Energy Storage System Guide

Version 4 / July2022

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COMPANY REVIEW: The Company's shall review the Customer's design at various stages of the design as well as during construction. The Company's review is for general arrangement and conformity with the Company's interconnection requirements only and does not indicate safe or faultless design. Company review of the final plans or drawings indicates that the design is compatible with Company equipment and service. Responsibility for proper design, operation, maintenance and safety of the Customer's installation rests solely with the Customer. In addition, all work and equipment must conform to municipal and all other applicable codes and requirements, including applicable provisions of the National Electrical Code (NEC), the National Electrical Safety Code (NESC) and OSHA in effect at the time of construction.

Table of Contents

Consolidated Edison Company of New York: Guide to ESS Interconnection

Introduction

This guide is for Con Edison customers who are considering installing or upgrading an Energy Storage System (ESS) up to 5MW-AC that is or will be connected in parallel to Con Edison's electric distribution system. For projects above 5MW-AC, please contact dgexpert@coned.com for additional guidance. For projects of emergency storage as backup, please apply through Con Edison Project Center and contact your Con Edison Energy Services Representative at www.coned.com/es for more information. Please also review Con Edison specification EO-2113 and Con Edison Electric Tariff General Rule 8.1 for emergency storage projects.

This guide is intended to provide high level details of the electric interconnection process, typical steps, challenges, and technical solutions associated with ESS projects. This guide is not a design or technical specification.

Interconnections of all types of technology up to 5MW-AC are subject to the New York State Standardized Interconnection Requirements (SIR). All developers and applicants should read the NYSIR as it will take precedence. This document is aligned to the May 2022 version of the SIR, but updates to the SIR will be integrated as quickly as possible.

Section 1: About Con Edison's Grid

Con Edison provides electric service to 3.4 million customers in New York City and portions of Westchester County. Electricity is delivered through approximately 94,000 miles of underground cable, and almost 37,000 miles of overhead cable.

The distribution system supplies power to the Company's low voltage network customers and radial customers from area substations at 4kV, 13kV, 27kV, and 33kV primary service voltage levels. Most customers receive Low Tension (low voltage) service directly at the distribution system secondary voltage levels of 120/208V; 120/240V or 265/460V, while a small percentage of High Tension (high voltage) customers receive power at primary service voltage levels.

There are two types of electric distribution grid systems: radial grids and network grids.

Radial Grids traditionally have a single high voltage cable, often referred to as a feeder, sending energy from the substation to numerous distribution transformers tapped at various points along its length. The distribution transformers step the voltage down to low-voltage electricity. These systems are called radial grids because the substation and feeders resemble a hub with spokes. Cables and transformers on radial grids are often above ground, seen predominantly in areas like Staten Island or Westchester.

Con Edison uses a reliable type of radial grid called an "auto-loop". An auto-loop typically has two feeders, two additional backup feeders, and automatic switches at various points along the feeder. In this configuration, feeder faults are rapidly isolated, with a portion of the affected customers being restored with one of the aforementioned backup feeders.

Network grids have multiple primary feeders supplying several network transformers. They are tied together in parallel on the secondary side to provide energy into a low voltage grid (area network type) or a local building bus (spot network) where the consumer is connected. Thousands of low voltage customers are served off the low voltage grid of an area network. Cables and transformers on network grids are typically below ground and are used in densely populated areas. Network grids are used extensively throughout Manhattan, Brooklyn, Queens, and the Bronx, in addition to several small network grid areas in Staten Island and Westchester.

The different grid configurations have different associated characteristics. Network grids are considered more reliable than radial grids as there are redundant sources of backup power in case of failures on the grid. Additionally, with cables and transformers mostly underground, network grids tend to be less prone to outages resulting from severe weather conditions than above ground radial grids. Network grids are more complex than radial grids due to the increased number of system components and the redundant cabling.

Spot networks are a special class of network grids where one or multiple transformers are dedicated to a single, large energy consuming building like a skyscraper. A spot network is essentially a small network grid that is implemented for a single large user.

Both the radial and network grids are represented in **Figure 1**, below:

