



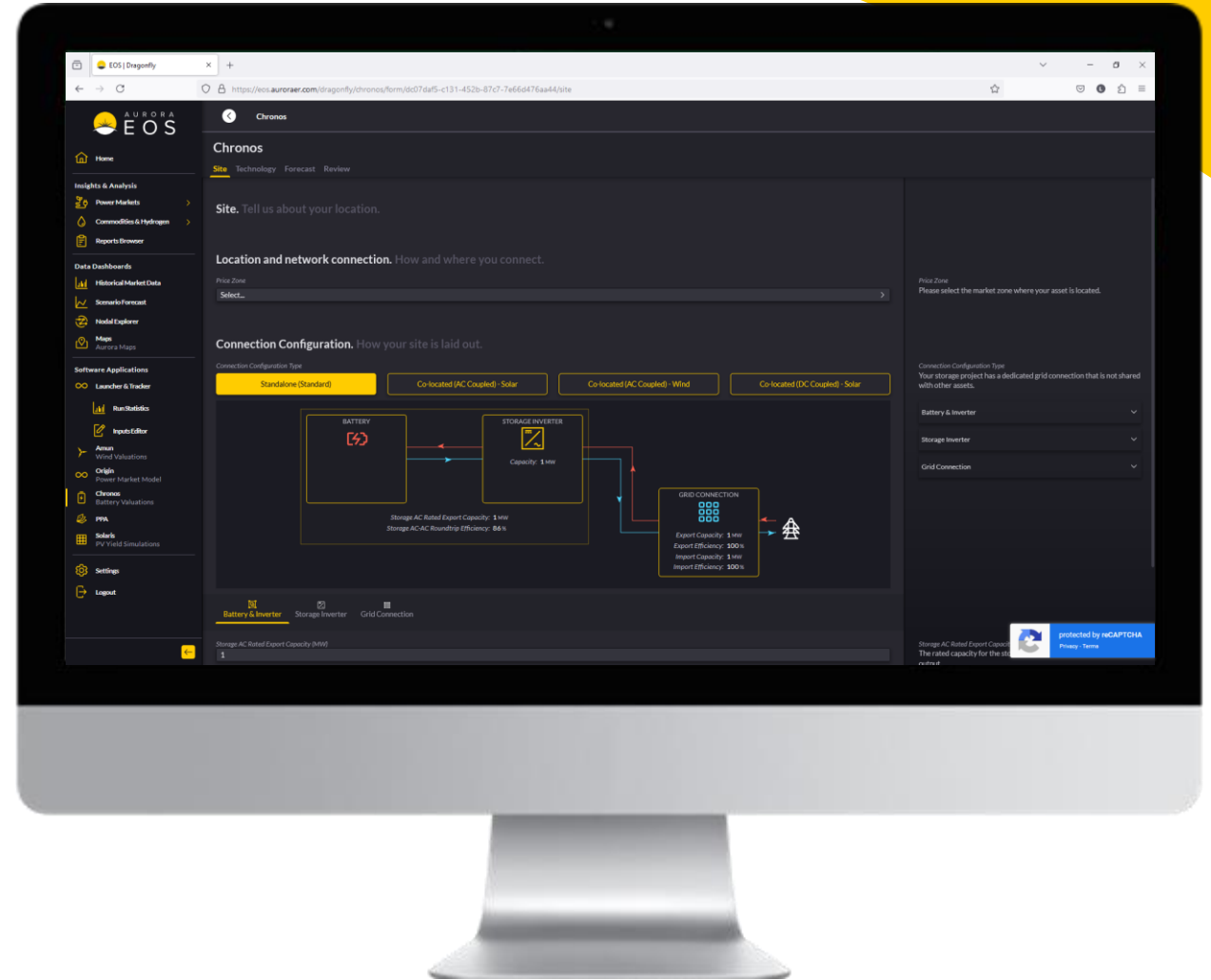
Webinar

# Strategic Battery Investments in Iberia and Italy

Powered by



CHRONOS



# Our team



**Ana Barillas**

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Please get in touch with me for more  
information about **Chronos** and  
**battery investments**:

