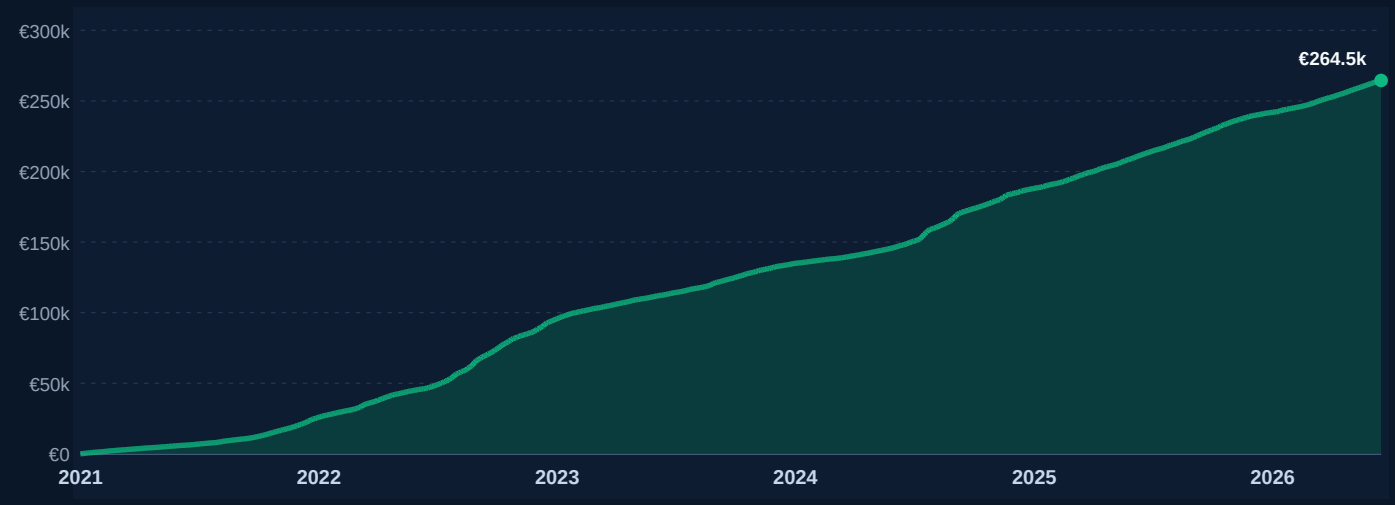
BESS Arbitrage Analysis

Greece — Day-Ahead Energy Arbitrage

1 MWh · 2h charge / 2h discharge (c2_d2) · 1988 days simulated

GROSS ARBITRAGE REVENUE	AVG DAILY SPREAD	BEST / WORST YEAR	DAYS SIMULATED
€264,492	**€133.04/MWh**	**€69.7k / €25.7k**	**1988**
Day-ahead arbitrage only. Before degradation, opex, grid fees and capacity charges. Not a net return figure.			

