Energy Storage System Process

Overview

An Energy Storage System (ESS) is a technology that uses mechanical, chemical, or thermal processes for absorbing energy and storing it for use at a later time. Examples include a battery energy storage system (BESS), which is an electrochemical device that stores energy from the grid or a generating facility, and pumped storage hydropower (PSH), which uses hydroelectric energy storage. ESS technologies can enhance power system flexibility and enable energy from renewables, like solar and wind, to be stored and later released when needed.

The procedures in IPC's OATT Attachment M and N are designed to evaluate the impacts to IPC's Transmission System for a single Generating Facility discharging energy. An ESS that is discharging energy meets the definition of a Generating Facility in the generator interconnection procedures. Idaho Power (IPC) provides service from an Interconnection Customer's (IC) Generating Facility to the Transmission System in accordance with IPC's Open Access Transmission Tariff (OATT) Large Generator Interconnection Procedures (Attachment M) and Small Generator Interconnection Procedures (Attachment N). Therefore, a discharging ESS is studied pursuant to IPC's OATT Attachments M and N.

IPC's OATT Attachments M and N do not address the impact to the system or the facilities necessary to interconnect the ESS when it is storing energy from the Transmission System. Unless it is specifically requested to not be studied during the Generation Interconnection process, IPC will study an ESS to identify the system impact and facilities necessary to interconnect the ESS when it is storing energy from the Transmission System. The Generation Interconnection Requests for Energy Storage System section of this ESS Process document identifies the additional information required for IPC to perform those studies.

If an ESS has a Generator Interconnection Agreement (GIA) and was not studied to store energy from the Transmission System during the Generation Interconnection process or has executed a System Impact Study (SIS) Agreement and has not yet been studied to store energy from the Transmission System, this capability can be studied pursuant to the Post-SIS Energy Storage System Study Process section of this ESS Process document. The results will be captured in the GIA or a GIA amendment, as appropriate.

Important Note: Neither the Generation Interconnection process nor this ESS Process provides a guarantee or rights to transmission service or resources to serve the load.

IPC's OATT can be accessed in the Tariff folder on IPC's Open Access Same-time Information System (OASIS) site: http://www.oatioasis.com/ipco/index.html.

Energy Storage System Procedures

Generation Interconnection Requests for Energy Storage System

The IC must submit its Interconnection Request for ESS into IPC's Generation Interconnection Queue to be processed in accordance with IPC's OATT Attachment M or N.

As part of the Generation Interconnection Study process, IPC will study the ESS to identify the system impact and facilities necessary to interconnect the ESS when it is storing energy from the Transmission System. To accomplish this, the IC must complete and provide the Project Data Sheet included as Exhibit A of this ESS Process document.

Post-SIS Energy Storage System Study Process

The following process is applicable to any ESS that has a GIA and was not studied to store energy from the Transmission System during the Generation Interconnection process or has an executed System Impact Study Agreement and has not yet been studied to store energy from the Transmission System. IPC will evaluate the impacts of the ESS storing energy from the Transmission System and incorporate the results into the GIA, as necessary.

1. The IC requests the ESS be studied to store energy from the Transmission System by submitting the following:
    a. Project Data Sheet (Exhibit A of this procedure document)
    b. $10,000 refundable deposit
    c. Appendix 1 of Attachment M or N specific to the charging aspect of the ESS; include the voltage level of the Point of Interconnection
    d. KMZ file and Geographic Project Site Map identifying the Generator Lead Line Route
    e. Lat/Long Coordinates of the Project Site
    f. Identification of the source of energy, if known
    g. Identification of any submitted Transmission Service Requests for delivery from the source to the ESS, if any
2. Within 5 Business Days of receipt of a completed ESS study request, IPC will offer an ESS system impact study agreement to the IC.
3. If the IC elects to proceed, the executed ESS system impact study agreement and a $10,000 deposit must be provided to IPC within 30 Calendar Days, or the ESS study request will be deemed withdrawn.
4. IPC shall use reasonable efforts to complete the ESS system impact study within 90 Calendar Days of receipt of the executed agreement and deposit. The purpose of the study is to evaluate the impacts of the ESS storing energy from the Transmission System.

5. If the ESS system impact study identifies any additions or upgrades to the Transmission System, IPC will offer an ESS facility study agreement to the IC simultaneously with the ESS system impact study report.
    a. If the IC elects to proceed, the executed ESS facility study agreement and a $20,000 deposit must be provided to IPC within 30 Calendar Days, or the ESS study request will be deemed withdrawn.
    b. IPC shall use reasonable efforts to complete the ESS facility study within 90 Calendar Days of receipt of the executed agreement and deposit. The purpose of the study is to determine a list of facilities, the cost of those facilities, and the time required to interconnect the ESS to the Transmission System.
6. Within 30 Calendar Days of issuance of an ESS system impact study report with no additions or upgrades identified, or an ESS facility study with facilities identified, IPC shall amend the IC's GIA to incorporate study findings.

Contact Information

Please contact IPC's Generation Interconnection desk with any questions:

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Revision History

This document has been approved and revised according to the revision history recorded below.

Review Date	Revisions
8/15/2022	Document was implemented.
12/5/2022	Document was updated to identify incorporation of ESS studies to store energy from the Transmission System into GI process.

Exhibit A—Project Data Sheet

Description	IC Input	Units
Power Capacity (AC)		MW
Power Capacity (DC)		MW
Energy Capacity (DC)		MW
Duration		Hrs
Auxiliary Load		MW
Capacity Degradation		--
Annual – Baseline Degradation		%/yr
Per Cycle Degradation		%/cyc
Minimum state of charge		
Maximum state of charge		
Maximum number of cycles allowed per day		
Maximum number of cycles allowed per year		
Maximum Ramp-up Rate		MW/min
Maximum Ramp-down Rate		MW/min
Time required to charge from minimum to maximum state of charge		Hrs
Voltage of Interconnection		kV

Dynamic Models Required for ESS with Inverter Interface	
Functionality	**GE PSLF Module**
Grid Interface	regc_*
Electrical Controller	reec_c or reec_d
Plant Controller (ESS-only or DC-coupled Hybrid)	repc_*
Plant Controller (AC-coupled Hybrid)	repc_b
Voltage Protection	lhvrt
Frequency Protection	lhfrt

Fundamentally, the dynamic modeling of an ESS with Synchronous Machine Interface (e.g., Pumped Storage Hydro) is no different than the traditional practice for dynamic modeling of synchronous machines by using the standardized dynamic models available for machine, exciter, stabilizer and governor. The dynamic model parameters remain unchanged for both generating and pumping operating modes. While representing dynamic behavior in charging mode, care should be taken with regard to application and parameterization of governor models.