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# Agenda

## I. Aurora Software Solutions

II. Chronos methodology

III. Chronos in action

IV. Taking Chronos results to the bank

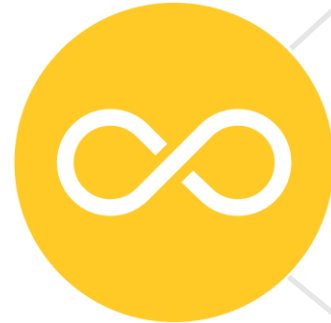
V. Customer Success support

VI. Q&A

# Seamlessly integrated suite of software products

**ORIGIN**  
for markets

Our **market-level model** enables you to create your own market scenarios within hours, and quantify market risks and upsides from policy, commodity, demand and supply changes.



**AMUN**  
for wind



**CHRONOS**  
for batteries



**SOLARIS**  
for solar



**LUMUS**  
for PPA contracts

Our **contracts valuation engine** lets you price and analyse Power Purchase Agreements, fully consistent with Aurora's view of the market.

Our **asset-level tools** quantify the value of your assets or sites under different configurations and market scenarios.

**With Origin:** use your own scenarios in your valuations

**With each other:** value co-located assets and portfolios



# CHRONOS

Battery valuations, perfected

**Chronos** allows you to evaluate any storage asset using Aurora's cutting-edge proprietary dispatch engine

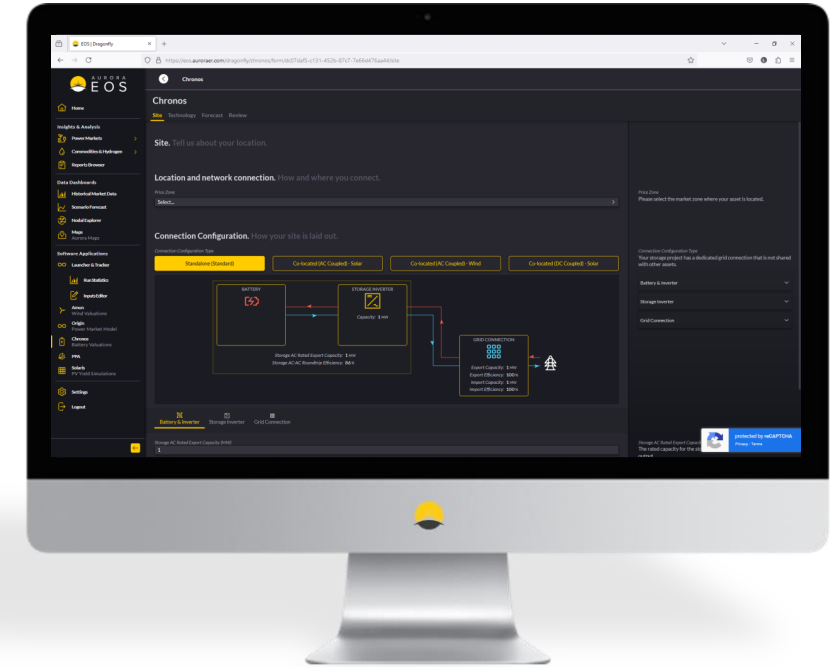
**Thorough:** Accounts for all site-specific value drivers

**Reliable:** Backed by Aurora's trusted forecasts and team of experts

**Bankable:** Methodology recognised by banks and investors, with reliance available

**Comprehensive UX:** Intuitive interface that empowers user driven analyses

**Efficient:** Evaluate as many opportunities or scenarios as you require, without any consultancy lead times, for just one yearly fee



Intuitive 4-step process:



What can Chronos be used for?



