



CONTAINERISED BATTERY ENERGY STORAGE

A2000

■ 1 MW / 2 MWh ■ 20 FT HIGH-CUBE ■ LIQUID-COOLED LFP

2088 kWh on EVE 314 Ah cells, eight power-conversion strings and the Solaris™ EMS in one enclosure. Delivered as one unit, commissioned as one asset.

1 Liquid-cooling unit · battery thermal loop 2 Battery strings · 8 × 261 kWh 3 Electrical room · PCS, EMS, air-cooled

2088 kWh

RATED ENERGY
8 × 261 kWh strings

1 000 kW

RATED AC POWER
1100 kW maximum

8 000 cycles

CELL RATING
to 70 % SOH, 25 °C

2.1 h

AT RATED POWER
≈ 0.5C duty

IP54

OUTDOOR RATED
-25 ... +60 °C

WHY IT HOLDS UP

FIVE DESIGN DECISIONS

01

One unit, one connection

Battery, PCS, distribution, cooling, suppression and monitoring arrive factory-integrated.

02

Eight independent strings

Each 261 kWh string has its own converter. No circulating current between strings.

03

Modular conversion

Converter modules scale with battery units. Charge and discharge run string by string.

04

Protected by design

Graded fault escalation, three-level BMS, clean-agent suppression, water and door sensing.

05

Remote-ready

Strategies and firmware update remotely. Cloud dispatch and reporting through Solaris.



CELL
EVE 314 Ah LFP



CONTROL
Solaris™ EMS



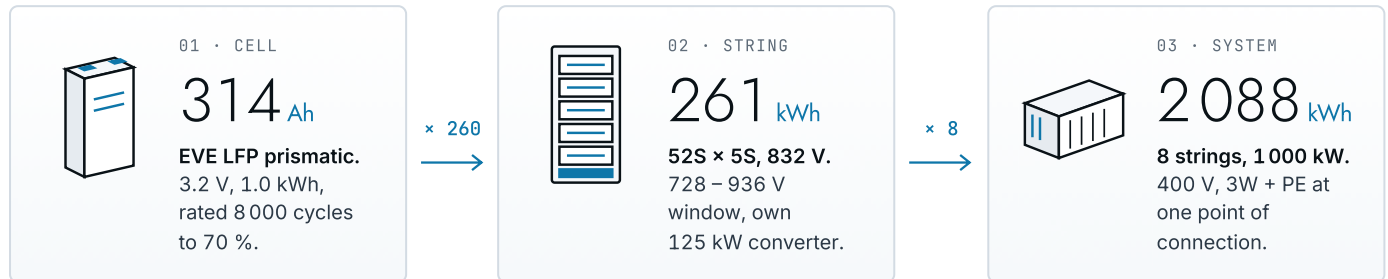
DELIVERY
Factory-integrated · tested before dispatch

02 · ARCHITECTURE

From cell to system.

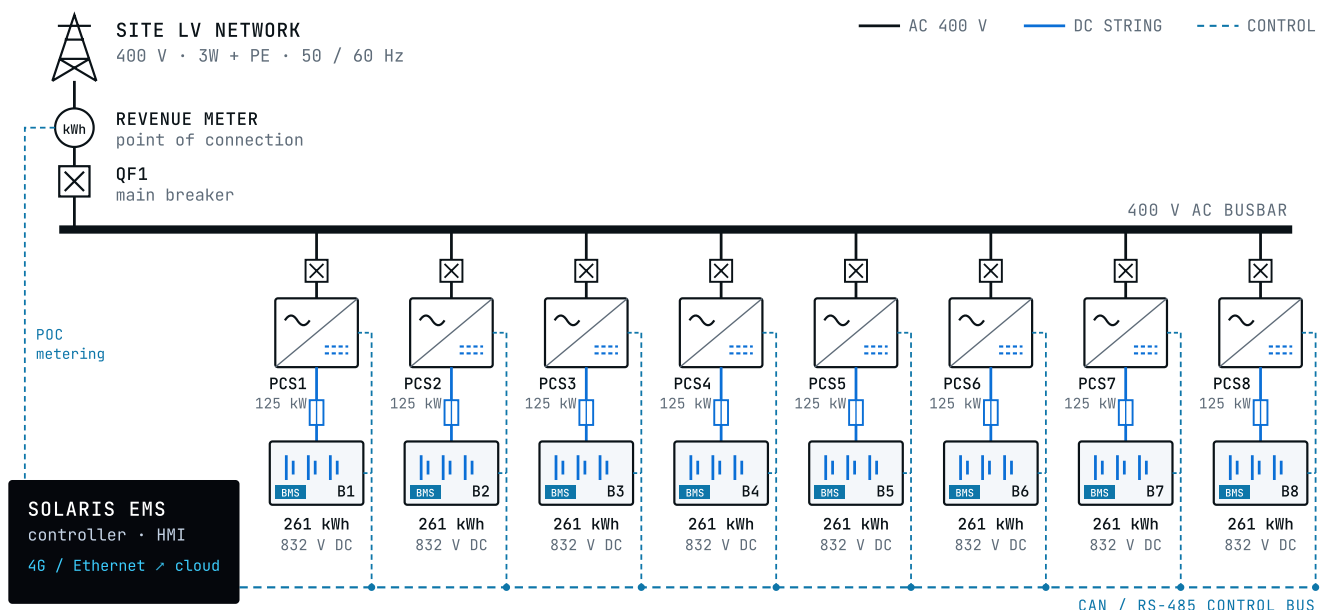
Eight strings, one asset.