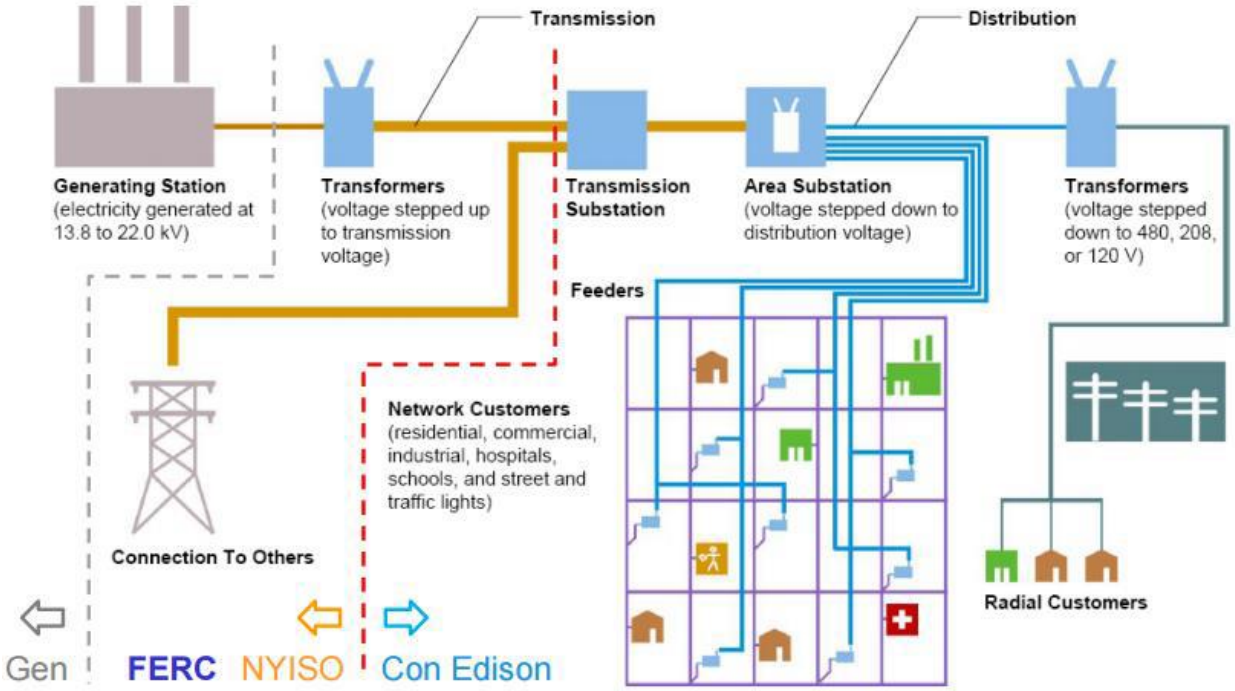


Figure 1 - Electric Distribution System

Section 2: Technical Interconnection Considerations for ESS

Con Edison manages the interconnection of ESS generation up to 5MW-AC in capacity under the New York State Standardized Interconnection Requirements (SIR). For projects above 5MW-AC, please contact dgexpert@coned.com for additional guidance.

If the ESS is not properly designed to export power, there can be undesirable system impacts, such as voltage fluctuation or the repetitive operation of network protector relays, particularly for systems more than 50kW-AC. The technical considerations for accommodating large ESS systems will vary depending upon the type of electrical distribution service (e.g., radial or network) at the point of interconnection as well as surrounding loads.

Radial Service

Interconnecting exporting ESS generation to a radial service can be limited by the capacity of the local service, the primary feeder, the capability of a unit substation to accept reverse power flow, and switch and re-closer issues. The methods of resolving these constraints vary in complexity and cost.

Network Service

With network service, if one of the primary feeders supplying a portion of the network grid's transformer were to experience an outage, the parallel connected secondary grid will try to provide power into the dead feeder. For this reason, these transformers are designed with an automatic switch, known as a network protector, which will open when energy feeds back from the low voltage bus toward the high-voltage feeder outage. This is the same condition as when a large ESS provides more power into the area network grid or spot network than there is load to serve. While Con Edison's dense network grid system typically has enough load to "soak up" the exported power, the electric system can be adversely affected by the back-feed of power.

For applicants connecting to Con Edison's secondary grid, the engineering review will determine if the service cable to the site is adequate to carry the export, in addition to determining if export into the network will cause network protector operation. If the service cable is not rated for either the expected ESS import or export capacity, the customer will need to upgrade the existing service or put in additional service. For those projects where local network protectors will be impacted, Con Edison has a solution called "Adaptive Network Protector (NWP) Relay Settings", where modifications are made to the relays of nearby transformers.

In some cases with inverter-based ESS, Con Edison will also need to rely on the inverter itself to help regulate voltage. This generally requires the inverter to consume VARs at a fixed power factor, or better still utilize the "Advanced" inverter features as outlined in the draft IEE1547 specification (Volt-VAR and Volt-Watt Characteristics) with settings recommended by Con Edison. When the inverter is required to prevent overvoltage, the function shall be "supervised" by a utility grade overvoltage relay. Additionally, Con Edison requires communications be established to any inverter managing voltage by consuming VARs to ensure voltage is maintained within ANSI limits.

Spot or Isolated Networks

For customers on dedicated spot or isolated networks, the opening of a network protector would result in a loss of power to the customer. Con Edison's traditional approach to maintain reliability for customers wanting to install ESS on a spot or isolated network would be to require a reverse power relay that would prevent export. Since 2012, Con Edison has begun offering solutions to enable export across network protector relays through pilot programs, making it the only utility in the nation to allow export on network service. This solution is called "Communications Aided Tripping" (CAT) and it involves the following:

1.) Reducing sensitivity on local network protectors – reprogramming network protectors to an "insensitive" mode that allows back-feed of up to 50% of the transformer rating.
2.) Supervisory Control and Data Acquisition (SCADA) and anti-islanding – installing equipment to monitor the performance of the ESS generator and the network protectors and allow for remote tripping in the event of system contingencies and/or outage risk to the customer.

The solutions offered will be tailored to the specific service configurations. Costs for CAT will be project specific and determined by your CPM but very generally can be on the order of $100,000[1]. The reduced sensitivity solution on local network protector relays is more suitable for interconnections to the low voltage grid, whereas CAT is more suitable for isolated or spot networks.

