Titanium ESS-L20

Second-Life DC Block · 638 kWh

Containerised DC energy storage from graded Nissan Leaf packs · MODEL ESS-L20-638

638 kWh	320 kW	288 – 806 V	24 packs
Rated energy [1]	Peak power · 160 kW rated	DC voltage, 1× or 2× series	Leaf 40 kWh



Renders are for illustration; the final product may differ.

One block. Twenty-four graded packs.

- Graded Leaf Packs
- DC Combiner
- System BMS
- Cooling and Fire

A complete DC block for third-party PCS, at a lower upfront cost than new-cell storage, and ready for the PUC's 2026 storage requirement.

1–2 h	24	N+1	2×
PUC rule	Graded packs	Cooling	Series option

Second-Life Battery Assets

- 24 OEM Nissan Leaf 40 kWh packs in their original enclosures
- Capacity rated on measured health: Band A, 68% SOH
- No new cells manufactured for the block

Integrated Safety

- Pack-level contactors and OEM battery controllers
- Gas, smoke and heat detection with aerosol suppression
- Off-gas exhaust and roof deflagration vents

Serviceability

- Every connector faces the doors
- Single-pack replacement without system shutdown
- Graded spare packs matched to each block



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WHY SECOND LIFE

Lower upfront cost. Ready for the PUC rule.

Since May 2026, Belize requires storage with every solar system above 6 kW. The ESS-L20 meets it with Nissan Leaf packs that are already built, graded and matched, at a lower upfront cost than new-cell storage.

Lower Upfront Cost [1]

Built from recertified EV battery packs instead of newly made cells: a lower upfront cost than a new-cell battery system of the same usable capacity.

Meets the PUC Storage Rule [2]

One block covers 1 h for a solar system of up to 250 kW. 500 kW needs two blocks, 1 MW four.

1.6 GWh Over 10 Years [3]

At one cycle per day from 68% SOH, allowing for observed field fade. Graded spares restore capacity.

Renew, Don't Replace

Packs swap one at a time from the door. Top up capacity with graded spares while the block keeps running.

Rated on Measured Health

Every pack is scanned and graded. The block uses Band A only and is rated at its lower limit, 68% SOH.

Cells Already Built

The block uses recertified OEM packs in their crash-tested enclosures. Reuse comes before recycling; no new cell manufacturing.

[1] Steckel, Kendall and Ambrose, Applied Energy 300 (2021); CEPS, Second-life applications for battery packs (May 2026). [2] Electricity Licensing and Consent (Capacity Limits) Order, 2026. [3] Observed field fade of 3 SOH points per year.



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APPLICATIONS

Where it pays back. One cycle a day.

543 kWh usable at 160 kW, about 3.4 hours: sized for commercial, industrial and off-grid sites. Values are indicative per block, excluding PCS, PV and installation, and are confirmed by a site study.

Diesel and Off-Grid Sites

Cayes, lodges and farms: stored solar replaces genset hours costing BZ$1 – 2 per kWh. BZ$80 – 360k fuel avoided per year.

Solar Under the New Licence

Store midday solar instead of exporting it at BZ$0.13 per kWh, and meet the 1 – 2 h requirement. BZ$30 – 45k per year.

Industrial Peak Shaving

Take up to 160 kVA off demand charges of BZ$23 – 36 per kVA each month. BZ$30 – 60k per year.

Evening Resilience

3.4 h at 160 kW carries a site through the evening CFE curtailment window and grid outages.

Caribbean C&I

Where commercial power costs US$0.30 or more per kWh, solar self-consumption and backup pay back faster.

Sized to the Rule

Up to 250 kW of solar: 1 block. 500 kW: 2 blocks. 1 MW: 4 blocks. Allow for fade, or plan graded-spare top-ups.

DC POWER AND ENERGY

Configuration	24 × 96S2P, direct parallel; option 12 × 192S2P
Voltage range	288 – 403 V; option 576 – 806 V [5]
Nominal voltage	350 V; option 700 V
Rated / peak current	457 / 914 A; option 229 / 457 A
Nameplate energy	941 kWh (new cells)
Rated energy	638 kWh at 68% SOH [1]
Usable energy	543 kWh, 10 – 95 % SOC [1]
Rated / peak power	160 / 320 kW [2]
Charging & discharging rate	≤ 0.25P continuous, 0.5P peak
DC round-trip efficiency	≈ 97 %, excluding auxiliaries [3]

BATTERY

Pack	Nissan Leaf 40 kWh (ZE1), OEM enclosure, second life
Cell	NMC pouch, 56.3 Ah, 3.65 V nominal
Pack configuration	96S2P, 192 cells, 350 V nominal
Packs per block	24 (4 stacks × 6 levels)
Grade band	Band A: 76 – 79 Ah per cell group (68 – 71 % SOH)
Pack protection	Pack contactors and precharge; fuse-switch per pack
Battery management	System BMS (3 controllers) reads every pack: SOH, cell-group voltages, temperatures; insulation monitoring

[1] Start of second life, 25 °C, 0.25C; rated at the Band A lower limit. Each block's delivered rating follows its measured pack grades.

[2] Operating power set by the site PCS within these limits.

[3] Design estimate; verified at factory acceptance test.

[4] Power derates above +45 °C ambient.

[5] Series option: 12 strings of two packs in series; energy and power unchanged.

MECHANICAL AND ENVIRONMENT

Dimensions (L × W × H)	6,058 × 2,438 × 2,591 mm (20 ft)
Weight	≈ 13.8 t (30,428 lb)
Enclosure	Insulated steel, IP55, C4; not stackable
Access	Front double doors; ISO cargo doors
Operating ambient	–20 to +50 °C [4]; ≤ 2,000 m
Humidity	0 – 95 % RH, non-condensing

THERMAL AND SAFETY

Cooling	2 × 7.5 kW DX, R32, N+1
Battery temperature	15 – 30 °C in operation
Detection	Smoke, heat, H_2, CO per stack
Suppression	Aerosol generator per stack
Explosion control	Gas-alarm exhaust; roof vents

CONTROL AND COMMUNICATION

Site EMS	Modbus TCP
PCS interface	CAN or Modbus TCP
Auxiliary supply	400/230 or 480/277 V, 3-phase
Hard-wired I/O	Fire, E-stop, door contacts

STANDARDS AND CERTIFICATION

NFPA 855 · 68 · 69
Design basis

IEC 62933-5-2
Design basis

UL 1974
Pack grading aligned

UL 9540 · 9540A
Not yet listed

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