

**ECO-H**  
TECHNOLOGIES INC.



# Frequently Asked Questions

## **WHAT IS THE POWER CAPACITY OF THE ECO-H SYSTEM?**

**The ECO-H Power Conversion System (PCS) is designed to be modular and can be customized to meet all site requirements.**

**Our larger MW Systems, range in power increments of**

**0.9 MW (1.0 MVa),**

**1.3 MW (1.45 MVa)**

**2.0 MW (2.2 MVa)**

**Ex. A 20 MW site load will utilize 10 x 2.0 MW PCS's**

**Our smaller MW Systems, range in power increments of 94kW, up to 750kW**

**All ECO-H systems are rated for full continuous power.**

## WHAT IS THE DURATION (RUNTIME) OF ECO-H?

The battery racks modules are offered in two options, namely product for Energy oriented application (ECO-E) and Power oriented application (ECO-P)

The duration of the system is also customizable by adding battery racks to the capacity required without a limit. The battery racks come in the following configurations

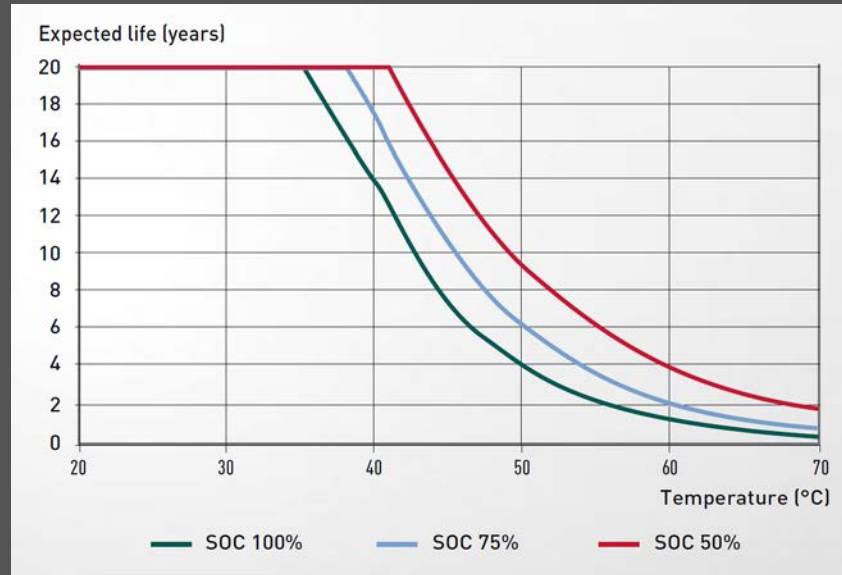
ECO-E R800	91.2 kWh
	137.0 kWh
ECO-E R1000	55.4 kWh
	110.8 kWh
	166.4 kWh
ECO-P R800	45.9 kWh
	91.9 kWh
ECO-P R1000	55.8 kWh
	111.6 kWh



# WHAT IS THE EXPECTED CALENDAR LIFETIME?

Calendar Life represents how long the battery is expected to last in terms of calendar years.

Charging or discharging the battery does not influence the calendar years but it is influenced by the state of charge (SOC) of the batteries and its operating temperature over its lifetime.

