Net Metering & Energy Storage Device (ESD) Interconnection

PROGRAMS HANDBOOK

NVEnergy

TABLE OF CONTENTS

Please ensure you are reading the most recent version of this handbook, which is available on the NV Energy website at www.nvenergy.com

Table of Contents

OVERVIEW OF NET METERING AND ENERGY STORAGE DEVICE (ESD) PROGRAM

The goal of this handbook is to describe the steps in the net metering and interconnection process. This handbook outlines the requirements for receiving interconnection approval from NV Energy for the installation of a non-incentivized renewable energy system and/or non-incentivized Energy Storage (ESD) system.

- All interconnection applications must qualify for, participate in and comply with all of the rules of NV Energy, Net Metering Rules, Electrical Services Requirements (ESRs) and Tariffs.
- All portfolio energy credits issued for a solar energy system belong to the solar system owner.
- NV Energy will install digital "smart meters" that may include bidirectional or generation meters for all program participants. The metering requirements will be defined based on the configuration, installation and whether an ESD is included. Please refer to the metering standards in this document.
- NV Energy is not responsible for operation, maintenance, or energy production of renewable energy systems installed through this program.
- NV Energy is not responsible for consumption changes or billing changes because of the customer's decision to install a renewable energy or energy storage system.
- Installations must be permitted through the local building authority and interconnections must be performed by a Nevada licensed C-2 electrical contractor. For solar installations, a C-2 or C-2g licensed contractor is acceptable. If a contractor's license is suspended or revoked, applications associated with the contractor are not eligible to receive a reservation notice or in the case of an incentive application, an incentive payment, unless the system was completed and inspected by the local building authority prior to the suspension date. Customers may select a different installer in this scenario – refer to the Application Changes section in this handbook for more information.
- The contract sales price must be within the Contractor's License Monetary limit. For example, if the contract license monetary limit is $100,000, the contract price cannot exceed that amount.
- Self-installations are allowed by the property owner. All self-installations must be performed by the property owner and we will abide by the Nevada State Contractors Board rule found here: http://www.nvcontractorsboard.com/contractor_license_requirements.html#2 and we will validate that the self-installer is indeed the property owner.

DEFINITIONS AND TERMS

Alternating Current (AC): The form in which electricity is delivered to residences and businesses. This is the type of electricity produced by the inverter and delivered to the home and the utility grid through the service panel.

Applicant: The party responsible for preparing the application and in NV Energy's application portal.

Back-up load Panel Meter: A one directional meter that measures power being consumed by the back-up loads. This meter is unique to DC-Coupled ESD projects which utilize a backup load panel (NV Energy's RE-3 standard, Attachment 6). This meter is installed in conjunction with an Energy Storage Meter to measure battery performance in this specific equipment configuration.

CEA AC Sizing: Is the California Energy Commission rating standard for measuring the nominal output power of a PV module/cells to determine the system rating.

Customer's Annual Requirements for Electricity: The kilowatt-hours (kWh) consumed at the installation location in the consecutive 12 months using the highest energy usage during the two years prior to the application submittal.

Designated Applicant: An individual or who is designated by the NV Energy host customer to apply to NV Energy's net metering program on the host customer's behalf.

Direct Current (DC): The electrical current produced by the generating system. Similar to the energy from a battery, this type of current is not typically used in the home but must be converted to AC electricity by the inverter before being used in the home or returned to the grid.

Disconnects: An AC or DC breaker in a distribution panel or a fusible switch. Both may be required. NV Energy personnel must have access to the disconnect breaker.

Energy Capacity: The maximum amount of electrical energy, in kilowatt-hours (kWh), that an energy storage system can store as rated by the manufacturer. For instance, if you have two batteries, each capable of storing 5kWh, your system's energy capacity would be 10 kWh.

Energy Storage Device (ESD): A commercially available technology that is capable of retaining energy or storing energy for a period of time and delivering the energy after storage, including, without limitation, by chemical, thermal or mechanical means. An ESD is also considered a generator for the purposes of this document.

Energy Storage Meter: A revenue grade, bi-directional, utility owned and operated interval meter that may monitor the power flow to and from the Energy Storage Device.

