KRAKEN

PART OF THE octopus energy GROUP

2024 Energy Storage Summit - Rome

Market Participation: A Case Study on Navigating Multi-Market Control & Optimisation Opportunities with Advanced Tools like Kraken

1

Why do we need Energy Storage?

2

Lessons from GB Market and applying that to international markets

Since 2016, we've been building the first fully integrated post-transition energy company

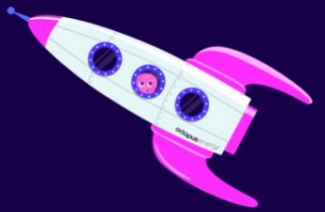
27
countries

1,600
employees

65m
accounts & capacity contracted to Kraken platform

43GW

50%
GB market share for BESS



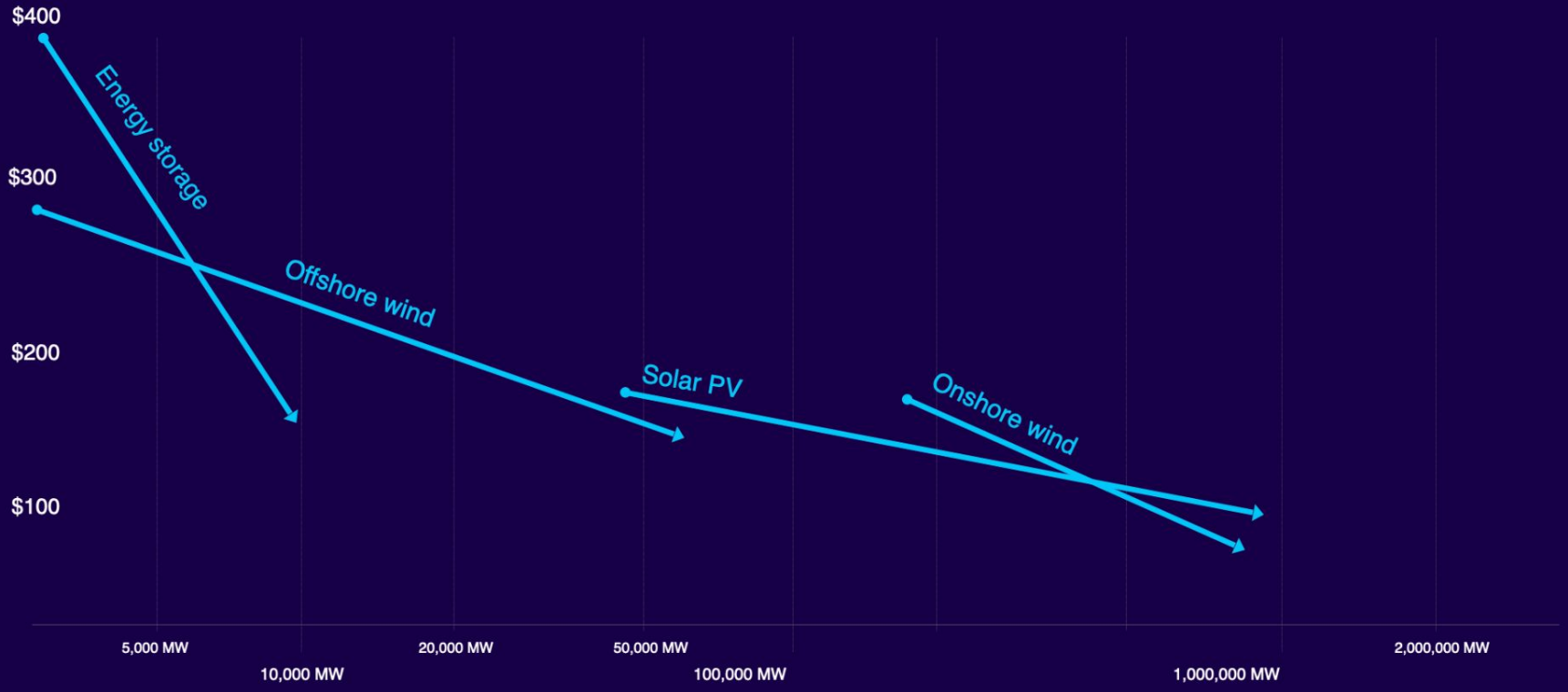
1

Why do we need energy storage: it responds sub-secondly and supports the buildout of renewables

