State of New Jersey
Board of Public Utilities

CADMUS

Sustainable Energy Advantage, LLC

NJ Solar Transition

Introduction to the Process & Consulting Team

STAKEHOLDER WORKSHOP #1

MAY 2, 2019

Opening Remarks

BPU

- Welcome
- Intro to Process and Consulting Team

Today’s Workshop

Bob Grace, Sustainable Energy Advantage, LLC

- Purpose of today’s workshop
  - Orient stakeholders to scope & goals
  - Present preliminary findings, identify omissions, engage stakeholders
  - Seek input to upcoming analysis steps
  - Introduce stakeholders to upcoming outreach
- Agenda
- Consulting Team / Facilitators
- Housekeeping items
- Q&A

Disclaimer

The information and views in this presentation do not necessarily represent the views of the New Jersey Board of Public Utilities, its Commissioners, its Staff or the State of New Jersey. This presentation is provided by the Consulting Team (Cadmus and Sustainable Energy Advantage) for discussion purposes only. It does not provide a legal interpretation of any New Jersey statutes, regulations, or policies, nor should it be taken as an indication or direction of any future decisions by the Board of Public Utilities.

Agenda

Time	Agenda Item
10:00-10:15 AM	• Opening Remarks • Introduction and Overview of Stakeholder Process • Review of the Day's Agenda
10:15 - 10:40 AM	• Presentation and Q&A: Assessment of SREC Program
10:40 - 10:55 AM	• Presentation: Identification and Prioritization of Objectives & Option Evaluation Criteria for the Solar Transition
10:55 – 11:00 AM	• *Transition into Breakout Groups*
11:00 AM – 12:00 PM	• Breakout Session: Identification and Prioritization of Objectives & Option Evaluation Criteria for the Solar Transition
12:00 – 12:50 PM	• *Lunch (participants are responsible for own lunch)*
12:50 – 1:05 PM	• Re-Opening of Meeting & Breakout Session Report Back
1:05 – 2:20 PM	• Presentation and Q&A: Draft Preliminary Findings on Impact of SREC Program, Draft Model Results of Cost Cap for Solar Transition
2:20 – 2:30 PM	• *Break*
2:30 – 3:10 PM	• Presentation & Moderated Discussion: Modeling Assumptions
3:10 – 3:40 PM	• Presentation, Q&A: Overview of Elements & Dimensions Comprising Future Policy Paths
3:40 – 3:50 PM	• Wrap Up, Next Steps & Adjourn

Consulting Team Supporting Stakeholder Engagement

Facilitator Roster

Bob Grace
SEA Managing Dir.,
Stakeholder Engagement Lead

Steve Tobey
Cadmus Sr. Associate
SEP Sr. Contributor

Tom Michelman
SEA Sr. Dir.
SEP Sr. Contributor
Project Manager

Emily Chessin
Cadmus Sr. Associate
SEP Sr. Contributor

Jim Kennerly
SEA Sr. Consultant
Workshop, Interview Support

Courtney Ferraro
Cadmus Sr. Analyst
Workshop, Interview Support

BPU Staff will co-facilitate workshop breakouts

Housekeeping

- Logistics:
  - Cell phones on mute!
  - Restrooms
  - Wireless
  - Lunch (on our own)
  - Transitions to breakout

- Ground rules:
  - Be Present
  - Be Respectful
  - Step up, Step Back

- Some segments of agenda designed to encourage discussion
- During Q&A:
  - Introduce yourself and your organization
  - Questions, please, not statements
  - Be brief
  - If time insufficient, write question on index card and submit to moderator

CADMUS | Sustainable Energy Advantage, LLC

CADMUS | Sustainable Energy Advantage, LLC

Thank You

State of New Jersey
Board of Public Utilities

CADMUS

Sustainable Energy Advantage, LLC

NEW JERSEY SOLAR TRANSITION

Draft Preliminary Findings from Assessment of New Jersey's Current SREC Program

STEVE TOBEY | CADMUS ASSOCIATE

Disclaimer

The information and views in this presentation do not necessarily represent the views of the New Jersey Board of Public Utilities, its Commissioners, its Staff or the State of New Jersey. This presentation is provided by the Consulting Team (Cadmus and Sustainable Energy Advantage) for discussion purposes only. It does not provide a legal interpretation of any New Jersey statutes, regulations, or policies, nor should it be taken as an indication or direction of any future decisions by the Board of Public Utilities.

Overview

- New Jersey was a pioneering solar market in the United States and has remained a leader in the country
- Strong solar growth is a function of the state's commitment to and collaboration with the market
- Key factors include:
  - ✓ Commitment to solar technology
  - ✓ Support from a series of legislative and regulatory underpinnings
  - ✓ Stakeholder engagement by regulators
  - ✓ General reliance on SREC market with various "levers" to deploy
  - ✓ Favorable market aspects (lots of big roofs)

New Jersey SREC Timeline

1999-2001: RPS Foundation

2003-4: Solar Carve-Out

2006-7: Market Transition

2008-10: Additional Levers

2012-14: Addressing Oversupply

2018-2020: Solar Transition

1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020

You Are Here

- Key junctures in the SREC evolution:
  - ✓ Issues identified, goals established
  - ✓ Governor, legislature, BPU, and others work collaboratively with stakeholders
  - ✓ BPU implements solutions (pulls levers)

CADMUS | Sustainable Energy Advantage, LLC

1999-2001

- **Notable goals for future solar program**
  - Place greater emphasis on competitive markets
  - Improve diversity in the supply of electric power
  - Prevent adverse impacts on environmental quality
- **Legislation and regulation**
  - Electric Discount and Energy Competition Act 1999
  - BPU established RPS rules
  - Clean Energy Program 2001
- **Key provisions**
  - **New** Renewable Portfolio Standards for Class I and Class II renewable energies
  - **New** Societal Benefits Charge (SBC), including to fund Class I renewable energy
  - **New** Net Metering & Interconnection

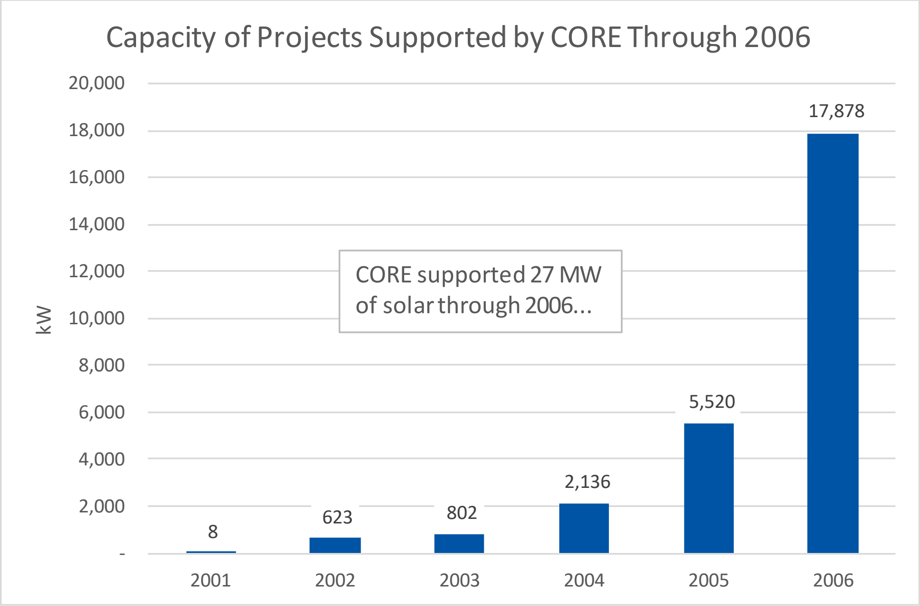
2003-2004

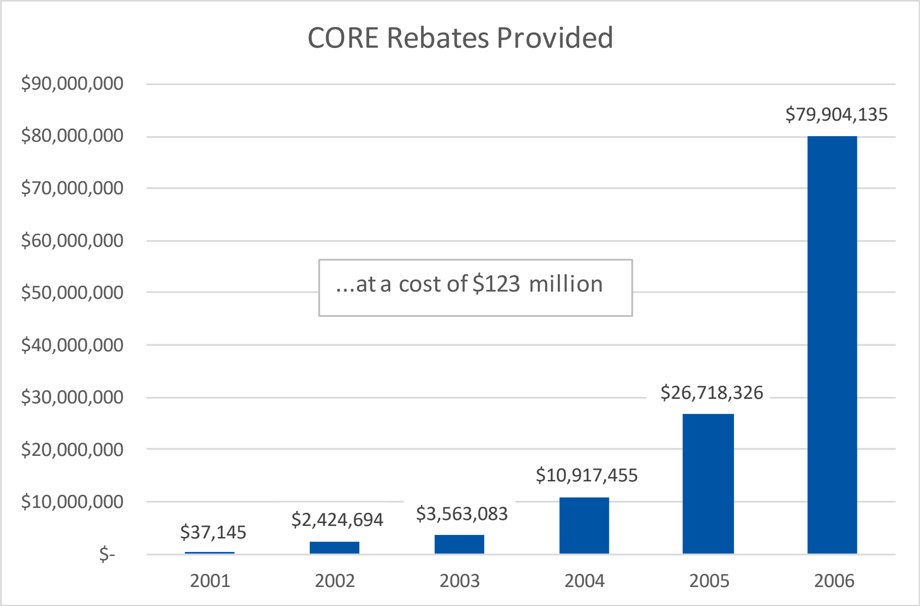
- **Issues**
  - Heavy reliance on traditional energy sources
  - RPS not robust enough for renewable energy goals
- **Legislation and regulation**
  - Executive Order #45 → Renewable Energy Task Force, report submitted April 2003
  - BPU amended RPS rules 2003 and 2004
- **Key changes**
  - **NEW** Solar Carve-Out: five-year schedule starting in EY 2004**
  - **NEW** Solar Alternative Compliance Payment (SACP)
  - **NEW** Certificate-based program for unbundled renewable attributes

