PowerBot

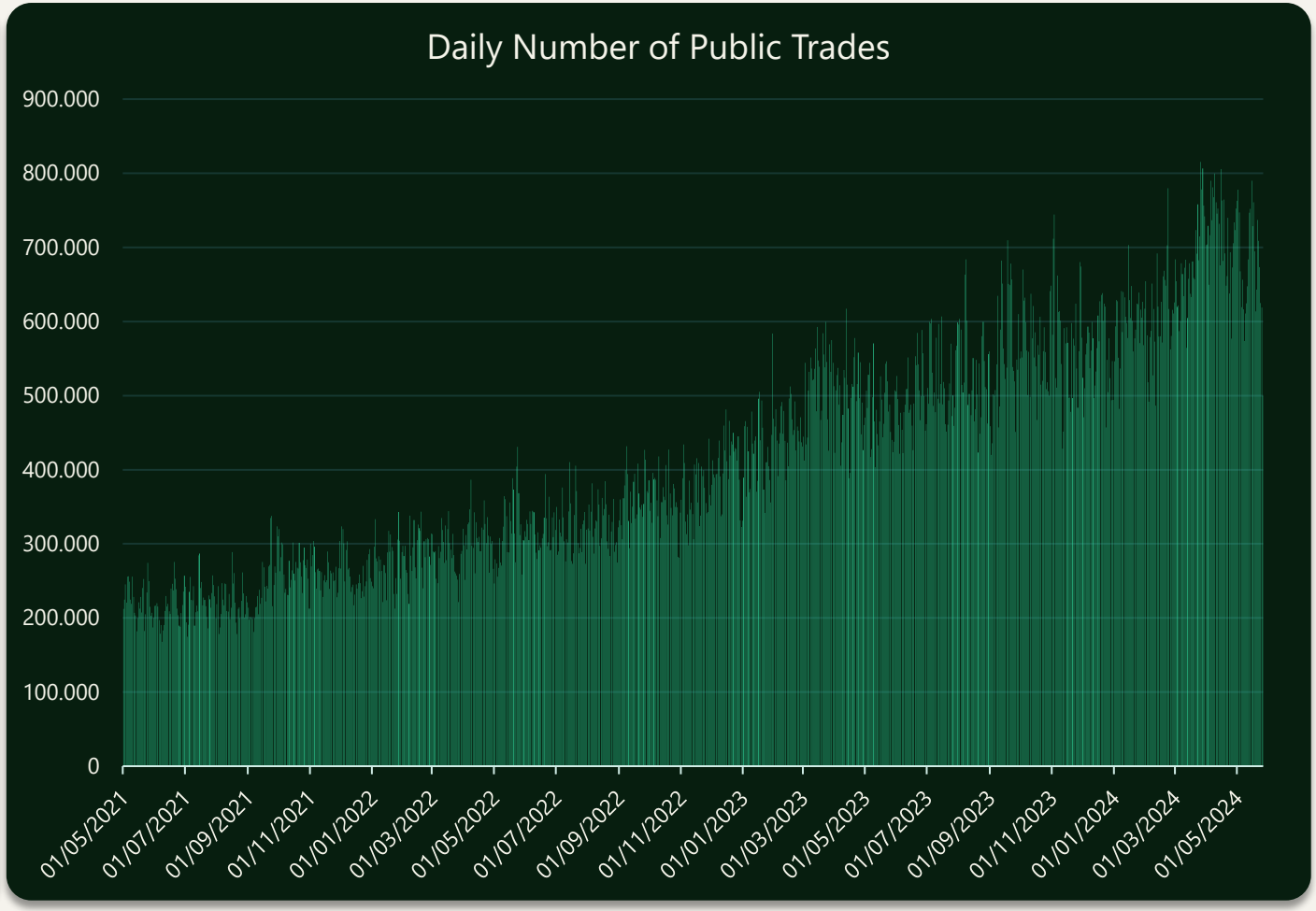
From Data to Decisions

Driving Energy Trading with Big Data Insights

Maximilian Kiessler

Why Big Data Matters More Than Ever

- **We will never produce less data than yesterday**. The relentless growth of data underscores the need for robust data management and analysis systems.
- In the last **3 years**, the average number of daily trades has **increased roughly threefold.**
- Trades are only a fraction of the number of orders being produced, emphasizing the **complexity and volume of data** generated.