The energy system is changing because the generation mix is changing

Deploying more renewables and storage has driven down costs

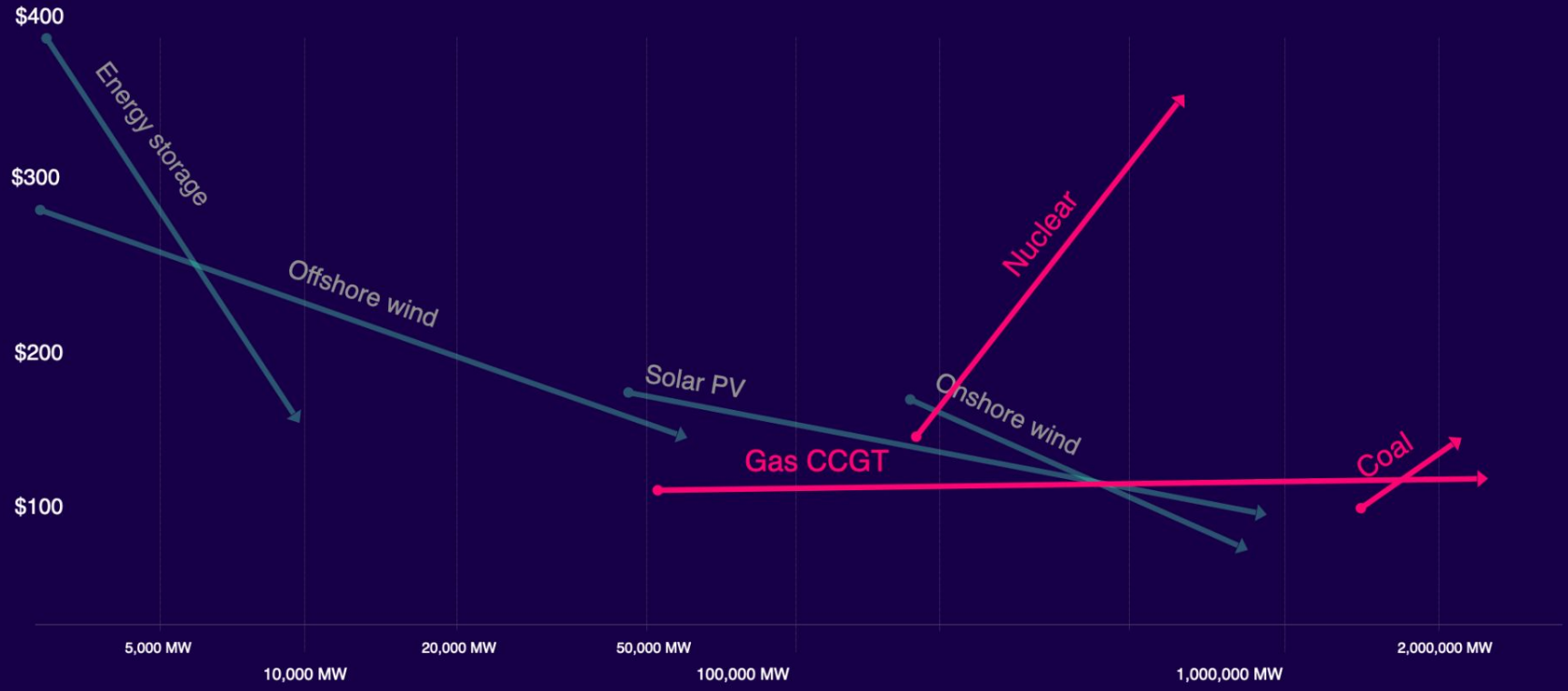
Price per MWh of electricity without subsidies in 2013 compared to 2023



Source: Bloomberg New Energy Finance

Nuclear, coal and gas have become more expensive

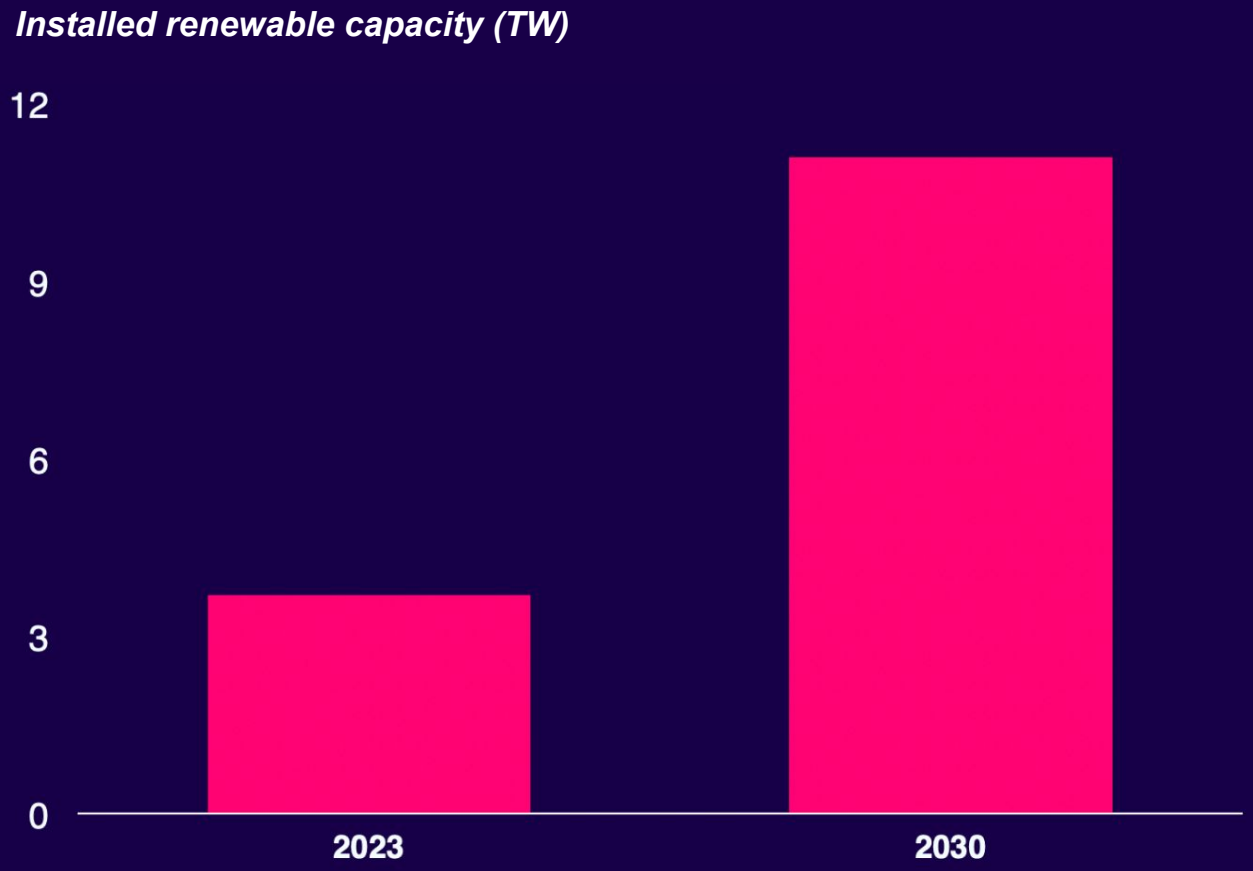
Price per MWh of electricity without subsidies in 2013 compared to 2023



Source: Bloomberg New Energy Finance

The energy system is changing because of the build out of intermittent generation

