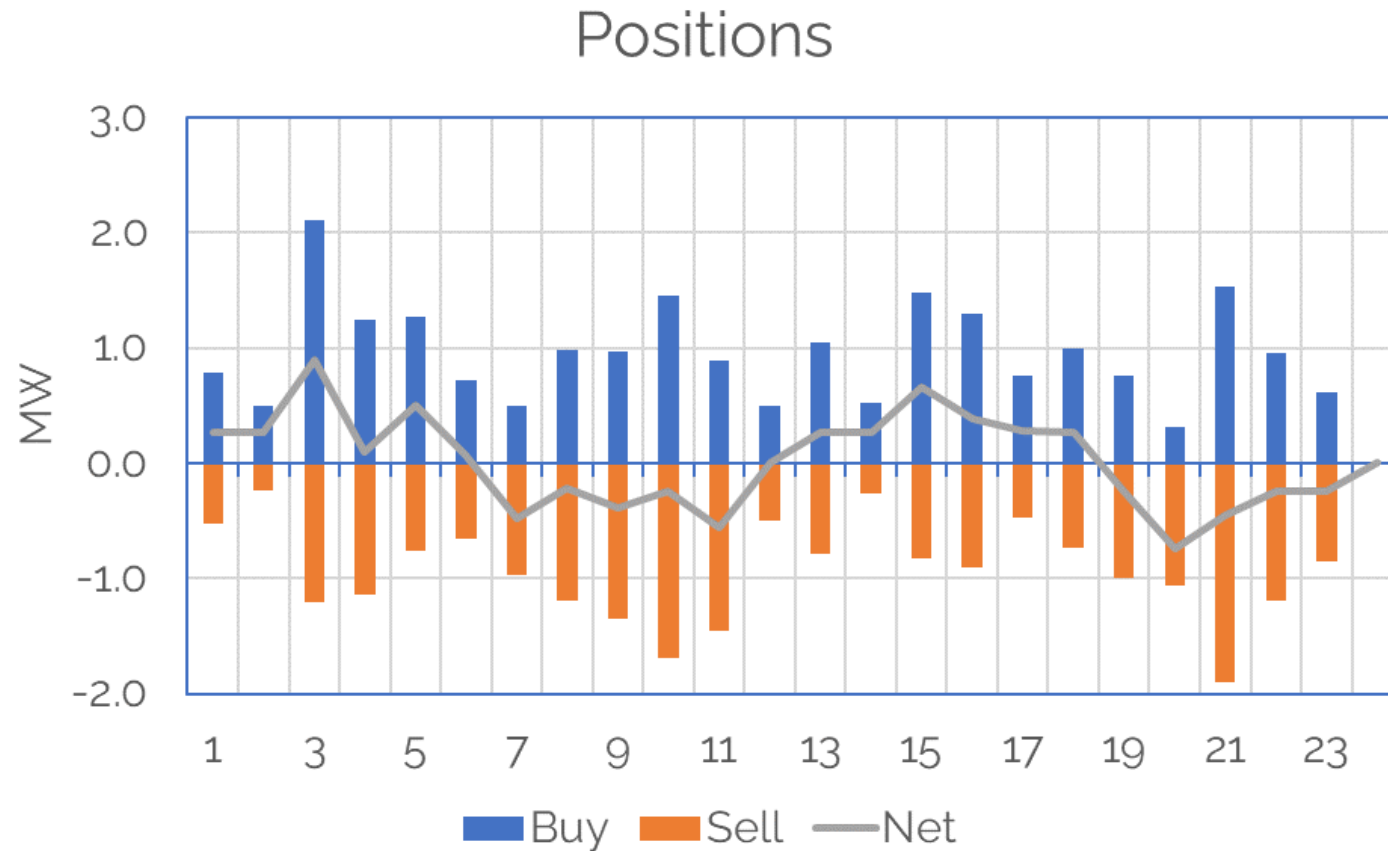- Execute all requested trades

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Real-time optimizer – results

- Market: Germany (Tennet)

