

---

# **Customer Manual**

## **Energy Storage Incentives for Business**

**2024-06-20**

---

---

## Table of Contents

1	Overview .....	3
1.1	Program Offer .....	3
2	Program Offers and Requirements .....	4
2.1	ES Incentives .....	4
2.2	General Eligibility .....	5
2.3	ESS System Requirements .....	5
2.3.1	Product selection requirements .....	5
2.3.2	Installation and interconnection requirements .....	6
2.3.3	DERMS connectivity .....	6
2.3.4	Customer reserve .....	7
2.3.5	Telemetry .....	7
3	How it works .....	8
4	Policies and Procedures .....	9
4.1	Application Process .....	9
4.2	Measurement standards .....	9
4.3	10 Year Agreement Term .....	9
4.4	Eligible Costs .....	9
4.5	Incentive Payments .....	9
4.6	Performance Requirements .....	9
4.7	Incentive Clawbacks .....	10
4.8	Timelines .....	10
4.9	Event Management .....	10
4.10	Pre-charging & recharging .....	10
4.11	Demand Charge Impacts .....	11
4.12	Reporting requirements .....	11
4.13	Maintenance .....	11
4.14	Failure to complete .....	11
4.15	Performance Penalties .....	11
4.16	Other Demand Response Programs and Offers .....	11
5	Performance Calculations .....	13

---

# 1 Overview

Energy storage systems (ESS) are an emerging technology in BC Hydro's service area and will play an important role in future non-wires, grid resilience and demand response solutions. BC Hydro has increasing interest in storage as it can be used to reduce peak demand and improve resiliency and reliability.

The Energy Storage Incentives (ESI) product is offered province wide, with the objective of helping customers who are interested in adopting energy storage overcome financial, technical and knowledge barriers.

Only electro-chemical (or battery) ESS are eligible for this program. Other types of energy storage will be assessed when they become commercially available and incorporated into the program if warranted. This program is not for front-of-the-meter batteries, only ESS that are installed behind a customer meter are eligible.

Customers wishing to earn incentives from BC Hydro for energy storage solutions can follow either of two paths, but may not participate in both:

- Energy Storage Incentives
  - For customers seeking up-front funding assistance for the installation of an eligible ESS
  - Customers may receive study funding through the Feasibility Study offer
  - A study is not a mandatory precursor for this program.
  - Customers must sign a 10 year agreement to provide demand flexibility services to BC Hydro, via an eligible autoDR pathway such as SCADA or OpenADR
  - Repayments and claw backs are in place for ESS that do not fulfill event dispatch criteria for reliability and capacity or performance expectations and for customers leaving the program before the 10 year agreement expires.
  - After 10 years, the customer may join any demand response programs if they desire.
- Demand Response for Business
  - Customers with existing ESS may join Demand Response for Business and earn incentives for each season they successfully participate
  - Customers may join via the manual or autoDR offer
  - Suitable for customers who already have a battery or do not wish to sign long term contracts with BC Hydro
  - Refer to the DR for Business manual and materials for eligibility and other details.

Customers seeking funding to study the potential or fit of ESS in their operation should refer to the Feasibility Study (FS) offer. This program does not provide separate study funding outside of the FS.

The ESS must integrate directly with BC Hydro's distributed energy resource management system (DERMS). This will allow the ESS to automatically respond to event dispatches from BC Hydro. See ESS System Requirements for more information.

Customers must be able to reliably reduce demand year-round at the request of BC Hydro, through the use of their ESS. This participation does not impact the level of service from BC Hydro.

## 1.1 Program Offer

Customers are offered a one-time up-front incentive of \$10,000 / kW of demand flexibility that can be sustained over a 4 hour duration. Incentives are calculated on the customer's nominated energy or demand of the storage system (i.e. amount excluding any customer elected reserve.) In exchange for the up-front incentive, customers will agree to provide 10 years of year-round demand flexibility to BC Hydro.