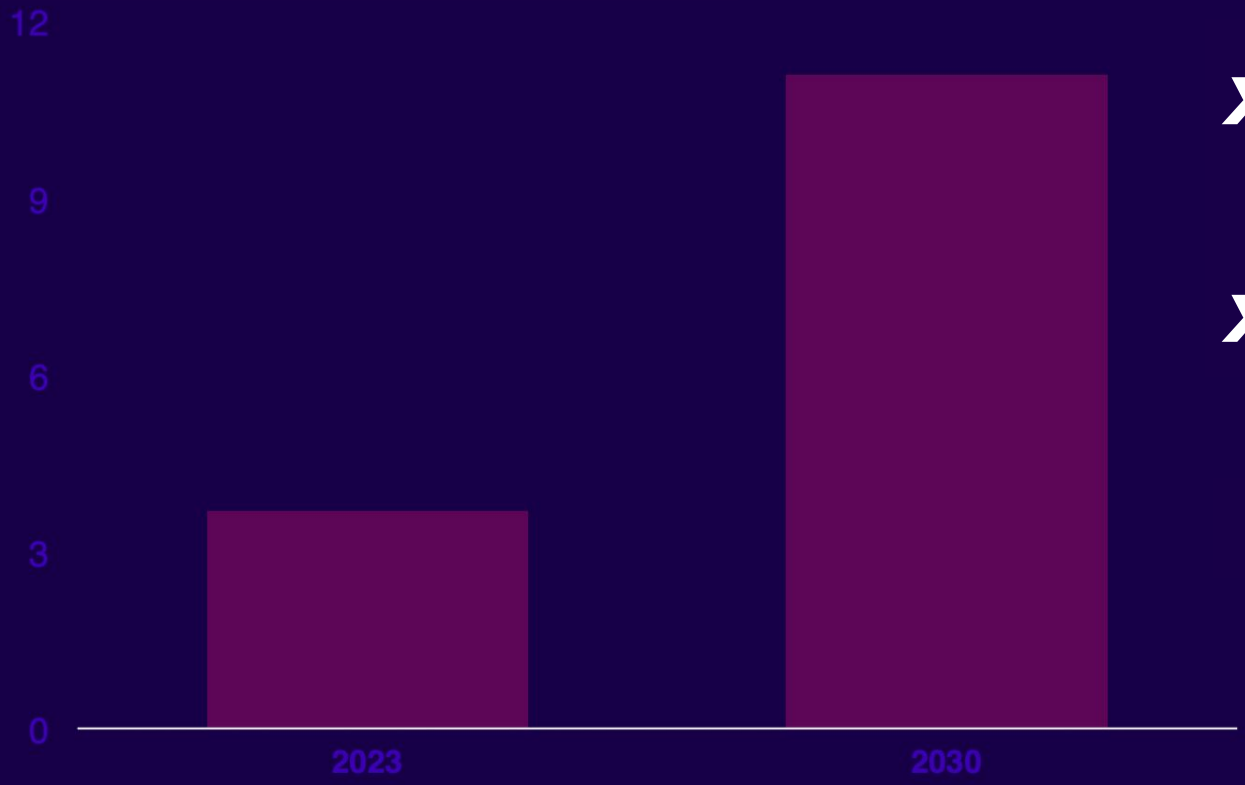
The world has committed to triple renewables by 2030



Source: Bloomberg NEF

The world has committed to triple renewables by 2030

Installed renewable capacity (TW)



x4 Solar

x4 Wind

Source: Bloomberg NEF

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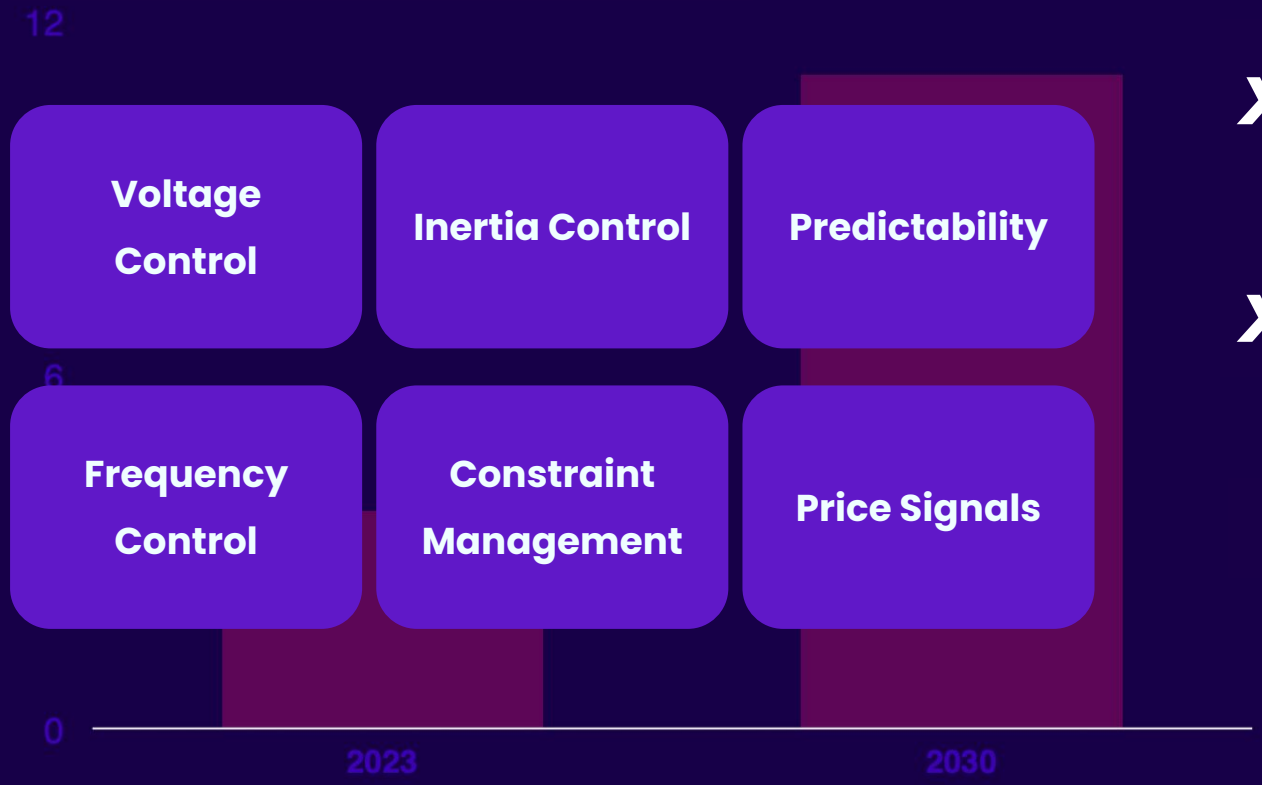