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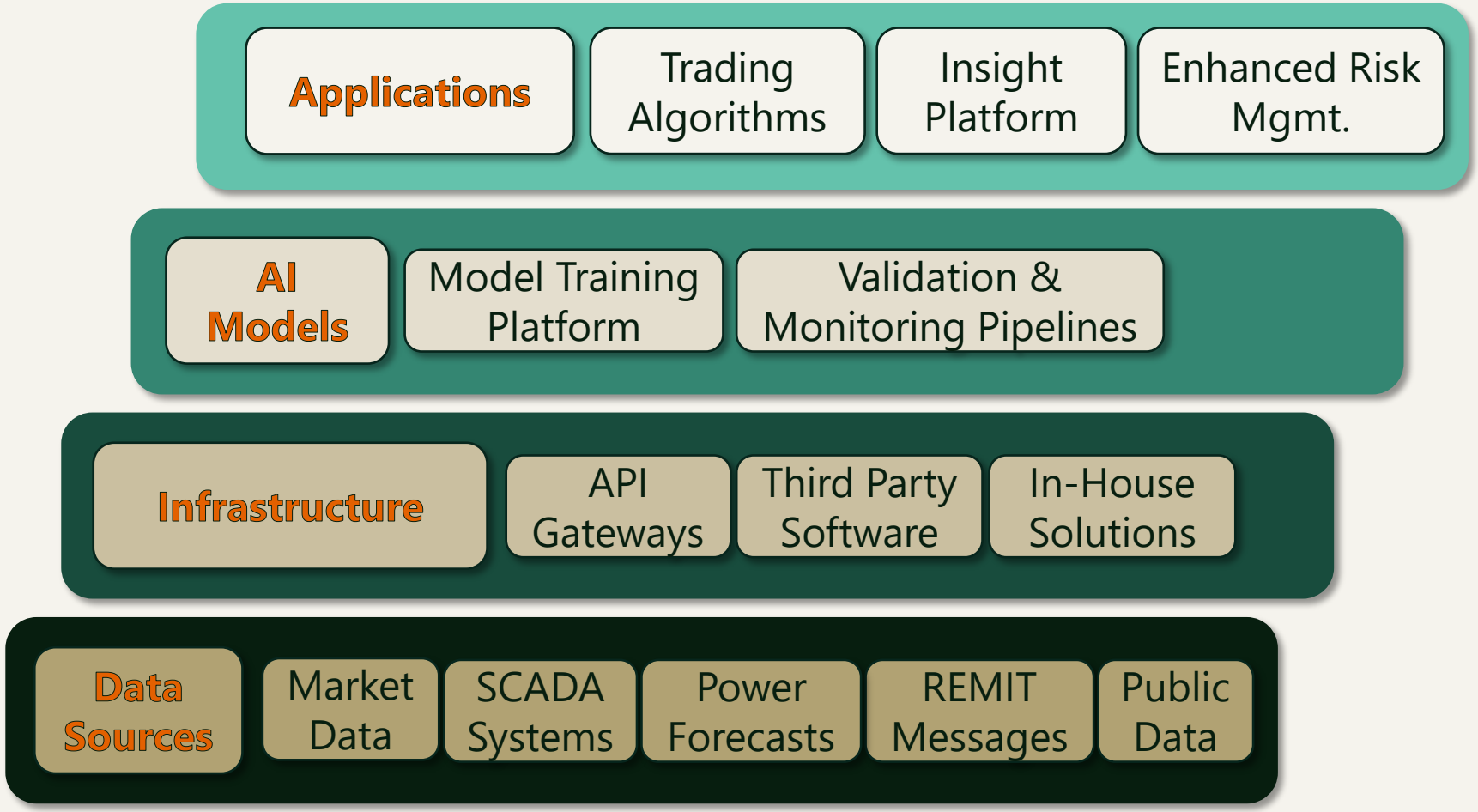
The New Operational Model for Energy Trading