Grid: the distribution network of NV Energy.

Host Customer: The NV Energy customer on record at the proposed installation location. The host customer name must exactly match the name on the NV Energy account. The host customer is responsible for making any changes to their NV Energy account prior to application. Persons listed as co-Applicants on the NV Energy bill may apply as the host customer.

Installer: The individual who performs the system installation and interconnection. NV Energy requires installations to be performed by a Nevada licensed electrical contractor. A Nevada licensed contractor is required for any renewable energy system that is paired with incentivized energy storage system. Self-installs

must be performed by the property owner and adhere to the Nevada State Contractors Board rule found here: http://www.nvcontractorsboard.com/contractor_license_requirements.html#2

Inverter: A device that converts DC current into AC current for use at the property where the system is located. Only grid-interactive inverters are eligible for participation in the Energy Storage programs. Please refer to NV Energy's RE-3 standard for detailed requirements.

Large Commercial/Industrial Customer: Non-residential customers in rate classes GS-2, LGS-1 or larger.

Meter Set: The installation of the net meter and energy storage metering by NV Energy. This occurs after submission of complete supporting documentation, satisfactory net metering verification, and completion of utility safety inspection.

Net Meter: A revenue-quality, bi-directional, utility owned and operated interval meter that measures the electricity used by the customer from the grid and the amount of electricity that the customer's renewable energy and/or ESD sends back to the grid.

Net Metering: Enables customers to offset the cost of their electrical consumption by measuring the difference between the electricity supplied by NV Energy and the electricity generated by the customer that is fed back to the utility over the billing period. This will be required for both solar and energy storage installations.

Non-Profit Entity: See Public and Other Property.

One-Line Diagram: Also known as a single-line diagram. A simplified document for representing an electrical power system. Typically, it is in the form of a block diagram portraying the paths for power flow within a system. Electrical components such as capacitors, conductors, circuit breakers, protection equipment, etc. can be depicted on such diagrams.

Owned, Leased or Occupied: Any real property, building or facilities which are owned, leased or occupied under a deed, lease, contract, license, permit, grant, patent or any other type of legal authorization.

Power Capacity: Also referred to as the maximum continuous output power capacity. It is the amount of power, in kilowatts (kW), that an ESD can deliver to the grid as rated by the manufacturer. For ESDs measured in btu/hr, the conversion is 1 watt equals 3.41 btu/hr.

Portfolio Energy Credit (PEC): A measured unit that represents one kilowatt hour (kWh) of renewable energy.

Premise: All of the real property and apparatus of a residential or non-residential customer employed in a single integrated activity operating under one name in one or more buildings and/or locations on an integral parcel of land where: (a) such buildings and/or locations are situated on a single unit of property; or (b) such buildings and/or locations are situated on two or more units of property which are immediately adjoining or adjacent, and are not divided by intervening public highways, streets, alleys, railways or waterways.

Public and Other Property: Any real property, building or facilities which are owned, leased or occupied by:

a. A public entity;

b. A non-profit organization that is recognized as exempt from taxation pursuant to section 501(c)(3) of the Internal Revenue Code, 26 U.S.C. § 501(c)(3), as amended; or

c. A corporation for public benefit as defined in NRS 82.021.

d. School Property**:** Any real property, building or facilities owned, leased or occupied by:

- A public school as defined in NRS 385.007;
- A private school as defined in NRS 394.103; or
- An institution of higher education.

The term includes, without limitation, any real property, building or facilities which are owned, leased or occupied by:

a. A church; or

b. A benevolent, fraternal or charitable lodge, society or association.

Public Entity: A department, agency or instrumentality of the State or any of its political subdivisions.

Public Property: Any real property, building or facilities owned, leased or occupied by:

1. A department, agency or instrumentality of the State or any of its political subdivisions which is used for the transaction of public or quasi-public business; or
2. A nonprofit organization that is recognized as exempt from taxation pursuant to section 501(c)(3) of the Internal Revenue Code, 26 U.S.C. § 501(c)(3), as amended, or a corporation for public benefit as defined in NRS 82.021.

Revenue Meter: Also known as a billing meter, is the meter installed by NV Energy that measures the electricity used by the customer from the grid. Where there is a renewable system installed, the revenue meter also measures the amount of electricity that the customer's renewable energy system sends back to the grid.