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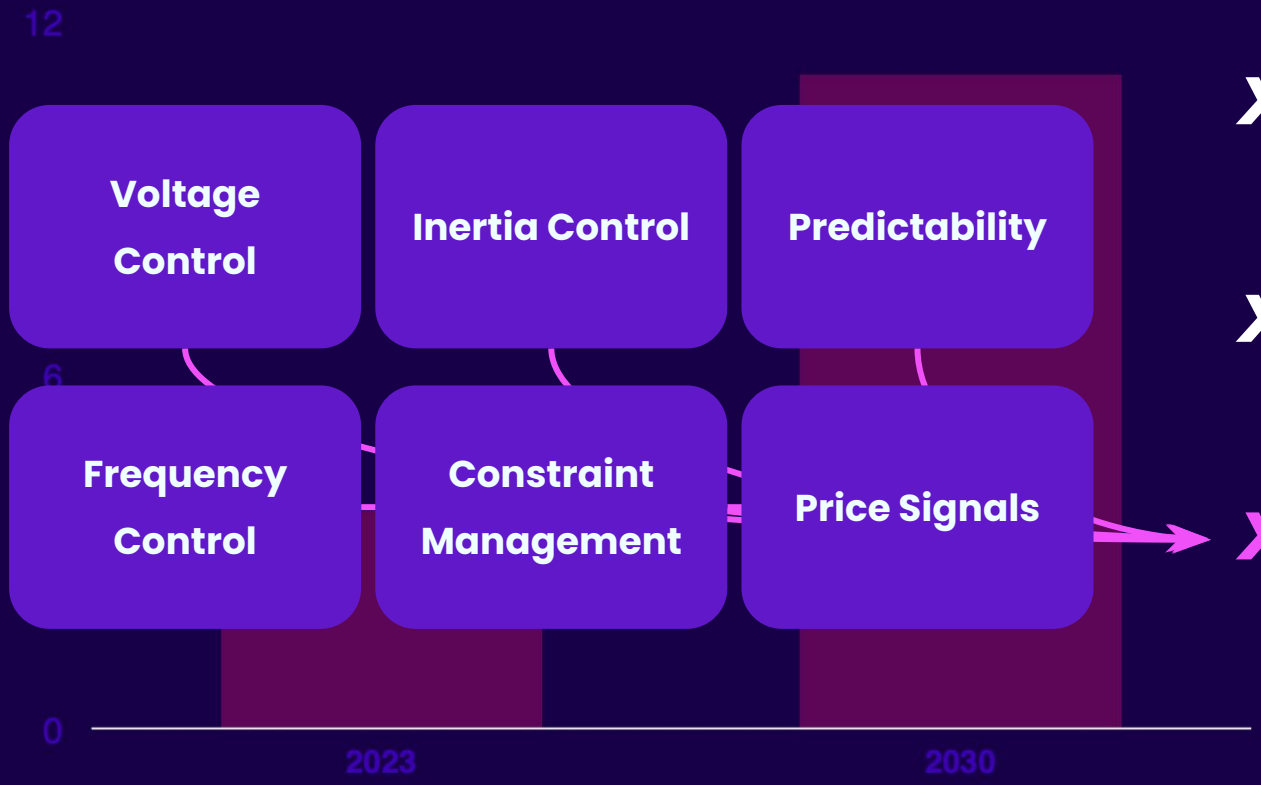