Building a Data-Driven Foundation for Enhanced Decision-Making and Efficiency



Source: Horváth & Partners

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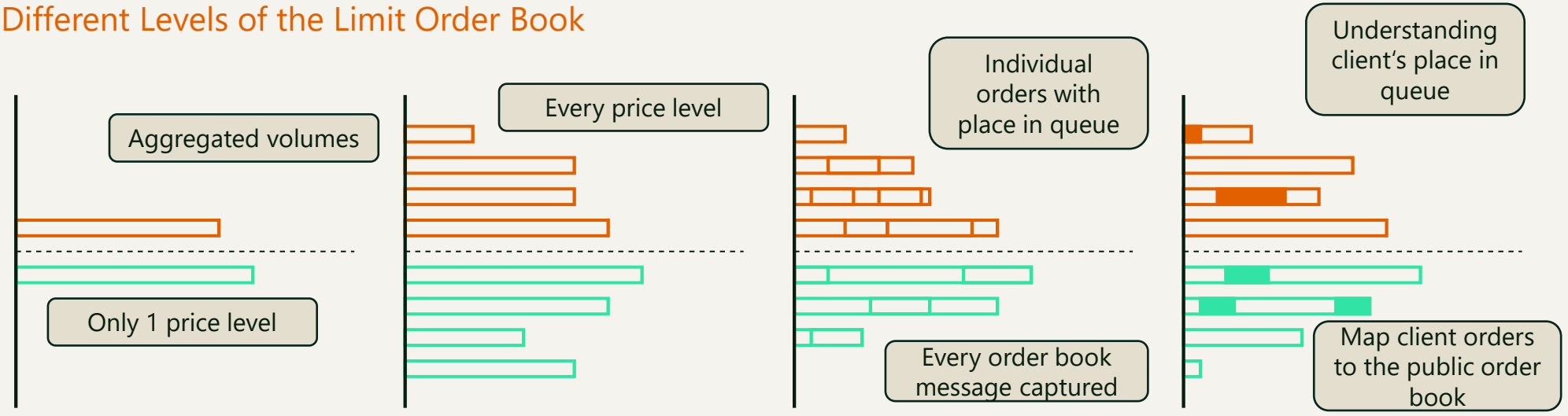
Understanding Data Sources in Energy Trading

Examining the Different Levels of the Limit Order Book



Level	Level 1	Level 2	Level 3	Level 3+
Description	Simple Insights	Deep Insights	Deep Understanding	Full Understanding
Available data	Best bid and ask price plus all trades	Volume at every price level plus all trades	Every revision of a public order plus all trades	Every revision of a public order plus all trades + all own order revisions and own trades
Information gathered	Understanding of bid-ask spreads, volume and mid prices	Adds execution cost for volume and average liquidity	Adds order book dynamics (order lifetimes, iceberg modelling, best price races etc.)	Adds own market impact, own order lifetimes and efficiency of own strategy