Transactions



Project Design  
Optimisation



Portfolio  
Valuation



Optimisation  
Benchmarking

# A global benchmark trusted by industry leaders



90+ subscribing companies in the first year

Underpins major debt financings

Used by leading developers for site selection and optimisation

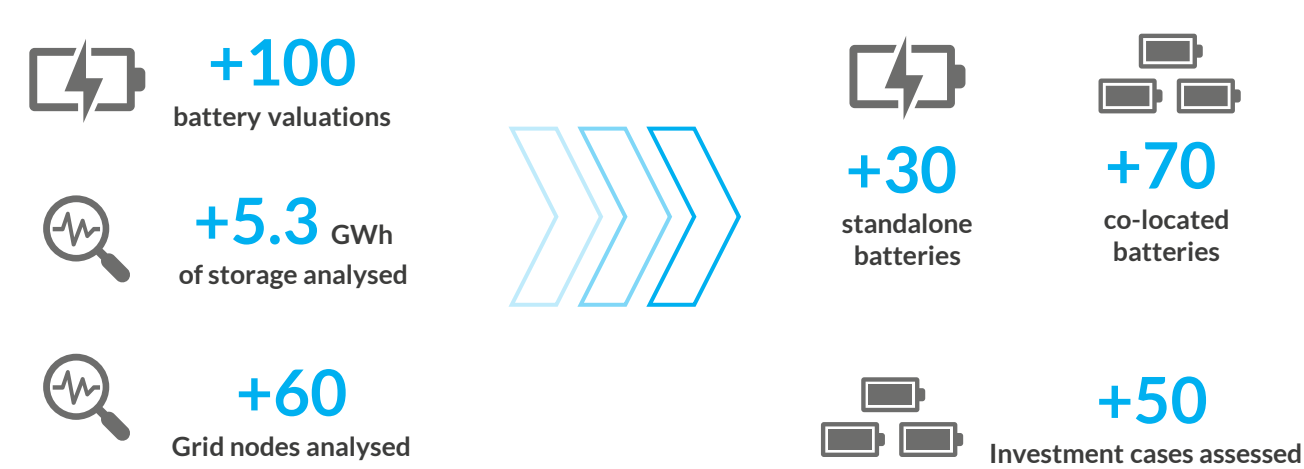
Simple to use and beats advisory wait times

Underpinned by Aurora's bankable market forecasts used by and relied on by 350+ companies globally

# Chronos in Iberia and Italy builds on our extensive experience supporting clients and lenders with battery evaluations



## KEY FIGURES



## PROJECT TYPE



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I. Aurora Software Solutions

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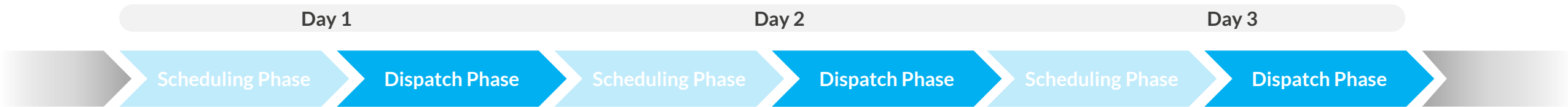
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# Aurora's battery dispatch model **Chronos** for Italy optimises daily between the Day-Ahead and MSD<sup>1</sup> markets to profit from arbitrage



Chronos is solved in **blocks of 1 day** (24 hours), determining all actions for each block before moving onto the next block. Each block is solved in two stages:

## SCHEDULING PHASE

### Outputs:

- Day-Ahead wholesale market positions (at hourly granularity)

### Method:

The Scheduling Phase is solved with an optimisation approach, with up to 32 hours foresight of remaining prices (for Day-Ahead only). Participation in this market also accounts for the opportunity cost of participating in the MSD. Opportunity cost is influenced by an imperfect foresight over a limited number of upcoming MSD prices.

## DISPATCH PHASE

### Outputs:

- Final positions in all markets
  - Fulfilment (or non-fulfilment) of Day-Ahead commitments
  - MSD charging/discharging
- End-of-day state of charge

### Method:

Day-Ahead commitments are fulfilled first (subject to state of charge conditions). MSD actions are determined using a heuristic price threshold approach based on upcoming Day-Ahead prices. No direct foresight over the upcoming MSD prices is assumed.