CUMULATIVE ARBITRAGE REVENUE

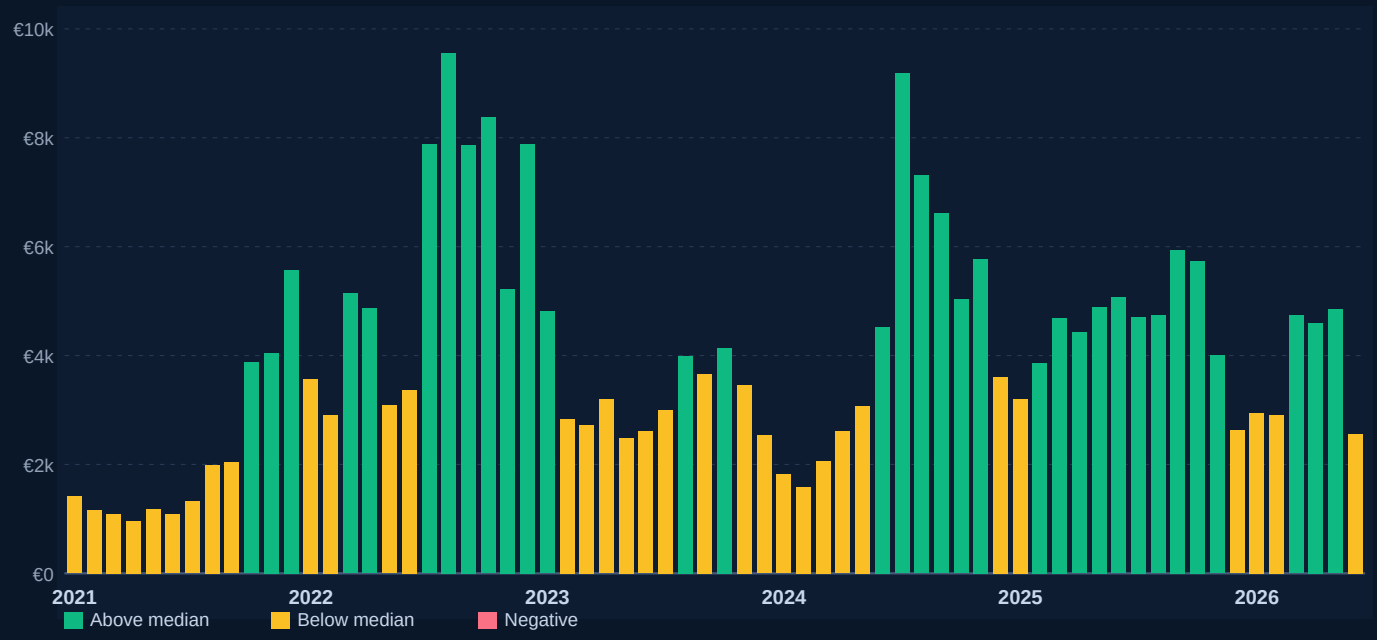


Cumulative gross arbitrage revenue. The curve only rises because it is a running total; it is not a measure of risk. See page 5 for downside analysis.

This report analyses 1988 days of historical day-ahead market data for Greece, simulating a 1 MWh battery using a 2h charge / 2h discharge (c2_d2) dispatch strategy. The headline figure of €264,492 represents gross arbitrage revenue — the spread captured between cheap charging hours and expensive discharging hours — and excludes all costs including grid fees, degradation, taxes and operating expenses. For stress scenarios and downside analysis see page 5; for payback projections and full methodology see page 6.

Monthly Arbitrage Revenue

MONTHLY ARBITRAGE REVENUE BY PERIOD



c2_d2 strategy: charges over the cheapest consecutive hours and discharges over the most expensive consecutive hours after charging each day. Bars coloured above/below the monthly median; negative months in rose.

MONTHLY STATISTICS

METRIC	VALUE
Best Month by Arbitrage Revenue	August 2022: €9.6k
Worst Month by Arbitrage Revenue	April 2021: €964
Months with Positive Arbitrage	66 / 66 (100%)
Monthly Std Dev (Arbitrage Revenue)	€2.0k
Avg Monthly Arbitrage Revenue	€4.0k
Share of Revenue from Best 12 Months	33%