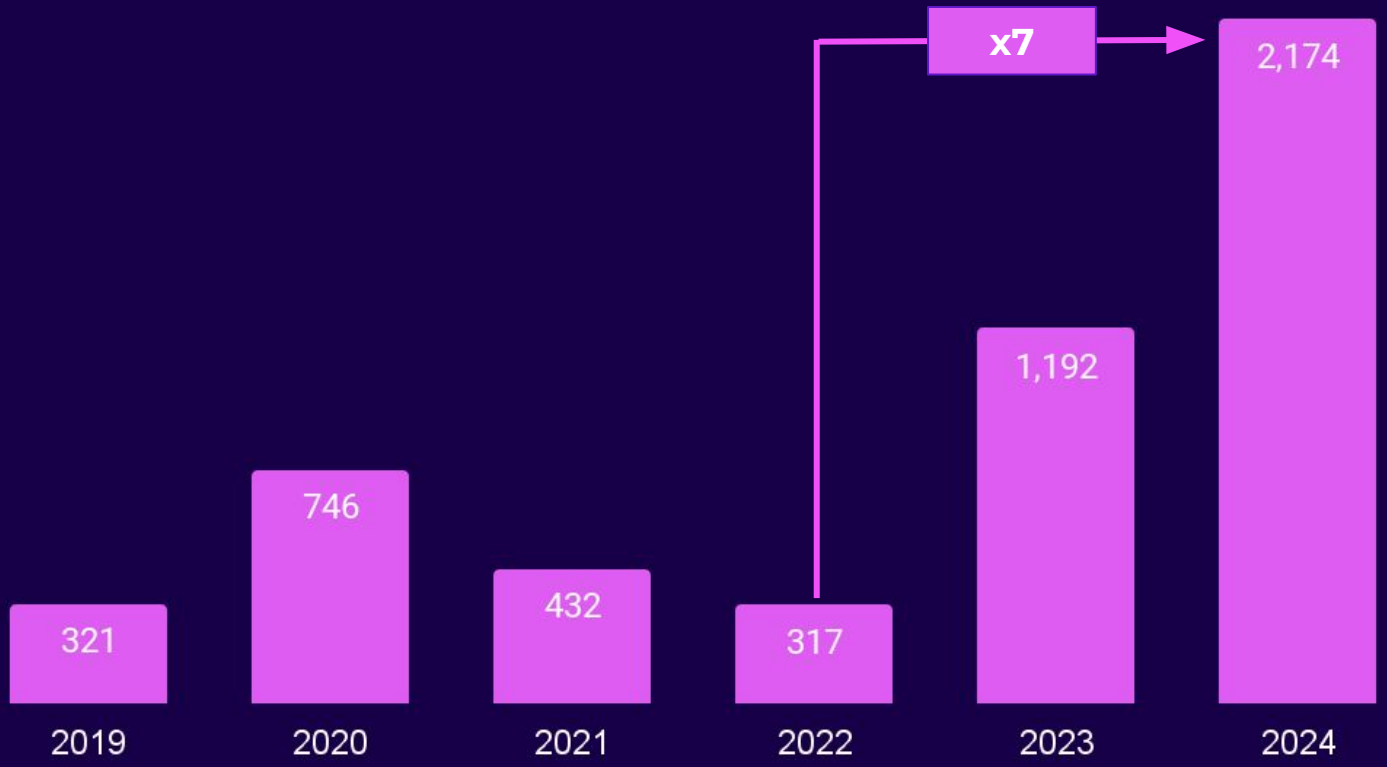
x4 Solar

x4 Wind

x16 Storage

Source: Bloomberg NEF

Negative price hours have grown x7 since 2022...

