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## **ENERGY STORAGE SUPPLEMENTAL FORM** To Accompany Part 1 of the Interconnection Application/Agreement

### **Interconnection Customer Information**

Customer Name: \_\_\_\_\_

Telephone: \_\_\_\_\_ Email Address: \_\_\_\_\_

### **Facility Information**

Street Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip Code: \_\_\_\_\_

Account #: \_\_\_\_\_ Meter #: \_\_\_\_\_

### **Intent of Energy Storage System (ESS)**

Type of Application (check all that apply):

- Including with a new Customer-Generator request
- Adding to an existing Customer-Generator
- Applying for a new Standalone Energy Storage System
- Modifying an existing Standalone Energy Storage System

My ESS is intended to (check all that apply):

- Charge from the Distribution Grid
- Charge from a Customer-Generator (either new or existing)
- Discharge to the Distribution Grid (i.e. export through utility meter)
- Discharge to Customer Facility (i.e. local electrical loads)

My ESS will utilize the following Operating Modes (check all that apply):

EXPORT (across Utility Meter)	NON-EXPORT
<input type="checkbox"/> Energy Arbitrage <input type="checkbox"/> Local Grid Support <input type="checkbox"/> PJM Grid Support <input type="checkbox"/> Other(s): _____ _____ _____	<input type="checkbox"/> Solar Self-Consumption <input type="checkbox"/> Backup <input type="checkbox"/> Load Shifting/Demand Charge Management <input type="checkbox"/> Non-Export (for ESS and PV, if applicable) <input type="checkbox"/> Other(s): _____ _____ _____

**Note:** Changes to the above section will first require the customer (or owner) to submit a revised interconnection application, to ensure that any proposed changes do not negatively impact safety and reliability of the customer's electric service.



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If the ESS will charge from the Customer-Generator Facility only, please explain how it is prevented from being charged by the Distribution Grid.

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If the ESS will discharge to the Customer Facility only, please explain how it is prevented from being discharged to the Distribution Grid.

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If the ESS will perform as a back-up source, please describe how it will disconnect from the Distribution Grid during an outage (i.e. mechanical or electronic disconnect, protection and control schemes, sequence of operations, etc.).

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If the ESS will perform any Grid Support functions, such as autonomous voltage or frequency support, please describe each function and associated default settings.

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If the ESS will impose any operational limitations, please describe each (i.e. will not charge or discharge at specific times of day).

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**Energy Storage System Information (please provide equipment datasheet)**

Manufacturer: \_\_\_\_\_ Model(s): \_\_\_\_\_

Energy Storage Type: \_\_\_\_\_

Energy Capacity (per system): \_\_\_\_\_ (kWh)      Quantity of systems: \_\_\_\_\_

Min. Allowable Depth of Discharge: \_\_\_\_\_ %      Discharge Efficiency: \_\_\_\_\_ %

Max. Continuous Discharge (Export) Rate: \_\_\_\_\_  kW  C-Rate

Max. Continuous Charge (Import) Rate: \_\_\_\_\_  kW  C-Rate

If the ESS can inadvertently export (unintentionally discharge through utility meter):

    Max. Export (Peak Power): \_\_\_\_\_(kW)

    Max. Export Duration: \_\_\_\_\_sec

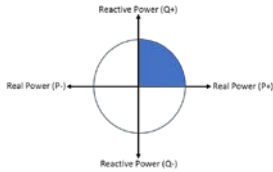
Energy Capacity Depreciation Rate: \_\_\_\_\_ (kWh/yr.)

Operating Temperature Range: \_\_\_\_\_ to \_\_\_\_\_ °F  °C

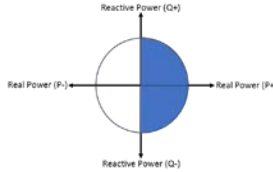
Temperature De-Rating Factor (if available): \_\_\_\_\_ in units of:  %kW/°C  %kW/°F

Power Quadrant Capability (shown in blue):

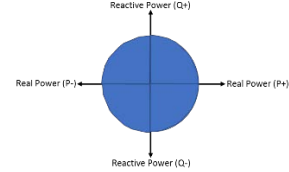
Single



Double



Four



Does the ESS share an inverter with a Customer-Generator Facility or EV Charger (also known as DC-coupled)? Yes  No  (if Yes, skip next section)