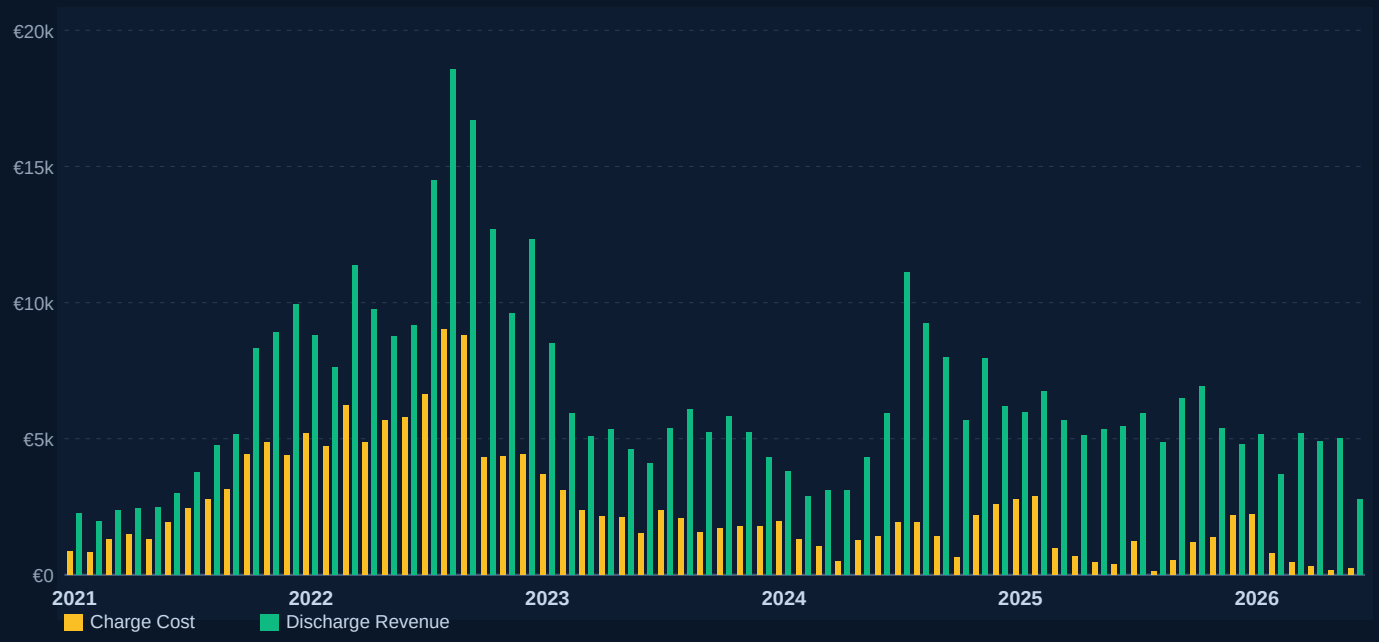
Revenue Mechanics

How the arbitrage revenue is generated: buying low, selling high.

THE ARBITRAGE, IN THREE LINES

Discharge revenue (energy sold in expensive hours)	+ €427,598
Charge cost (energy bought in cheap hours)	- €163,106
Gross arbitrage revenue	**€264,492**

MONTHLY CHARGE COST VS DISCHARGE REVENUE



The battery charges during the cheapest hours and discharges during the most expensive hours each day. The monthly gap between the two bars is the gross arbitrage captured.