-> Real-time Optimizer outperforms Battery Index
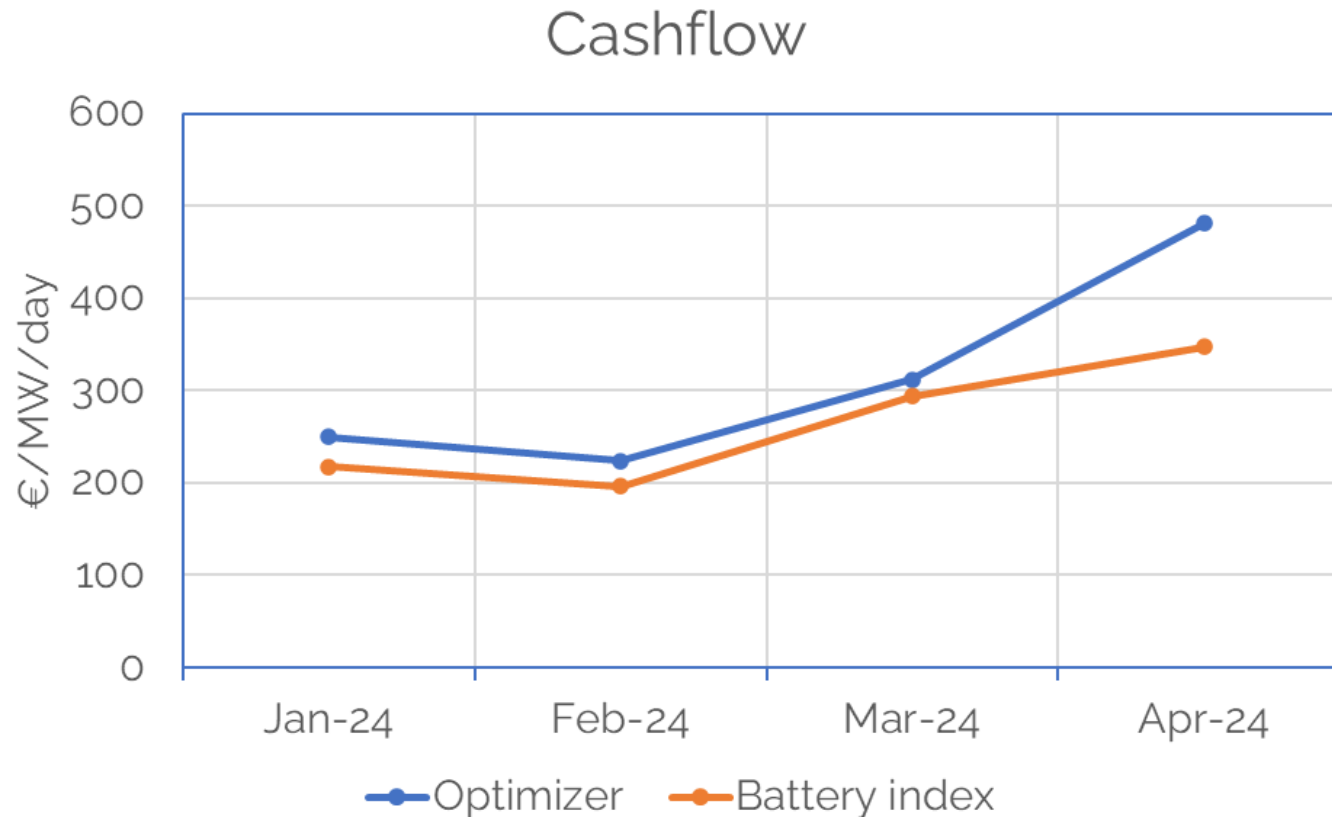
Cashflow

Real-time optimizer – results

Example of traded position: 2 April 2024

Positions

- Churn: 4-5x
- Cashflow from virtual trades: ~35-40%

PowerBot integration

PowerBot Algorithmic Trading

- PowerBot provides fully managed **24/7 automated trading**

- Connect to Day-Ahead and Intraday markets at **10+ different exchanges** across Europe

- Combine out-of-the-box strategies with custom solutions from **third-party providers**
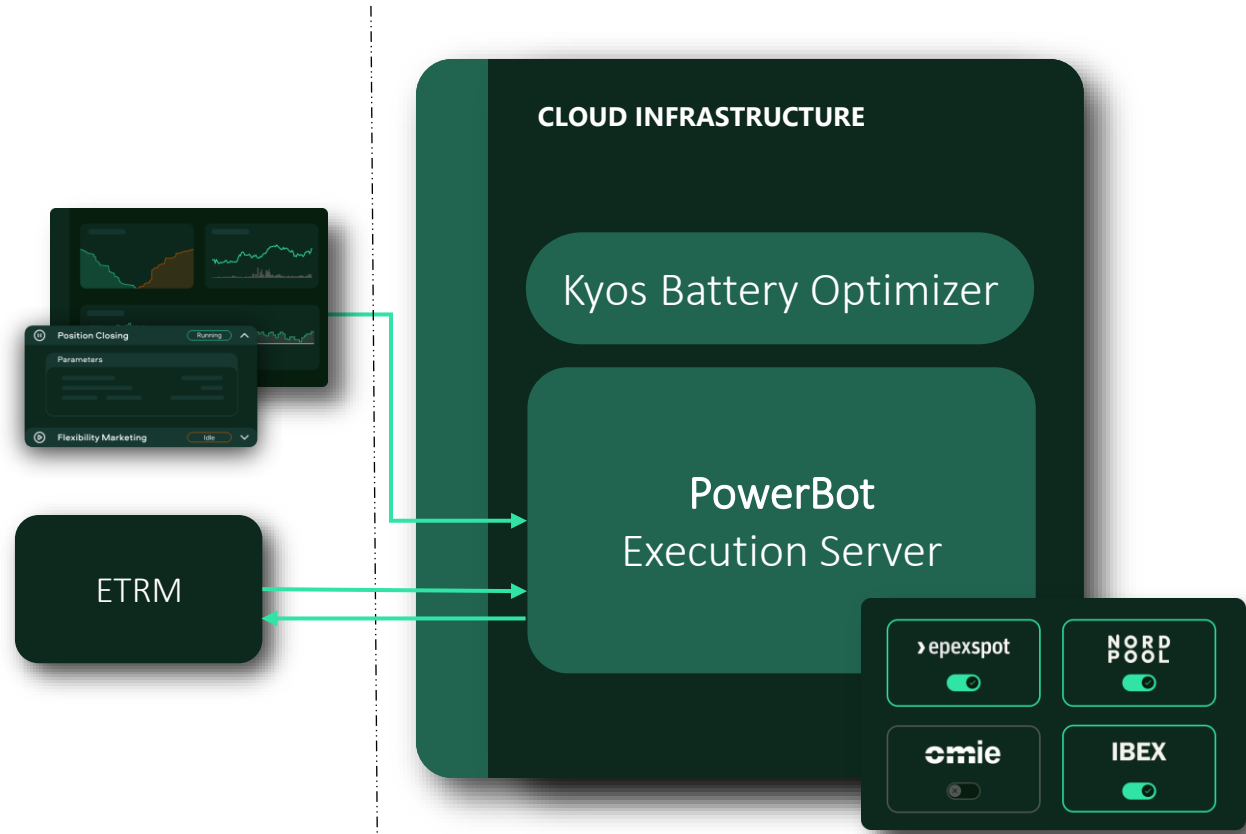
PowerBot Algorithmic Trading