Seller: The party that sells or leases the renewable and/or ESD system to the host customer.

Site Plan: This is a top down visual layout of the installation site. It should show the location of all relevant system components including the solar system panels, the energy storage system, any and all inverters, disconnect switches, any and all meters, main service electrical panel, and any and all electrical sub panels. Any access issues should be indicated on the site plan. This could include, but is not limited to, walls, gates, or equipment installed buildings or structure that are not easily accessible.

Small Commercial Customer: Non-residential customers in rate classes GS, GS-1 or smaller, including irrigation rate classes.

Utility: NV Energy

Utility Interconnection: The physical connection between the NV Energy grid and the customer generation. An Interconnection Agreement is required for a customer to have on-site electric generation connected to the NV Energy grid.

Watt: The basic unit of measure of electric power. One-thousand Watts is equal to one kilowatt (kW). One million Watts is equal to one megawatt (MW). A kilowatt-hour (kWh) is the unit by which residential and most business customers are billed for monthly electric usage. One kWh represents the use of one kilowatt of electricity for one hour.

APPLICATION

Applications are submitted online through the online application portal that is accessed through the NV Energy website.

Applications are reviewed within ten (10) business days[1] to confirm that all required documentation is provided for renewable system interconnection and energy storage device interconnection. If defects are noted, the utility and applicant shall cooperate in a timely manner to establish a satisfactory application. Applications are approved based on the order in which complete applications are submitted.[2]

Deficient applications will be returned to the applicant for correction. Deficient applications that are not corrected within 20 calendar days of the Applicant being notified of the deficiency are canceled. Upon resubmittal, the application will be re-reviewed for accuracy.

Important communications are sent by email to program participants. Accurate email addresses are required for ALL program participants, including host customers.

[1] Rule 15 Paragraph D.1.b

[2] NRS 701B.210.3

The chart below shows the documents required for the initial application:

Documents Required	Net metering + Energy Storage Application	Net Metering only Application	Non-incentive Energy Storage only Application
Copy of the installation contract or energy services agreement for the installation of the system	✓	✓	✓
Site plan	✓	✓	✓
Energy Storage Technical Specification Includes: Data/Specification sheet with nameplate or Power Capacity listed	✓		✓
One line-diagram	✓	✓	✓

Contract or agreement must include:

1. Names and signatures of the NV Energy Host Customer and the Installer. Host Customer name on the contract or agreement must match the name on the application and the NV Energy account. In the case of a lease agreement (or PPA), a copy of the executed lease agreement/PPA must be attached to the executed installation agreement. In the case of a landlord/tenant situation, the tenant as the customer on the Utility account can designate the property owner to act as the Host Customer as related to the Application. This can be done by completing and submitting the appropriate Landlord Designated Applicant form.

2. The project contract value must be listed on the contract to confirm that the contract price is within the Contractor's License Monetary limit. For example, if the contract license monetary limit is $100,000, the contract price cannot exceed that amount.

3. The physical address of the installation.

4. The AC wattage, expected energy of the system or other clear indication of proposed system size.

5. The Power Capacity, Energy Capacity of the energy storage system or other clear indication of the proposed system size. **(Applies to applications for energy storage only or solar + energy storage coupled systems)**

6. Inverter specification information

Requirements

Net metering solar and energy storage applications must include a one-line diagram and site plan. Data/spec sheets with nameplate or power capacity listing are required for energy storage system applications.

The metering configuration must comply with NV Energy's RE3 Net Metering standard. This can be found at: https://www.nvenergy.com/publish/content/dam/nvenergy/brochures_arch/account-services/building-and-new-construction/electric-service-standards-south/re/ESRNPC-RE003-REV11.pdf.

Meter and Disconnect Switches

All utility meters and disconnect switches shall be located on the exterior of the building or in an electrical supply room that is easily accessible to NV Energy personnel. The appropriate number of meters and disconnect switches should be included in the site plan and technical diagrams depending on the systems and system configurations.

Inverter

Any and all inverters should be clearly indicated on the site plan. For AC coupled solar and energy storage integrated systems, there should be at least two inverters included in the site plan. Inverters must be IEEE 1547 compliant.