SCADA Equipment Details

The following list of equipment may be required (and installed as needed) for ESS projects, particularly those using the CAT solution. The exact requirements and specifications of the equipment will be determined during the engineering review and site visits.

The customer is responsible for the cost of procuring and installing this equipment, regardless of whether the customer or Con Edison is installing it.

- **Supervisory Control and Data Acquisition (SCADA)**: This equipment collects data from the customer's inverters and Con Edison's network protectors. In addition to providing communications, SCADA also allows for remote operations and controls of the network protectors.

- **Anti-islanding device**: This equipment is sometimes required, based on a case-by-case assessment of the ESS size and the type of service to the customer. The purpose of this device is to ensure that ESS export does not cause a customer outage if one or more feeders go out of service.

- **DNP3 Data Concentrator for data link communication**: DNP3 communication protocol is required to ensure reliable, and consistent communication between customer's inverters and Con Edison. This can be achieved by customer installing DNP3 compliant Data Concentrator for Con Edison to adequately monitor customer equipment and issue controls. A DNP3 converter card will be required if the customer Control System is MODBUS. The customer is responsible for ensuring availability of a DNP3 protocol in their Control System.

- **Network protector micro-processor relay and associated cabling**: A device to remotely monitor the operations of the network protector. This is required to enable two-way communications. Con Edison network protectors are typically installed with a standard non-communicating relay and must be upgraded for participation in this program. Con Edison will install the relays and connect any required cables within Con Edison's jurisdiction.

[1] This is an estimate only. Project costs can be higher or lower depending on project specifics. Customers should not rely on this number for before they receive actual costs and written design approval from Con Edison.

- **Conduits & Cables**: Cables and conduits will be run between the communications and protective equipment. The customer will be required to provide their own communications cable which specified by Con Edison engineering design. The customer will make the connections and bring the cable to Con Edison's jurisdiction, who will then connect the ESS to the relays to complete the installation. New conduits may be required, depending on existing site conditions

Section 3: Interconnection Process

Con Edison follows the New York State SIR to review and approve all ESS up to 5MW-AC. Prior to application submittal, please read the SIR thoroughly to familiarize yourself with the application process and timelines, technical and operating requirements, and required contracts and forms.

Other resources to review in advance of application submission include Rider R which is the Net Metering and Value Stack tariff for Con Edison (discussed further in Section 4), General Rule 20 Standby Service, and Service Classification 11 (Buyback Service). Applicants will need to register with Power Clerk prior to application submission. The Small DG portal should be used for Interconnection requests up to 50kW-AC. The Large DG portal should be used for Interconnection requests greater than 50kW-AC up to 5MW-AC. For Hybrid Projects, please use export capability instead of total combined nameplate capacity to determine, which portal to use (e.g., a project with 40kW-AC of storage and 40kW-AC solar qualifies as a small system of less than 50kW-AC if the net export capabilities do not exceed 50 kW-AC).

An applicant proposing a Hybrid Project, adding an ESS to an existing DG facility, or stand-alone ESS shall complete and submit Appendix K (found in Power Clerk) as part of the application package.

For all projects involving ESS, the utility shall review the application and respond within defined time frames: for systems 50kW-AC or less, the utility has ten Business days upon receipt of the original application submittal to determine if the application is complete, whether the project is eligible for expedited processing and whether it is approved for interconnection if eligible for expedited processing. The utility shall notify the applicant in writing of its findings upon review of the application. For systems greater than 50kW-AC up to 5MW-AC that are proposed to be installed in underground secondary network areas, the applicant should be aware that a Coordinated Electric System Interconnection Review (CESIR) may be required.

Following interconnection of a Hybrid Project or a stand-alone ESS, the owner may apply to the utility to change the operating characteristics of the storage component. To initiate review, the owner shall submit through Power Clerk a completed Appendix K of the SIR specifying the proposed new operating characteristics.

Applicants who plan on operating their ESS device as part of a Microgrid should expect that additional documentation, engineering review time and a more detailed testing plan will typically be required.

To provide additional guidance in preparing materials for ESS interconnection applications, Con Edison has prepared checklists for three-line diagrams. These checklists provide requirements for system diagrams, as well as consistency in review and can be found on the Con Edison DG website.

Examples of some of the features that should be called out on the three-line diagram are shown in **Figure 2**:

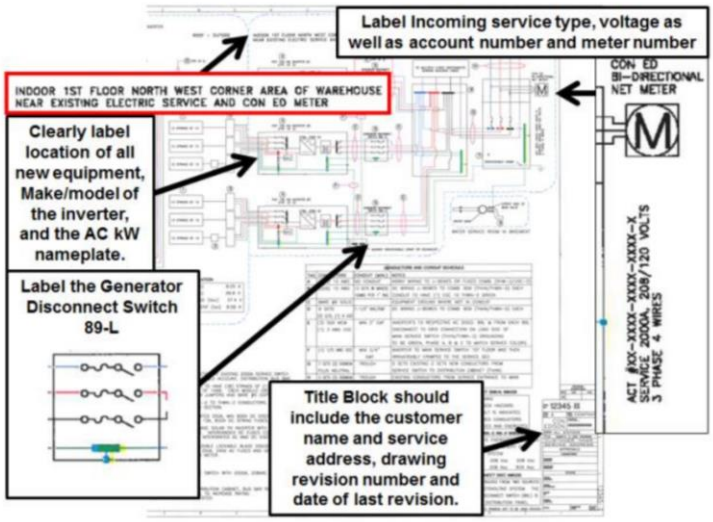


Figure 2 - Required Elements of an Acceptable Drawing

In the Power Clerk portal, once all required information is entered/attached and submitted, the application will be routed to the appropriate Con Edison Energy Services personnel and the application review will begin. The SIR process is different for small (less than or equal to 50 kW-AC) and large (>50 kW-AC up to 5MW-AC) projects. The Interconnection application process for large projects is shown on **Figure 3**.