Every string runs on its own converter, so one fault takes out 261 kWh, not the system.



SINGLE-LINE DIAGRAM

400 V AC · EIGHT DC STRINGS · SIMPLIFIED



03 · SPECIFICATION

A2000 · 2 088 kWh · 1 000 kW

Typical configuration. Final values are fixed in the project technical agreement.

01 BATTERY SYSTEM

Rated energy	2 088 kWh · 8 × 261 kWh
Usable energy	2 046 kWh · 98 % DOD
Cell	EVE 314 Ah LFP, prismatic
Cell rating	8 000 cycles to 70 % SOH · 25 °C
Configuration	8P × (52S × 5S) · 2 080 cells
Rated voltage	832 V · window 728 – 936 V
Battery management	Three-level BMS: cell, string, system
Thermal management	Liquid cooling, battery compartment

02 POWER CONVERSION · DC SIDE

Converter	8 × 125 kW modular, bidirectional
DC operating voltage	580 – 1 000 V
Maximum DC current	8 × 200 A
Charging method	BMS command · three-stage · MPPT
Operating modes	CC · CP · MPPT · AC or DC voltage source

03 GRID CONNECTION · AC SIDE

Rated / maximum power	1 000 / 1 100 kW
Rated AC current	8 × 180 A
Rated AC voltage	400 V, 3W + PE
Frequency	50 / 60 Hz ± 5 Hz
Current distortion	THDi < 3 % at rated power
Power factor	–1 leading to +1 lagging

04 ENCLOSURE & ENVIRONMENT

Enclosure	20 ft high-cube, IP54
Dimensions (W × D × H)	6 058 × 2 438 × 2 896 mm
Weight	≈ 25.5 t
Operating temperature	–25 ... +60 °C · derating > 45 °C
Relative humidity	0 – 95 %, non-condensing
Altitude	3 000 m · derating > 2 000 m
Electrical room	Intelligent forced-air cooling

05 SAFETY & MONITORING

Fire suppression	Perfluorohexane / heptafluoropropane, pipe-type
Sensing	Water-immersion, door, dynamic loop monitoring
Fault handling	Graded escalation against preset scenarios

06 CONTROL & COMMUNICATION

Energy management	Solaris™ EMS
Communication	RS-485 / CAN
Local interface	Touchscreen HMI · power, energy, mode, status
Remote	Strategy and firmware updates · cloud dispatch
Applications	Peak shaving · NMD control · demand response · backup · PV self-use · reactive power

SCOPE OF SUPPLY

Battery system, PCS, AC distribution, liquid cooling, fire suppression, EMS controller and HMI, factory-integrated and tested before dispatch. MV step-up and civil works are scoped per project.

SCALING

Units parallel at the point of connection to match the site's demand. Larger plants step to 11, 22 or 33 kV through an MV skid, under one Solaris controller.

Model your site.

Send twelve months of interval data and your tariff. We size the A2000 to your peaks.