** *We will use "EY" throughout to denote both Energy Years and the predecessor Reporting Years, i.e., the period June 1 to May 31 that is named after the year it ends. If a year has no "EY" prefix, it represents a calendar year.*

2006-2007

- **Issues**
  - Rebate program growing expensive and not sustainable to reach RPS goals
  - Anticipated shortfall in PV to meet RPS





Note: Calendar years.

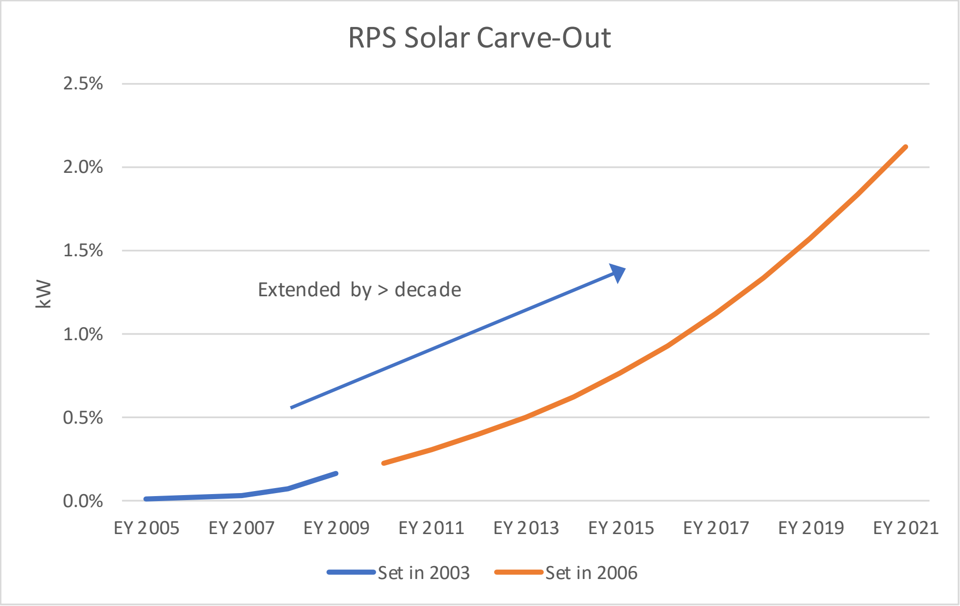
Source: NJ Clean Energy Program Archives: Public Record of CORE Paid Projects: Program-to-Date as of June 30, 2013 [FINAL].

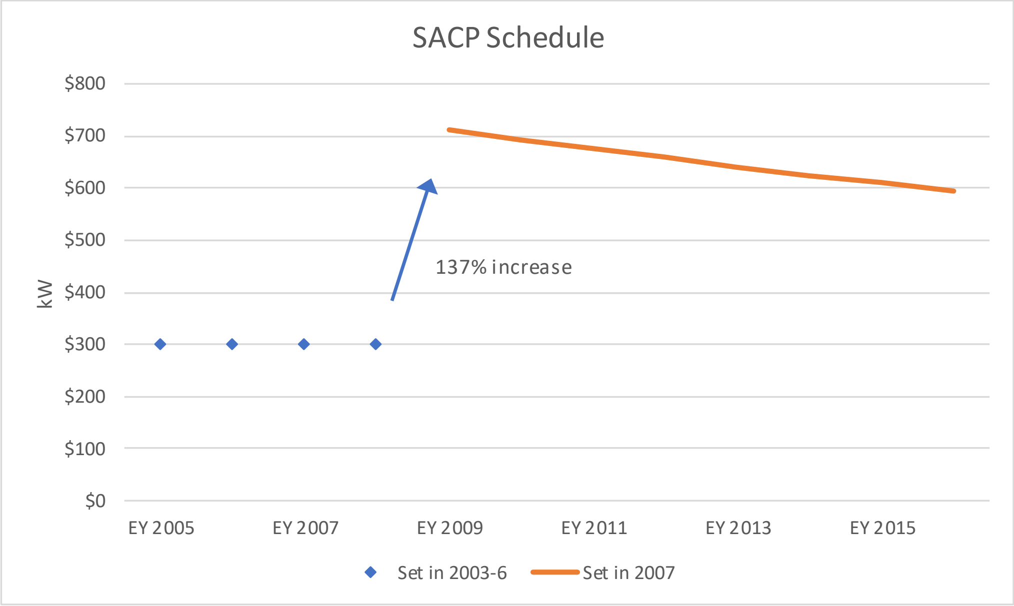
2006-2007

- **Issues**
  - Anticipated shortfall in PV to meet RPS
  - Rebate program growing expensive and not sustainable to reach RPS goals
- **Legislation and regulation**
  - OCE establishes RPS Transition Working Group
  - BPU Solar Transition Order (Docket EO06100744)
- **Key changes**
  - Set multi-year SACP
  - Extend/Ramp Up Solar Carve-Out
  - Extend trading life (vintage) from same year of generation to two years
  - Establish qualification life at 15 years
  - Limit rebates to four-year, declining block rebate schedule; projects capped at 10 kW
  - **NEW** SREC-Only Pilot Program