Source: BMLL

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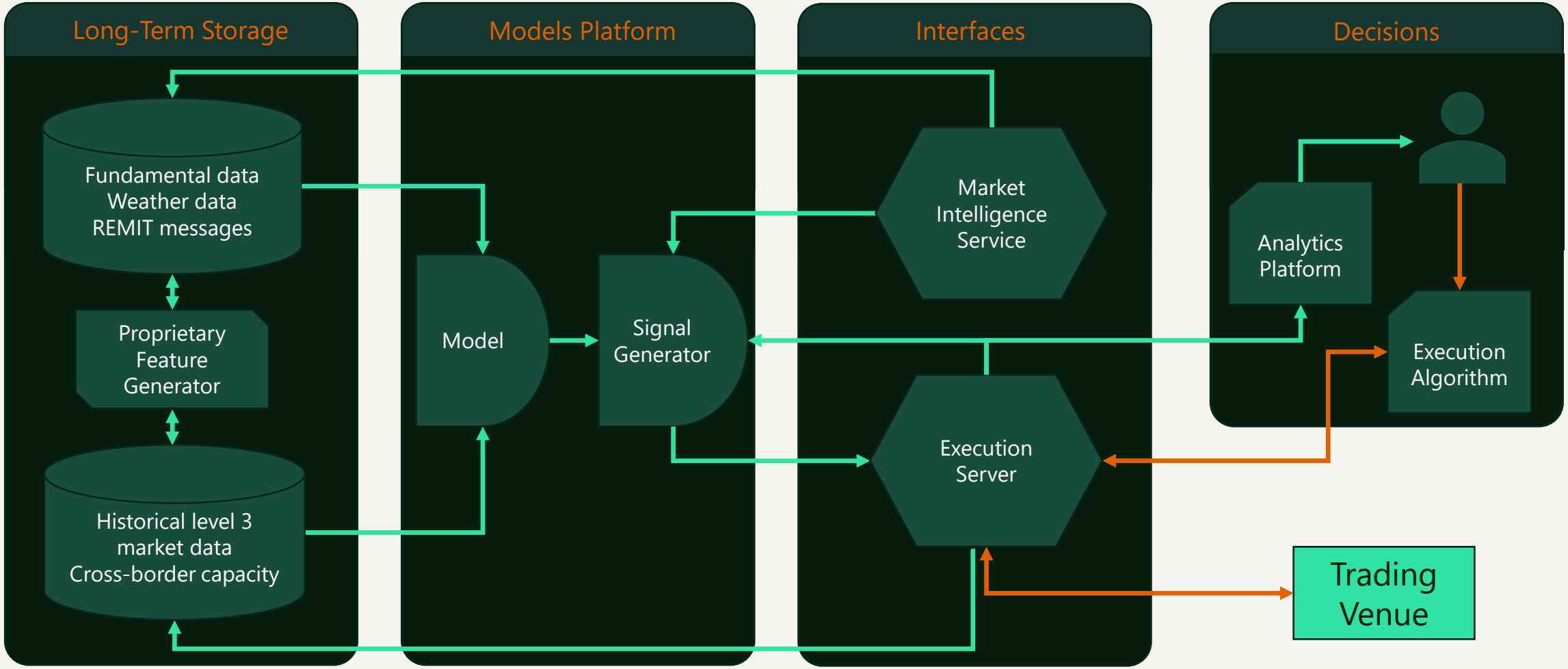
Blueprint for Energy Trading Infrastructure