Eligible ESS must connect to BC Hydro's distributed energy resource management system (DERMS), in order to receive automated signals that trigger the battery to provide demand flexibility, and accept pre- or re-charge commands. The connection must use IEEE 2030.5, SCADA, established API for the BC Hydro DERMS, or other communications method approved by BC Hydro.

---

## 2 Program Offers and Requirements

### 2.1 ES Incentives

ES Incentives are direct financial incentives paid to customers to support the acquisition, installation and operation of customer-sited ES system (ESS). These participating ESS are obligated to support demand flexibility requirements of BC Hydro, through response to dispatch signals from BC Hydro. Additionally the ESS must be non-exporting and not inject power to the grid as part of the demand flexibility services. The incentives do not include costs to prepare the customer facilities for the ESS, the associated permits and other safety inspections.

Participating customers may be eligible to receive an incentive for the installation and energization of an ESS at their site. The system must provide demand flexibility services back to BC Hydro, reliably, for 10 years.

The ESS must meet the technical requirements outlined in ESS System Requirements.

The demand flexibility services include:

- Discharging for up to 4 hours consecutive, up to 2 times per day
- Delaying recharging from the grid by up to 12 hours
- Pre-charging up to 12 hours before a discharge command

These demand flexibility services are to be provided year-round to BC Hydro. Participation in events is mandatory, to earn the entire incentive and not trigger clawbacks. Eligible ESS must connect directly to BC Hydro's DERMS platform so that the ESS can receive automated signals from BC Hydro.

Key terminology:

- **Available** energy and capacity refer to the actual ability of the ESS to perform. Many systems only allow for discharge to 5% and maximum charge of 80 – 90% of the nameplate rating.
- **Reserve** refers to the amount of energy a customer will not discharge below when dispatched by BC Hydro, in order to retain some resiliency for the customer's site.
- **Nominated** refers to the amount of energy and capacity the customer makes available to BC Hydro in this program. **This amount may not exceed 100% of the site's average winter peak demand, measured from November to February of the prior year.**

The incentive amount is based on the amount of demand flexibility the battery can provide on a dispatchable basis, to BC Hydro, for 4 consecutive hours, excluding the reserve amount. The total financial incentive is calculated as the **lesser** of the following:

- a)  $\$10,000 * (\text{kWh nominated} / 4)$  or;
- b)  $\$10,000 * \text{kW nominated}$  or;
- c) 80% of eligible project costs

Examples:

A nameplate 480 kWh / 120 kW system with a 80% operating range would have 400 kWh/100 kW of available range. A 20% reserve would have 320 kWh / 100 kW nominated:

- a)  $\$10,000 * 320 / 4 = \$800,000$
  - b)  $\$10,000 * 100 = \$1,000,000$
- Eligible incentive = \$800,000

An ESS with 400 kWh / 100 kW available and a 50% reserve could nominate 200 kWh / 100 kW:

- a)  $\$10,000 * 200 / 4 = \$500,000$
  - b)  $\$10,000 * 100 = \$1,000,000$
- Eligible incentive = \$500,000

An ESS with 200 kWh / 100 kW available and a 20% reserve could nominate 160 kWh / 100 kWh:

- 
- a)  $\$10,000 * 160 / 4 = \$400,000$
  - b)  $\$10,000 * 100 = \$1,000,000$
- Eligible incentive = \$400,000

An ESS with 1,600 kWh / 200 kW available and a 20% reserve could nominate 1280 kWh / 200 kW:

- a)  $\$10,000 * 1280 / 4 = 3,200,000$
  - b)  $\$10,000 * 200 = \$2,000,000$
- Eligible incentive = \$2,000,000

Incentives are payable in three tranches:

- 50% of incentive upon delivery of the system to the customer
- 25% of incentive upon approval to energize from BC Hydro
- 25% of incentive upon successful integration to the BC Hydro DERMS

**Total project incentive may not exceed 80% of eligible customer costs**, made up of battery equipment, installation and permitting. Infrastructure costs are not eligible under this program. Refer to Eligible Costs section below for more details.

Projects located in eligible non-wires alternative or feeder relief areas may be eligible for additional top-up incentives. These incentives will be determined on an area-by-area basis by BC Hydro. Total incentives received after top-up may not exceed 100% of eligible costs.