2006-2007

- Substantial adjustments to Solar Carve-Out and SACP levers



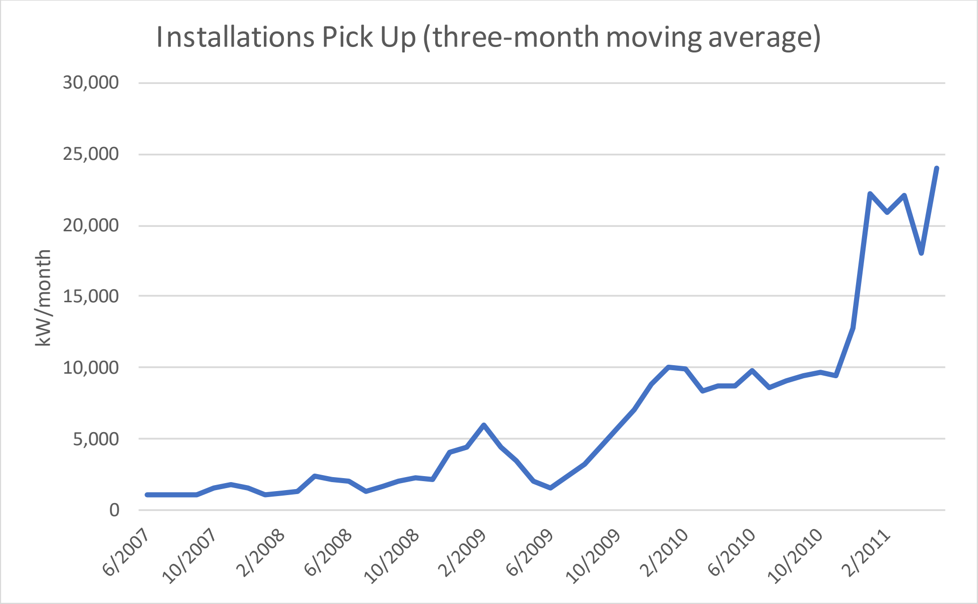


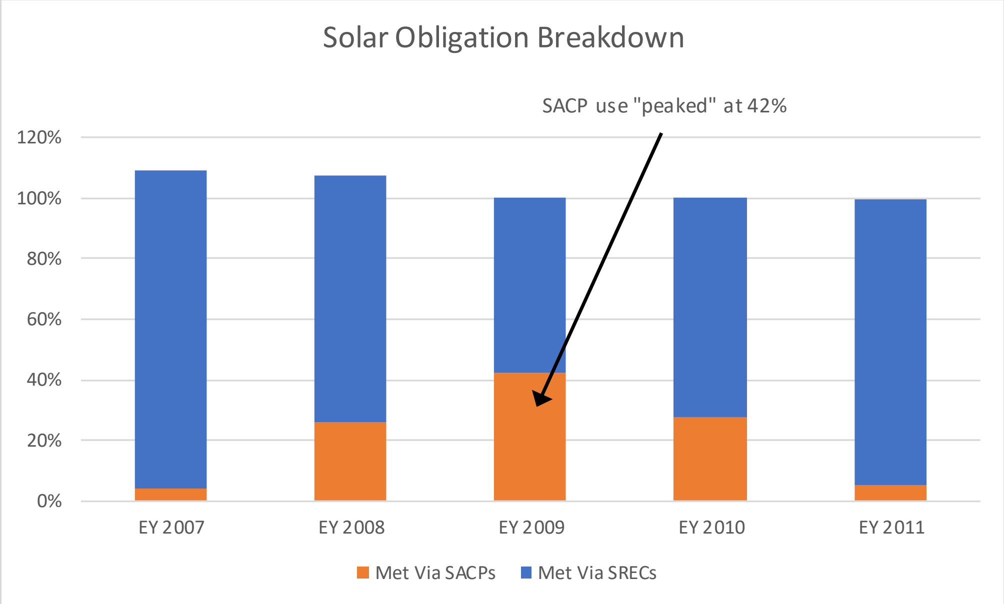
Prior to 2004, a Reporting Year (RY) ended on May 31st but named after the year it began. In the graphs above, RY (renamed EY) was shifted to the name when it ended.
Sources: 35 N.J.R. 4445(a); 36 NJR 2053(b); 38 N.J.R. 2176(a); BPU Order dated September 12, 2007, DOCKET No. EO06100744.

CADMUS | Sustainable Energy Advantage, LLC

2006-2007

- Installations picked up
- Provisions helped bring back some balance to SREC obligation side





Sources: Clean Energy Progam - Solar Activity Reports as of March 31, 2019; New Jersey RPS Compliance History: 2005-2018.

2008-2010

- **Legislation and regulation**
  - Solar Energy Advancement and Fair Competition Act
  - Residential Development Solar Energy Systems Act
  - BPU adopted amendments
- **Key changes**
  - RPS extended, automatic adjustment added
  - Extended SACP to 15-year schedule
  - SREC eligibility from two → three years
  - **NEW** EDC SREC financing programs

2008-2010

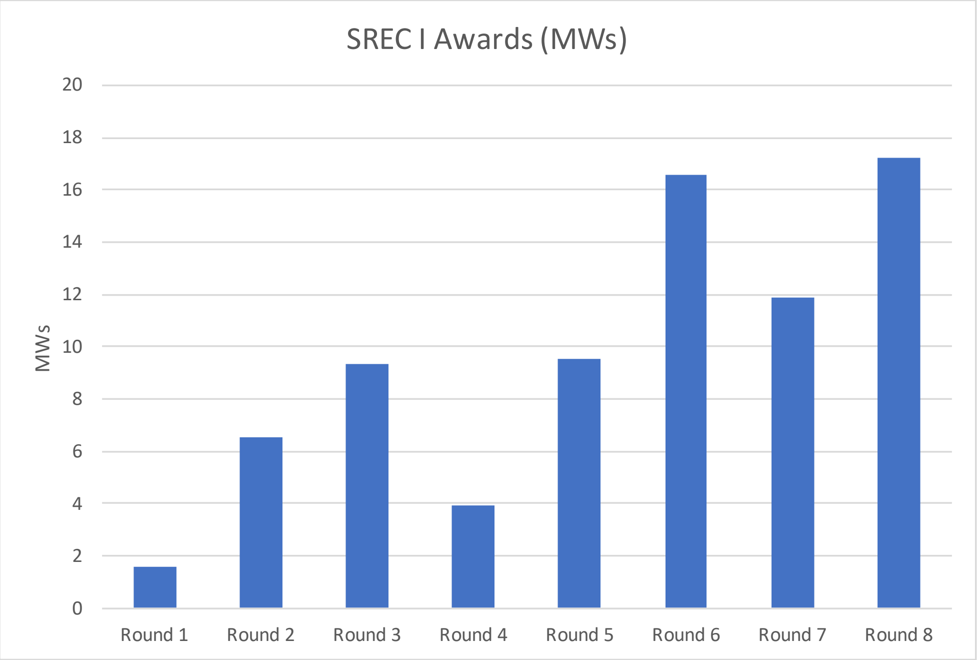
EDC Financing Programs

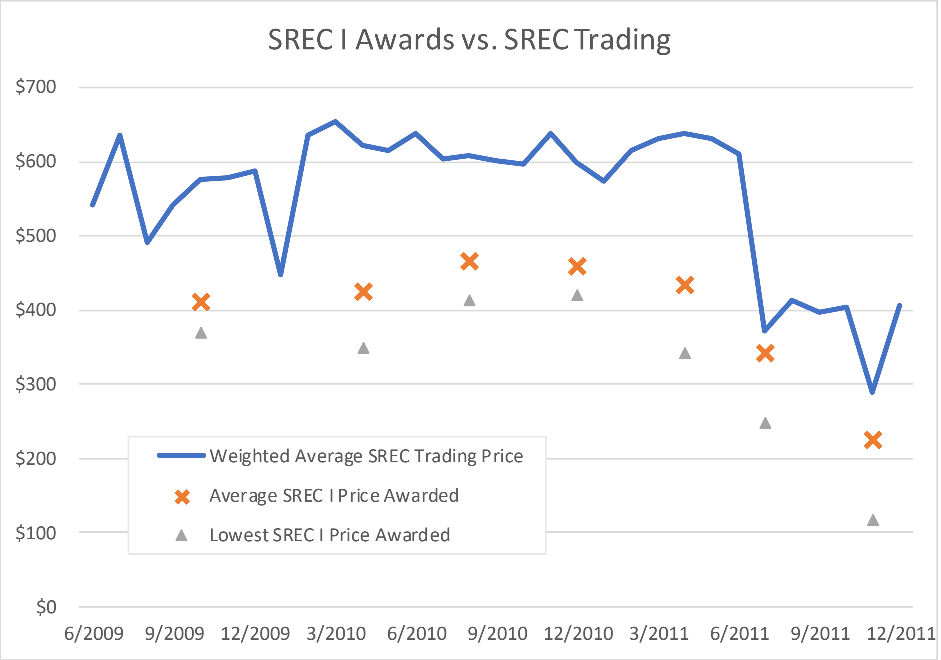
- 2008 BPU directed EDCs to develop long-term contracting
- EDC SREC financing: ACE, JCP&L, RECO
  - 10- to 15-year, fixed-price contracts
  - March 2009 approved SREC I: eight rounds 2009-2011
  - May 2012 BPU approves extension of 180 MW over three years: SREC II nine (joint) solicitations
- PSEG Solar Loan
  - Guaranteed floor for SREC, which can be used to pay off loan
  - 10-year tenor, up to 70% costs
  - April 2008 Solar Loan I: goal 30 MW
  - Dec 2009 Solar Loan II: additional 51 MW
  - May 2013 Solar Loan III: 180 MW
- EDCs collect SRECs, sell through auction, then use net revenue to reduce ratepayer impact