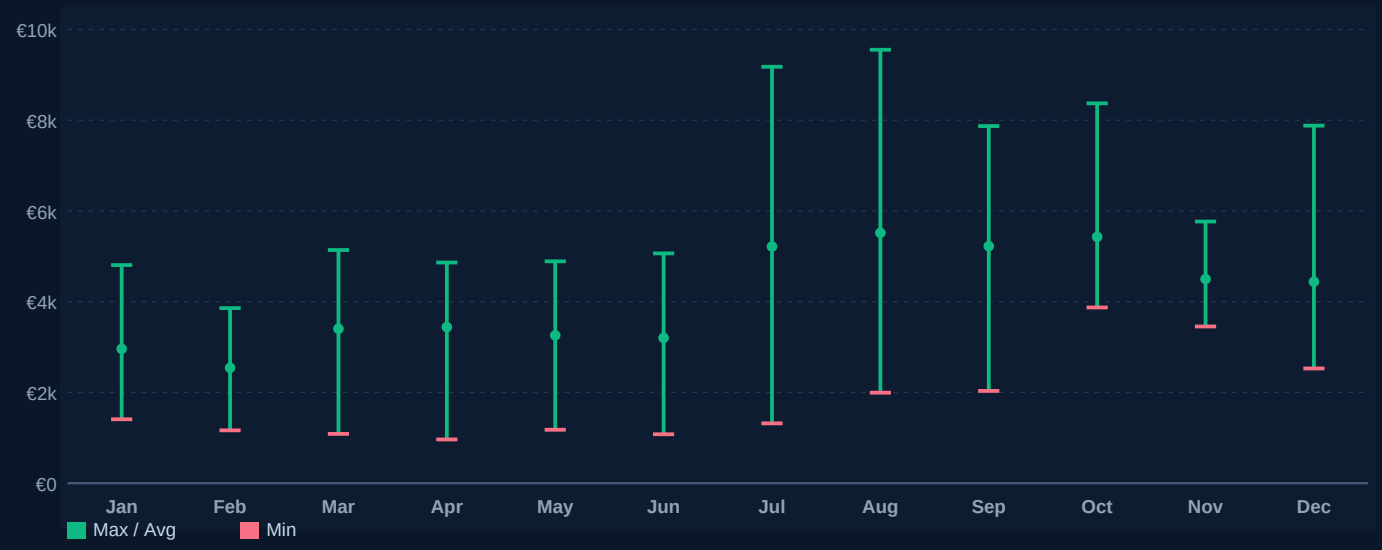
Seasonal Pattern

When in the year the battery earns the most.

MONTH X YEAR ARBITRAGE REVENUE HEATMAP

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
2021	1.4k	1.2k	1.1k	964	1.2k	1.1k	1.3k	2.0k	2.0k	3.9k	4.1k	5.6k
2022	3.6k	2.9k	5.1k	4.9k	3.1k	3.4k	7.9k	9.6k	7.9k	8.4k	5.2k	7.9k
2023	4.8k	2.8k	2.7k	3.2k	2.5k	2.6k	3.0k	4.0k	3.7k	4.1k	3.5k	2.5k
2024	1.8k	1.6k	2.1k	2.6k	3.1k	4.5k	9.2k	7.3k	6.6k	5.0k	5.8k	3.6k
2025	3.2k	3.9k	4.7k	4.4k	4.9k	5.1k	4.7k	4.7k	5.9k	5.7k	4.0k	2.6k
2026	2.9k	2.9k	4.7k	4.6k	4.8k	2.6k						

MONTHLY DISTRIBUTION — MIN / AVG / MAX



Risk & Downside Analysis

How the result holds up when favourable assumptions are removed.

BEST / WORST CALENDAR YEAR

BEST FULL YEAR	€69,713
WORST FULL YEAR	€25,722

PEAK-TO-TROUGH RANGE

63%

The worst full calendar year earned significantly less than the best. This is the revenue volatility a model should price in.

STRESS SCENARIOS

SCENARIO	GROSS REVENUE	vs BASE
Base case (full-period)	€264,492	—
Excluding 2022 (gas-crisis year)	€194,779	-26.4%
At 20% day-ahead spread compression	€211,593	-20.0%
At 85% round-trip efficiency on energy in	€235,709	-10.9%

Historical-backtest stresses applied to simulation inputs. Not forecasts of future performance.

DOWNSIDE METRICS

METRIC	DETAIL
Worst 3-Month Stretch	Feb 2021 – Apr 2021: €3.2k
Worst Single Month	April 2021: €964
Months with Positive Arbitrage	66 of 66 (100%)

