NEW YORK STATE OF OPPORTUNITY. | NYSERDA

Value of Distributed Energy Resources

Phase 1 Order

Highlights for Commercial/Industrial PV

Context of Order

- As part of Reforming the Energy Vision (REV), NYS is transitioning away from net energy metering (NEM)
- NYS' Public Service Commission (PSC) recently released an order to start this transition
  - *Phase One* (issued March 9, 2017)
  - *Phase Two* (to come)
- This presentation focuses on the implications for non-CDG commercial and industrial PV systems. Details specific to other sectors are omitted

Introduction

- NEM has been effective at growing NYS' PV market
  - Policy in place since 1997
  - However, it's a blunt method for valuing distributed energy resources (VDER). Time and location of generation are not considered in compensation structure
- NYS PSC has begun to develop a more precise approach to VDER

Phase One

What's Impacted

- Solar PV, Wind, Hydro, Farm Waste Generation, and Fuel Cells up to 2MW AC
- Combined Heat and Power (CHP) up to 10kW AC
- National Grid, NYSEG, Central Hudson, Orange and Rockland, ConEd, Rochester Gas & Electric

Volumetric vs Monetary Metering

Volumetric metering tracks net kWh delivered to grid.

- NEM is a volumetric method. PV production exported to the grid is credited on the customer's utility bill with a kWh reduction on a 1:1 ratio.

Monetary metering converts energy production into dollars.

- PV customers see a dollar credit on their energy bill (rather than a kWh credit)
- Solar energy consumed onsite is not delivered to the grid and is not converted to a monetary credit

For both metering methods, PV kWh consumed on-site is a kWh not purchased from the utility. It reduces the customer's bill like energy efficiency.

Definition of Project Types

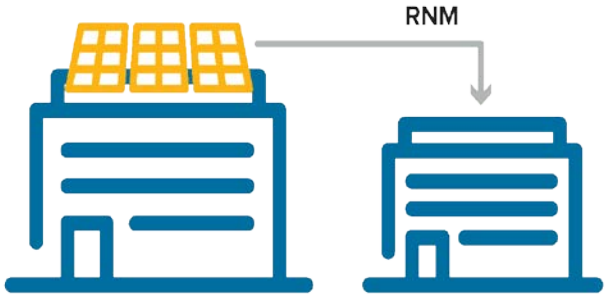
Large-scale onsite

- Onsite projects for commercial customers with demand billing or mandatory hourly pricing (MHP)

Definition of Project Types

Remote net metering (RNM)

- Off-site projects of nonresidential customers; credits are used to offset use at remote meters
- Certain RNM projects already meeting specific criteria are grandfathered into monetary compensation. These projects must be installed by the end of 2017



Definition of Project Types

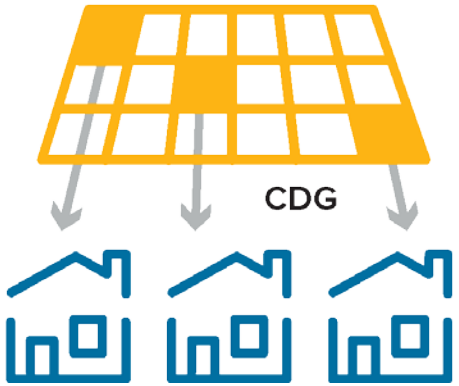
Mass Market

- PV system is located at off-taker site
- Residential or small commercial solar electric systems where customer has non-demand billing
- Outside of the scope of this presentation

Definition of Project Types

Community Distributed Generation (CDG) or Community Solar

- Off-site projects located behind a nonresidential host meter that provide bill credits to subscribed members
- Typically 10+ members, but in conjunction with VDER order, the PSC approved a waiver for multifamily projects
- Outside the scope of this presentation



Phase One - Tariff Categories

1. **Net Energy Metering (NEM)** – no longer available for new projects
2. **VDER Phase One NEM** – temporarily available based on project criteria
3. **Value Stack** – available for most commercial/industrial projects moving forward

Phase One - Tariff Categories

Net Energy Metering (NEM)

- Volumetric crediting
- Compensation for life of the system
- Periodic true-up for net excess production

Phase One - Tariff Categories

VDER Phase One Net Energy Metering

Phase One NEM is similar to NEM compensation except:

- Phase One NEM projects are subject to a 20-year term
- Credits will carry over to next billing periods
- Projects must have utility metering capabilities for recording
  net hourly use and delivery, except mass market
- After a 20-year period, projects will receive compensation structure in effect

Phase One - Tariff Categories

Value Stack - Overview

- The Value Stack consists of several elements representing the value of a clean kWh to the grid and the environment
- Some elements are time and location sensitive
- kWh produced in congested parts of the grid during peak demand time will be paid more

