



Image shown may not reflect actual configuration.

Cat® Energy Time Shift modules

1000 kW Energy Time Shift (ETS) with
1518-9108 kWh Energy Capacity Expansion (ECE)
50 Hz 380-415 Volt
60 Hz 480-600 Volt

The Cat® ETS and ECE container modules are a scalable and rapidly deployable energy storage system. The energy storage system integrates with solar or other renewable sources to store energy from the overproduction of the renewable source for use when the renewable source is not available. Cat energy storage systems provide temporary backup power to facilities in the event of a power outage.

Features

Reliable, Modular and Scalable

The Cat ETS and ECE modules are robust and consist of pre-engineered containers that are easily installed on site. Multiple energy storage modules may be operated in parallel to provide increased power output and/or increase the battery energy capacity. Installed modules allow optimized genset operation.

Renewable Integration

The energy storage modules are designed to work with an array of renewable systems, including solar and wind. Seamless integration with the Cat Microgrid Master Controller (MMC) allows for maximum renewable penetration and full asset control. The onboard multi-mode Cat Bi-Directional Power (BDP) inverter is capable of grid forming allowing generator set(s) to be completely switched off, further reducing fuel consumption and operating costs.

Grid Stabilization

The ETS module also protects against many typical power problems, including grid outage, voltage sags/surges, and under/over frequency conditions.

Cat® Bi-Directional Power (BDP) Inverter

The Cat BDP inverters are the core to the energy storage system. Based on technology developed for Cat electric drive machines, the Cat BDP provides exceptional reliability, durability and features that include:

- Controls for the charging and discharging of the energy storage equipment.
- 2 per unit fault current capability
- Static VAR compensator
- Four-quadrant output power factor control

- Patented Non-Linear droop control for ultra-fast response
- Seamless mode transfer
- Automatic anti-islanding
- Grid forming
- Grid firming
- Grid following
- Autonomous mode or Remote-Control mode
- Parallel ready – multiple modules may be used in parallel to increase total output up to 100+MW)

Energy Storage

- Advanced lithium-ion batteries provide energy density, high discharge/recharge efficiency, and long cycle life.

Standard Equipment

- Cat BDP1000 bi-directional power inverters
- Energy storage batteries
- Color HMI touchscreen
- CSC certified ISO High Cube container
- Remote communications via Modbus TCP
- HVAC system to maintain optimal interior temperatures
- Convenience receptacles
- Fire suppression system

Applications

- Time shifting of energy from renewables, genset or utility
- Renewable smoothing
- Peak shaving
- Grid firming/grid stabilization
- Generator set transient assist
- Facility backup
- Reserve power capacity

Product Scalability

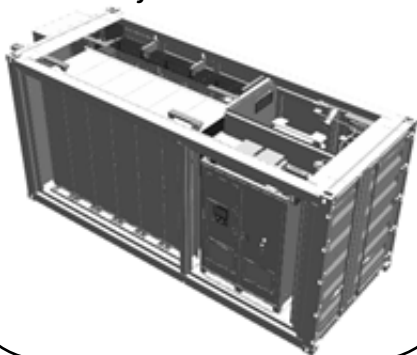
The ETS1500 contains the bi-directional power inverter BDP1000 with a fixed number of batteries and support equipment. The ETS1500 may be installed and operated alone or in combination with up to three (3) ECE1500, ECE2000 or ECE2500 modules for increased energy capacity and discharge duration.

Total Energy Capacity	Continuous Power Rating	Energy Time Shift (ETS)	Energy Capacity Expansion (ECE)	
1.5 MWh	570 kW	ETS1500		
3.0-4.0 MWh	1 MW	ETS1500	ECE1500/2000/2500	
4.5-6.5 MWh	1 MW	ETS1500	ECE1500/2000/2500	ECE1500/2000/2500
6.0-9.1 MWh	1 MW	ETS1500	ECE1500/2000/2500	ECE1500/2000/2500

Modular Configuration

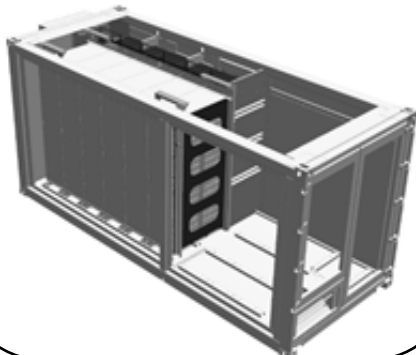
Energy Time Shift (ETS)

- BDP Inverter with liquid cooling
- 6 racks of batteries
- HVAC for batteries
- Fire suppression
- Transformer



Energy Capacity Expansion (ECE)