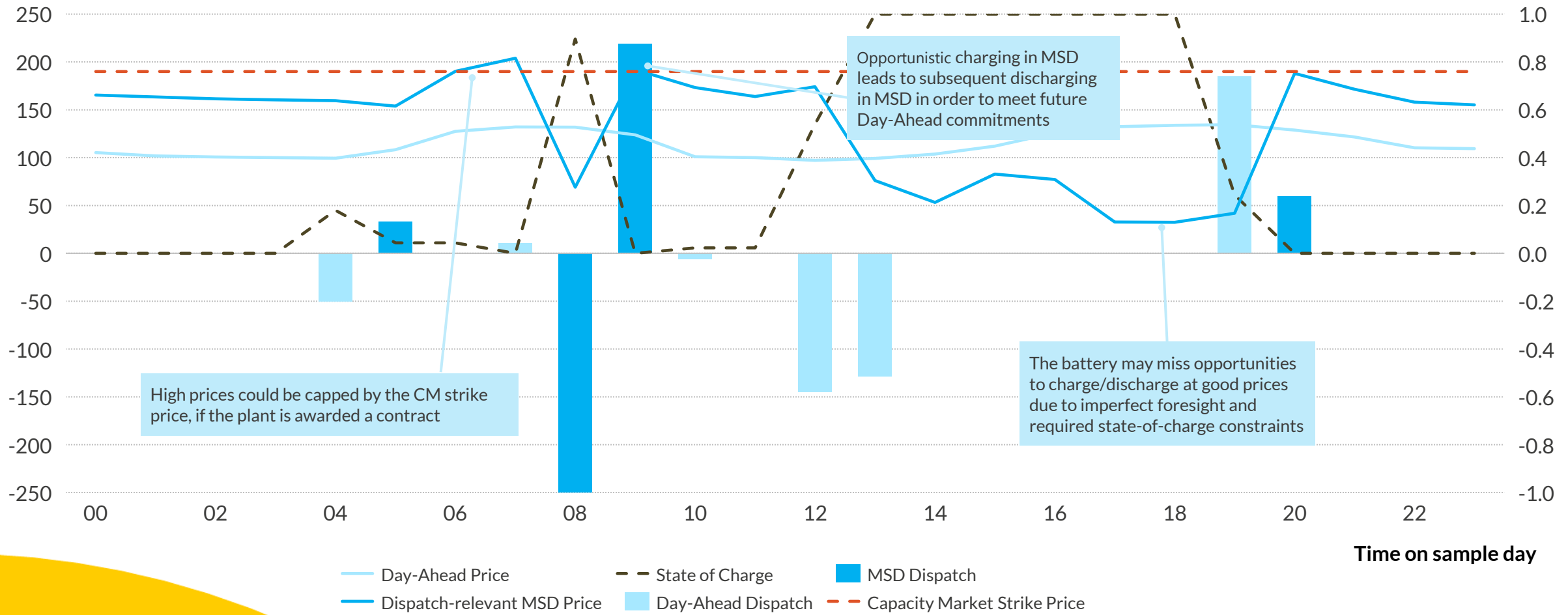
1) Mercato dei Servizi di Dispacciamento, Italy's ancillary services market.

# Example of modelled battery - Italy

Asset is optimising to price movements, but could miss out on some prices due to imperfect foresight

Day-Ahead and MSD prices  
€/MWh, line chart

State of charge and battery dispatch<sup>1</sup> for a 1MW, 1h battery  
MWh, bar chart



1) Discharging/export actions are shown as positive, while charging/import actions as negative; 2) MSD price in the prevailing (i.e. highest-volume) direction of the regulation in the relevant hour.

# Chronos for Iberia optimises daily revenues across the Wholesale, Secondary and Balancing Markets<sup>1</sup>



Chronos is solved in **blocks of 1 day** (24 hours), determining all actions for each block before moving onto the next block.

