



# **ELECTRICITY AND ANCILLARY SERVICES PRICE FORECAST AND BUILDING A BUSINESS MODEL IN EUROPE**

June 2023

[www.cleanhorizon.com](http://www.cleanhorizon.com)





### Energy market data forecast Simulations based on AI

Leading data & analytics firm created in 2014

Provides proprietary data & analytics, market insight and forecasts on commodity markets (gas, liquids, dry bulk)

250+ employees in a dozen locations across the globe. 4,500 users in 460 client companies, including world-leading energy and shipping companies, investments funds and banks

Jumped into power in September 2022 with the acquisition of COR-e



### Energy storage expertise Revenue simulation

Clean Horizon is a one-stop shop consulting firm dedicated 100% to energy storage, active worldwide since 2009.

Clean Horizon has a deep expertise and knowledge of markets for energy storage globally and supports projects from conception to commissioning, as well as having the ability to monitor storage profitability during its lifetime.

To date, we have designed/audited 10944 MWh of ESS storage projects in 81 countries.

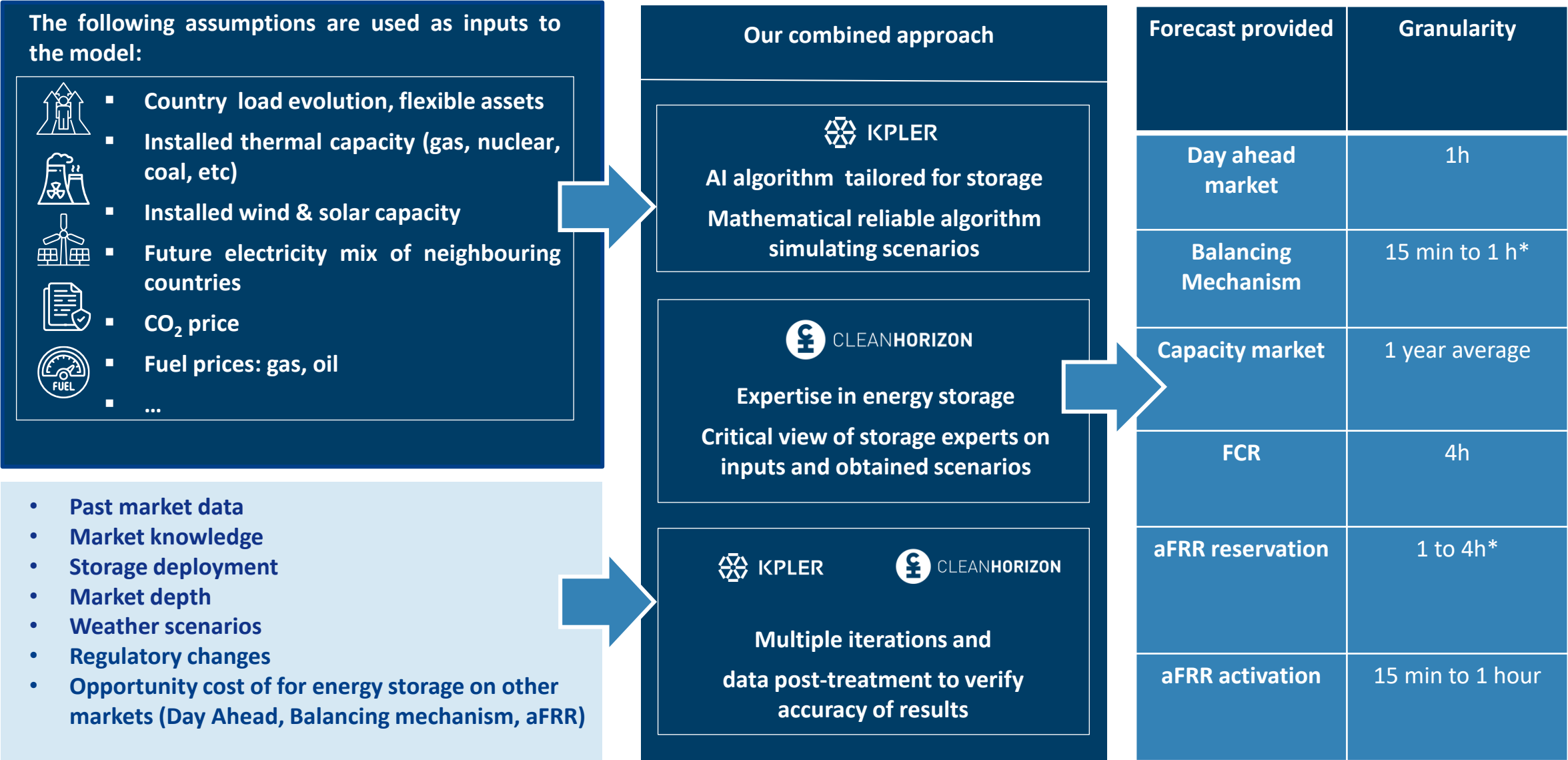
## STRENGTHS

*rely on the capacity to simulate the revenues accessible for storage based on:*

- 1 Precision of historic data on energy market
- 2 Analyses of revenues streams accessible for storage
- 3 Accounting for revenue cannibalisation in shallow markets
- 4 Logical real-time trading decisions allowing realistic trading strategy based on thresholds to determine logically positions on the markets
- 5 Flexible approach allowing to change combination of variables and visualise the impact, taking into account the unforeseen situations and simulating with different inputs

# PRICE FORECAST METHODOLOGY

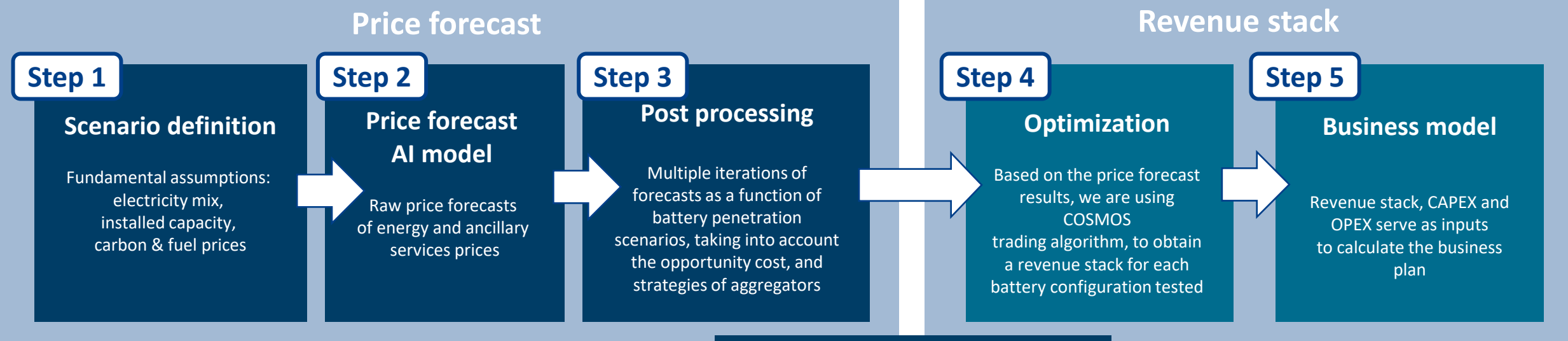
A simple and efficient formula for a long-term forecast based on factors impacting energy storage revenue streams



\* Country specific