Technical Diagrams

The application must also include technical diagrams, either single-line or three-line diagrams, that show the electrical connections for all relevant electrical systems on site. This would include any existing or previously installed renewable generation, distributed generation or energy storage equipment in addition to any ancillary components. Technical specification, including any telecommunications protocols or equipment, for all included electrical systems should also be provided. This includes inverters, energy storage systems (or battery modules), renewable energy systems, or others.

APPLICATION FEES

No fee is required for renewable net metering or non-incentive energy storage applications.

SYSTEM SIZING – SOLAR

When it comes time to properly sizing a solar PV system, the installation contractor will utilize NV Energy's online application software or will determine the size based upon historical energy usage at the Premise.

> **Premise:** All of the real property and apparatus of a residential or non-residential customer employed in a single integrated activity operating under one name in one or more buildings and /or locations on an integral parcel of land where: (a) such buildings and/or locations are situated on a single unit of property; or (b) such buildings and/or locations are situated on two or more units of property which are immediately adjoining or adjacent, and are not divided by intervening public highways, streets, alleys, railways or waterways.

The highest energy usage that occurred in 12 consecutive months out of the last 24 months will be used to determine the maximum size of the new solar PV system. The system size can be less than the amount estimated to be used at the premise, but it cannot be sized to create more energy than is estimated to be consumed in a year based on the customer's annual requirements for electricity.

> **Customer's Annual Requirements for Electricity:** The kilowatt-hours (kWh) consumed at the installation location in the consecutive 12 months with the highest energy usage during the two years prior to application submittal.

The size of a net metered solar PV system is measured in kilowatts (kW) in alternating current (AC). The CEC AC wattage of a system is the California Energy Commission (CEC) rating of each panel multiplied by the number of panels, then multiplied by the CEC efficiency rating of the inverter(s). The adjustment factor is inherently included in the NV Energy application software.

Commercial and Residential System Sizing

If energy has not been consumed at a proposed location for a 12 consecutive-month period during the two prior years, or if the customer has a change of circumstances that would make the historical usage calculation incorrect, then a Nevada licensed electrical engineer's estimated energy usage may be used for systems as an alternative method for estimating usage. Some of the factors that may contribute to a change of energy consumption include:

1. customers that add on additional square footage to a dwelling that already has a solar installation;
2. customers that add electric vehicles;
3. premises that do not have 12 consecutive months of billing history prior to submission of the application; and
4. other significant load changes.

The estimated production of the proposed system (kWh) may not exceed the engineer's calculation. The engineer's name and license number is verified during the application review process and shall be in the roster maintained by Nevada board of Engineers and Land Surveyors. Electrical load calculations are only valid if wet-stamped and signed by a Nevada Licensed Electrical Professional Engineer.

Alternative Residential System Sizing Method

If the host customer has not consumed energy at a proposed residential installation location for a 12 consecutive-month period during the two prior years, then the solar system may be sized by using less than 12 months which would produce a smaller than potential maximum system size. Alternatively, the system may be sized based on the interior living area of the residence. In northern Nevada the solar system may be up to 2 watts (CEC-AC) per square foot of interior living space; in southern Nevada the solar system may be up to 2.8 watts (CEC-AC) per square foot of interior living space. If 12 months of energy usage history exists, then the watts per square foot of interior living space method may not be used.

Proof of evidence of living: floor plan

System Additions

Host customers may interconnect additional capacity at a premise with existing renewable generation capacity. System addition applications are subject to special terms that require review and approval by NV Energy. The list below addresses some of the considerations for system additions. **Ask before you add!**

- All renewable generation capacity on a premise that has received or will receive interconnection cannot exceed 1 megawatt (CEC-AC). Systems over 1 megawatt (but not to exceed 20MW) must adhere to the Rule 15 interconnection process. This limitation applies separately for renewable generation systems of other types (i.e. wind and hydro generation).
- Non-incentive expansion systems on an originally-incentivized system will be interconnected so that they do not pass through the existing Portfolio Energy Credits (PEC) meter. The system owner is entitled to keep the PEC credits on a non-incentivized solar system. PECs for any previously installed incentivized capacity that is not separately metered are assigned by the system owner to NV Energy.
- In the case of installation of additional capacity on a system receiving production-based incentives (PBIs) the approved expansion capacity does not require a REC meter.