CADMUS | Sustainable Energy Advantage, LLC

2008-2010

EDC Financing Programs



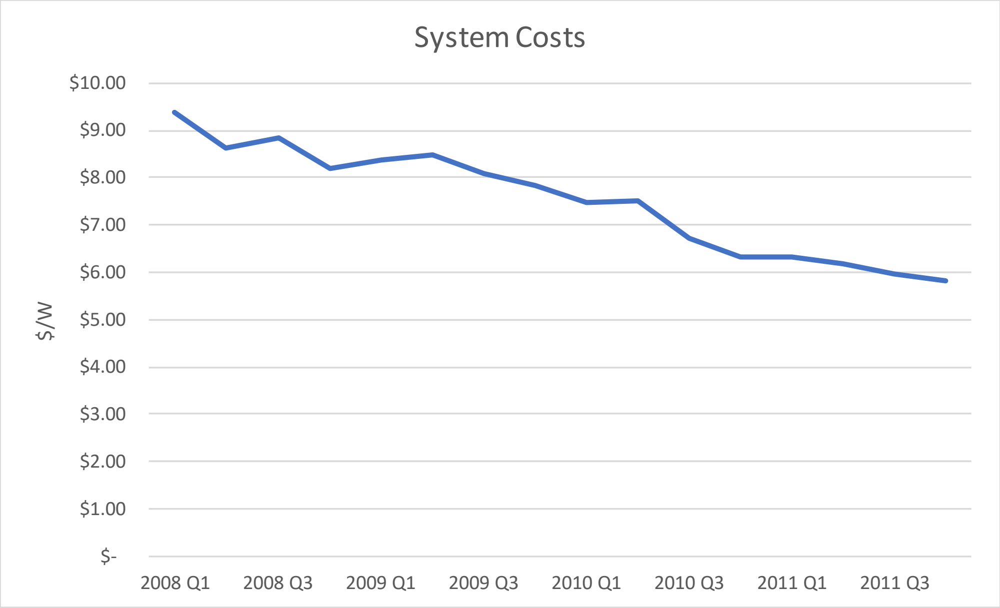


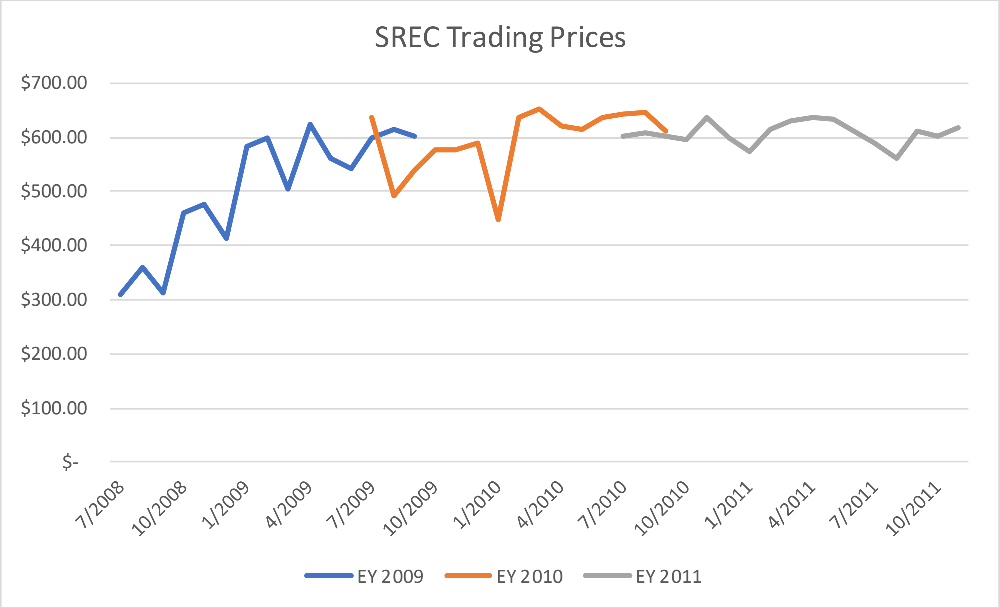
Sources: SREC-Based Financing Program website (http://www.njedcsolar.com); Clean Energy Program.

CADMUS Sustainable Energy Advantage, LLC

2012-2014

- **Issue 1:** Multiple factors drive robust installation growth



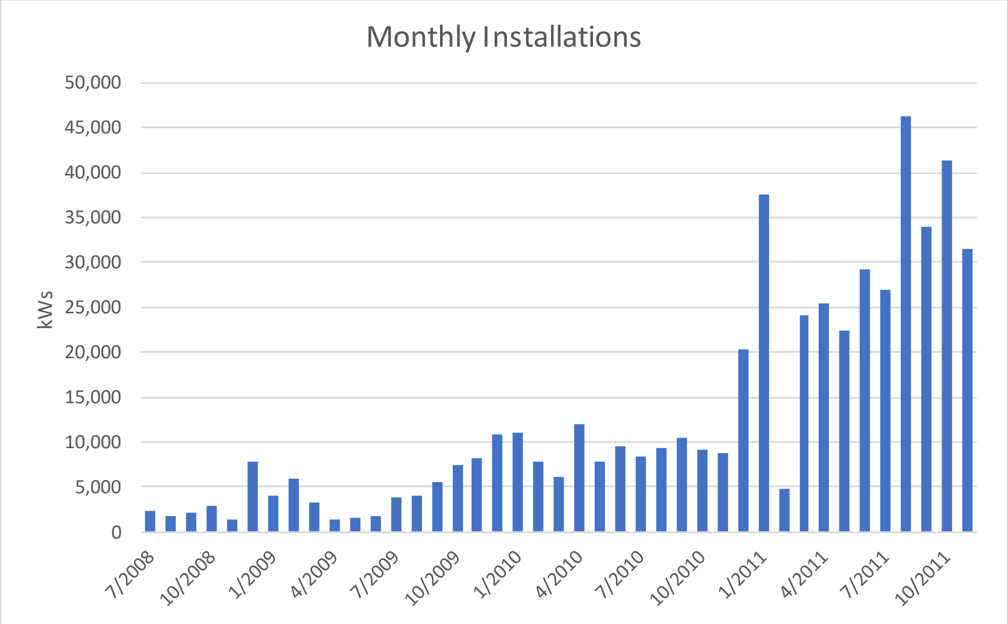


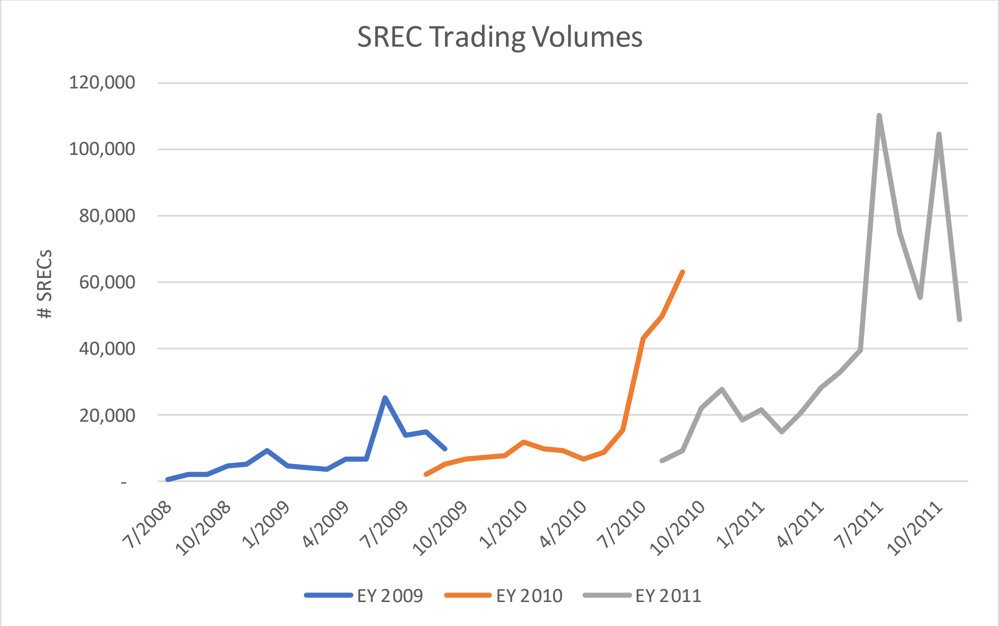
Source: Clean Energy Program.

CADMUS | Sustainable Energy Advantage, LLC

2012-2014

- **Issue 1:** Installation growth → Major increase in SREC trading volumes





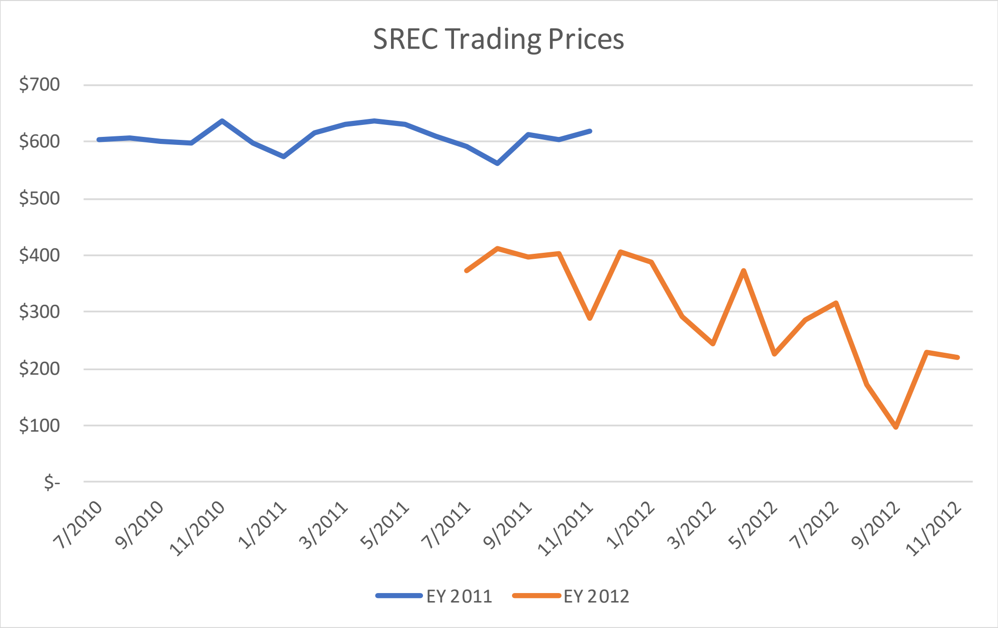
Note: December 2011 installations omitted as an outlier (124 MW).