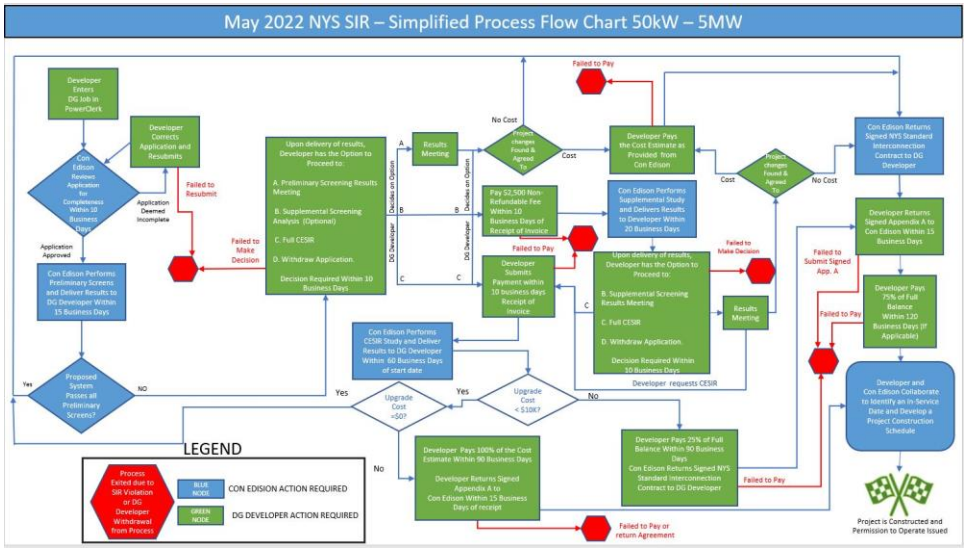


Figure 3 - Interconnection application process for > 50 kW-AC SIR projects

The general steps for SIR include:

1. Applicant submits a Pre-Application Report request (Optional)
2. Con Edison returns the Pre-Application Report
3. Applicant submits an application
4. Con Edison reviews the application for completeness

5. Con Edison performs preliminary screening analysis
    a. If application passes the six preliminary screens, Applicant proceeds to construction
6. Applicant selects additional review/meeting option (Note: this can be an iterative process)
    a. Preliminary Screening analysis results meeting to explain the screening process and identify any simple changes that could lead to the project being approved.
    b. Supplemental Screening Analysis, at customer choice, to perform three additional screens, which if passed progress the application to construction.
    c. CESIR, at customer choice, to perform in-depth analysis of the proposed DG system to determine the system changes and cost estimates needed to accommodate interconnection. CESIR costs generally range up to $20,000 for inverter-based systems and $27,000 for rotating machines. Cost is dependent upon size, operation, type of electric distribution service, type of equipment, etc. Numbers may vary slightly for high-tension service but are in a similar range.
    d. Withdraw/cancel – the applicant has the option to withdraw or cancel their application at any time.
7. Con Edison performs requested review
8. If applicable, Applicant commits to construction costs and provides full payment within 120 business days
9. Applicant and Con Edison complete their respective constructions
10. Con Edison performs field verification testing
11. If applicable, Applicant addresses any issues emerging from the field verification testing and Con Edison issues final acceptance letter
1) Con Edison performs project closeout

Taking the following steps prior to and during the application submission will help speed up the review:

1. Include account (14 digit) and meter (7 digit) numbers
2. Include customer email address
3. Include the Con Edison service information in all drawings
4. Include additional existing on-site DER in the application
5. Enter the rating per inverter and number of inverters (if used)
6. Ensure consistency in all forms and documents

When an application is ready for submission, the applicant should upload all documents listed in Appendix F of the SIR. The applicant should also include any additional rate application forms (Form G or Community DG Appendices A and B, as applicable).

Additional technical information may be required if the application progresses to a CESIR.

Note on failed inspections:

If an Applicant disagrees with a failed inspection, they should send an email to the CPM, engineer, and dl-DGinspectionappeal@coned.com. This email goes to Energy Services and Distribution Engineering senior managers. The email subject line should include the case number and “Appeal of Verification Test.” The email should describe in detail why the Applicant disagrees with the results of the inspection

as related to the verification test checklist. Include any documentation or photographs that are necessary. In addition, upload the email to the case in Power Clerk.

The Applicant will receive an acknowledgement of the appeal in 2 business days via email, and Con Edison will respond with a proposed resolution and rationale within 10 business days.

Note on ESS projects that require an outage to interconnect their project:

If the project requires an outage for interconnection, please work with the CPM to coordinate this outage request. It is important to note that Con Edison crews will be available at no charge during regular business hours: Monday-Friday, 7:00am – 3:00pm excluding holidays. However, if requesting an outage outside of these hours, or if the outage extends beyond 3:00pm, the Applicant will be responsible for the cost of time outside working hours, including overtime.