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04 · ENERGY MANAGEMENT

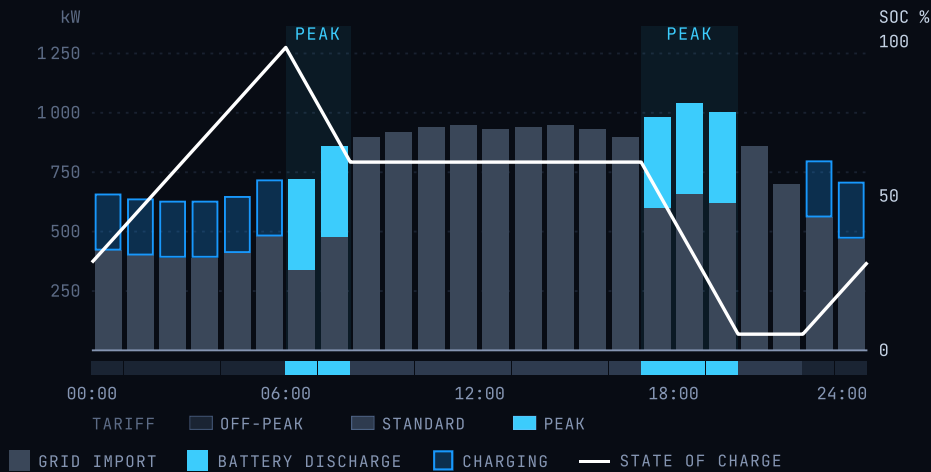
Solaris™ EMS.

Savings made every few seconds.

The hardware sets the ceiling. Solaris decides how much of it you capture: solar, battery, grid or generator, against your tariff and your demand limit.

FIG 04-1 · A WEEKDAY, DISPATCHED

ILLUSTRATIVE · HIGH-DEMAND SEASON



THE DAY

1 900 kWh
MOVED INTO PEAK WINDOWS

5 h
OF PEAK CARRIED ON
STORAGE

-380 kW
OFF EVERY PEAK HOUR

98 → 5 %
SOC WINDOW USED

01

Minimise energy cost

Eskom and municipal time-of-use calendars loaded per site, with seasonal and day-type variants.

02

Hold the demand ceiling

Watches the rolling half-hour and discharges early, so one event never resets your NMD charge.

03

Protect the asset

SOC window, C-rate, temperature spread and cycle budget are hard limits, not targets.

04

Keep a reserve

A floor of stored energy is held for continuity, sized to the process, not the arbitrage.

05

Forecast, then commit

Solar and load forecast a day ahead and again intraday. A cloudy morning changes the overnight charge.

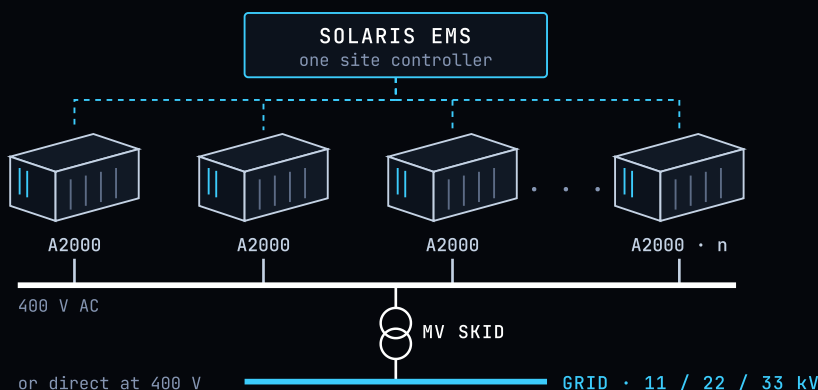
06

Stay compliant

Export limits, power factor and grid-code duties at the point of connection are enforced as constraints.

FIG 04-2 · SCALES BY THE BLOCK

ONE CONTROLLER, ANY NUMBER OF UNITS



INTEGRATION

OPEN PROTOCOLS

SITE SCADA
Modbus TCP / RTU

UTILITY & PROTECTION
IEC 60870-5-104 · IEC 61850

LOCAL BUS
CAN · RS-485

REMOTE LINK
Ethernet · 4G failover

REPORTING
Live dispatch · monthly tariff reconciliation ·
asset health

05 • CELL LIFE

Twenty years, mapped by duty. Ten schedules, one chemistry.