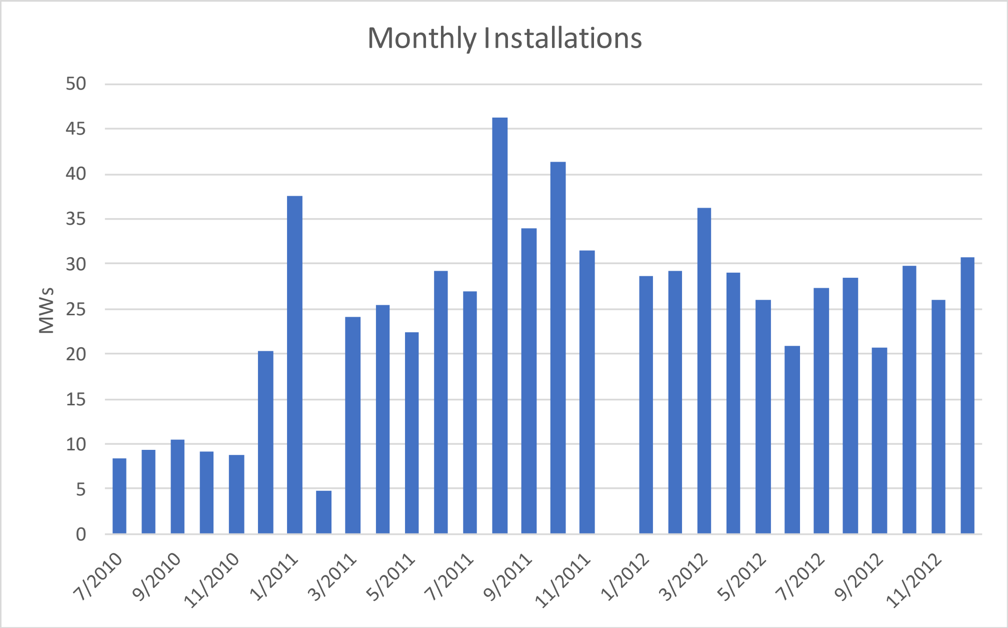
Source: Clean Energy Program.

CADMUS | Sustainable Energy Advantage, LLC

2012-2014

- **Issue 1:** 2011-2012 supply spike → SREC price drop, growth tempered





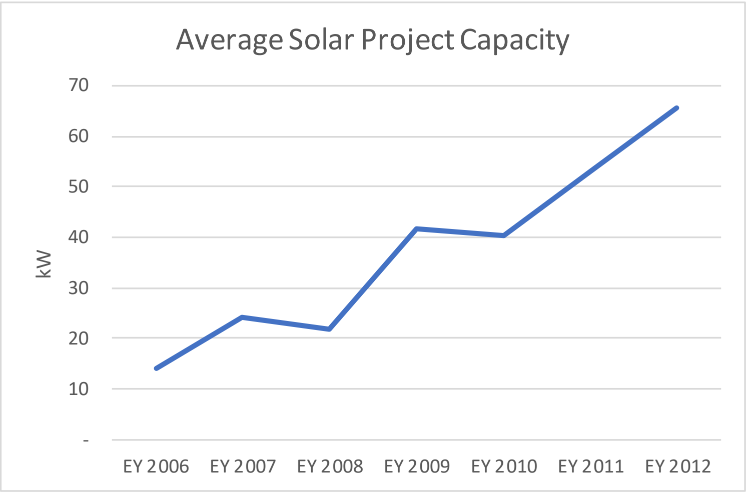
Note: December 2011 installations omitted as an outlier (124 MW).

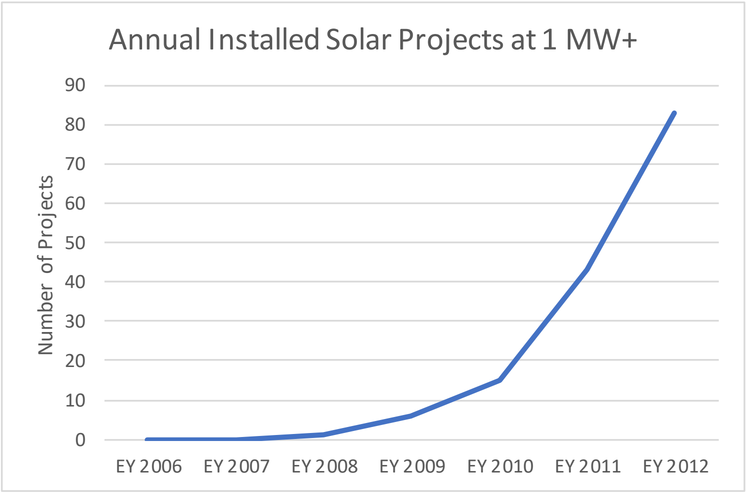
Source: Clean Energy Program.

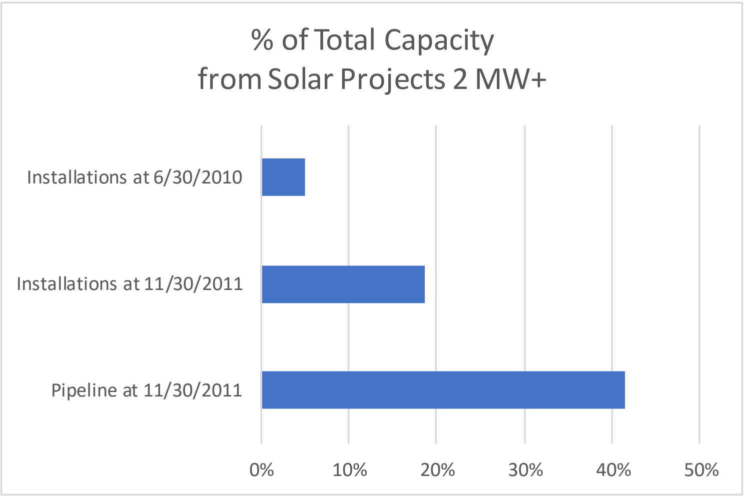
CADMUS | Sustainable Energy Advantage, LLC

2012-2014

- **Issue 2:** Increasingly large greenfield projects







Source: Clean Energy Program.

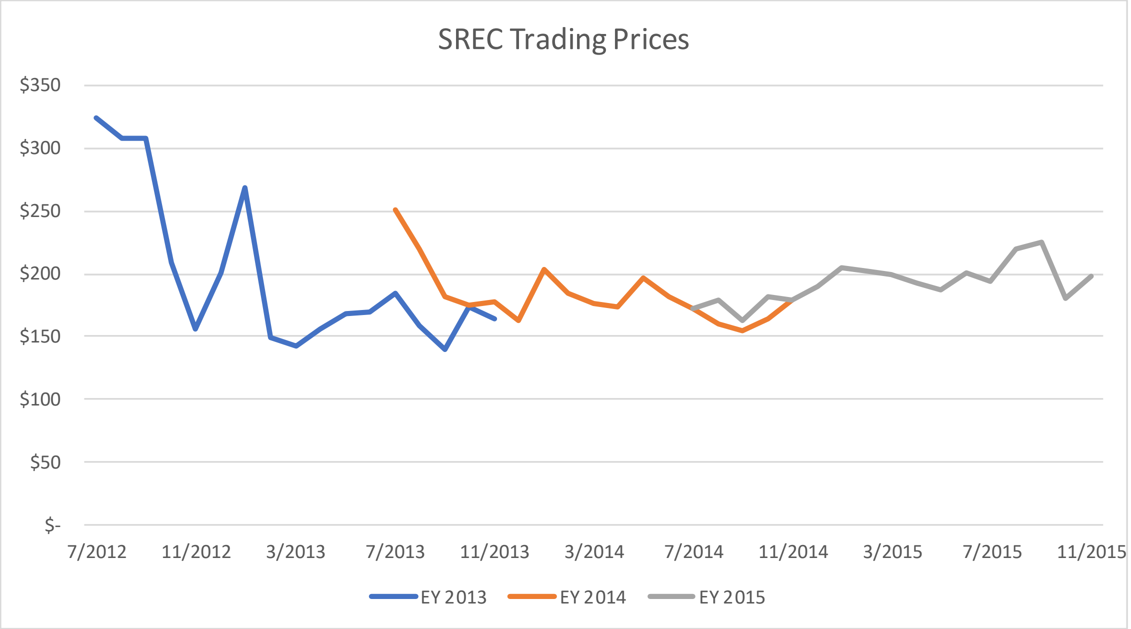
CADMUS | Sustainable Energy Advantage, LLC

2012-2014

- **Issues**
  - Supply spike (and boom-bust cycle)
  - Increasingly large greenfield projects
- **Legislation and regulation**
  - Solar Act of 2012
  - BPU investigation to mitigate solar development volatility
  - BPU Orders, Subsection reviews for grid-scale projects
- **Key changes**
  - SREC eligibility → generation year + four years
  - Solar Carve-Out obligation front-end loaded
  - Reduced SACP
  - Grid supply projects must get Board approval (Subsections q-t)