Phase One - Tariff Categories

Value Stack

- Applies to projects not eligible for NEM or Phase One NEM
- Monetary crediting only. Customers will see a dollar credit on their bill
- Compensation is based on electricity delivered to the grid (not consumed on site) on an hourly basis
- Projects receiving the Value Stack will have a compensation term of 25 years, then receive compensation structure in effect
- Credits will carry over to next billing periods

Net Energy Metering - *How to Qualify*

- All projects already interconnected or completed as of 3/9/2017 will retain NEM for the life of the system
  - Must have notified utilities of finished projects by 3/17/2017
- No action is required for already-interconnected projects to keep NEM

Phase One Net Energy Metering - *How to Qualify*

- To qualify for Phase one NEM a project must have made payment of at least 25% of interconnection upgrade costs, or have executed an interconnection contract (SIR) if no upgrade payments are required by July 17th 2017.
- Non-grandfathered RNM and large-scale, onsite projects are eligible

NEW YORK STATE OF OPPORTUNITY. | NYSERDA

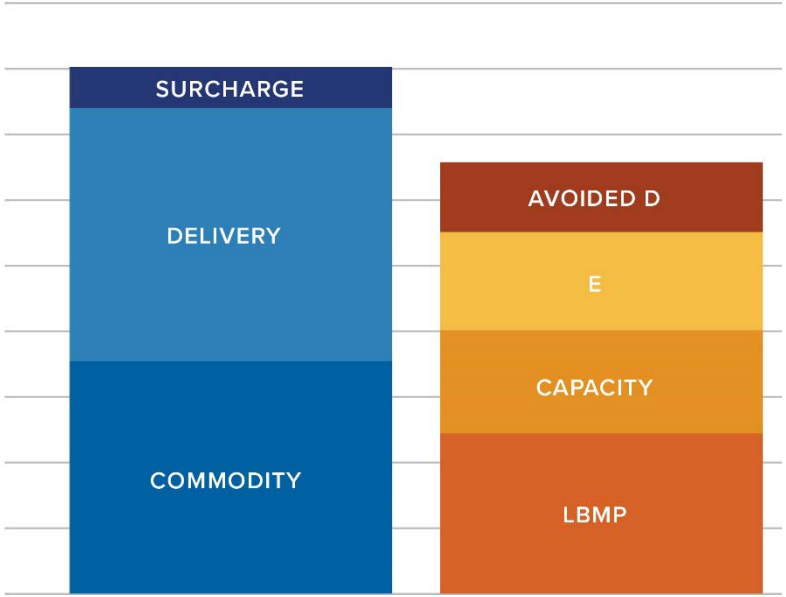
Phase One Value Stack - *How to Qualify*

- Projects that do not receive NEM or Phase One NEM will receive the Value Stack
- Projects receiving NEM or Phase One NEM may permanently opt into Value Stack
- All projects receiving the Value Stack must have advanced utility meter capable of measuring hourly electric exports and imports

Phase One Value Stack - Components

- **Energy (LBMP)** – the current wholesale energy price, changes hourly
- **Capacity (ICAP)** – similar to the capacity credit currently provided under NEM, changes over time
- **Environmental benefits (“E”)** – project’s rate is locked in at interconnection. Certain CDG projects can take a non-tradable REC instead
- **Avoided demand (“D”)** – based on amount system will reduce distribution grid’s peak demand
- **LSRV (locational system relief value)** – additional value for location-specific congestion relief in distribution network

Phase One Value Stack - Components

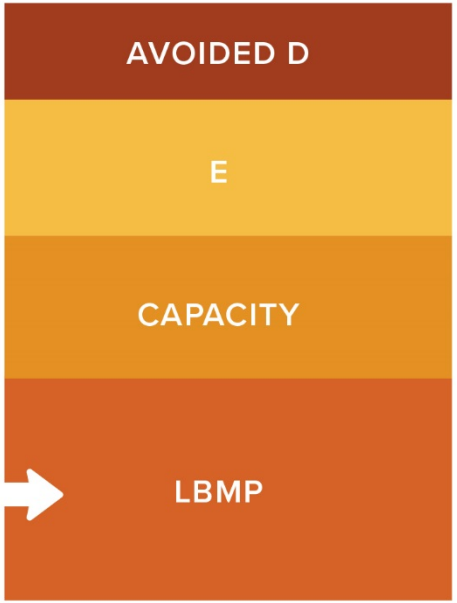


- Avoided D – avoided demand
- E – environmental benefit
- Capacity – ICAP
- LBMP – energy commodity

Phase One Value Stack Components –

Energy Value (LBMP)