# METHODOLOGY: HOW DO WE PROCEED?

We are building the revenue stack based on the results of the price forecast



## What are we considering

Choice of assumptions	Based on official documents of TSOs, regulators, assumptions on gas and coal prices, Clean Horizon’s reference scenarios of storage penetration	Applying various trading models to maximize revenues The model determines for each timestep which revenue category the battery should seek to maximise the generated revenue under the market and battery constraints
Simulation	Simulation with set of assumptions, definition of parameters, weight of variables, based on understanding of the market drivers and its evolution	Logical real-time trading decisions A possible realistic trading strategy would be to use thresholds that determine when to buy or sell energy
Correlations	Defining the main drivers for price variation, based on past data. Analysis of the dependency on coal/ oil, nuclear, renewables; interconnections; markets shared; markets’ volumes	Technical requirements Energy availability requirements to be able to deliver each specific service; respecting SOC constraints
Principles	Forecast based on bid ladder. Considering short term price forecasts for gas and long term price scenarios. Applying a critical view on results of simulations	Degradation, cycling Including the evaluation of degradation in relation to the cycles performed by the system
Battery penetration	Cannibalisation of revenues based on future battery penetration and its impact on the markets	
Opportunity costs	Impact of the opportunity cost of other markets available for storage	

# WHAT IS INCLUDED?

Our approach is usually based on 3 main components:

## I. Overview of the market for energy storage

- Evolution of the energy storage market & key players in the country
- Revenues streams available to energy storage and market volumes
- Future opportunities and risks
- Storage penetration