Note on placement of customer equipment relative to revenue metering compartment:

The revenue metering compartments represent the dividing point between Customer equipment and Con Edison's system. Customer equipment is not to be installed, nor are any customer connections to be made, inside Con Edison's metering compartment.

Roles and Responsibilities

Throughout the interconnection process, applicants will interact with a number of Con Edison personnel with various roles and responsibilities, including:

- **Distributed Energy Services Customer Project Manager (CPM)** – Primary point of contact for all communication, scheduling of inspections and overall project process oversight
- **Distribution Engineering** – Electrical interconnection experts for Con Edison who perform the technical document reviews, perform the Supplemental Review and CESIR studies, attend technical meetings, witness verification testing and perform the final inspection.
- **Distributed Generation Ombudsman** – An additional layer of assistance in understanding the Con Edison interconnection process, tariff interpretations, and new policy implications which can be leveraged even prior to commencing your ESS projects. The Ombudsman's office can also provide assistance on any unresolved project-specific issues.
- **Customer Care Group** – Handles billing and post-installation billing questions

Section 4: Rates and Service Classifications

The service classifications for customers typically installing ESS includes the following. Con Edison assigns the service class based on the customer characteristics:

Mass Market

Service Class 1 (SC1) – Residential/Religious

This rate is for residential customers. It is volumetric billing based on energy usage (kWh). SC1 customers have no demand charge.

Service Class 2 (SC2) – General – Small

This rate is for small commercial customers with demand less than 10kW-AC. It is also volumetric billing based on energy usage (kWh). SC2 customers have no demand charge.

Large Onsite

Service Class 8 (SC8) – Multiple Dwellings

This rate is for master-metered residential customers. It includes energy usage (kW-ACh) billing with a variable demand charge (kW-AC), adjusted monthly based on the highest 30 minutes of demand

Service Class 9 (SC9) – General Large

This rate is for large commercial customers with demand 10kW-AC or larger. It is energy usage (kW-ACh) billing with a variable demand charge (kW-AC), adjusted monthly based on the highest 30 minutes of demand.

Value of Distributed Energy Resource (VDER)

On March 9, 2017 the New York State Public Service Commission (PSC) released an order to transition away from net energy metering (NEM) to VDER.

Phase One NEM (Only if paired with another Phase One NEM eligible technology)

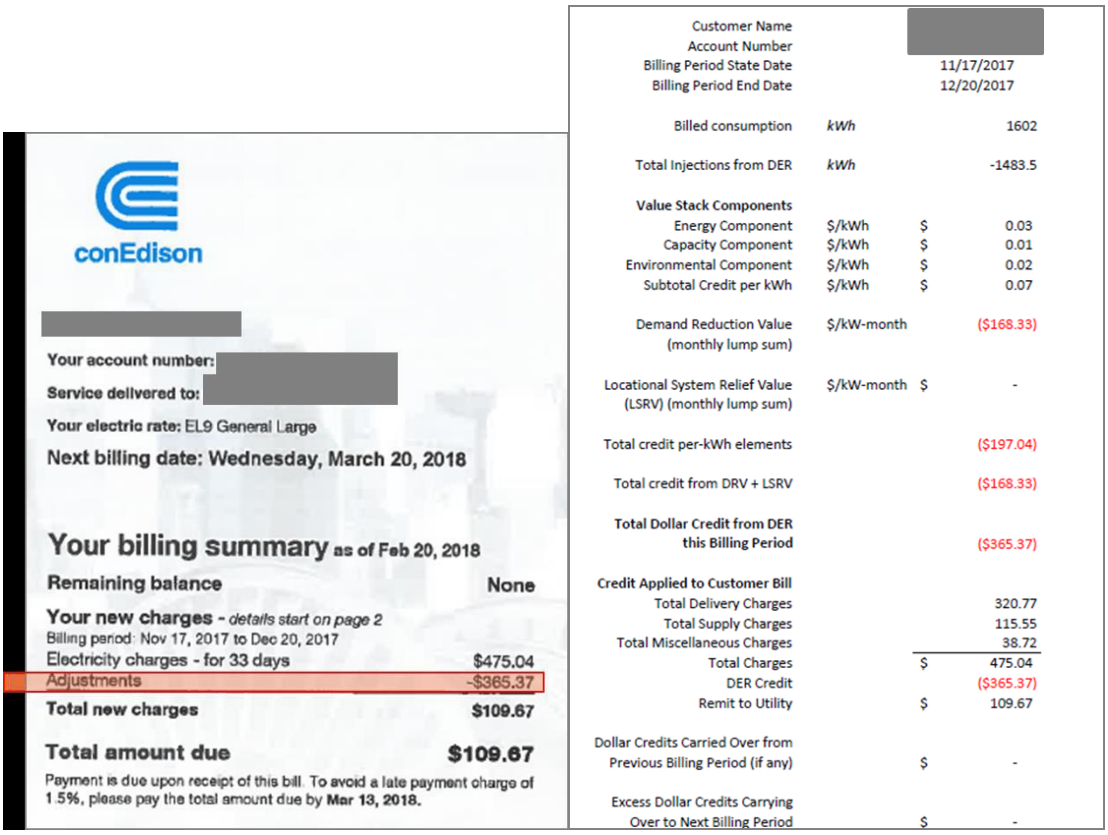
- Residential customers (SC1) with less than 25kW-AC and Small Commercial customers (SC2) with less than 2MW-AC who have ESS installed after March 10, 2017, will receive Phase One NEM compensation. Phase One NEM is similar to Grandfathered NEM.