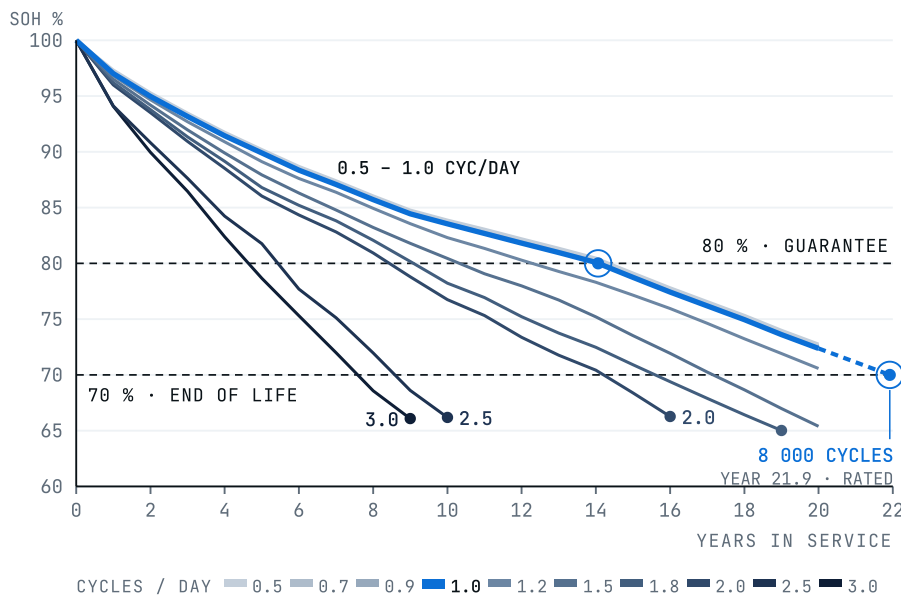
At one cycle a day the A2000 holds 80 % into year 14 and reaches 70 % at 8000 cycles.

CELL	RATING	USABLE, BOL	BASIS	DUTIES	HORIZON
EVE 314 Ah LFP prismatic	8 000 cycles to 70 % SOH, 25 °C	2 046 kWh 98 % DOD	0.5P 98 % DOD • 25 °C	10 schedules 0.5 – 3.0 cyc/day	20 years year by year

FIG 05-1 • CAPACITY RETENTION BY DISPATCH DUTY

SOH, % OF USABLE

READING THE CURVES



At design duty: **80 % in year 14**, 70 % at 8 000 cycles.

Duty headroom.

From 0.5 to 1.0 cycles a day the curves sit within a point of each other. Set the schedule by the revenue case.

Fade decelerates.

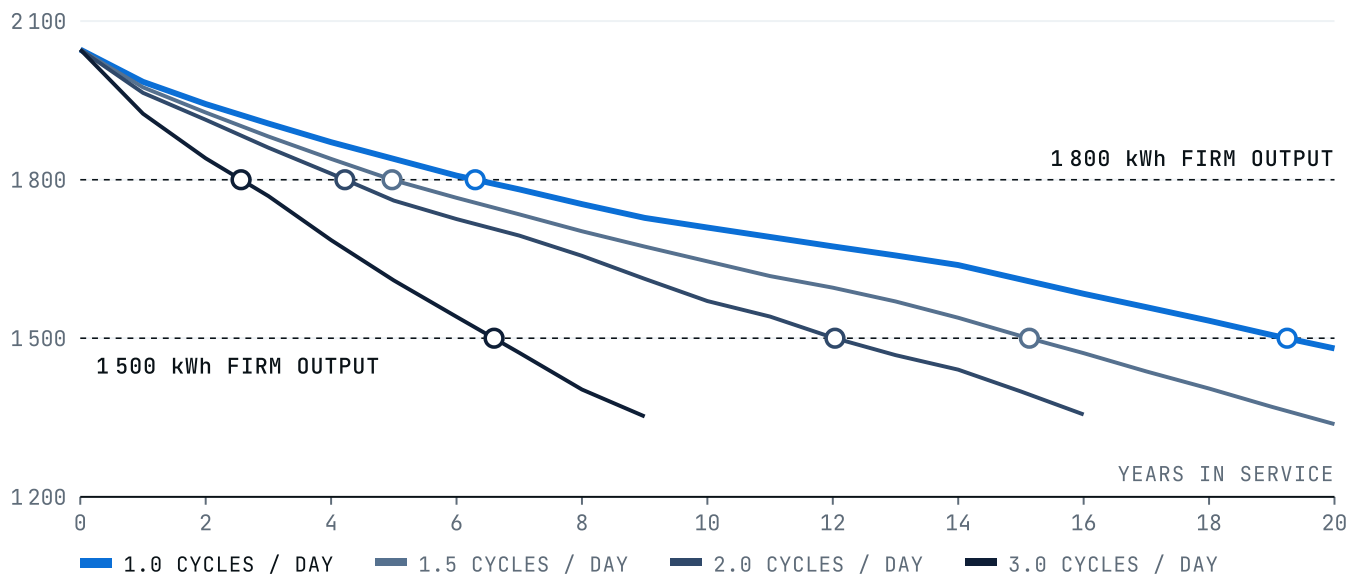
The first year costs about 3 points. After that the curve flattens to near-linear.