## 2.2 General Eligibility

To be eligible for ESS Incentives, customers must meet the following criteria:

1. Be on a small, medium or large general service (business rate) or irrigation rate under the Electric Tariff. Transmission customers are not eligible for this offer. Customers on Self Generation rate 1289 and Overnight rates 1640-1643 are not currently eligible.
2. Plan to install a new battery. Batteries that are already purchased or installed are not eligible.
3. Have an operating smart meter (no manually read meters)
4. Install and energize an ESS that meets all the system requirements of the program (outlined below), within 24 months of Distribution Generator Interconnections facility study completion or the Self Generation Application acceptance. Systems must be non-exporting to the grid.
5. Agree to a 10 year contract to provide demand flexibility services via the ESS to BC Hydro
  - a. Provide demand flexibility year-round within the following parameters:
    - Max. duration (hours / event): 4
    - Max. daily frequency: 2
    - Min. hours between events: 5
  - b. Must reliably respond to flexibility dispatch events. Performance is considered reliable when the ESS is charged to provide at least 85% of its nominated capacity for all DR events, as measured at the start of the event.
  - c. Customers may not receive ES incentive funding and also participate in the manual or automated demand response streams of DR For Business.
6. Customers may elect to reserve a portion of their battery. See section Customer Reserve section below.

## 2.3 ESS System Requirements

The ESS must meet the following requirements:

### 2.3.1 Product selection requirements

The ESS and related equipment must meet all applicable codes and standards. The system or assembly assures safe and successful design, fabrication, procurement and installation of a fully functioning ESS that meets or exceeds all technical requirements, including protections and controls, communications equipment/software and connection to the BC Hydro electric system and DERMS.

- 
- An electrochemical energy storage system.
  - Carries at least a 10-year manufacturer warranty.
  - Operates at a minimum 80% round-trip efficiency.
  - Includes fire and deflagration systems.
  - Meets BC Hydro DERMS integration requirements.
  - Meets BC Hydro interconnection requirements.
  - Complies with structural, building, and codes, laws and regulations.
  - Permanently installed, grid connected, and behind the meter.

There are codes and standards that apply to the ESS and related equipment. Individual technologies may have specific standards while improvements are pushing these standards to evolve. Systems installed in this program should comply with all applicable current standards including, but not limited to the following list:

- a. Product/Process Standards
  - UL 9540
  - UL 9540A
  - UL 1973
  - UN 38.3
- b. Power Conversion System Standards
  - UL 1741
  - UL 1741 SA
  - CSA C22.2 No. 107.1
  - IEEE 1547
- c. Installation Standards
  - NFPA 855, latest version
  - CEC, latest version
  - BC and Local Building and Safety Codes, latest version

Pending compliance is not acceptable.

### **2.3.2 Installation and interconnection requirements**

To ensure the safety of the installation, all systems must be installed in compliance with the requirements of all authorities having jurisdiction, including the BC Hydro Distribution Generator Interconnections process or the BC Hydro Self Generation program. Batteries less than 100 kW go through the Self Generation program. Batteries greater than 100 kW must complete the Interconnections process and field verifications.

Installers must be members of the BC Hydro Alliance in good standing.

The ESS must be non-exporting, meaning it may not inject energy onto the grid. The ESS may be stand-alone or paired with renewable generation, such as on-site solar photovoltaics.

All installations must have a documented safety and risk mitigation plan, which must be submitted to BC Hydro prior to the final incentive payment being released.

### **2.3.3 DERMS connectivity**

The ESS must connect to the BC Hydro DERMS platform in order to receive automated dispatch commands. This connection must be highly reliable in nature in order to meet the reliability requirements for this program. The ESS must be capable of receiving commands from BC Hydro through an IEEE 2030.5 certified connection, SCADA, existing API to the DERMS, or other method BC Hydro deems acceptable. Manual control of the battery to fulfill event commands is not permitted. It is the customer's responsibility to ensure that their connection of choice meets this criteria and that it remains operational for the duration of the 10 year contract.