## II. Price forecast

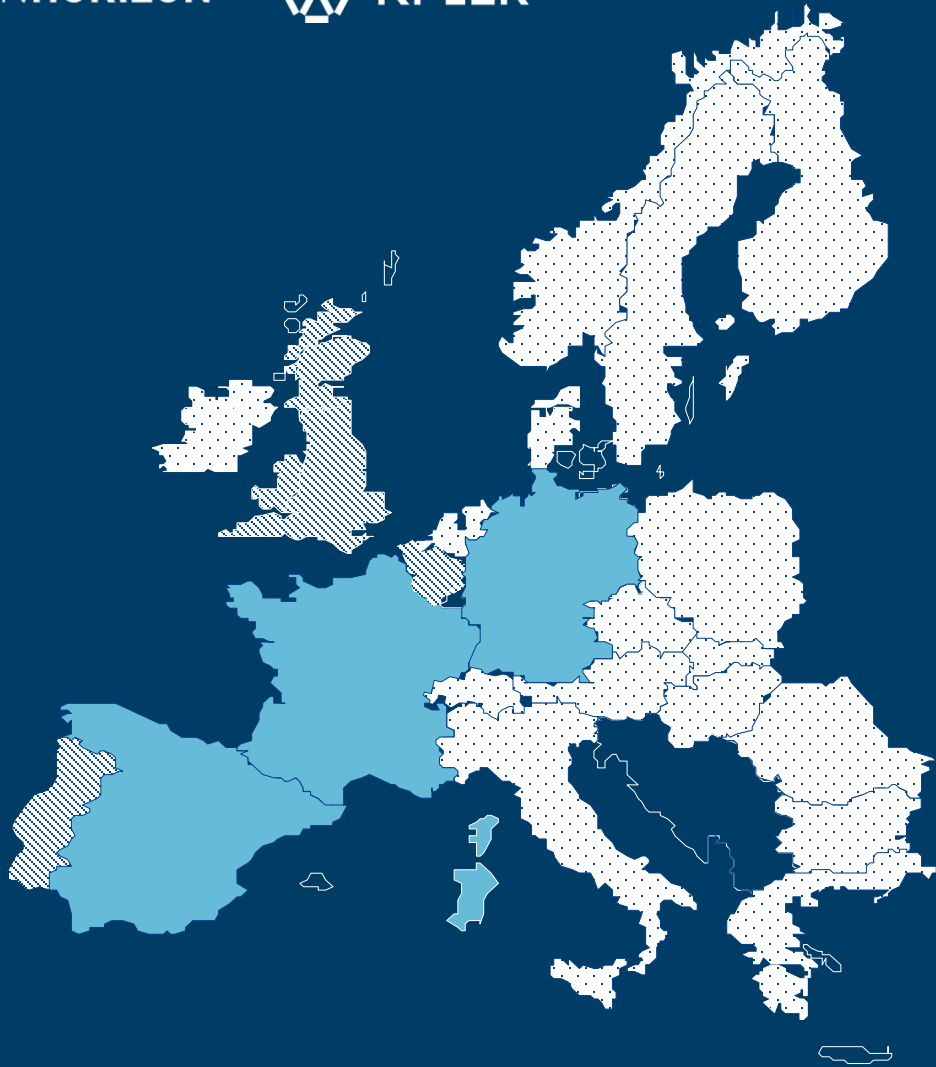
Developed in cooperation with KPLER

## III. Revenue stack and business model obtained with optimization tool COSMOS

The tool is country-specific, as the parameters are set for each country based on the market design, existing and upcoming market rules, technical requirements and other particularities of the market.

We are providing:

- Results of simulation for sample projects (1h, 2h, 3h batteries)
- Optional:
  - customized revenue stack and business model (in excel) for 1 project in the 3 reference price scenarios
  - the compiled executable version of the optimization tool COSMOS to let the client run simulations and sensitivity analyses



## COUNTRIES COVERED AS OF Q2 2023

France

Spain

Italy (Sardinia)

Germany

## COUNTRIES TO BE COVERED BY Q3 2023

Belgium

Great Britain

Portugal

## OUR STRATEGY BEYOND Q3 2023

Nordics

Key storage geographies across ENTSO-E





We look forward  
to working with you!

12 rue de la Chaussée d'Antin  
75009 Paris, France  
[contact@cleanhorizon.com](mailto:contact@cleanhorizon.com)  
Tél : +33 (0)1 78 76 57 04

Clean Horizon Americas  
1200 BRICKELL AVE, SUITE 1960  
MIAMI, FL33131, USA  
[reports@cleanhorizon.com](mailto:reports@cleanhorizon.com)

[www.cleanhorizon.com](http://www.cleanhorizon.com)