2012-2014

- SREC Prices Stabilize

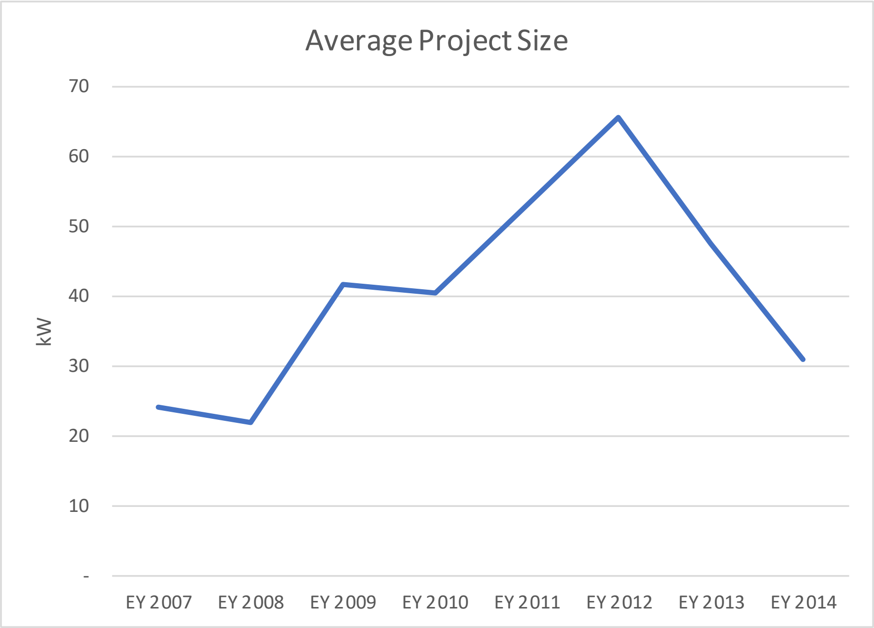


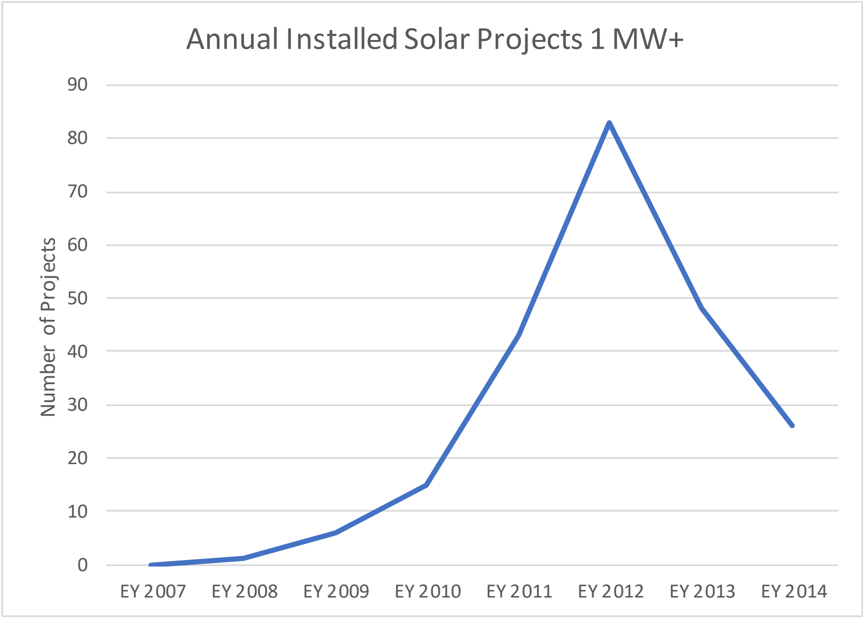
Source: Clean Energy Program.

CADMUS | Sustainable Energy Advantage, LLC

2012-2014

- Installation of large projects rationalized





Source: Clean Energy Program.

2018-2019: Solar Transition

- **Issues**
  - Increasing need to address climate change → significant investment and support for clean energy
- **Legislation and regulation**
  - Executive Order #28 → 2019 Energy Master Plan
  - Clean Energy Act (P.L. 2018, c. 17)
  - Stakeholder process to address Subsection (r) projects
  - BPU rulemaking and regulations implementing the Clean Energy Act
- **Key changes**
  - Blueprint toward 100% clean energy by 2050
  - Close the existing SREC Program, modify or replace
  - Accelerate Solar Carve-Out in near years
  - Reduce solar project qualification life from 15 years to 10 years

New Jersey Solar Snapshot

- **2,800 MW** solar installed
- **2.7m MWh** of clean energy in last 12 months
- **#7** market in US 2018
- **>6,400** solar jobs
- **>$9 billion** invested

Sources: The Solar Foundation; SEIA.

CADMUS | Sustainable Energy Advantage, LLC

Thank You

State of New Jersey
Board of Public Utilities

CADMUS

Sustainable Energy Advantage, LLC

NJ Solar Transition

Objectives & Option Evaluation Criteria: Identification & Prioritization

STAKEHOLDER WORKSHOP #1, MAY 2, 2019

PLENARY SESSION #1

BOB GRACE, SUSTAINABLE ENERGY ADVANTAGE, LLC

EMILY CHESSIN, CADMUS

Disclaimer

The information and views in this presentation do not necessarily represent the views of the New Jersey Board of Public Utilities, its Commissioners, its Staff or the State of New Jersey. This presentation is provided by the Consulting Team (Cadmus and Sustainable Energy Advantage) for discussion purposes only. It does not provide a legal interpretation of any New Jersey statutes, regulations, or policies, nor should it be taken as an indication or direction of any future decisions by the Board of Public Utilities.

NJ Transition Principles

BPU's SREC Transition Principles articulated in Dec. 2018 Staff Straw Proposal and April 2019 Notice

- Provide maximum benefit to ratepayers at the lowest cost
- Support the continued growth of the solar industry
- Ensure that prior investments retain value
- Meet the Governor's commitment of 50% Class I Renewable Energy Certificates ("RECs") by 2030 and 100% clean energy by 2050
- Provide insight and information to stakeholders through a transparent process for developing the Solar Transition and Successor Program
- Comply fully with the statute, including the implications of the cost cap
- Provide disclosure and notification to developers that certain projects may not be guaranteed participation in the current SREC program, and continue updates on market conditions via the New Jersey Clean Energy Program ("NJCEP") SREC Registration Program ("SRP") Solar Activity Reports

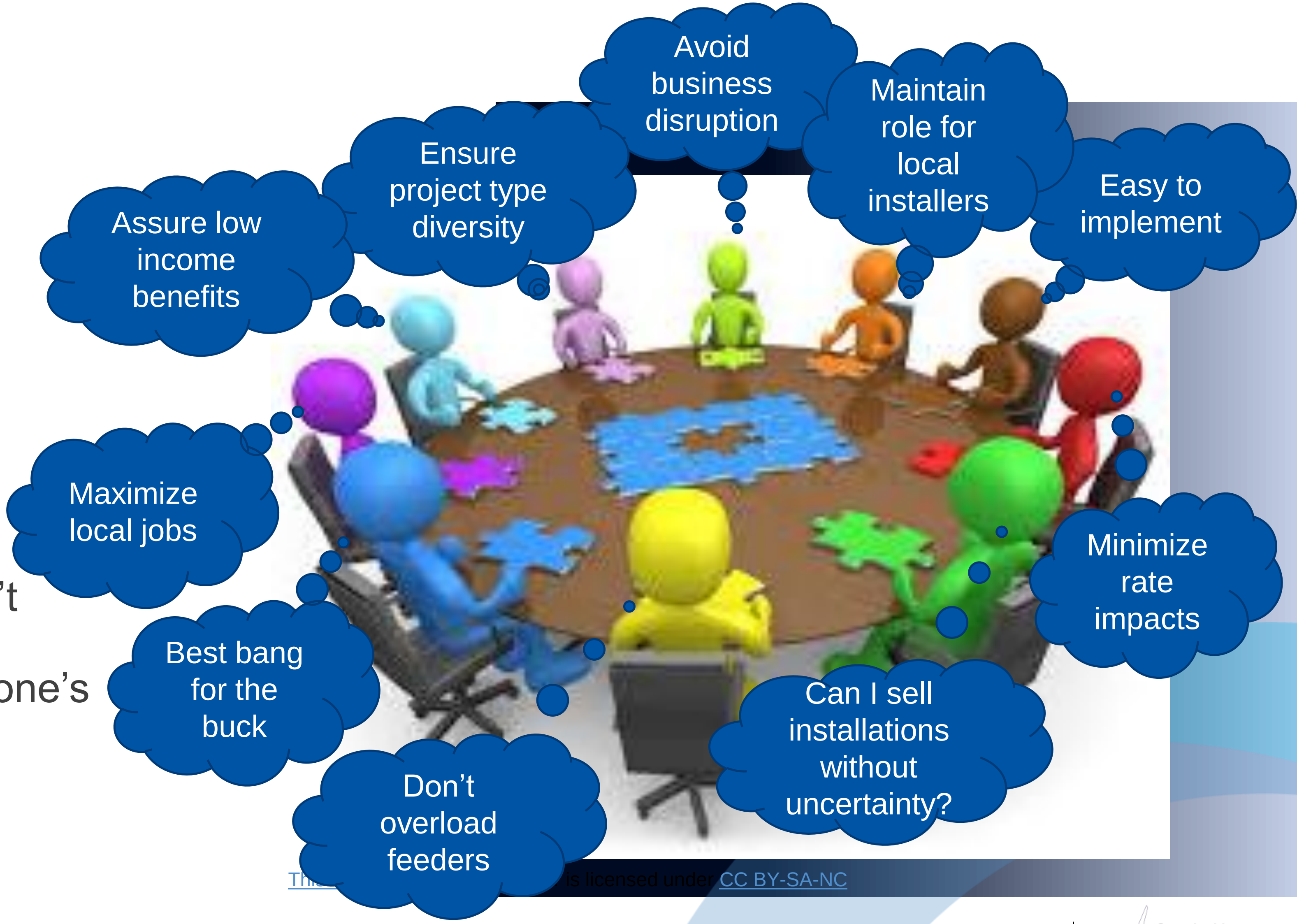
Even within the lines of the BPU objectives… Stakeholders each have interests & objectives

For example…

- Commercial interest
- Institutional objectives & constraints
- Policy objectives

- Often conflict
  - Maximizing one stakeholder's objectives can assure others' aren't met
  - So… can't meet (maximize) everyone's needs

How to find the viable solution space?