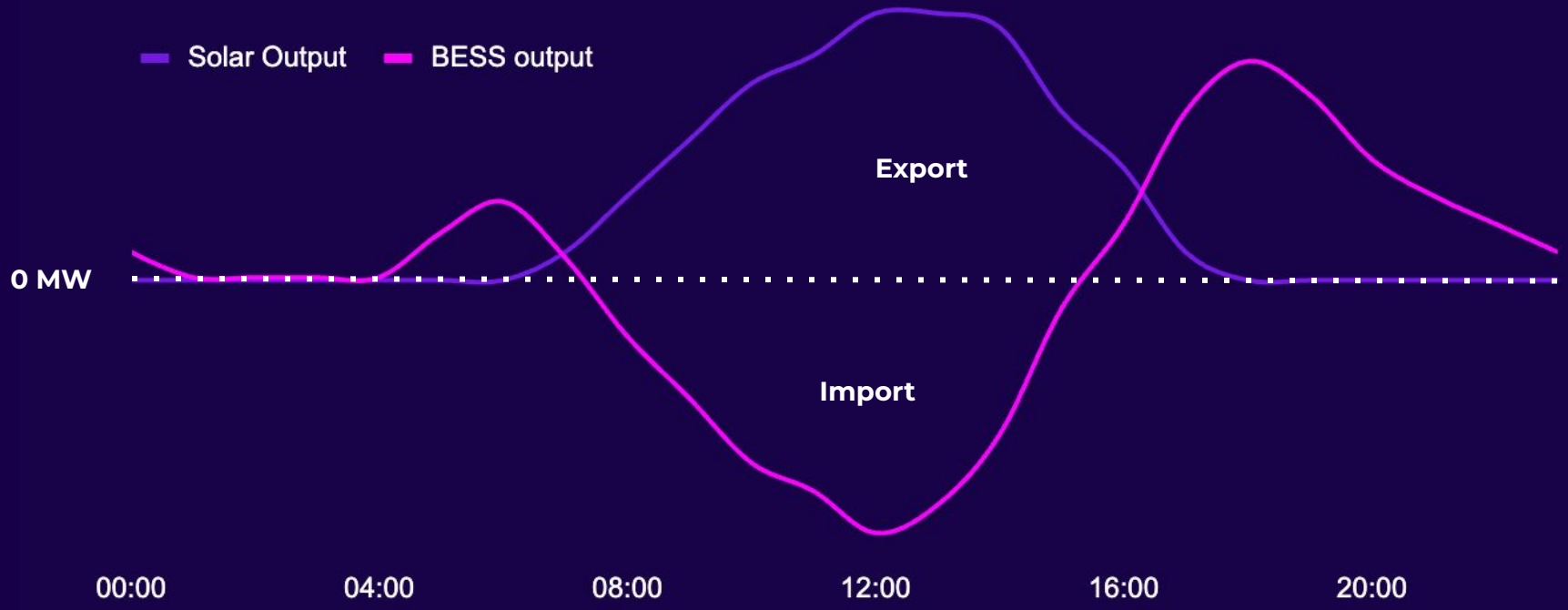


Markets: GB, DEU, BEL, NED, POL, ESP, FRA. Source: Ember

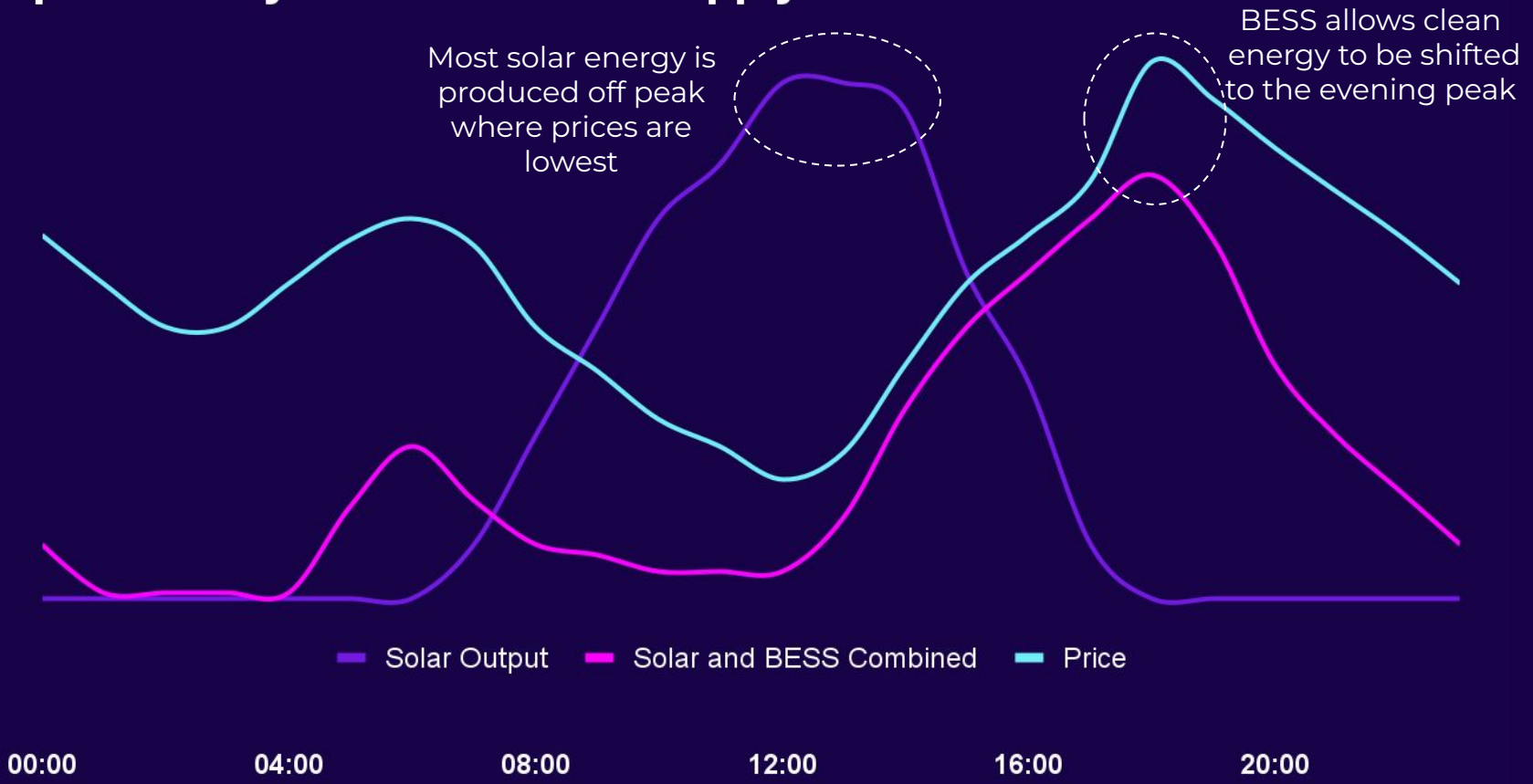
...and 80% have occurred during peak sunlight hours

Markets: GB, DEU, BEL, NED, POL, ESP, FRA. Source: Ember

Co-located BESS charge up on cheap solar energy and discharge for the evening peak



Solar output is limited to cheaper periods: BESS enhances dispatchability to better match supply and demand



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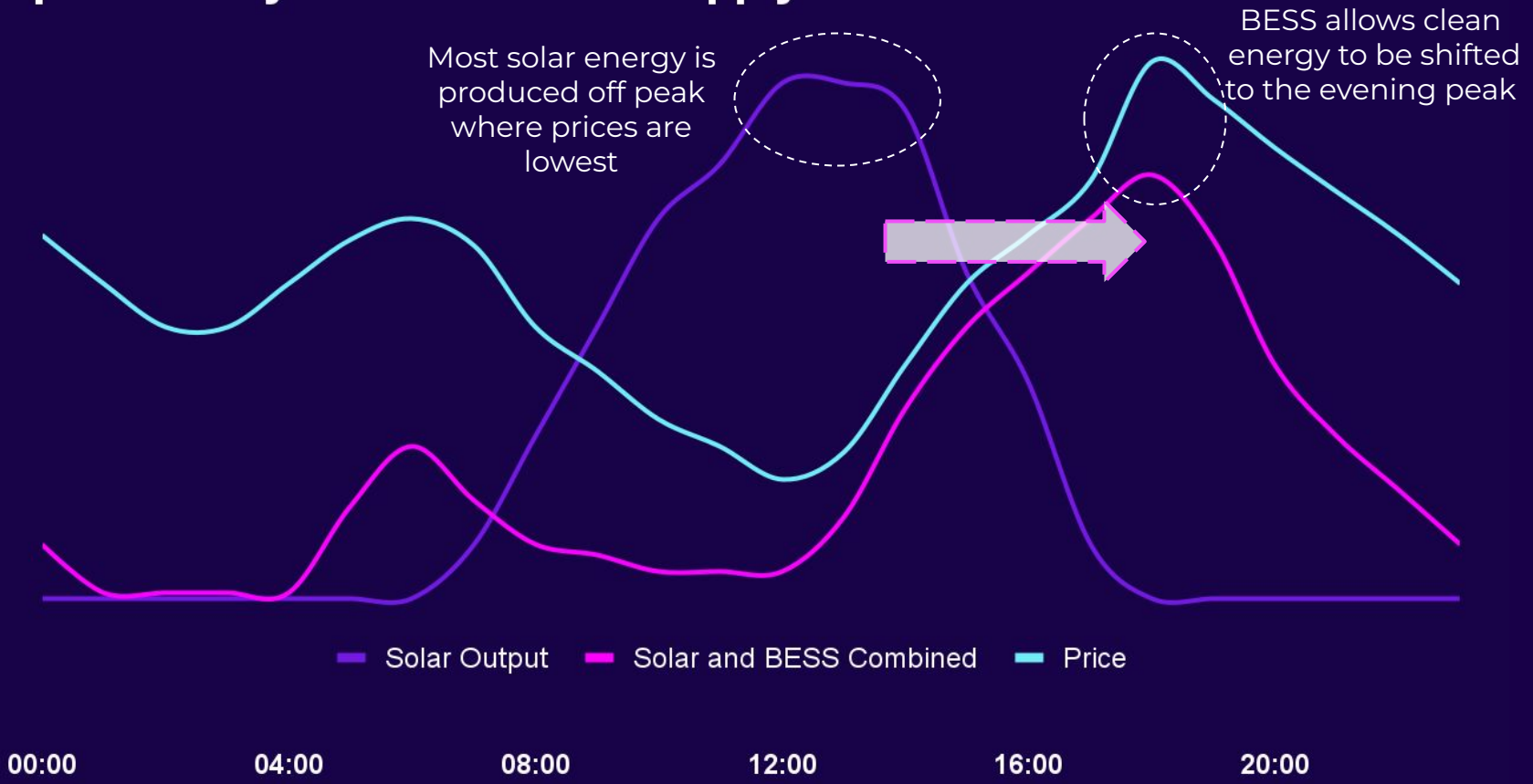
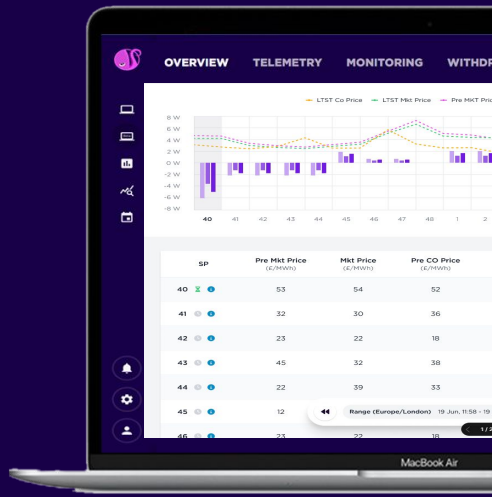