Each block is solved in two stages:

## SCHEDULING PHASE

### Outputs:

- Day-Ahead market positions (at hourly granularity)
- Secondary Reserve Capacity Band commitment

### Method:

The Scheduling Phase is solved with an optimisation approach, with up to 32 hours foresight of upcoming prices (for Day-Ahead and Secondary Reserve Capacity only). Participation in these markets also accounts for the opportunity cost of participating in real-time markets (Intraday and Balancing), however the assessment of the opportunity cost is based on imperfect foresight.

## DISPATCH PHASE

### Outputs:

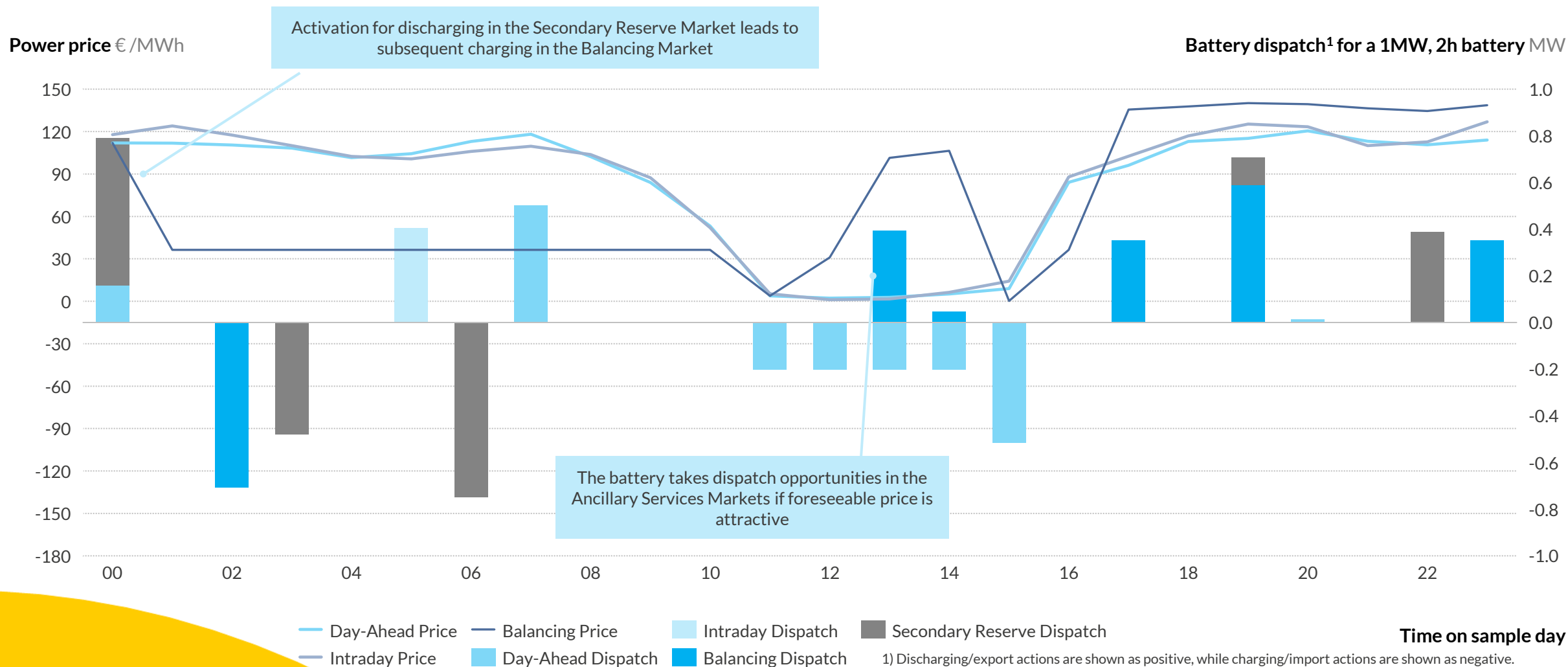
- Fulfilment (or non-fulfilment) of Day-Ahead and Secondary Reserve Capacity commitments (including Secondary Reserve energy activation)
- Intraday market charging/discharging, if applicable
- Balancing market charging/discharging, if applicable