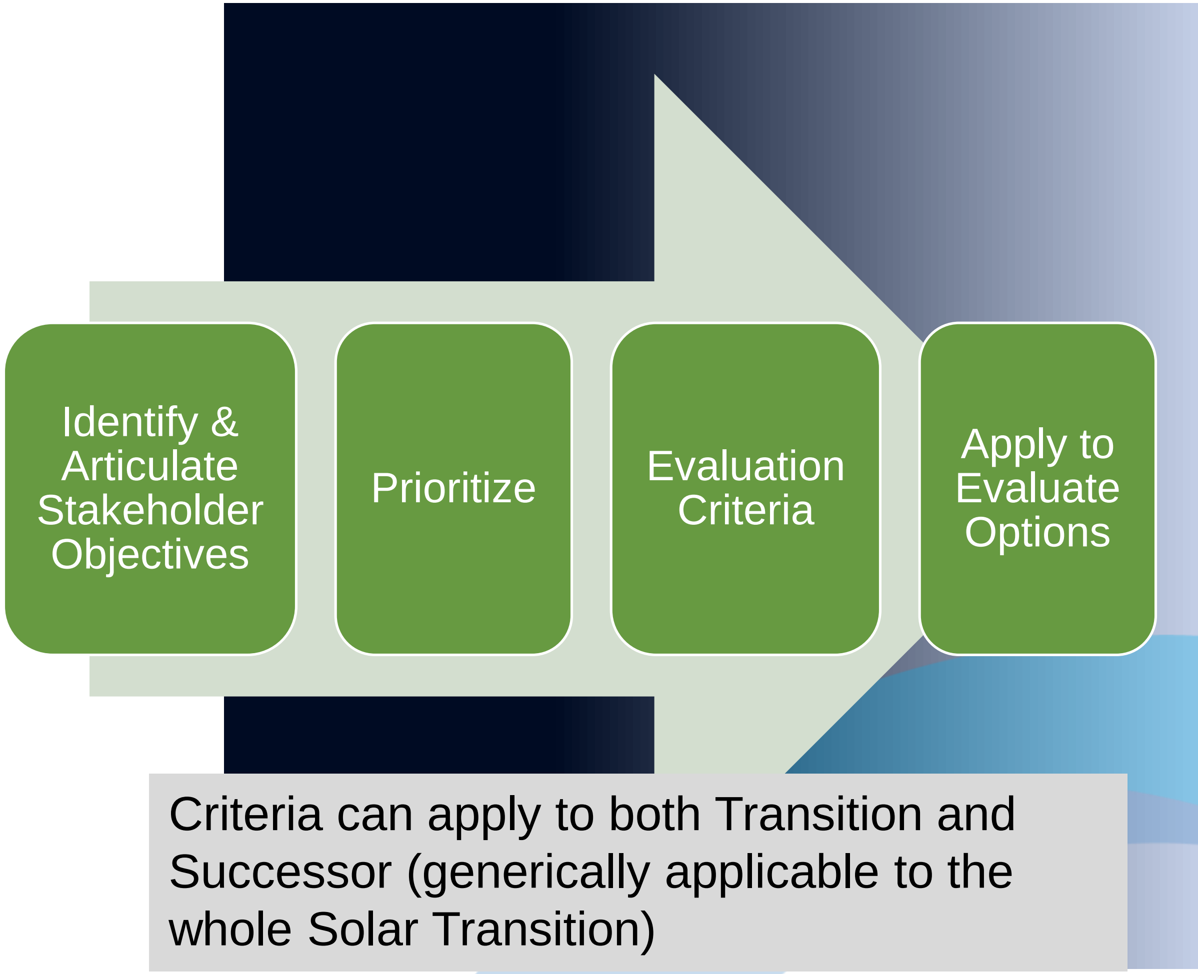


CADMUS | Sustainable Energy Advantage, LLC

Developing Policy Option Evaluation Criteria

Identify conflicting commercial, institutional and policy objectives to distill prioritized criteria and explicitly identify those criteria necessitating tradeoffs

- Solicit input from stakeholders early in process
  - Seek buy-in on relevant objectives, priorities
  - Articulate conflicting objectives necessitating tradeoffs
  - Develop detailed evaluation (decision-making) criteria
    - Does proposed approach meet objectives? Does it conflict? Which is more important?
- Benefits:
  - Facilitates productive & efficient process
  - Helps avoid false equivalencies between competing objectives which may not merit equal weight
  - Supports stakeholder acknowledgement of incompatible needs of others, if not consensus
  - Creates transparent measuring stick for considering policy options throughout the process
  - Allows stakeholders to more readily visualize the viable solution spaces



Beyond NJBPU Transition Principles: Stakeholder Objectives & Interests ➔ Evaluation Criteria to Help Define & Select Policy Paths

Illustrative examples

1. **Transparency**
   With respect to total subsidy or policy support
2. **Minimize Market Disruption**
   Smoothest transition to minimize high transition costs
3. **Minimize Ratepayer Impact**
4. **Ensure Cost Effectiveness**
   a) Incentives set through competition
   b) Set incentive only high enough to allow efficient long-term market participation
   c) Prioritize most cost-effective installation types
5. **Encourage Supplier Diversity**
   e.g., large, small, in-state, out-of-state, varying sizes, etc.…
6. **Encourage Participant Diversity**
   a) Low-income, renters, parties without viable roofs, etc.
   b) Energy justice and solar democratization
7. **Encourage Installation Type Diversity**
8. **Minimize Complexity**
   Establish a policy that is administratively simple, transparent and verifiable
9. **Maximize Solar PV Installation Growth**
   a) Ensure targets are met
   b) Supports increased investment in distributed solar
10. **Create Permanent In-State Jobs**
11. **Fairness to Those Who Have made Past Commitments**
    a) Revenue stability
    b) Guarantee participation to projects with long gestation period
12. **Support Steady Industry Growth**
    - Encourage long term market stability
13. **Support Market-Based Approaches**
    - Favor "open" market incentives vs. scheduled procurements
14. **Transition to Sustainable Market**
    a) Move away from incentive-dependent market
    b) Stimulate self-sustaining solar market beyond Successor
15. **Encourage Low-Cost Financing**
    a) Minimize financing risk
    b) Enhance/enable ability to attract low-cost finance
    c) Enable use of more long-term debt
16. **Prioritize Competitive Market Structures**
    - Create a market that is compatible with competition in wholesale and retail energy markets
17. **Protect Low-Income Ratepayers**
    - Avoid shift to fixed charges that affect low-income customers
18. **Minimize Cost-Shifting Between Participants and Non-Participants**
    a) Provide fair cost recovery to T&D utilities
    b) Allocate costs equitably among ratepayers
19. **Focus on Feasible Implementation**
    - Establish a policy that is viable within existing political / legal framework
20. **Support PV Location Where Most Needed**
    a) Encourage systems to promote solar where it has most system reliability + locational benefits
    b) Compensation based on location and grid value

Breakout Group #1

Overview & Instructions

- Breakout Group based on the letter on your nametag ➔ Please proceed to your designated location (starting promptly in 10 minutes)
- Handout = draft of diverse set of potential objectives and interests
  - (borrowed, courtesy of MA Net Metering & Solar Task Force process)
- Take 5 min to review the example objectives:
  - Circle keepers, strike 'inapplicable', modify, list other interests important (to you, to process, etc.)
- Facilitated discussion: As a group, provide input on list of objectives for the NJ Transition
  - What objectives would you maintain and include? Do they require any changes or edits?
  - What objectives would you remove?
  - What objectives are missing?
- Then… Each group will prioritize most important objectives
  - Identify your top six objectives
  - See what rises to the top!