- 6, 8 or 10 racks of batteries
- HVAC for batteries
- Fire suppression



Technical Specifications*

Model		ETS1500	
Output Power			
Maximum Continuous at 1.0 PF	kW	*570	1000
Energy (Nameplate Start of Life)	kWh	1518	
Number of Battery Racks	qty	6	
Battery type		Li-Ion	
Battery Chemistry		NMC	
Application		High Energy	
Inverter Model		BDP1000	
Number of inverters		1	
Isolation Transformer	Pri / Sec	△-Delta / Y-Wye	
Number of Transformers		1	
Output Voltage	(50Hz)	380-415 VAC	
	(60Hz)	480-600 VAC	
Output Voltage THD		<3%	
Ambient Temperature Capability	°C	-40 to +50	
Average Parasitic Load			
At 0° / 40°C in standby operation (0% load)	kW	2.0/4.0	2.0/4.0
At 0° / 40°C in continuous operation (100% I	kW	33.0/36.0	33.0/36.0
Shore Power Connection	V (50Hz)	400V 50Hz	
	V (60Hz)	480V 60Hz	
Features			
Microgrid Stabilization		Yes	
Patented Non-Linear Droop Control		Yes	
Seamless mode transfer		Yes	
Islanding detection		Yes	
Grid forming		Yes	
Four Quadrant Power Factor Control		Yes	
Static VAR compensator		Yes	
2 Per Unit Fault Current Capability		Yes	
Reserve Power Capacity		Yes	
Plug-and-Play parallel ready		Yes	
Energy Storage Management		Yes	
Human-Machine Interface		Yes	
Fire Suppression System		Yes	
Communications Protocols		Modbus TCP/IP	

ECE1500	ECE2000	ECE2500
-	-	-
1518	2024	2530
6	8	10
Li-Ion		
NMC		
High Energy		
-		
-		
-		
-		
800-1000 VDC		
800-1000 VDC		
-		
-40 to +50		
2.0/4.0	2.0/4.0	2.0/4.0
33.0/36.0	33.0/36.0	33.0/36.0
400V 50Hz		
480V 60Hz		
-		
-		
-		
-		
-		
-		
-		
-		
-		
-		
Yes		
Modbus TCP/IP		

¥ - Ensure compatibility of all microgrid equipment by referring to A&I guides (or equivalent) for generator sets, BDP inverters, PV inverters, switchgear, and controls. Contact your local Cat dealer for assistance selecting compatible equipment.

* - Power is limited due to available energy content.

Applicable Standards and Certifications

- UL Listed to the following standards (certification and mark pending):

	ETS	ECE
• UL 9540	✓	✓
• UL 1741 SB	✓	
• IEEE1547-2018	✓	
• IEEE1547.1-2020	✓	
• UL1998	✓	
• CSA C22.2 No. 107.1/16	✓	
• cULus mark	✓	✓

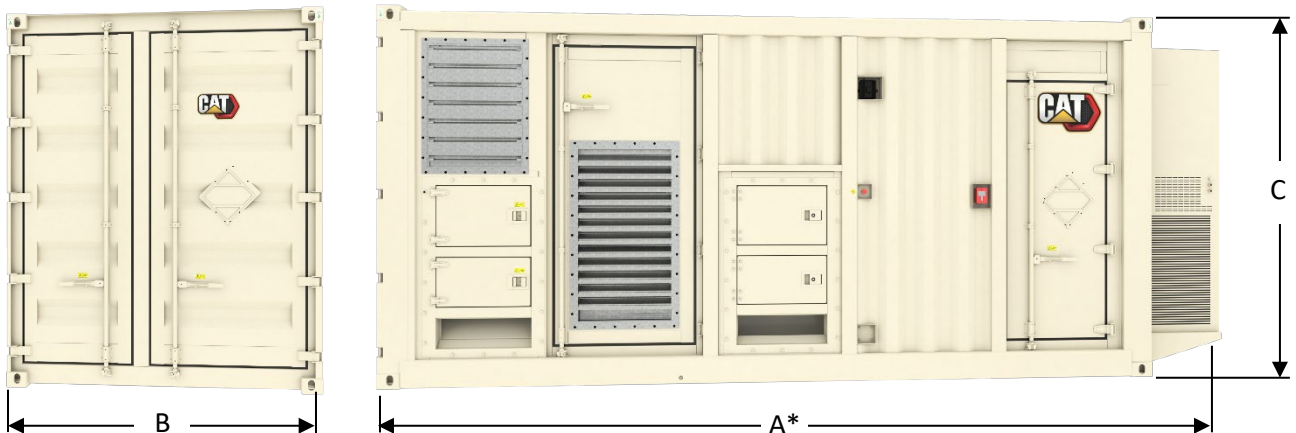
- Declarations (pending):
 - CE Declaration of Conformity
 - IEC60204-1

Remote Monitoring (Sold Separately)

The Cat® Connect telematic device (PLR809 router) and an active subscription to Cat Connect are required for battery warranty. The internet connection provides real time monitoring of the performance and health of the battery and installation. If an issue is detected, local technicians can be dispatched to resolve the problem.

Worldwide Product Support

- Cat dealers provide extensive post-sale support including maintenance and repair agreements.
- Cat dealers have over 1,800 dealer branch stores operating in 200 countries.



Dimensions		ETS1500	ECE1500	ECE2000	ECE2500
A - Length	m (ft)	6.75 (22.13)	6.75 (22.13)	6.75 (22.13)	6.75 (22.13)
B - Width	m (ft)	2.4 (8)	2.4 (8)	2.4 (8)	2.4 (8)
C - Height	m (ft)	2.8 (9.5)	2.8 (9.5)	2.8 (9.5)	2.8 (9.5)
Weight (approximate)	kg	18,725	16,325	19,693	23,061
	(lbs)	41,282	35,990	43,416	50,841

Note: Do not use for installation design. See general dimension drawings for detail. Dimensions are dependent on selected options.

* Without A/C module length 6.06 m or 19.87 ft

Materials and specifications are subject to change without notice.

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