### Method:

Day-Ahead and Secondary Reserve Capacity commitments are fulfilled first (subject to state of charge conditions<sup>2</sup>). Intraday and Balancing actions are undertaken if the prices are deemed attractive based on upcoming Day-Ahead prices<sup>3</sup>. No foresight over upcoming Intraday and Balancing prices is assumed.

1) Balancing Market represents the combination of Tertiary Reserve and Replacement Reserve. 2) If the battery cannot deliver the scheduled Day-Ahead volume or Secondary Reserve volume upon activation, the non-delivered volume is subject to a penalty. 3) Historically, Balancing Market prices have closely followed the Day-Ahead Market trends.

# Example of modelled battery: Asset is optimising to price movements, but could miss out on some prices due to imperfect foresight



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In the webinar, we presented  
a **Chronos** demo here.

**Would you like a personalised demo?**  
**Reach out to us today!**

Beatriz Barros, Senior Commercial Associate

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# Chronos captures our experience as the leading commercial advisor for battery investments and transactions in Europe

Deeply experienced in investment & business case analysis

1

- Aurora have advised >4GW of battery storage projects in Europe
- Our forecasts have enabled battery investments of >2.1bn €
- Over 250 developers, investors, utilities and banks subscribe to Aurora's regular revenue stream and battery business case forecasts in Europe

Extensively relied upon for debt financing

2

- Aurora forecasts have helped to raise >750mn € of debt financing for battery storage projects
- We provided reliance to 10+ banks to debt finance battery projects

Widely trusted for ongoing fund valuations

3

- Aurora provides forecasts used in the regular valuation of 3 listed battery funds with total Net Asset Value of > 2.1bn €
- Renewable & Energy Transition funds with >100bn € AUM use Aurora forecasts for their battery storage valuations & investments





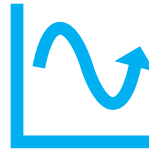
# Take your **Chronos** valuations to the bank with our additional Advisory Services including complementary reports and bespoke analysis

## Complementary report<sup>1</sup>



- Overview of the available markets under Aurora's Central scenario.
- Description of **Chronos** methodology and a summary of results for the configurations analysed<sup>2</sup>.
- Includes a breakdown of gross margins and volumes per market.

## Bespoke scenarios



- Aurora can simulate configurations under additional scenarios.
- The deliverable includes an Excel databook with the same structure as the **Chronos** output.

## Longer duration (up to 8h)



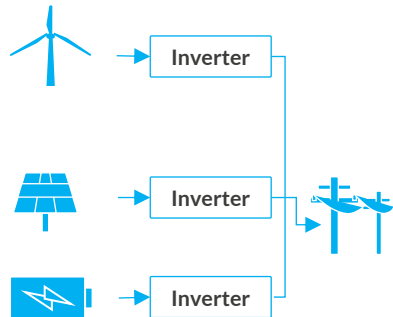
- Aurora can simulate configurations under Aurora's Central scenario for assets with up to 8-hours duration.
- The deliverable will include an Excel databook with the same structure as the **Chronos** output.

1) In ppt format, c.20 slides. 2) Up to 4 configurations included in the report.