2

Lessons from GB Market: What does that mean for international markets

As battery expansion grows, technology & skills need to stay ahead of the game



As Markets mature, demands change:

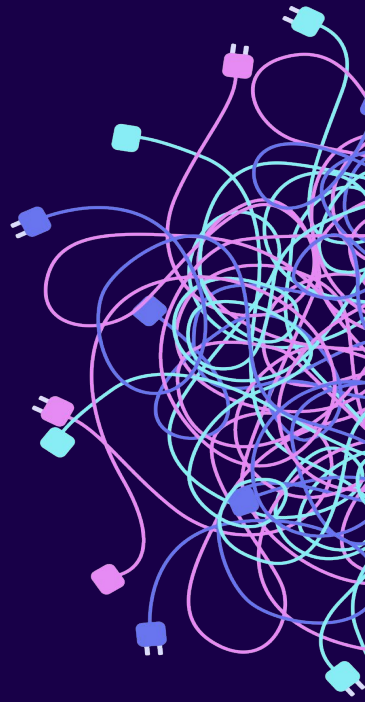
Market Sophistication

Automated orchestration for all stackable services

Balancing and trading with multiple stackable ancillary services, across multiple asset classes with minimal downtime

Energy Arbitrage for a single BESS asset

Transparency of decision making of portfolio of mixed assets with minimal downtime



Required Product Capability

Can you control & optimise our single BESS asset?

What happens when there is a negative price period for a portfolio of mixed asset classes with multiple individual strategies?

When is the best time to schedule in outages on site for updates?

Can we offer gateway upgrades and site onboarding without outages?

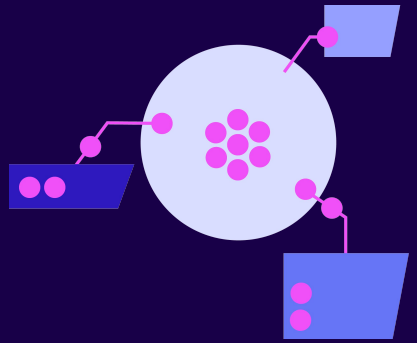
Ensure that you are ready for this new regulatory change...

Can we partner on understanding how these regulatory changes may impact BESS?

Our product strategy articulates around 3 principles:

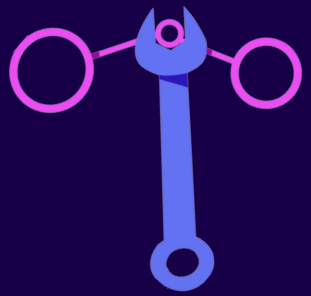
Global

We develop product capability to be available around the globe, so we can equip our clients with one solution globally. One global solution complemented by region specific layers.



Modular

We understand that every client has their “secret sauce”. Our product provides a powerful engine capability that can be used in a modular and customizable way (APIs, data lake, dashboards..)



T-shaped

Depth and breadth. We include all asset classes, think cross-assets operability and optimisation, and drill our capability from planning to real-time.

Existing markets and product learnings

Understanding the interplay between market structure and product offering allows us to **develop day one solutions** that **facilitate successful growth** in new markets as a **partner with Asset Owners, Traders & Utilities.**

Whilst Core functionality is non-market specific.