Unlike traditional NEM, VDER Value Stack compensation is not based only on volumetric metering; the energy produced and exported to the grid will not be credited on the customer's utility bill at the same kW-ACh rate at which energy is consumed. Instead, the Value Stack consists of six potential components and converts energy production into monetary credits that vary by location and time.

Value Stack

Unlike traditional NEM, VDER Value Stack compensation is not based only on volumetric metering; the energy produced and exported to the grid will not be credited on the customer's utility bill at the same kW-ACh rate at which energy is consumed. Instead, the Value Stack consists of six potential components and converts energy production into monetary credits that vary by location and time.

Value Stack credits are based on export into the utility grid. Stand-Alone ESS generation that instantaneously reduces customer load will reduce the customer bill; generation that exceeds a customer's load behind the meter is exported to the grid and credited according to the Value Stack rates. For more information about VDER, including a description of all of the components of the Value Stack, please visit our Private Generation Tariffs webpage.



conEdison

[redacted]

Your account number: [redacted]

Service delivered to: [redacted]

Your electric rate: EL9 General Large

Next billing date: Wednesday, March 20, 2018

Your billing summary as of Feb 20, 2018

Remaining balance	None
Your new charges - *details start on page 2*	
Billing period: Nov 17, 2017 to Dec 20, 2017	
Electricity charges - for 33 days	$475.04
Adjustments	-$365.37
Total new charges	**$109.67**
Total amount due	**$109.67**

Payment is due upon receipt of this bill. To avoid a late payment charge of 1.5%, please pay the total amount due by **Mar 13, 2018.**

Customer Name			[redacted]
Account Number			
Billing Period State Date			11/17/2017
Billing Period End Date			12/20/2017
Billed consumption	*kWh*		1602
Total Injections from DER	*kWh*		-1483.5
Value Stack Components			
Energy Component	$/kWh	$	0.03
Capacity Component	$/kWh	$	0.01
Environmental Component	$/kWh	$	0.02
Subtotal Credit per kWh	$/kWh	$	0.07
Demand Reduction Value (monthly lump sum)	$/kW-month		($168.33)
Locational System Relief Value (LSRV) (monthly lump sum)	$/kW-month	$	-
Total credit per-kWh elements			($197.04)
Total credit from DRV + LSRV			($168.33)
Total Dollar Credit from DER this Billing Period			($365.37)
Credit Applied to Customer Bill			
Total Delivery Charges			320.77
Total Supply Charges			115.55
Total Miscellaneous Charges			38.72
Total Charges		$	475.04
DER Credit			($365.37)
Remit to Utility		$	109.67
Dollar Credits Carried Over from Previous Billing Period (if any)		$	-
Excess Dollar Credits Carrying Over to Next Billing Period		$	-

Figure 4 - Example Demand Customer Value Stack Bill

Community DG

Community Distributed Generation (CDG) describes the configuration when Value Stack Net Metering credits from one solar system (the host) are distributed to multiple different customers (the satellites). For a customer to be eligible for CDG, several conditions must be met:

- The host account must be non-residential
- Host and satellite accounts can be in different NYISO zones within Con Edison service territory
- At least 10 satellite customers unless all are located at the same premise as the host
- Each customer must have at least 1,000 kWh annual usage
- Satellite customers above 25kW-AC can take up no greater allocation than 40% of the Net Metering credits
- Potential service upgrades required to accommodate export
- Use Community DG Procedural Document for application, which requires self-certification of creditworthiness, cyber security, NYISO load zone, and any other obligations

Remote Net Metering

The general process and application of Remote Net Metering is described below. The rates will be governed by the tariff and specific questions can be directed to your project manager or the DG ombudsman.

Remote Net Metering describes the configuration when Value Stack credits produced by one solar system (the host) are distributed to the same customer's multiple accounts on different locations (the satellite(s)). For a customer to be eligible for Remote Net Metering, several conditions must be met:

- Only available to existing remote net metered Grandfathered Net Metering and Phase One NEM customers, their successor accounts, as well as new and existing net metered wind customers
- The host account must be non-residential
- The host account and satellite account must be different and shall be established in the same customer's name and located on property owned or leased by the customer
    - Satellite accounts can have more than one host account
- Host and satellite accounts must be located within the same NYISO zone within Con Edison service territory
- Starting September 1, 2021, all existing RNM projects interconnected prior to this date, who received Value Stack credits were transitioned to the Remote Crediting program and will continue to receive Value Stack credits. Value Stack RNM is no longer available for non-wind customers.
- Other requirements specified in Rider R, Section A Applicability (e.g., system size)

Remote Crediting

Remote crediting describes the configuration when Value Stack credits produced by one solar system (the host) are distributed to multiple different customers (the satellite(s)). For a customer to be eligible for remote crediting, several conditions must be met:

- Taking Value Stack service
- The host account must be non-residential or residential with Farm Operations
- Host and satellite accounts can be located in different NYISO zones within Con Edison service territory
- Form G must be used for the application
- Host account must submit an allocation form

Net Crediting Program

A voluntary program offered by the Company to CDG Hosts. The Net Crediting Program authorizes the Company to remit payments to the CDG Host on behalf of CDG Satellites, resulting in a net credit on the CDG Satellite's Electric Bill.