The customer is responsible for any costs incurred by them to connect to the DERMS. BC Hydro will cover costs that its own DERMS provider may charge for the work on the DERMS platform itself.

---

### 2.3.4 Customer reserve

Customers may elect to reserve a portion of the available energy for their own purposes. Customers must determine their own reserve that will be programmed into the ESS and will be automatically excluded from demand flexibility events. This provides some level of resiliency for the participating customer's operation, in the event it is needed by the site.

The reserve is nominated by the customer on the application form.

### 2.3.5 Telemetry

- a. At a minimum each individual ESS must be capable of location, charge, discharge, state of charge and event schedule.
- b. Fleets should not be aggregated.
- c. The ES must be capable of providing a minimum of 15 minute interval performance data and store a minimum of 7 days of data locally. Shorter time intervals may be acceptable but must be confirmed with BC Hydro prior to application.
- d. Performance data must come from the ESS, not a separate meter
- e. For safety purposes, it is strongly recommended that customers or their battery operators monitor the following metrics on an ongoing basis:
  - i. inverter AC and DC voltage, current, kW, kVA, kVAR, power factor
  - ii. battery rack voltage and current
  - iii. battery module min/max voltage
  - iv. auxiliary system critical parameters
  - v. fire detection/suppression monitoring points
  - vi. state of charge
  - vii. temperature monitoring points of the battery racks.

---

### 3 How it works

The following outlines the steps to proceed through the program:

1. Customer submits workbook and related documentation to Key Account Manager (KAM). If you do not have a KAM, contact us at [demand.response@bchydro.com](mailto:demand.response@bchydro.com).
2. Submit application for pre-approval before proceeding with the purchase or installation of any equipment
3. Receive incentive agreement
  - a. Customers will be notified by BC Hydro via email if their application has been approved
4. Initiate interconnection process:  
**Distribution Generator Interconnection** (greater than 100 kW)
  - a. Fill out the **application form**.
  - b. Initiate request to begin Generator Interconnection review.
  - c. Initial approval from Generator Interconnection group to proceed.  
**Net Metering Requirements** (less than or equal to 100 kW)
  - a. Fill out the **application form**.
  - b. Submit application form to [net.metering@bchydro.com](mailto:net.metering@bchydro.com).
  - c. Wait for email approval to energize.
5. Purchase and install the Energy Storage System (ESS) (**50% payment**)
  - a. Submit proof of delivery to receive first incentive tranche
  - b. Installation
  - c. Permits
  - d. Fire safety plan
  - e. Inspections by Authority having Jurisdiction including BC Hydro where applicable
  - f. Submit all cost documentation to BC Hydro
6. Receive Interconnection or Net Metering approval to energize (**25% payment**)
  - a. Documentation of Completion for interconnection application
  - b. Field Verification documents and photos
  - c. Interconnection approval to energize
  - d. Receive email notification of incentive approval.
7. Connect Energy Storage System (ESS) to BC Hydro Distributed Energy Resources Management System (**final 25% payment**)
  - a. Customers to contact BC Hydro when they are ready to connect their ESS to receive demand response signals from BC Hydro
  - b. BC Hydro will work with the customer or ESS installer to provision and test the connection
  - c. Once the connection is in place, the site will need to be **enrolled** to receive demand response notifications and dispatch commands from BC Hydro
  - d. Updated documentation for verification that may impact incentives (i.e. any updated invoices, costs to connect to DERMs, etc)
8. Participate in DR events for next 10 years
9. Receive annual performance report from BC Hydro
  - Customers must meet at least 85% of the nominated load for 85% of the event called per year over a ten year period.
  - If these parameters are not met, BC Hydro will claw back 10% of the incentive.
10. Contract completes
  - After ten years, the contract obligation is now considered completed and contract ends.



---

## **4 Policies and Procedures**

### **4.1 Application Process**

Customers may not purchase equipment until their Energy Storage Incentive application has been pre-approved by BC Hydro. Customers may not apply for incentives for projects that are already purchased or installed.