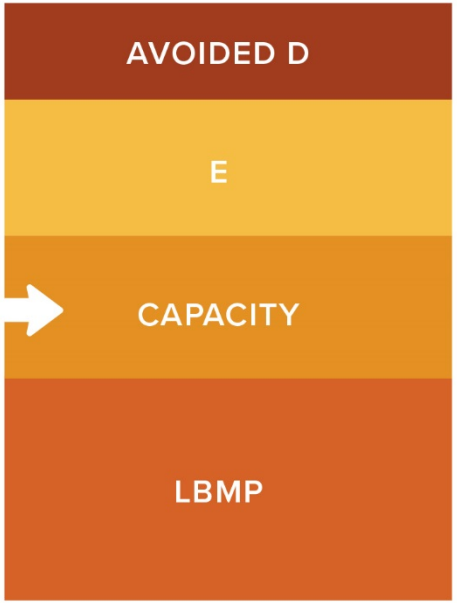
The wholesale cost of energy:
Day ahead Locational-based marginal pricing (LBMP) on an hourly basis inclusive of electrical losses. Compensation only for electricity exported into the grid at the time of generation.



Phase One Value Stack Components –

Installed Capacity (ICAP)

- Compensation per kWh, based on the capacity portion of the utility's full service market supply charges (similar value as in NEM)*
- Option 1 – spread across all hours of the year
- Option 2 – spread across 460 summer hours



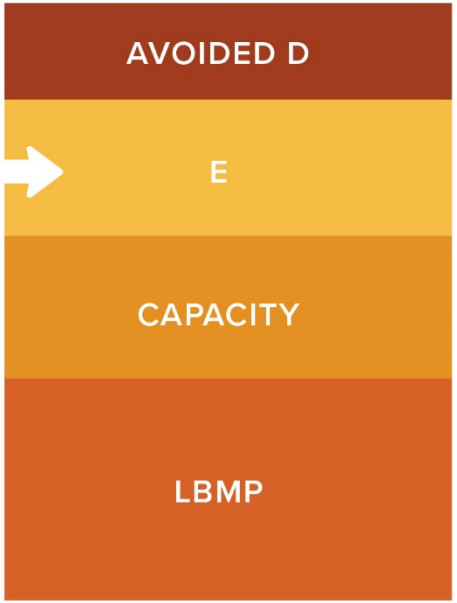
*For intermittent technologies

Phase One Value Stack Components –

Environmental Value (interconnecting-LSE option)

A fixed value representing environmental benefits

- Environmental compensation is the higher of:
  - The applicable Tier 1 REC price per kWh generated delivered (currently $0.02424 per kWh)
  - The social cost of carbon (SCC) per kWh value minus Regional Greenhouse Gas Initiative
- This value will be fixed for the Value Stack term and is locked in at interconnection

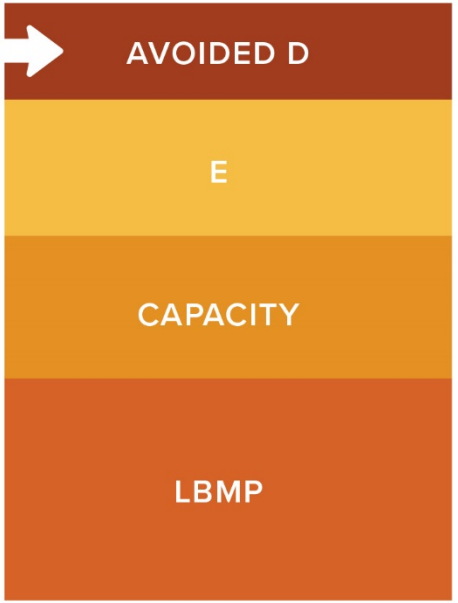


Phase One Value Stack Components –

Value of “D” (DRV) - Demand Reduction Value

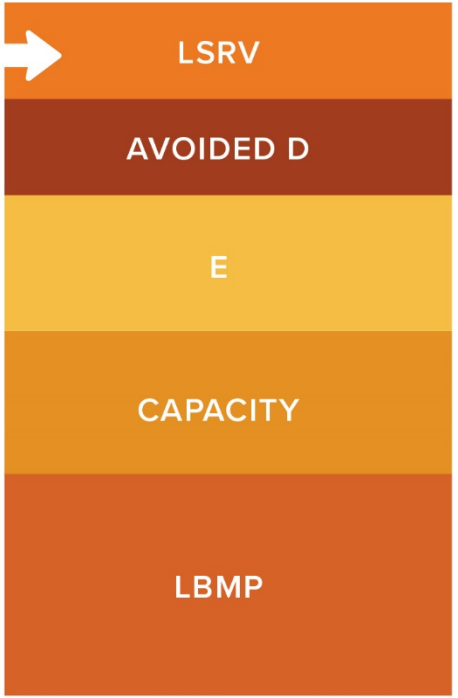
Value of PV System’s Reduction of Peak Grid Distribution Demand