Hard duty, more cycles.

At 2.0 cycles a day the block ages faster in years but delivers more cycles before 70 %.

FIG 05-2 • ENERGY PER DISCHARGE

KWH PER FULL DISCHARGE • RINGS: YEAR IT FALLS BELOW FIRM OUTPUT



06 · LIFE IN NUMBERS

Choose the duty, read off the return.

One cycle a day delivers 12.6 GWh over twenty years. Two cycles a day delivers 19.4 GWh by year 16.

14 _{yrs} TO 80 % SOH · 1 CYCLE/DAY	8 000 _{cycles} TO 70 % SOH · CELL RATING	12.6 _{GWh} DELIVERED IN 20 YEARS · 1 CYCLE/DAY	10 370 _{cycles} TO 70 % AT 2.0 CYCLES/DAY
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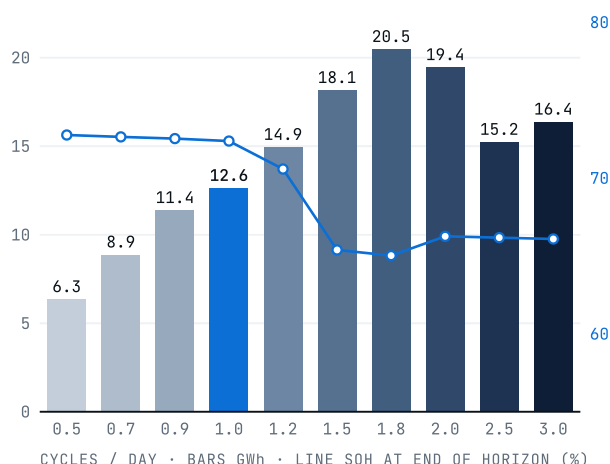
TABLE 06-1 · RETENTION MILESTONES BY DUTY

0.5P · 98 % DOD · ▶ BEYOND YEAR 20, EXTRAPOLATED

CYCLES / DAY	YEAR-1 LOSS	80 % SOH AT	70 % SOH AT	CYCLES TO 70 %	MODELLED TO	SOH THERE	ENERGY DELIVERED
0.5	2.66 %	y14.4	y22.2 ▶	4 060	y20	72.8 %	6.3 GWh
0.7	2.77 %	y14.3	y22.1 ▶	5 650	y20	72.6 %	8.9 GWh
0.9	2.87 %	y14.2	y22.0 ▶	7 240	y20	72.5 %	11.4 GWh
1.0	2.97 %	y14.1	y21.9 ▶	8 000	y20	72.4 %	12.6 GWh
1.2	3.18 %	y12.3	y20.4 ▶	8 950	y20	70.6 %	14.9 GWh
1.5	3.49 %	y10.3	y17.2	9 390	y20	65.4 %	18.1 GWh
1.8	3.80 %	y9.1	y15.6	10 250	y19	65.0 %	20.5 GWh
2.0	4.00 %	y8.4	y14.2	10 370	y16	66.3 %	19.4 GWh
2.5	5.89 %	y5.4	y8.6	7 840	y10	66.2 %	15.2 GWh
3.0	5.92 %	y4.6	y7.6	8 300	y9	66.1 %	16.4 GWh

FIG 06-1 · ENERGY DELIVERED BY DUTY

GWh



DURATION ENVELOPE

SAME BLOCK, SET AT COMMISSIONING

DURATION	C-RATE	DISPATCH	PER CYCLE
2 h	0.5C	1 000 kW	2 046 kWh
4 h	0.25C	500 kW	2 046 kWh
6 h	0.17C	333 kW	2 046 kWh

Longer durations work the cells less hard and extend cycle life. The container, cells and cooling are identical; only the dispatch envelope changes.

Modelled. Duty-dependent fade from a measured 314 Ah LFP container test set (0.5P, 98 % DOD, 25 °C), scaled to the EVE 314 Ah rating of 8 000 cycles to 70 % SOH. Energy delivered = cycles × usable energy × state of health, year by year. The project warranty curve is issued with each offer.

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