Click the following link for more information on how to enroll in the net crediting program.

Standby Pilot Rate Program (Rider Q)

A pilot rate program that allows options for Distributed Generation customers to choose their own contract demand and select a different As-Used demand period. Please review the tariff for further details including participation requirements. New Distributed Generation customers applying for the Standby Pilot Rate Program should indicate it on their interconnection application in PowerClerk and fill out Form G accordingly during the interconnection process.

Electric Standby Service (General Rule 20):

Standby Service is available to replace or supplement the energy ordinarily generated on customer premises. If the customer's generation is unable to supply their maximum connected load, called "contract demand," Con Edison ensures the appropriate infrastructure is in place to meet that maximum. Contract demand charges are used for the maintenance and repair of the equipment that is in place to provide standby service and generally represent the most significant part of a standby bill under General Rule 20. Please note that there can be substantial surcharges if the customer sets the contract demand level inaccurately. Other charges include customer charges, as-used demand charges, metering charges, associated MACs, and an O&M charge for additional equipment installed on the Con Edison system to accommodate the generator.

SC-11 Electric Buy-Back

A customer who would like to sell energy to Con Edison may take service under SC-11 Buy-Back Service. The payment rate for energy will be based on the applicable wholesale rate, which is the Locational Based Marginal Price (LBMP) set by the New York Independent System Operator (NYISO). Customers delivering energy at the secondary distribution level will have the LBMP increased by a factor of 1.066 to account for line losses. Under this service agreement, the customer will pay a customer charge and a contract demand charge based on the facilities in place to deliver energy.

Section 5: ESS Paired with Other Technologies

Table 1 incorporates the necessary interconnection elements for Energy Storage Projects. When pairing ESS with other technologies, the technical considerations generally become more complex than can be covered in this guide. However, the following are some frequently designed configurations along with the typical interconnection solution required to accommodate them. For general questions about a concept or potential project, developers can contact the DG Ombudsman's office. For more specific information on configuration and feasibility, a formal interconnection request should be submitted.

Technology	Power Clerk	Project Center
PV + Storage as Back-up (not grid parallel)	Solar Application	Emergency Back-up Generator Application
Storage in Parallel with Grid	Battery Energy Storage Application	None
New PV + New Storage	Hybrid Application Combining Solar and Energy Storage	None
New Storage + Existing PV	Battery Energy Storage Application	None
New PV + Existing Storage	Solar Application	None

Table 1 - Interconnection applications for ESS

** Check "Yes" for "Will this DG project include energy storage?"

1. Residential Solar system with emergency storage only as a backup – When a residential solar system is paired with an onsite storage system (ESS) used solely for backup, the solar application should be submitted as a normal PV interconnection request in Power Clerk. The emergency back-up generator application (lead-acid, lithium ion, etc.) should be submitted in Project Center.

2. Standalone Energy storage or adding ESS operated to an existing DG system in parallel with the grid - An application should be submitted for the ESS by selecting 'Battery Energy Storage'. The

inverter specifications should be entered for the battery in discharge mode. In addition, the technical specifications for charging the battery must be specified (peak kW-AC/kVA required to charge) in the scope of work statement, and if these exceed the local service, upgrades to the existing service may be required. Effective June 18, 2018, the initial application in PowerClerk will require battery information in order to complete SIR Appendix K "Energy Storage System (ESS) Application Requirements / System Operating Characteristics / Market Participation."

3. Hybrid generation systems (multiple distributed generation types which will all operate in parallel with the grid) – when applying for such systems, a single Hybrid application should be submitted for both technologies by using the Online Interconnection Application Portal (PowerClerk). You can start this application by choosing "New SIR Application >50kW-AC (including Hybrid)" from the PowerClerk home screen. Even if all technologies are being installed by separate developers, a single combined system diagram may be required to enable engineering evaluation. For Hybrid DG systems, which pair battery energy storage systems (BESS), you will be asked to enter all information related to the ESS in order to complete SIR Appendix K.

4. Additional technologies that receive credits under different rate structures other than the ESS to be installed, behind a single Con Edison meter, will require specialized metering and/or relaying schemes. Con Edison must be made aware of all DG technologies on site at the time of your initial request to add ESS in order to avoid billing problems. **Figures 5-7** shows the different acceptable configurations for hybrid system of ESS with PV. In addition, New York Public Service Commission approved a three-meter configuration for hybrid system with ESS in the Ordering Clause No. 2 in the New York Public Service Commission's April 19, 2018 Order Modifying Standardized Interconnection Requirements in the subject proceedings[3]. For additional guidance on metering requirements for hybrid system with ESS, please contact Distributed Generation group at dgexpert@coned.com.

Residential and Small Commercial (SC1 and SC2) customers are eligible to pair grid-parallel energy storage with solar and take service under the Phase One NEM tariff.