EQUIPMENT AND UTILITY INSTALLATION STANDARDS

Meter requirement: All renewable energy and ESD installations must meet NV Energy's metering requirements as outlined in NV Energy's Rules and Standards. A comprehensive list of these rules and standards can be found at www.nvenergy.com. One of the standards that is relevant to solar and energy storage installations is the **RE-3 Standard**. This standard includes the approved installation configurations document in one-line diagrams and can be found at:

https://www.nvenergy.com/publish/content/dam/nvenergy/brochures_arch/account-services/building-and-new-construction/electric-service-standards-south/re/ESRNPC-RE003-REV11.pdf

Engineering Requirement Standards

The following documents will provide information on engineering requirements and standards associated with renewable generation and energy storage devices.

Generator Device

The following link to the document below will discuss the utility's planning and design requirements for generators connected to and operating in parallel with electrical systems to ensure the safety of the people and property as well as the integrity of the electrical system. This is known as the **RE-1 Standard.**

https://www.nvenergy.com/publish/content/dam/nvenergy/brochures_arch/account-services/building-and-new-construction/electric-service-standards-south/re/ESRNPC-RE001-REV02.pdf

Additionally, the National Fire Protection Association has established the criteria for minimizing the hazards associated with energy storage systems with the **NFPA 855 Standard.** This standard for the installation of stationary energy systems can be found in the link below.

https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=855

Net Metering System

The following link to the document below will discuss the utility's design requirements for net metering systems to operate in parallel with the utility's electric system to ensure the safety of people and property and the integrity of the electrical system. ESDs that are paired with a net metering system are included in this standard. This is known as the **RE-3 Standard.**

https://www.nvenergy.com/publish/content/dam/nvenergy/brochures_arch/account-services/building-and-new-construction/electric-service-standards-south/re/ESRNPC-RE003-REV11.pdf

Metering Equipment Requirements

The following documents will provide information on metering equipment requirements and standards associated with a net metering system.

Material Requirements

The following link to the document below will discuss the minimum manufacturing requirements for utility metering and service equipment that is rated 0-600V. These requirements are based on practices that are necessary to supply uniform satisfactory and safe service. This is known as the **RPM-G Standard.**

https://www.nvenergy.com/publish/content/dam/nvenergy/brochures_arch/account-services/building-and-new-construction/electric-service-standards-south/rpm/ESRNPC-RPM00G-REV08.pdf

Installation Requirements

The guidelines within the following link to the document below are based on NV Energy practices that are deemed necessary to supply uniform satisfactory and safety service. This is known as the **RPI-G Standard.**

https://www.nvenergy.com/publish/content/dam/nvenergy/brochures_arch/account-services/building-and-new-construction/electric-service-standards-south/rpi/ESRNPC-RPI00G-REV05.pdf

Generating Facility Interconnections Requirements

The following link to the document below discusses **Rule 15**, which describes the interconnection, operating and metering requirements for generating facilities intended to be connected to the utility's electric distribution system over which the Public Utilities Commission has jurisdiction. This document applies only to generating facilities with a net power capacity of **20,000 kilowatts** or less, unless otherwise required in federal or state law.

https://www.nvenergy.com/publish/content/dam/nvenergy/brochures_arch/about-nvenergy/rates-regulatory/electric-rules-south/Rule_15_South.pdf

Electric Service Standards

The following links will provide information regarding electric service standards for southern and northern Nevada. Each link contains documentation on general information, guidelines, staking and trenching, conduits, boxes and vaults, etc. for each the two aforementioned territories.

General Standard Southern Nevada

https://www.nvenergy.com/account-services/building-and-new-construction/electric-service-standards-south

General Standard Northern Nevada

https://www.nvenergy.com/account-services/building-and-new-construction/electric-service-standards-north

SITING AND EQUIPMENT

All completed renewable and energy storage systems must adhere to the following siting requirements:

- The solar panels (modules) and inverters in the system must be listed on the California Energy Commission (CEC) list of approved solar equipment
- All photovoltaic and energy storage equipment requires a UL listing

APPLICATION CHANGES

Installation Location

Applicants and host customers may change the installation address of an application to another address with the same host customer. Changes must be requested in writing to NV Energy and are subject to system sizing rules.