Designing a Robust Architecture for Big Data Management and Analysis



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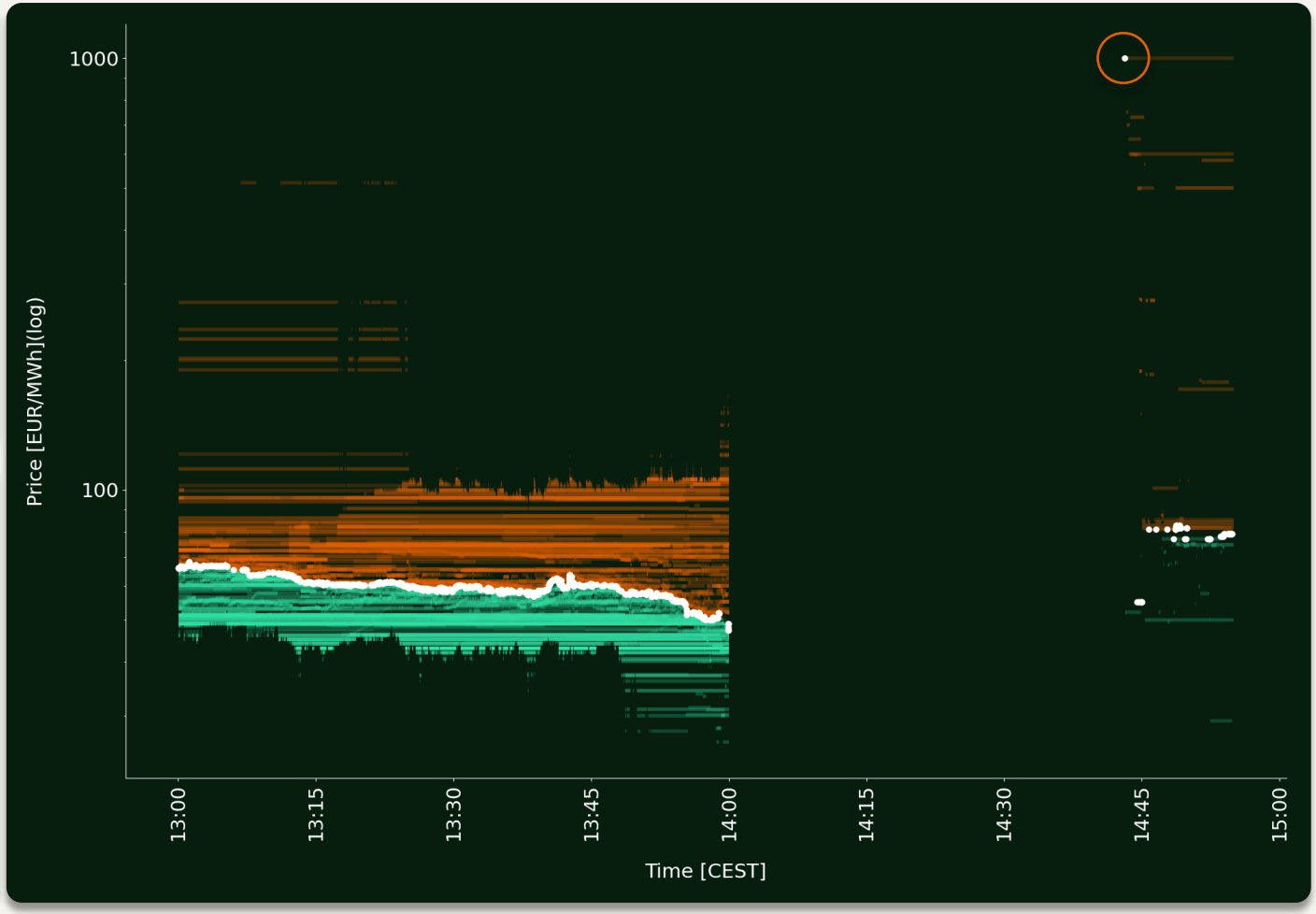
Navigating Algorithmic Turbulance

Scenario

- Area: Amprion, Germany
- Exchange: EPEX
- Contract: 15:00 – 16:00 CEST 17.04.2024
- **Liquidity gap** due to technical outage of the exchange

Conclusion

- **Microstructure** of the order book reveals crucial market behavior information
- **Safety mechanisms** to cover rare but impactful scenarios are required