### **4.2 Measurement standards**

Policy: All final performance measurements are rounded to two decimal places.

### **4.3 10 Year Agreement Term**

Customers must agree to provide demand response services to BC Hydro for 10 years.

- The anniversary date for each ESS is set as the date on which the test dispatch event is successfully completed, marking the eligibility of the ESS for full program participation.
- Customers who terminate their BC Hydro account, wish to terminate the 10 year agreement or do not meet the performance requirements for the duration of the 10 years will be subject to a clawback of incentive funding in proportion to the % of time remaining on the agreement. For example, a customer terminating the agreement after completing 6 years would be required to pay back 40% of the incentive funding received. See Performance Penalties below.
- Customers who do not wish to sign a long term agreement may choose to enroll directly into the Demand Response for Large Business program instead, which provides more flexibility and a pay-for-performance incentive model.
- Customers may not participate in manual or automated demand response through DR for Business and the ES offer at the same time.

### **4.4 Eligible Costs**

Incentives will be paid up to 80% of total eligible costs of the ESS. Eligible costs are as follows:

- ES equipment costs including the ESS itself, and related communications equipment to facilitate receiving dispatch event notices
- Installation costs
- Permit costs
- Costs of screening study by BC Hydro Distribution Generator Interconnections

Ineligible costs include:

- BC Hydro service upgrade costs, interconnection agreement fees
- Insurance premiums
- Facility and building upgrades
- Paving
- Costs to connect the system to the BC Hydro DERMS (e.g. software programming, battery energy management system programming or set up)
- Costs of system impact study by B Hydro Distribution Generator Interconnections

### **4.5 Incentive Payments**

Incentives are paid out within 6 weeks of receipt of required documentation proving each tranche milestone.

Incentives are payable in three tranches:

- 50% of incentive upon delivery of the system to the customer
- 25% of incentive upon approval to energize from BC Hydro
- 25% of incentive upon successful integration to the BC Hydro DERMS

### **4.6 Performance Requirements**

---

The ESS must be available for demand response dispatch events per program criteria.

- Events may occur at any time, and may be called ahead of time or in real-time
- Events are typically associated with colder or hotter days
- Events will be no longer than 4 hours and no more than twice per day
- Events may occur on consecutive days

The ESS must provide reliable performance, for the duration of the agreement. Reliable performance is defined as follows:

- the ESS is charged to provide at least 85% of its nominated capacity for 85% of dispatch events as measured at the start of each event.

Exceptions are made if the facility is experiencing a power outage at the time the event command was due to be enacted.

#### **4.7 Incentive Clawbacks**

A prorated incentive clawback will be applied to any customer's ESS that does not meet the performance requirements for the duration of the 10 years. This policy includes situations where:

- the customer chooses to terminate their participation
- the customer closes their BC Hydro account but does not withdraw
- the ESS fails the annual reliability performance assessment

Incentive clawbacks are only based on the cash incentive received through the offer and do not include costs related to interconnections studies.

Clawbacks are calculated as follows:

- For customers withdrawing or who have closed their account:
  - Clawbacks are calculated based on the number of months remaining on the contract after the withdrawal notice is received or performance failure is triggered.
  - This is determined by calculating a straight proration of the incentive over 120 months.
    - For example: if a customer withdraws at the end of the 3<sup>rd</sup> month in year 4, and originally received a \$100,000 incentive, the amount owing would be  $\$100,000 / (120 \text{ months}) * (120 - 39 \text{ months}) = \$67,500$
- For ESS that have failed the annual reliability performance assessment:
  - Clawbacks are calculated as 10% of the total incentive paid.
    - For example: \$100,000 in incentives,  $10\% \times \$100,000 = \$10,000$

#### **4.8 Timelines**

Customers have 24 months from the time of interconnections or Self Generation approval to complete their installation and submit Documentation of Completion for the Interconnections process.