Applicant or Installer

Host customers may change or rescind affiliation with any of the parties of the original application with written notice to NV Energy. The installer may be changed by either the applicant, system owner or the host customer with written notice to NV Energy.

Host Customer

The host customer name for an application may be changed before project completion and interconnection by the original host customer with written request to NV Energy.

INTERCONNECTION DOCUMENT REVIEW

Prior to any renewable energy or energy storage device application advancing to the pending utility inspection status, the building permit and satisfactory electrical inspection must be uploaded into the online application portal. Any modification of the customer's electrical bus bar (drilling, tapping, etc.) will also require a UL Recertification Report (conducted by a licensed third party testing agency) or a manufacturer's review and approval to be submitted.

If the documents are incomplete and the project is suspended, the Applicant has 60 days to make corrections. If the correction is not received within 30 days, NV Energy will send a final notice indicating that the Applicant has 30 days to correct or their application will be canceled.

Satisfied Building Permit: Must come from the local jurisdiction indicating the date of satisfactory final solar system and or ESD system inspection. Satisfaction of a permit is shown via a copy of final inspection results and date, which is a separate document than the permit. Required is a copy of the permit with an attached copy of the inspection passed results. In the case of jurisdictions that do not have a building official, verification by a Nevada licensed professional engineer is required attesting to compliance with all applicable state, county, and federal codes and ordinances.

Cost of Tangible Materials and Labor: The reasonable cost of materials and labor for permitting, panels, battery, inverters, the balance of system components and any other costs that are directly related to and required for the operation of a solar energy or energy storage system. The term does not include such costs for improvements to a building or site which are not necessary to accommodate a solar energy or energy storage system. Such improvements include but are not limited to carports or shade structures, fencing, roof coverings, parking lot surfaces, lighting and components for battery back-up systems.

INSPECTIONS

Net Metering & Energy Storage Interconnection verification

Net Metering Interconnection Safety Verification

The Interconnection Safety Verification is an inspection to confirm the system's compliance with net metering standards and is performed by the NV Energy Meter Operations department.

If the system passes the safety verification, the net meter and any required energy storage metering is installed and the system may be operated.

If the system does not satisfy the requirements of the net metering interconnection safety verification, NV Energy will contact the installer and/or host customer to inform them of the issue. Re-inspection may be necessary after corrections are made.

NOTE: Systems may not be energized prior to successful final net metering verification by NV Energy. The customer will not receive kWh credit for energy put back into the grid until the NV Energy net meter is set.

All projects must comply with applicable NV Energy construction standards which can be found at www.nvenergy.com.

The use of a battery backup system on a grid-connected system requires advance review and approval by NV Energy to ensure safe interconnection and that all energy produced by the system is accurately recorded by utility meters.

Modifications to customer-owned electrical service equipment may compromise the original equipment listing. All modifications shall be approved in writing by the authority having jurisdiction, the manufacturer, or a nationally recognized testing laboratory.

Systems larger than 25 kW

In order to pass inspection, the customer is responsible for the cost of any upgrades required to make the renewable energy system compatible with the NV Energy distribution system. System upgrades must be completed in accordance with NV Energy procedures and standards.

All Generating Facility Interconnections are subject to the provisions outlined in Rule 15: Nevada Power Company provisions can be found at:

https://www.nvenergy.com/company/rates/snv/rules/images/Rule_15_South.pdf

Sierra Pacific Power Company provisions can be found at:

https://www.nvenergy.com/publish/content/dam/nvenergy/brochures_arch/about-nvenergy/rates-regulatory/electric-rules-north/Rule_15_Electric_North.pdf

FOR MORE INFORMATION

Net metering and Energy Storage Device interconnection programs:

Website: nvenergy.com/cleanenergy
Website: https://www.nvenergy.com/account-services/energy-pricing-plans/net-metering
Email: **cleanenergy@nvenergy.com**
Toll-Free: 866-786-3823