# Aurora supports investors and lenders by providing bespoke country analysis via our **Chronos** software



## Triple Hybridisation



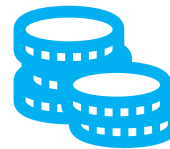
- Triple hybridisation configuration (solar PV + onshore wind + BESS)
- Databook will be provided

## DA<sup>1</sup> Technical Restrictions upside



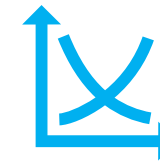
- Subject to publicly available data<sup>2</sup>, upside for a standalone BESS in day-ahead Technical Restrictions until 2030

## Pay-as-produced PPA or fixed tariff inclusion<sup>3</sup>



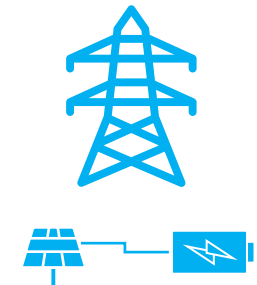
- For a physical pay-as-produced PPA or a regulated asset under a fixed tariff (CfD or FiT)

## Deep-dive of Business Models under MACSE



- Combining **Chronos** results with MACSE participation

## Co-location Analysis for Grid Curtailment



- RES/BESS co-location which considers province-specific forecasts of grid curtailment, and mitigation via BESS

1) Day-ahead.

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**Chronos** is continually updated with the latest market insights, ensuring you stay ahead; our ongoing support will help you make the most of your **Chronos** experience

### Research Market Experts

- Biannual **market reports**, covering modelling, policy and price updates
- Dedicated time with **regional experts** to gain insights into our market modelling



- **Rolling updates** to ensure **Chronos** reflects latest market trends, all part of your subscription
- **Hourly revenue optimisation** of country specific investment cases

### Customer Success

- **You are not alone!** We help you make the most of **Chronos**, with continued support along your entire **Chronos** journey

*Customer Success continued...*

# Chronos Customer Success: Getting started, made easy!

Comprehensive support from our dedicated team of Chronos battery valuation experts

## Implementation

**Chronos** is designed to be user-friendly, requiring minimal training or setup

- Use out-of-the-box features
- Benefit from onboarding sessions tailored to your use case and focused on your target assets
- Integrate **Chronos** into your financial modelling

## Training

Tailored training ensures proficiency after your **Chronos** service activation

- Create all your target valuations, upload your renewable profiles, and OEM degradation curves
- Delve into thematic deep dives and new feature training

## Ongoing Support

Our **Chronos** experts are on-hand to help you check and understand your valuations

- Have **Chronos** results checked by our team
- Ensure you are using **Chronos** correctly
- Use your checked results as a part of additional bespoke Advisory work

## Community Events

Participate in regular sessions where we learn from you, and you learn from each other

- Network with local, regional, and global peers
- Attend online and offline events
- Contribute to the **Chronos** development roadmap

# Chronos is **shaped by our subscribers:** current and future

The highest priority enhancements as ranked by the Chronos community

1

**Continued expansion of Chronos to more regions**, with DEU, ERCOT, and CAISO coming in the first half of 2025

2

**Create and launch many simulations easily** & refresh your entire portfolio against a new market scenario in just a few clicks