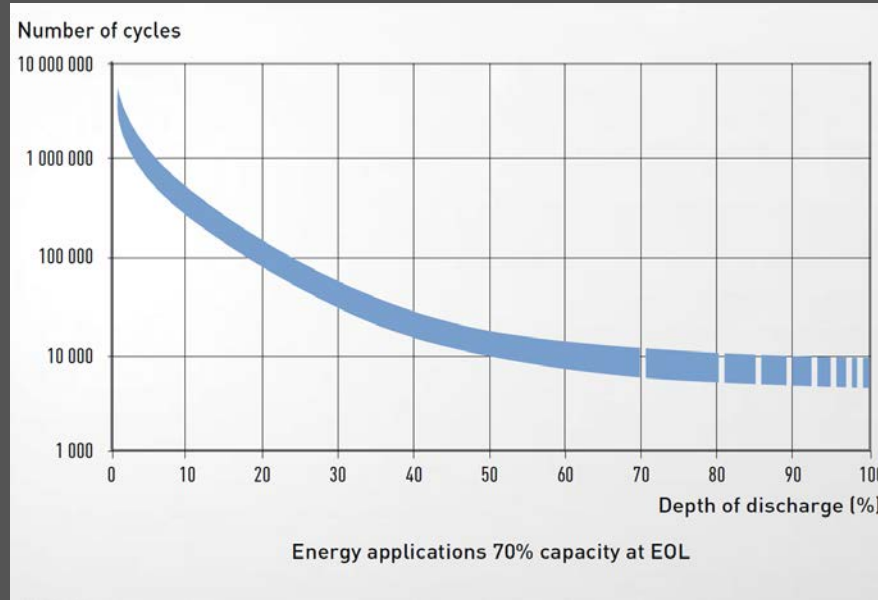


## WHAT IS THE EXPECTED CYCLES?

**Cycle Life** represents the number of charge and discharge cycles that can be achieved depending to what level the battery is discharged.

The ECO-H system is initially sized to achieve the cycles required by the customer.

This is defined as End Of Life (EOL).



## **WHAT IS THE EXPECTED END OF LIFE OF THE SYSTEM?**

**ECO-H initially oversize's a system so that by the required EOL, the system still has the full capacity required.**

**Lithium Ion batteries do not suffer from 'sudden-death' failure. Lithium Ion batteries gradually lose their energy capacity as they are being used.**

**At the EOL the batteries still have up to 70% to 80% of their original capacity. This offers the option to continue using the system as-is or adding extra capacity.**

# WHAT IS THE EXPECTED END OF LIFE OF THE SYSTEM?

## CONT'D

This means a 4 MWh (10 year) rated system will initially have approx. 5.324 MWh of energy to compensate for this effect.

As a general rule of thumb - a 10 year EOL rated system can achieve 1 full cycle per day or 3650 cycles over its life

A full cycle is defined as charging from

- 0% state of charge to 100%

Then discharging from

- 100% state of charge to 0%.

## HOW DOES ECO-H INTERFACE WITH YOUR SITE?

The ECO-H system connection point is through a step-up isolating transformer that converts the internal ECO-H Voltage to the your sites specific Voltage.

The ECO-H Transformer connects directly to the sites A/C bus bar via a dedicated circuit breaker on the site.

The system has remote access capabilities with integral SCADA, resulting in minimal adaptation and downtime (“plug and play”).





## **HOW IS THE ECO-H SYSTEM USED?**

**The ECO-H System can be preprogrammed with several modes of operations that can be customizable and stackable for the operator.**

**Load Levelling Generators**

**Global Adjustment**

**Peak Shaving & Demand Response**

**Time Shifting**

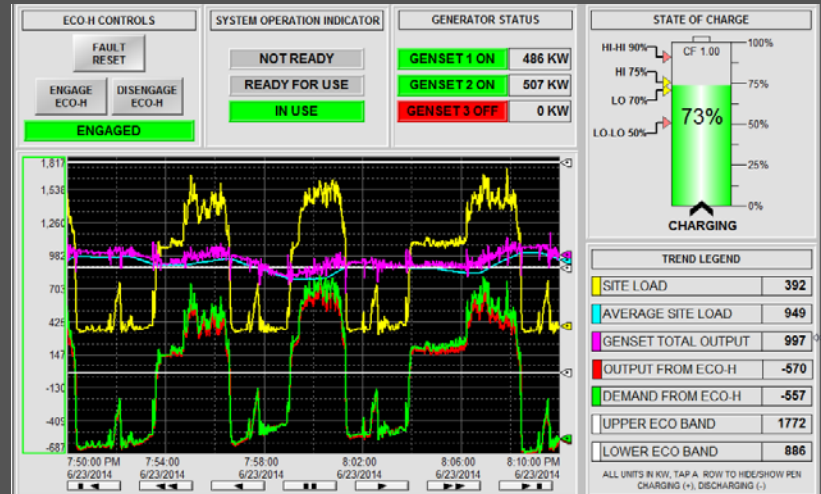
**Manual Charge/Discharge**

# HOW IS THE ECO-H SYSTEM USED?

## Load Levelling Generators

Currently, genset(s) are typically sized for peak loads but in fact they infrequently produce this power for any length of time.

These generators spend most of their time operating at lower loads. This method of sizing creates inefficiencies and increases the consumption of fuel, maintenance costs and overall emissions produced.



# HOW IS THE ECO-H SYSTEM USED?

## Global Adjustment

**For Global Adjustment, the ECO-H system is setup to discharge either manually or through remote signal.**

**Through third party Global Adjustment forecasting contractors the ECO-H system receives a remote signal and can discharge a predetermined amount of power.**

**If your facilities have forecasting capabilities ECO-H can be set in manual mode to discharge as much as you want with the click of a button.**

# HOW IS THE ECO-H SYSTEM USED?

## Peak Shaving & Demand Response

During Peak Shaving mode the ECO-H system can be setup to discharge or charge when the site loads are above set thresholds.