**Energy Storage System Inverter Information (please provide equipment datasheet)**

Number of Inverters: \_\_\_\_\_

Manufacturer: \_\_\_\_\_ Model Number: \_\_\_\_\_

Number of Phases: \_\_\_\_\_

Rated Current: \_\_\_\_\_ Amps Max. Fault Current: \_\_\_\_\_ Amps

Rated Nominal Voltage: \_\_\_\_\_ V<sub>AC</sub> \_\_\_\_\_ V<sub>DC</sub>

Power Factor (PF) Operating Range: \_\_\_\_\_ to \_\_\_\_\_

Max. Ramp Rate: \_\_\_\_\_ Can Ramp Rate be Adjusted? Yes  No

Does the inverter conform to the latest version of IEEE 1547? Yes  No

Is the inverter UL 1741 lab certified (as amended and updated)? Yes  No

**Communications Information**

Can the ESS execute read/write capability to inverter operating settings? Yes  No

Protocols Supported (check all that apply):  SunSpec Modbus  IEEE 1815 (DNP3)

IEEE 2030.5  IEC 61850  Other: \_\_\_\_\_

Communication Types (check all that apply):  WiFi  ZigBee  Hardwired Ethernet

RS485  RS232  Other: \_\_\_\_\_

Are any of the above protocols and media intended to be installed & utilized as part of the installation? Yes  No

**Market Participation**

Is the ESS intended to operate in PJM markets? Yes  No

Is the ESS intended to be compensated under a utility tariff? Yes  No



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**Customer Agreement for Energy Storage System**

**Acknowledgement of Modification of the Customer-Energy Storage System**

The interconnection of the proposed customer-energy storage system (ESS) will be evaluated according to the configuration and settings specified in this supplemental form. Any changes to the configuration and/or settings may adversely affect the safety and reliability of the electric distribution system.

The customer and ESS owner (if different from customer) both agree to not modify the mode of operation of the ESS without express written permission from the electric distribution company (EDC), which may come as the result of another technical evaluation of the proposed modification.

The EDC may also request modification of settings to produce desired system level impacts which affect all customers on the same circuit to maintain electric distribution system integrity. These requests will typically be in response to adverse system conditions (current or forecasted) that require mitigation (i.e. - management of reactive loads on the distribution system).

Customer Initials: \_\_\_\_\_ Installer Initials: \_\_\_\_\_

**Acknowledgement**

I hereby certify that, to the best of my knowledge, all of the information provided in this form is complete and true. By signing this document, I give my consent to representatives from the Public Service Commission and Delmarva Power to exchange information regarding the Energy Storage System to which this form applies.

Customer Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Print Name: \_\_\_\_\_

Owner Signature (if different from Customer): \_\_\_\_\_

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

**Definitions:**

**Local Grid Support:** The ESS will respond to support the electric distribution system (overloads, high voltage, reactive power support, etc.) as specified by the local EDC.

**PJM Grid Support:** The ESS will operate according to wholesale market signals to support the electric transmission and/or distribution system (demand response, frequency regulation, etc.).

**Energy Arbitrage:** The ESS will charge from the electric grid when electricity rates are low and discharge back to the electric grid when electricity rates are high.

**Back-up:** The ESS will be isolated from the electric grid during an outage while providing back-up power to the customer using energy reserves and/or an on-site customer-generator. ESS will also cease discharging when local electric grid service is restored to the customer-generator facility.

**Load Shifting/Demand Charge Management:** The ESS will manage the amount of electricity the customer uses from the electric grid by discharging during times of heightened electricity usage and may also charge during times of heightened solar output (if applicable). This can be used to “peak shave” the customer’s net electrical consumption from the electric grid, which may also reduce the customer’s demand charge (if applicable).

**Solar Self-Consumption:** The ESS will charge only when solar output exceeds the customer’s electricity usage (not from electric grid), and it will only discharge when the customer’s electricity usage exceeds solar output. If the ESS is at full charge and solar output exceeds the customer’s electricity usage, the solar energy is exported to the electric grid through a net-energy meter.

**Non-Export:** The ESS will charge only when solar output exceeds the customer’s electricity usage (not from electric grid), and it will only discharge when the customer’s electricity usage exceeds solar output. If the ESS is at full charge and solar output exceeds the customer’s electricity usage, the solar energy is curtailed and not exported to the electric grid.