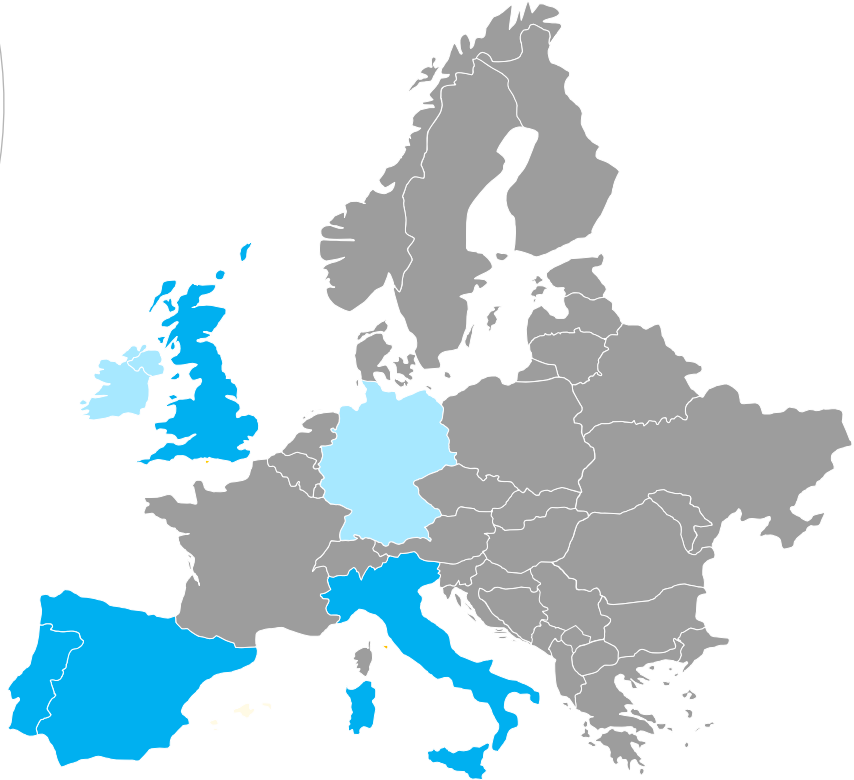
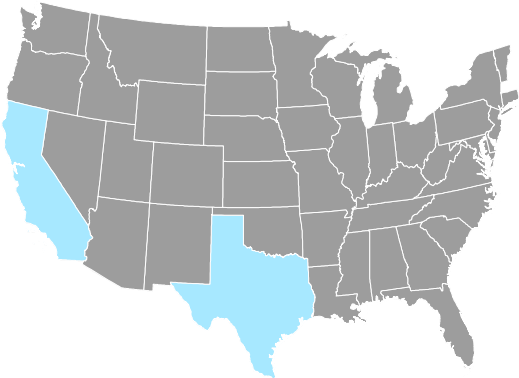
3



**Support significant battery overbuild market scenarios** and assess the impact of additional cannibalisation

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# Where can you find Chronos

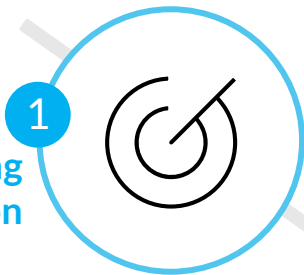


-  CURRENTLY AVAILABLE
-  COMING SOON...



# Chronos: your ideal tool for a wide range of use cases spanning the investment horizon

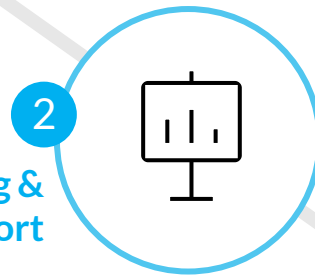
A U R  R A



1  
**Site scanning  
& optimisation**

**Easily run 100s of simulations** to assess multiple sites spanning diverse geographies & business models, for standalone & co-located sites

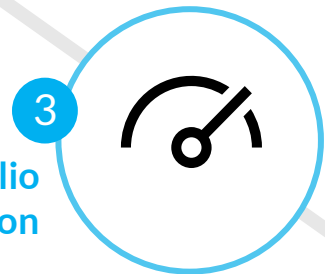
For each site, maximise returns by optimising key parameters such as battery sizing, cycle target, business model, & more



2  
**Financing &  
transaction support**

Generate rapid, site-specific, bankable results for use in transactions and financing processes

**Valuation Review Services:** our experts review and verify your results in order to generate bankable, reliance-ready reports



3  
**Asset & portfolio  
evaluation**

Regularly assess the impact of different market outlooks on the performance of your asset/portfolio, based on Aurora's latest bankable curves

Regularly refresh your valuations for financial covenant testing

*Upcoming: Quantify the impact of your own bespoke market scenarios (e.g., battery overbuild) on your asset/portfolio*



**Customer Success**

A dedicated team of experts to assist you every step of the way

[aurora.com](https://aurora.com)

**REACH OUT TO US:**

Beatriz Barros, Senior Commercial Associate

✉ [beatriz.barros@auroraer.com](mailto:beatriz.barros@auroraer.com)



**Thank you!**