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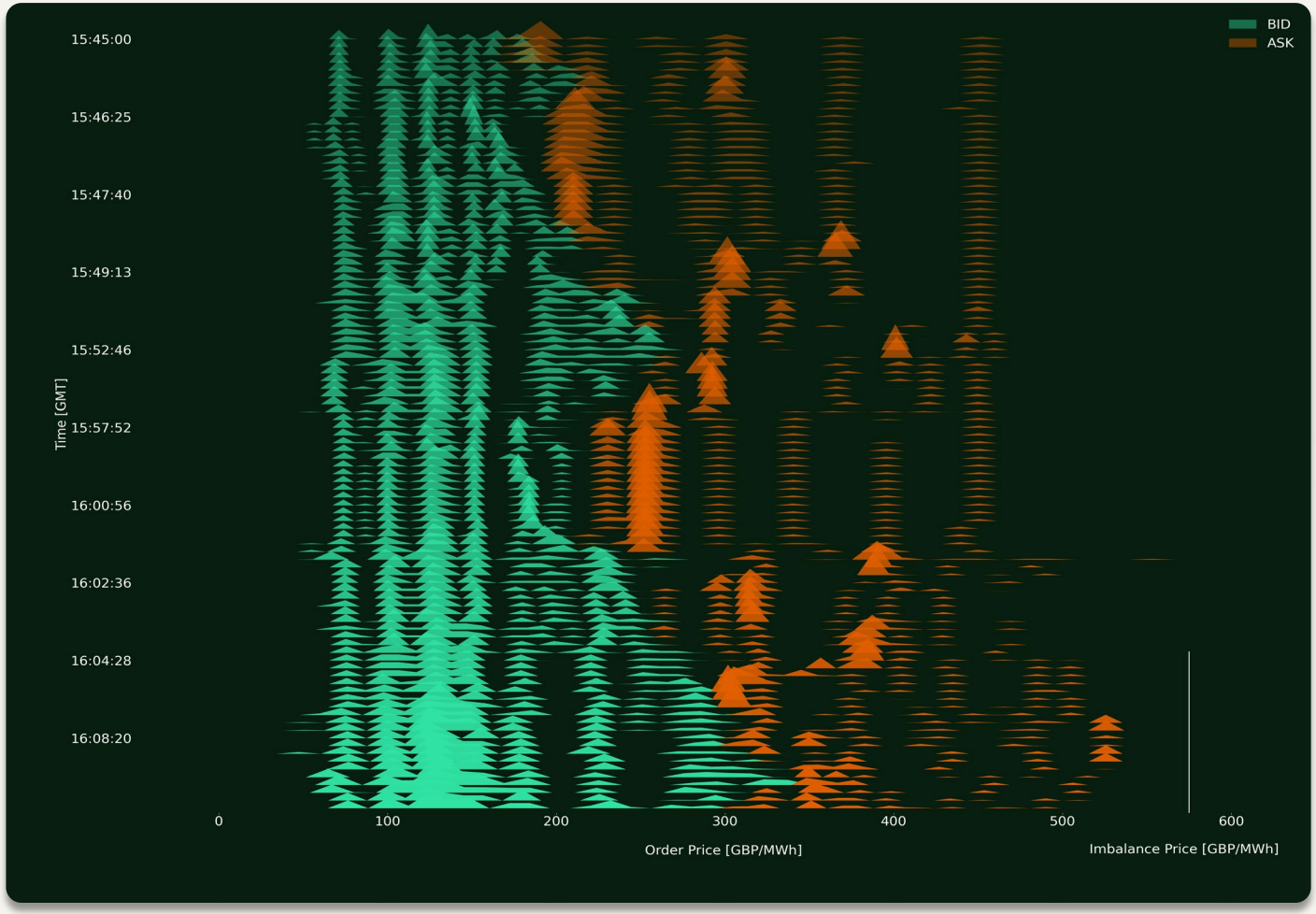
The Power of Visualization



Scenario

- Area: Great Britain
- Exchange: EPEX
- Contract: 16:30 – 17:00 GMT 07.03.2024
- Order book reflects the market's **imbalance expectation**

Conclusion

- Gaps in **order book's support levels** foreshadow price movements
- Creative analysis helps understand complex problems

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Synergizing Data Streams for Enhanced Clarity

Scenario

- Area: Bulgaria
- Exchange: IBEX
- Contract: 21:00 – 22:00 EET 10.02.2024
- German **transfer capacities** impact regional markets

Conclusion

- Good **understanding of local markets** allows for targeted hypothesis analysis
- Combining **multiple data sources** provides better oversight