#### **4.9 Event Management**

Events are dispatched from the BC Hydro DERMS. Events will be called within the following parameters:

- Events may occur at any time, and may be called ahead of time or in real-time
- Events are typically associated with colder or hotter days, but may occur at any time
- Events will be no longer than 4 hours and no more than twice per day
- Events may occur on consecutive days, weekends and holidays

#### **4.10 Pre-charging & recharging**

BC Hydro may trigger the battery to pre-charge up to 12 hours prior to an event and delay the recharge of an ESS from the grid for up to 12 hours after an event.

Generally speaking ESS may recharge as soon as the event ends. However, there may be some conditions under which BC Hydro may defer the recharging of the battery from the grid, up to 12 hours after an event.

---

Batteries with on-site renewables such as solar, may recharge the battery at any time from their renewable source.

Additionally, BC Hydro may trigger the ESS to pre-charge before an event, if it is not fully charged. Pre-charging may begin up to 12 hours before an event. BC Hydro may also pre-charge batteries prior to any upcoming storm or weather events identified.

#### **4.11 Demand Charge Impacts**

BC Hydro is not responsible for any increased demand charges a customer occurs at their site due to battery charging times. BC Hydro will make reasonable efforts, through its DERMS platform, to try to schedule pre-charging and re-charging at times not coincident to a customer's site peak.

#### **4.12 Reporting requirements**

Refer to Telemetry requirements in "ESS Requirements" section above.

#### **4.13 Maintenance**

Customers are responsible for maintaining the equipment and performing any maintenance specified by the manufacturer including, but not limited to maintaining:

- ESS and ensure it is in good working order to respond to dispatch events from BC Hydro
- Internet connection to ensure dispatches are received and data is sent back to BC Hydro DERMS as required
- ESS programming to ensure required minimums are maintained and that all nominated capacity and energy is available to meet performance requirements. Customers will be required to monitor their system for degradation and anticipate that incentive clawbacks may be enacted if performance measures are not met over time.

Customers must notify BC Hydro, in writing, within 7 days if their ESS or any of the required communications equipment that facilitates dispatch signals becomes inoperable. Refer to section 5.11 Performance Penalties.

#### **4.14 Failure to complete**

Projects that do not fully complete installation, energization and DERMS connection within 24 months from the time of Distribution Generators Interconnections Facility Study completion or Self Generation Application acceptance, will be required to repay any incentives they have received and have the application cancelled.

#### **4.15 Performance Penalties**

Customers will be required to repay a prorated portion of the incentives if the ESS, in any participation year, fails to perform reliability for 85% of the event dispatches

Performance will be measured each year on the project Anniversary Date.

Customers must notify BC Hydro within 7 days of their ESS becoming inoperable for any reason and unable to respond to event dispatches. Notice must be given by emailing [demand.response@bchydro.com](mailto:demand.response@bchydro.com)

Customers must also notify BC Hydro when their ESS becomes operable again, by following the same email procedure above.

#### **4.16 Other Demand Response Programs and Offers**

Customers may not participate in other BC Hydro or third-party demand response programs with the ESS while participating in this offer with the exception of [Demand Response for Business](#). In this case, any demand savings will initially be allocated to Energy Savings Incentive and the remaining balance will be applied to

---

Demand Response for Business. Applications to this offer will be checked for any duplicate submissions under other programs, offers and products.

---

## 5 Performance Calculations

Participating ESS must perform reliably to remain enrolled in this offer. Reliability is defined as having at least 85% of nominated energy stored in the battery at start of at least 85% of events for each 12 month period after the Anniversary date (i.e. each year of participation.)

For clarity, this means the battery must be ready to supply at least 85% of the energy nominated, for at least 85% of the events called each 12 month period the ESS participates.

The procedure for calculating performance reliability for each event is:

- Collect event data from DERMS
- Collect ESS state of charge data at time of each event
- Discount state of charge to available amount (based on application form amount)
- Subtract reserve amount
- Compare remaining state of charge (kWh) to the nominated kWh
  - Pass = remaining state of charge => 85% of nominated amount
  - Fail = remaining state of charge is < 85% of nominated amount

The procedure for calculating annual performance reliability is:

- # of passed events / total number of events in 12 month period = % reliability
- Pass = reliability is => 85%
- Fail = reliability is < 85%