Does it work for me?

Yes, if…	Yes, if…	Yes, if…
… you are a member of a supported power exchange	… you want to automate your trading 24/7 on the intraday market	… you want to programmatically connect to the market

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Roadmap & next steps

Real-time optimizer – roadmap

- **Launch mid-July 2024**
- Contact us to be the first to start testing this benchmark!
- Clear development path

FCR/aFRR

DA/ID auctions

Live shadow trading

Other flex assets

Continuous within-day

Historical back-test

Batteries

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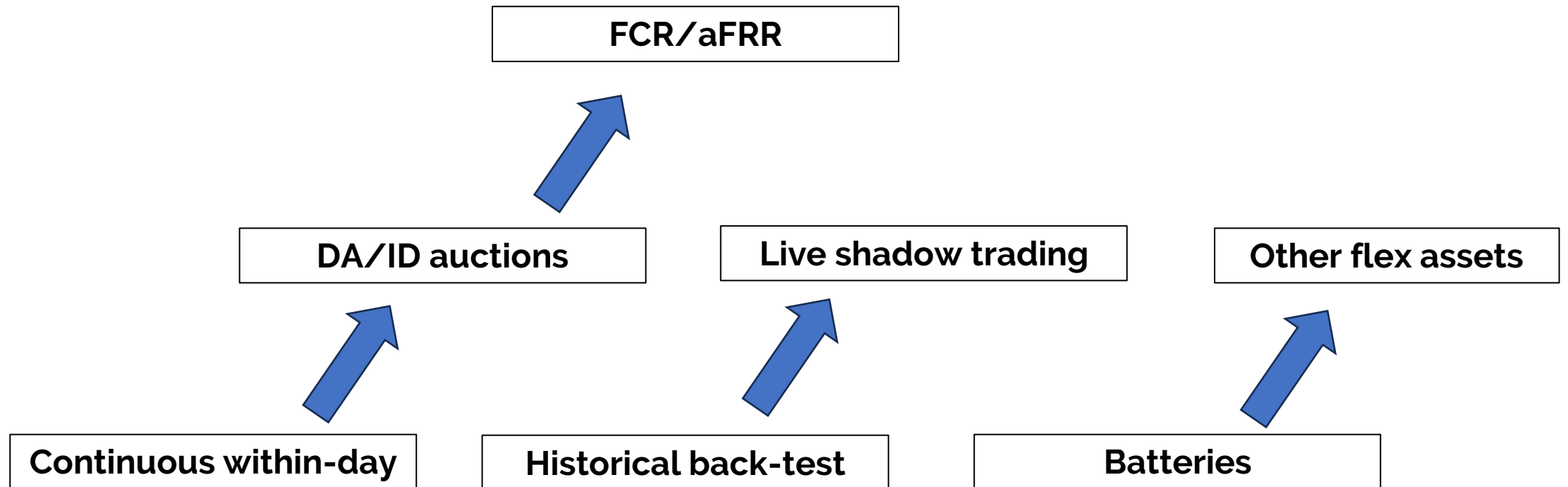
Questions and Answers

- Time for questions!

Contact Details

We look forward to supporting you with the right tools and advice in the rapidly changing energy sector!

KYOS

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