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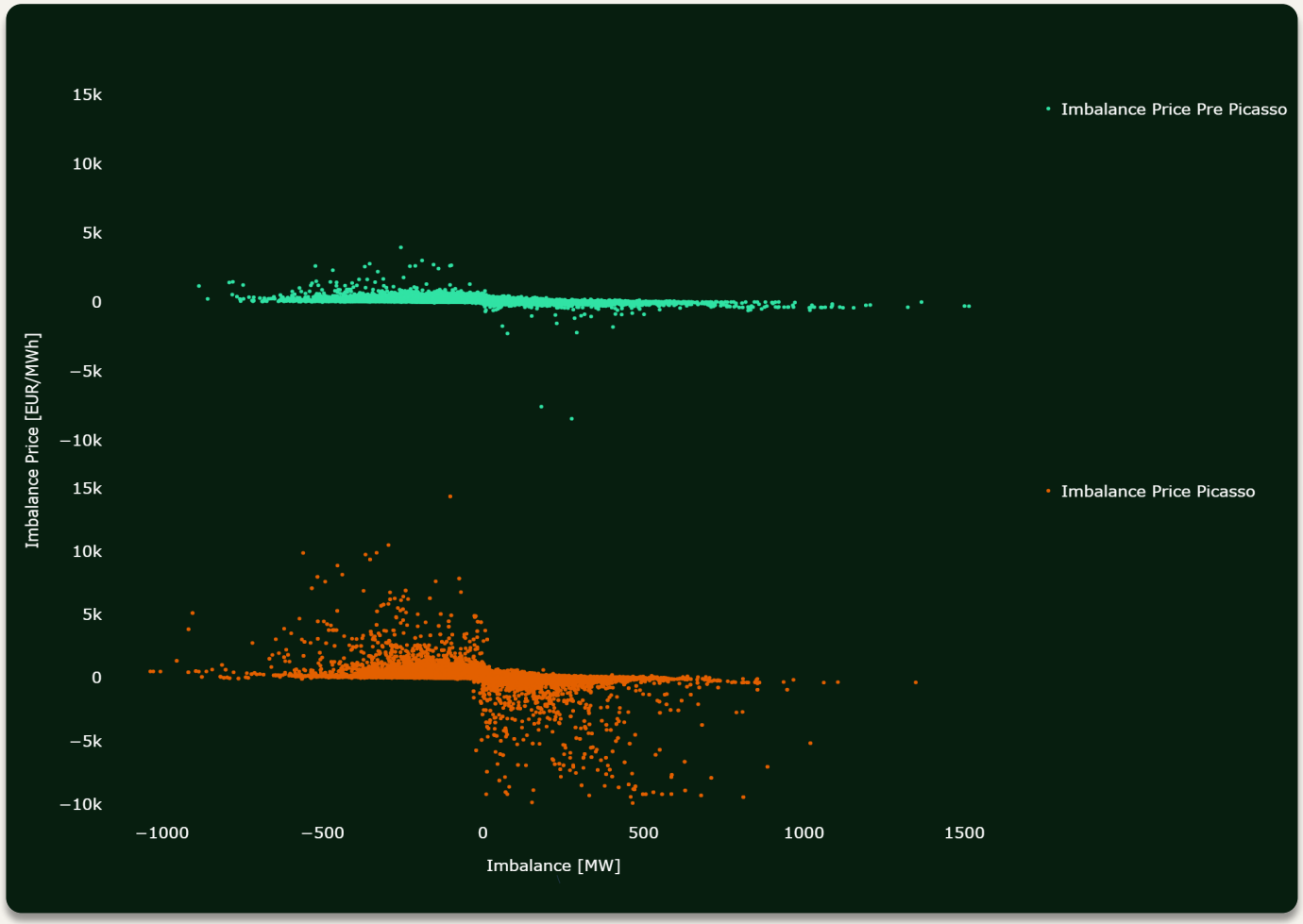
Analysis of Big Picture Market Trends



Scenario

- Area: Austria
- Pre-Picasso: 01.01.2022- 21.06.2022
- Picasso: 22.06.2022 - 15.05.2024
- Control area imbalance vs. imbalance prices for APG

Conclusion

- High relevance of constant monitoring of **regulatory market changes**
- Examine overarching trends, then focus on specific relevant subsections for deeper analysis

FINAL THOUGHTS

MORE OPPORTUNITIES

- A **robust data infrastructure** is the foundation for successful energy trading and the **precursor to leveraging more sophisticated technologies** and operational processes.
- The energy trading landscape is **dynamic**. **Continuous improvement** through data-driven insights is key to staying competitive.
- Embrace the **evolving data landscape** to ensure your trading strategies remain **ahead of the curve.**

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Thank you for your attention!

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