- Compensation is tied to PV system performance over the grid’s 10 highest usage hours per year
- Details of calculation are available starting page 111 of Order



Phase One Value Stack Components –

Locational System Relief Value



A locational adder

- Utilities are required to identify high-value locations and any limits on the MW needed in those areas
- $ per kW-year value identified by utility, locked in, and paid for first 10 years of project
- Utilities have identified but LSRVs, but they are not yet confirmed

Energy Storage

- Storage is included in Phase One when paired with an eligible technology. Details on compensation will be determined in future orders
- Storage is also permitted under NEM and Phase One NEM
- NYSERDA is in the process of developing a solar + storage solicitation
- Stand-alone storage and other storage valuation will be taken up in Phase Two

Renewable Energy Certificates (RECs)

Central Concept: *No projects receiving Phase 1 NEM or the Value Stack will receive monetizable RECs*

Details:

- Renewable Energy Standard (RES) Tier 1 differentiates between transferrable (monetizable) and nontransferable (non-monetizable) Renewable Energy Credits (RECs)
- RECs are tracked in NY Generation Attribute Tracking System (NYGATS) database, administered by NYSERDA
- 1 MWh = 1 REC
- NEM customers without an RPS (Renewable Portfolio Standard) or RES contract may still receive non-transferrable RECs
- Phase 1 NEM projects will not be eligible for Tier 1 solicitations or tradable RECs, but can receive non-transferrable RECs
- All rights to any environmental claims, credits, certificates, or attributes for energy produced by any system funded by Customer-Sited Tier or NY-Sun programs have been relinquished by NYSERDA

Renewable Energy Certificates *cont'd*

- Any VDER project receiving the value stack is ineligible for Tier 1 solicitations or transferrable RECs, but will receive one of two options:
  A. Default *Interconnecting-LSE-Option*: Utility (LSE) receives non-transferrable RECs, and customers receive environmental value component in Value Stack ("E")
  B. Customers may permanently opt into *Customer-Retention-Option* at time of interconnection. The customers forfeit "E" in the Value Stack but receive non-transferrable RECs (not redeemable for monetary value)
- NYGATS can create RECs retroactively to 1/1/16, but only if the system owner completes the registration process and provides the associated generation data by 5/31/17.
- Questions? Email attributes@nyserda.ny.gov

VDER Order Timeline

03/09/17	Phase 1 VDER Order issued and effective
03/16/17	Utilities report on CDG projects that have already met milestone to lock into a tranche
03/31/17	Utilities report final capacity of MW interconnected/grandfathered under NEM
04/01/17	Utilities amend their tariffs to bring them in line with Phase 1 (extended to April 27)
04/05/17	VDER Technical Conference
05/01/17	Utilities file Implimentation Proposals, including value stack calculations
May 2017	Phase Two procedural conference begins
05/31/17	Deadline to register in NYGATS for retroactive generation from January 1, 2016
Summer 2017	PSC to issue Value Stack Implimentation Order
07/17/17	Deadline to submit 25% construction payment or interconnection agreement to receive Phase 1 NEM. Dependent on Trache 0 capacity
09/01/17	Staff to file Low-Income CDG Proposal
12/31/17	Grandfathered RNM projects must be completed
01/01/20	Phase 1 NEM no longer availible for new Mass Market projects

Implications for C/I PV Contractors

- Projects that met grandfathering deadline for monetary RNM will still receive it, but must be completed by end of 2017
- C/I projects will receive Phase 1 NEM if they pay 25% utility upgrade cost or execute SIR within 90 days of order (July 17, 2017). If not, they will receive value stack
- Exact values for value stack components will be set this summer

Glossary

- CDG/Community Distributed Generation/Community Solar/Shared Solar: A PV project that remotely supplies energy to multiple off-takers
- Distributed Energy Resources (DER): Non-centralized energy generators, such as PV
- LSE (Load Serving Entity): One of the electric utility companies
- Net Energy Metering (NEM): Net metering
- NYGATS (New York Generation Attribute Tracking System): Used to track RECs
- MTC (Market Transition Credit): An element of the value stack, available for CDG projects only
- REC: A renewable energy credit. Sometimes redeemable or tradable for monetary value, but not under Phase One order
- Tier 1: The Clean Energy Standard mandate on Load Serving Entities to procure RECs
- MCOS: Marginal costs of services

Links and Resources

- PSC order and related documents: http://www.dps.ny.gov/VDER
- NYSERDA VDER Resource Page: nyserda.ny.gov/VDER
- REC questions: attributes@nyserda.ny.gov