Declaration of DC Coupled Electric Storage Operation Limited to and in Compliance with Configurations 3A and 3B in Energy Storage Guidance Document

Purpose of Declaration

Historically, Distributed Energy Resources (DERs) were assembled from discrete components or functional assemblies where the logic and operational approaches could be seen and analyzed. Today, much of the functionality is handled by an on-board computer following firmware and software instructions in order to achieve the desired results. To verify these actions requires extensive detailed review of the operating manuals and often inquiries with the manufacturer.

Declarations are used to provide the information to ensure correct documentation and ratings are used for the "first use of a design" review, if needed, and to confirm subsequent applications for an approved package match the previously approved package in order to expedite approval. *An update to the firmware which modifies or adds operation modes and changes the required functionality is considered a facility modification and may be subject to a partial or full interconnection review* as stated in the Interconnection Agreement, Section VI.E. This applies to all sources, whether generators or energy storage.

Under Xcel Energy's Guidance Document[1], Configurations 3A and 3B require an interconnection review.

[1] "Xcel Energy Guidelines for Interconnection of Electric Energy Storage with the Electric Power Distribution System", current revision.

Definitions

"Parallel Operation of Energy Storage" – a source operated in parallel with the grid when it is connected to the distribution grid and can supply energy to the customer simultaneously with the Company's supply of energy.

"Energy Storage Guidance Document" – Guidance document for the interconnection of electric storage with Xcel Energy's electric distribution system.

"**Operating Mode**" – a combination of the functionality in the physical configuration and the functionality in the software programming, some of which is not shown in the configuration diagram. Operating Mode is the combined function designed to achieve an Operating Objective that may vary with a change of settings. Operating Modes are established as a function, not by a diagram designation. Operating Modes include, but are not limited to, battery non-export, maximize self-consumption, maximize export, perform time shifting, and perform peak shaving. *A change of Operating Mode may constitute a change of Operating Objective*.

"**Operating Objective**" – the functional purpose of the DER operation achieved by the combination of the approved configuration and Operating Mode. *Any alterations to an Operating Mode may result in unacceptable changes to the Operating Objective as originally approved*. Such changes may render the facility ineligible for use without additional mitigations.

Configurations Covered

Energy Storage Guidance, Configurations 3A and 3B[2]

- 3A Parallel DC Coupled Energy Storage with Renewable Generation, Net-Metering, with Export
- 3B Parallel DC Coupled Energy Storage with Renewable Generation, Net-Metering, ATS, with Export

Key Requirements and Functionality

1. Energy storage operates in parallel[3] with the grid via hybrid inverter.
2. Generation is renewable.
3. Revenue metering is net metering.
4. Production metering, if required, is installed.
5. 3A and 3B may export to grid if the storage is **100% charged**[4] from on-site renewable generation[5].
6. If a Protected Load Panel (PLP) is present on the inverter side of any required production meter for configuration 3A, a second load meter must be installed on the PLP.

The method of achieving #5 must be fully illustrated in the oneline diagram or described below. Any aspect that is embedded in equipment and governed by firmware must be described, any additional equipment must be specified, **and specific settings needed to assure compliance must be listed**.

System software and programming that is required to meet the Energy Storage Guidance provisions are inaccessible and/or password protected, with access restricted to manufacturer/developer/installer. This may include locks or other physical security or other means of securing the settings; or as mutually agreed upon on a case-by-case basis and identified in this declaration[6].

Xcel Energy has the right to conduct an inspection to verify compliance at a later date if problems arise or indications of possible non-compliance with the applicable Energy Storage Guidance Document provisions are present.

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[2] Charging must be 100% renewable energy. Any storage mixture of non-renewable energy disqualifies 3A or 3B from exporting. If the battery charging is not 100% renewable, the configuration may be used with non-export from the battery to the grid.
[3] See Definition section.
[4] If battery exports when non-compliant, the site including PV is not eligible for net metering
[5] Charging must be 100% renewable energy. Any storage mixture of non-renewable energy disqualifies 3A or 3B from exporting. If the battery charging is not 100% renewable, the configuration may be used with non-export from the battery to the grid.
[6] If the Operating Mode cannot be secured to ensure continued operation in a 3A or 3B compliant manner, as applicable, the facility will require full interconnection review that includes all operating modes that are readily selectable and establish operating restrictions and mitigations to cover all selectable modes.

1. Electric Storage System (ESS) Details

This declaration covers the following electric storage system in whole or part as identified below:

Customer Information:

Name _____

Address _____

City _____ State _____ ZIP _____

Phone _____ Fax _____

Email (Optional)* _____

*A customer/developer email is needed to facilitate application related correspondence through our automated online application portal.

Energy Storage Facility Information:

Facility Name _____

Address _____

City _____ State _____ ZIP _____

Location _____ Premise _____

Customer ID _____

Application OID _____

2. ESS Equipment Details

ESS Battery (B) Rating & ESS Inverter (I) Information

(I) Manufacturer	
(I) Model Number(s)	
(I) UL Listings	
(B) Energy Capacity (kWh)	
(I) Maximum Current at AC Terminals	
(I) Frequency at AC Terminals (Nominal)	
(B) Real Power, max continuous charge (kW)	
(B) Real Power, recovery charge rate after utility outage (kW)	
(B) Real Power, max continuous discharge (kW)	
(I) Real Power, peak output (kW)	
(I) Peak Output Duration Capability (sec)	
(I) Apparent Power, max continuous for charging (kVA)	
(I) Apparent Power, peak during discharge (kVA)	
(I) Power Factor Output Range (+/- range)	+/-
(I) Power Factor Capability at full rated real power (+/- range)	+/-
(I) Charging: using rectifier or inverter	
(B) Charge Rate kW (Maximum continuous)	
(B) Charge Rate kW (Recovery charge rate)	
(I) Firmware version	
(I) Operating Modes available	
(I) Operating Modes enabled	

3. Additional ESS Hardware: Description, Model and Part Number and General Specifications

(Examples: charge controller, external auto transfer switch, etc.)

Model Number(s)	
Model Name(s)	
UL Listing(s)	
Firmware Version	

I, (print name and title of Installer/Developer)_____
certify that I have personal knowledge of the facts stated in this declaration and have the authority to make this declaration on behalf of the Customer. I further certify that all of the statements and representations made in this declaration are true and correct.

Installer/Developer Signature_____

Date_____