Each market is unique in its own right but **aspects of the previously discussed markets can be seen across both.**

Existing markets and product learnings

Response/ Reserve Services

Capacity Market

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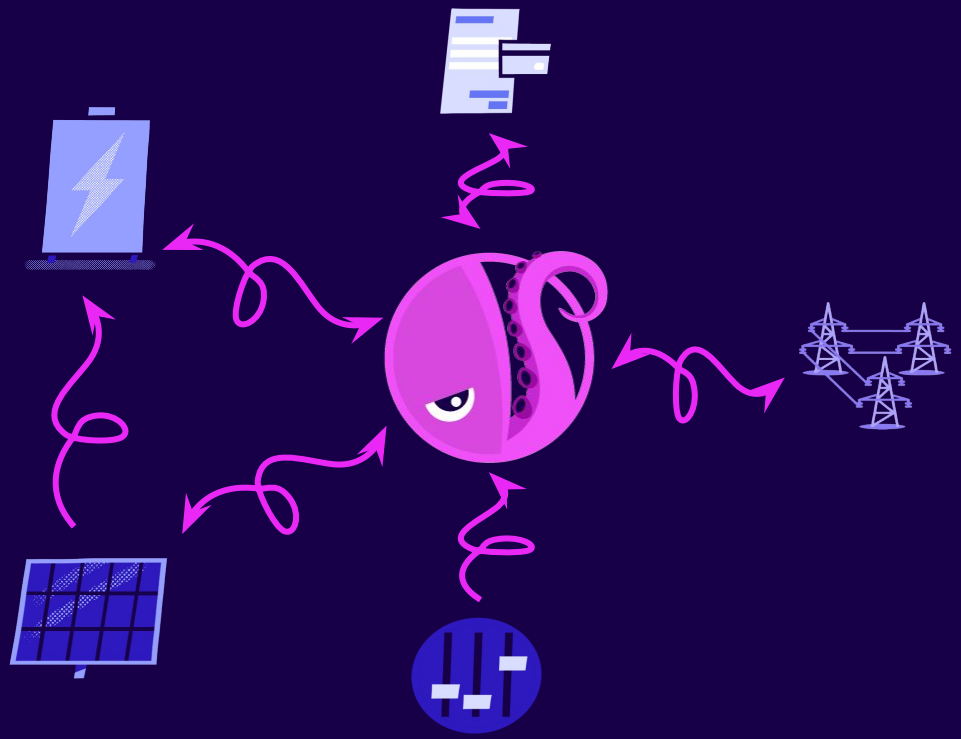
FCR, aFRR mFRR, RR

Capacity market & MACSE

So what if we have a negative price signal...



Delivery of BESS & Solar obligations, including multiple stacked services.

Decision making on whether export to grid or charging of BESS during different price periods.

What happens if the forecast does not match the real time output of the renewable source?

Does the site require asset level or site level instructions?

… Now what happens at scale

Multiple Inputs → **Control & Optimisation of a Portfolio of Co-located site(s)** → **Fulfilling multiple use cases**

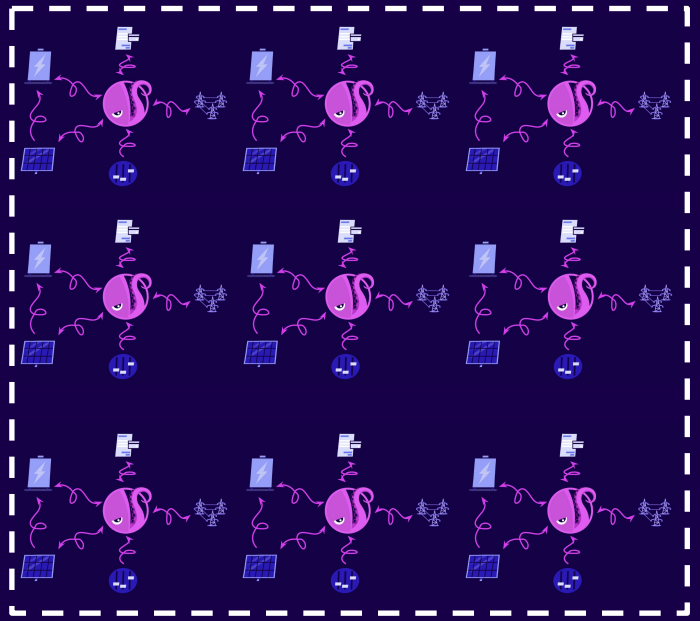
Multiple forecasts

Asset specific warranty/tariffs

Trader Price Curves

Market Commitments

Live conditions



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Asset operations

Single transparent platform of all assets across all markets

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Trading & optimisation

Traded position and delivery of portfolio of assets per market

Thank you!

Please reach out with any queries

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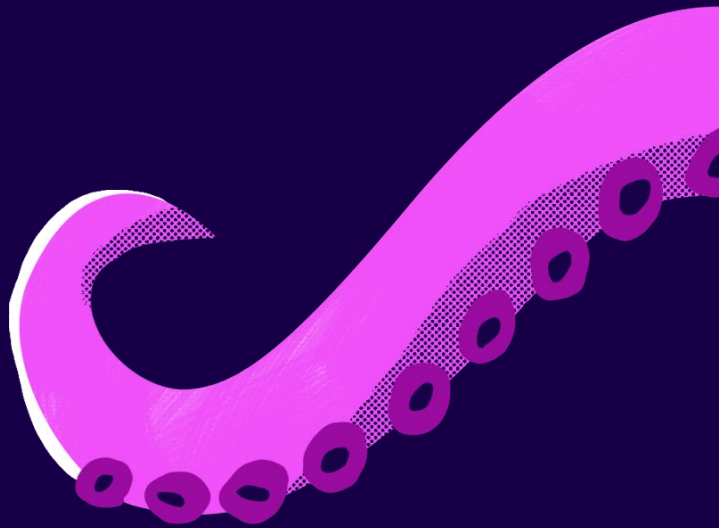
LinkedIn: Henry Taylor



Single platform:

Core

Kraken's market leading platform enables fast market access into energy markets

Automated control and scheduling across energy markets, and pre/post-fault ancillary services

Asset agnostic optimisation for markets with a single platform for all users and markets

Regional

Response/ Reserve Services

FCR, aFRR mFRR, RR

Capacity Market

Capacity market & MACSE