ANNUAL ARBITRAGE REVENUE BY YEAR

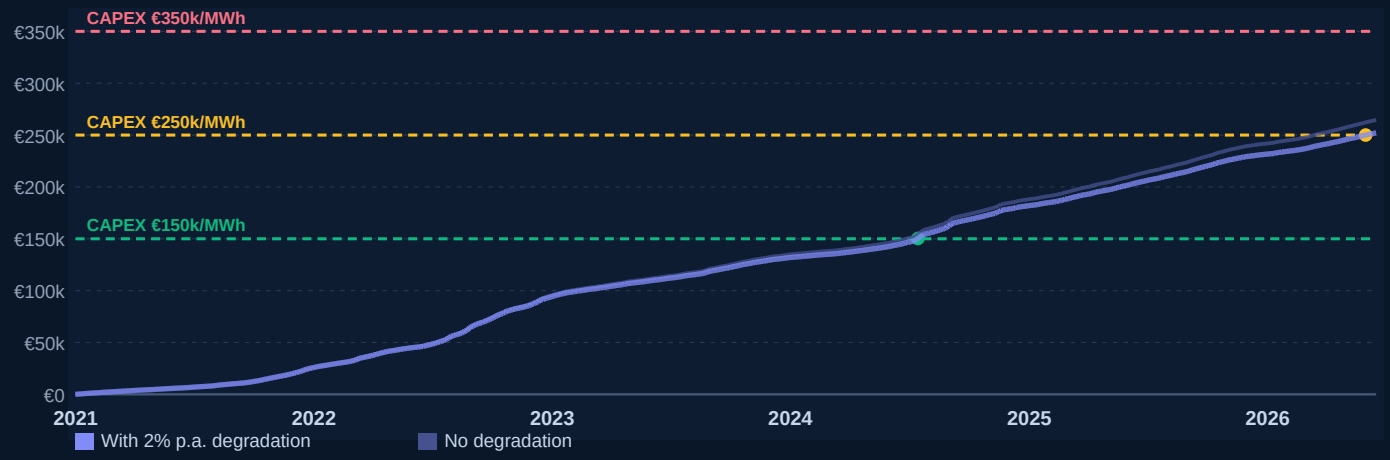
YEAR	REVENUE	YOY	NOTE
2021	€25,722	–	
2022	€69,713	+171.0%	gas crisis
2023	€39,430	-43.4%	
2024	€53,154	+34.8%	
2025	€53,870	+1.3%	
2026	€22,603	n/a	partial year · not comparable

2026 is a partial year. YoY change is not shown because comparing a partial to a full year would mislead.

Payback & Methodology

Investment math, data sources, and what this analysis does and does not include.

SIMPLE PAYBACK PERIOD



Simple payback, ungeared, before opex and ancillary revenue. Projection applies 2% annual capacity degradation, so the curve bends. CAPEX bands reflect realistic 2026 European costs for a 2-hour system. Illustrative, not a financing recommendation.

At avg daily arbitrage revenue (€264,492 ÷ 1988 days = €133.04/day), degradation-adjusted payback:

Low — €150k/MWh: ~2024 Q1 (3.1 yrs from start)
Mid — €250k/MWh: ~2026 Q1 (5.2 yrs from start)
High — €350k/MWh: ~2028 Q2 (7.3 yrs from start)

SIMULATION PARAMETERS

PARAMETER	VALUE
Country / Market	Greece
Analysis Period	2021-01-01 – 2026-06-19
Battery Capacity	1 MWh
Dispatch Strategy	2h charge / 2h discharge (c2_d2)
Cycles / day	1
Round-trip Efficiency	100%
PV Co-location	Disabled
Days Simulated	1988
Report Generated	20 June 2026

METHODOLOGY

Data source: ENTSO-E day-ahead auction prices accessed via Ember Energy for the period 2021-01-01 – 2026-06-19.

Dispatch respects state of charge: the battery always charges before it discharges. Each day it charges over the cheapest consecutive hours and discharges over the most expensive consecutive hours that occur AFTER charging — the best feasible charge-then-discharge spread (c2_d2). A discharge window never precedes its charge window. No intraday or multi-day optimisation.

Cycles: one full day-ahead cycle per day (charge once, discharge once). Additional cycles capture further day-ahead spreads only where profitable; this report uses a single cycle.

Efficiency assumption: 100% round-trip efficiency, applied on the charge side (energy-in). An 85% RTE stress scenario is shown on page 5.

Excluded: ancillary services (FCR / aFRR / mFRR), capacity-market payments, balancing revenue, intraday trading, grid connection and use-of-system charges, transmission fees, taxes, insurance, financing, operating costs, and battery degradation (except the illustrative payback curve). This report covers