[3]Cases 18-E-0081 et al., In the Matter of Proposed Model Tariff for Compensation of a Hybrid Energy Storage System and Distributed Generation System, Order Modifying Standardized Interconnection Requirements (issued April 19, 2018)("Order"), p. 27. It refers to January 31, 2018 ITWG Meeting Notes about metering hybrid ESS, available at http://www3.dps.ny.gov/W/PSCWeb.nsf/96f0fec0b45a3c6485257688006a701a/def2bf0a236b946f85257f71006ac98e/$FILE/95160166.docx/ITWG%20Mtg%20Notes%201-31-18.docx

Figure 5 - Exclusive ESS Charge from PV Configuration

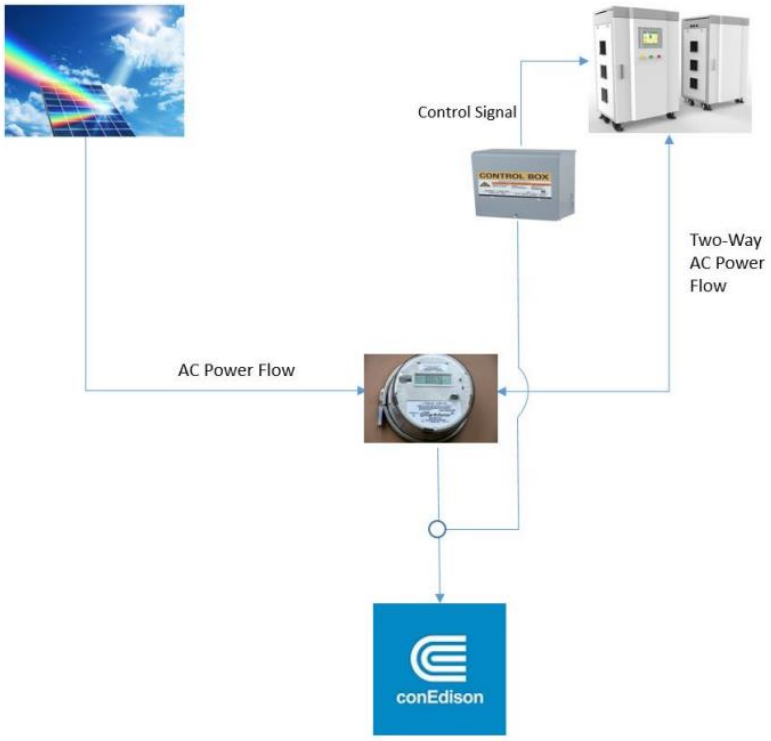


Figure 6 – PV Export Only Configuration

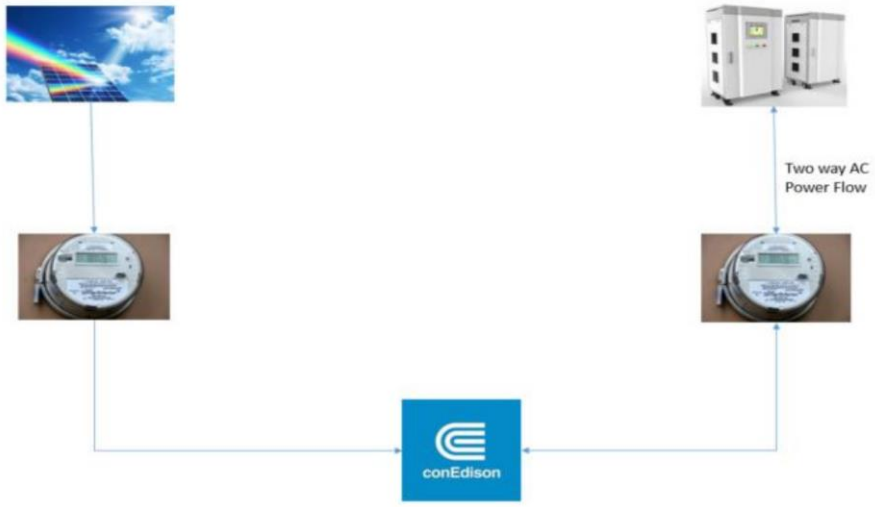


Figure 7 – Separate Metering Configuration

Section 6: Contacts for Further Questions

If you have questions about your specific project application, please contact your Energy Services Customer Project Manager (CPM). You will receive their contact information when you submit your application in Power Clerk.

For general questions regarding DG interconnection, please contact the Distributed Generation group at dgexpert@coned.com .

For residential billing questions, please contact netmetering@coned.com or 212-780-6600. For large/commercial customers please contact dl-CCGNet-metering@coned.com.

In addition, New York State Department of Public Service and the New York State Energy Research and Development Authority have dedicated “DG Ombudsmen” who can help answer questions. Their contact information is available here.

Section 7: Definitions and Acronyms

Acronym	**Definition**
SIR	Standardized Interconnection Requirements
SCADA	Supervisory Control and Data Acquisition
DNP3	Distributed Network Protocol
RNM	Remote Net Metering
CDG	Community Distributed Generation
DG	Distributed Generation (Now referred to as DER)
DER	Distributed Energy Resources
CESIR	Coordinated Electric System Interconnection Review
VDER	Value of Distributed Energy Resources
ESS	Energy Storage Services

Section 8: List of Figures