Facilities are paid to reduce their energy consumption at peak times or in response to market prices, replacing the need for additional generation on the grid.

ECO-H peak shaving mode during these periods acts as a “virtual” generator for the system operator.

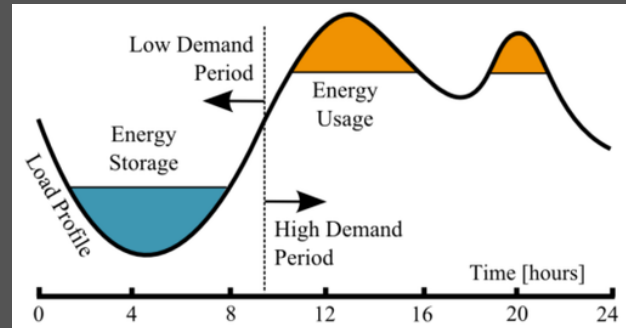


# HOW IS THE ECO-H SYSTEM USED?

## Time Shifting

In time shifting mode ECO-H allows you to buy and store power when it is least expensive and use the stored power during peak demand when prices are highest.

Time shifting mode takes full advantage of lower costs of power during off-peak times when some utilities even credit you for using their extra capacity.



# HOW IS THE ECO-H SYSTEM USED?

## Manual Charge/Discharge

The manual mode allows you to set any power limit and discharge or charge the ECO-H system for the length of time you require.

This mode allows you to set timers so that you can activate ECO-H at a predetermined time to charge/discharge.

It can also be set to a countdown mode as well. Where the System discharges/charges after a set period of time.

## **FIRE SUPPRESSION SYSTEM**

**The ECO-H System is fully integrated with a Fire Suppression System (FSS) within the ECO-H enclosure.**

**The FSS uses either an FM200 or NOVEC 1230 agent.**

**The FSS includes all necessary components for complete fire monitoring, communicating, alarming, and suppression, including but not limited to: Agent, detectors, manual release actuators, abort switches, visual/audible indicators, system control station, conduit, wire, piping and hardware. The Fire Suppression Controller and Active Material, shall be contained within the enclosure.**

**The FSS detects fire conditions using both Smoke and Temperature Sensors.**

# PREVENTATIVE MAINTENANCE

In order to ensure proper system functionality, the following checks need to be performed by ECO-H staff on a yearly bases:

## Battery System:

- **Scan connections with thermal camera**
- **Isolation Check**
- **Ground Measurement**
- **Battery Performance Check (Full charge / Discharge Cycle)**



# PREVENTATIVE MAINTENANCE

## PCS + Transformer:

- **Inspect the equipment for cleanliness (potential voltage path);**
- **Inspect for abnormal noise;**
- **Inspect power connections for any signs of overheat or arcing;**
- **Inspect devices for damage due to moisture or condensation;**
- **Inspect that all the parts are properly mounted and tightened properly;**
- **Inspect control and power wiring for discoloration and damage due to heating;**
- **Inspect for loose terminals, loose connections, loose or damaged wires;**
- **Inspect for any signs of entry of animals, chemical materials, dust or drip water;**
- **Inspect for proper ventilation openings (as per original design intent);**
- **Inspect for insulators damages;**
- **Inspect and replace air filters as needed;**

# PREVENTATIVE MAINTENANCE

## PCS + Transformer:

- **Verify the state of the PCS controller (including backup battery);**
- **Inspect inverter unit fan assemblies;**
- **Inspect and check UPS with batteries;**
- **Measure and calibrate control voltage levels;**
- **Inspect for monitoring devices integrity;**
- **Verify protection relay response times;**
- **Verify the state of current transformers;**
- **Inspect step-up transformer;**
- **Perform Insulation Resistance test of transformer;**
- **General Inspection of AC & DC circuit breakers and operating mechanisms.**

# PREVENTATIVE MAINTENANCE

## Fire Suppression System:

- **Check Cylinder Pressures**
- **Simulate fire scenarios via smoke and heat testing**

## HVAC System:

- **Replace Filters**
- **Check for correct heating and cooling output**



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PRECISION RENTALS

HYBRID POWER MANAGEMENT SYSTEM

ECO-H