CADMUS | Sustainable Energy Advantage, LLC

Report Back

Major take-aways from 4 Breakout Groups

- To be summarized by facilitators over lunch break

CADMUS | Sustainable Energy Advantage, LLC

Thank You

CADMUS | Sustainable Energy Advantage, LLC

NJ SOLAR TRANSITION

Draft Preliminary Findings: Impact of Existing SREC Program, Implications for Transition

TOM MICHELMAN | SENIOR DIRECTOR &
JIM KENNERLY | SENIOR CONSULTANT
SUSTAINABLE ENERGY ADVANTAGE, LLC

Disclaimer

The information and views in this presentation do not necessarily represent the views of the New Jersey Board of Public Utilities, its Commissioners, its Staff or the State of New Jersey. This presentation is provided by the Consulting Team (Cadmus and Sustainable Energy Advantage) for discussion purposes only. It does not provide a legal interpretation of any New Jersey statutes, regulations, or policies, nor should it be taken as an indication or direction of any future decisions by the Board of Public Utilities.

Presentation Outline of Draft Preliminary Analysis

- Introduction / Overview
- Historical SREC Prices
- Incremental SREC Supply Forecast
- Legacy SREC Supply & Demand
- Forecast of Clean Energy Act Class I Cost Cap Headroom
- Cost Cap Base Case Development
- Cost Cap Outlook & Results
- Illustrative Example of Capacity Under Cost Cap
- Appendix A - Incremental SREC Supply Forecast: Interim Calculations
- Appendix B - Cost Cap Base Case Development: Interim Calculations

Introduction/Purpose of Analysis

- The Clean Energy Act (P.L. 2018, Ch. 17) requires, in pertinent part:
  - *"(T)he cost to customers of the Class I…requirement imposed pursuant to this subsection* ***shall not exceed nine percent of the total paid for electricity by all customers in the State for energy year 2019, energy year 2020, and energy year 2021, respectively, and shall not exceed seven percent of the total paid for electricity by all customers in the State in any energy year thereafter (emphasis added)****. In calculating the cost to customers of the Class I renewable energy requirement imposed pursuant to this subsection,* ***the board shall not include the costs of the offshore wind energy certificate program (emphasis added)***
- What this analysis does
  - Forecasts the "total paid for electricity" in Energy Year 2019 through 2054 (the final year of commercial operation for all PV projects coming online through 2030) – including the incremental cost of clean energy programs
  - Forecasts Cost Caps for Class I projects (excluding OSW) based on the "total paid for electricity"
  - Determines the net dollar value remaining for the NJ Solar Transition (which is used here to refer to a potential Transition Incentive, as well as the statutory Successor program) after accounting for Class I programs under Cap (referred to hereafter as "headroom")
- What this analysis does not do
  - Answer (or propose answers for) questions related to the feasibility/legality of shifting unused/unspent funds under the Cost Caps to future years, or means to calculate Cost Caps as a measure of net benefits **OR**
  - Propose what the value of any NJ Solar Transition project incentives should be

Phase I: Developing Initial Budget for Transition Incentive and Successor Program (Steps 1-3 are Today's Focus)

Step 1: Develop Cost Cap Model

- Calculate high/base/low total future electricity cost estimates for NJ compliance entities through 2030
- Purpose: develop available budgets for solar programs/other non-OREC Class I through 2030

Step 2: Model Legacy SREC Program

- Model high/base/low future legacy program SREC prices based on SREC supply and demand
- Assume that legacy program continues until 5.1% is "attained"
- Purpose: Develop baseline estimate of largest driver of "business as usual" Class I REC costs

Step 3: Develop Budget Estimates

- Calculate annual Class I and legacy SREC program costs based on estimated / forecasted prices, multiplied by share of load
- Subtract total Class I and legacy SREC program costs from total budget
- Purpose: to calculate total available budget for solar transition under 9% and 7% cost caps through 2030

Phase II & III: Developing "Solar Transition" Incentive and Capacity Parameters

Start Step 4 Today. Implement Steps 5 & 6 to analyze Transition Incentive & Successor Program

Step 4: Solicit/Research Solar Cost and Performance Data

- Research high/medium/low capital, operating and finance costs for key system types (residential, small and large C&I, and community solar). Leverage select data on NJ and regional costs from industry, national laboratories and Team original research/analysis
- Solicit information from NJ market participants regarding technical potential of given market sectors
- Purpose: Develop reliable, independent cost estimates for inputs to NJ cost of entry model

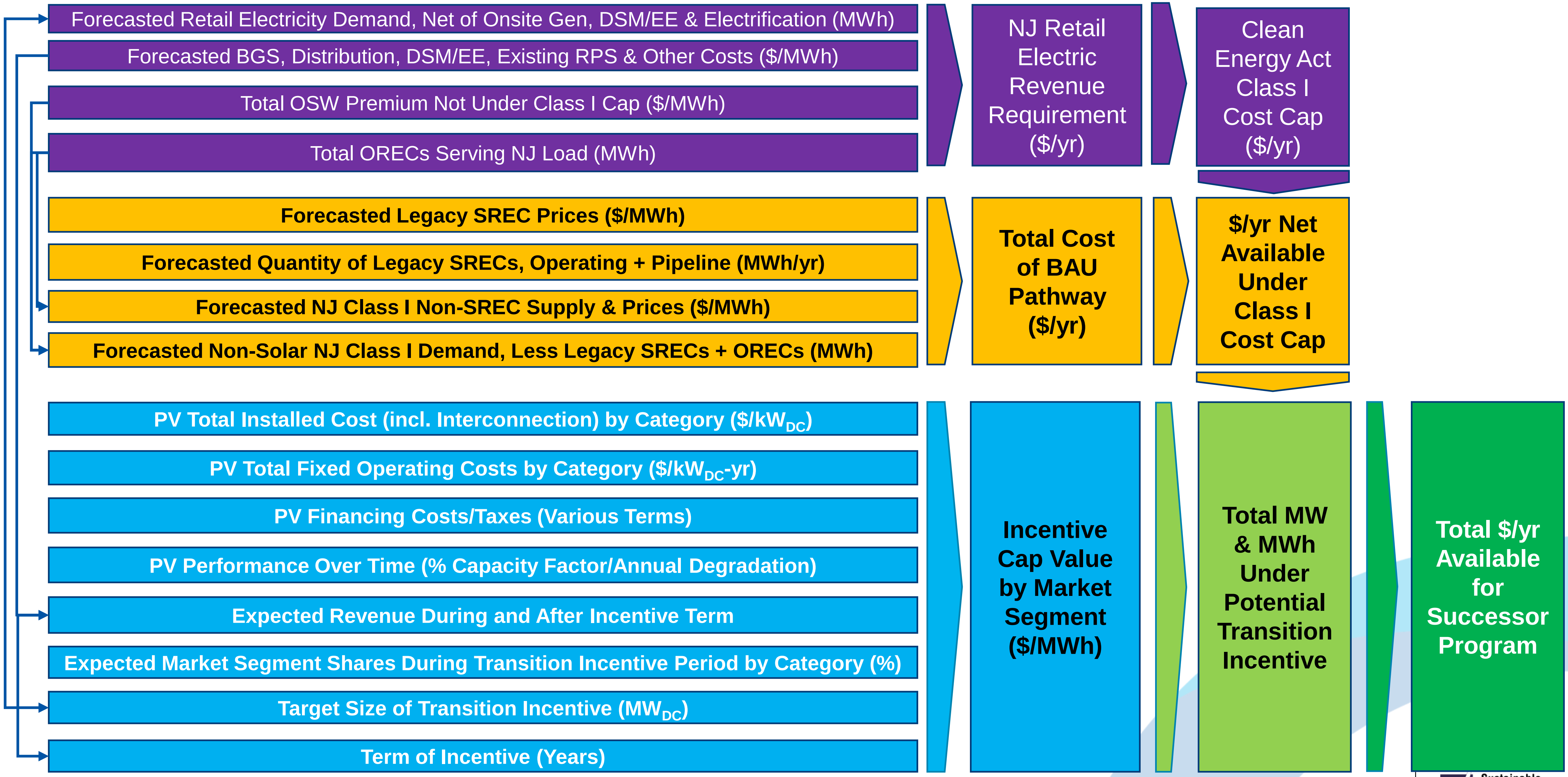
Step 5: Develop Incentive Requirement Scenarios for Transition Incentive Variants

- Utilize selected incentive variants (e.g., length of program, h/b/l costs to select appropriate assumed financing costs (based on perceived market risk)
- Develop expected deployment pathways based on market shares and technical potential
- Purpose: Critical inputs to determining incentive cap and MW target amounts

Step 6: Calculate Incentive Requirements and MW Targets by Transition "Policy Pathway"

- Calculate incentive requirements utilizing Cost of entry models
- Determine range of potential MW targets based on available budget under cost cap
- Purpose: To illustrate how different policy pathways could result in different amounts and mixes of solar development relative to the cost caps

NJ Phase I Solar Transition Analysis Overview

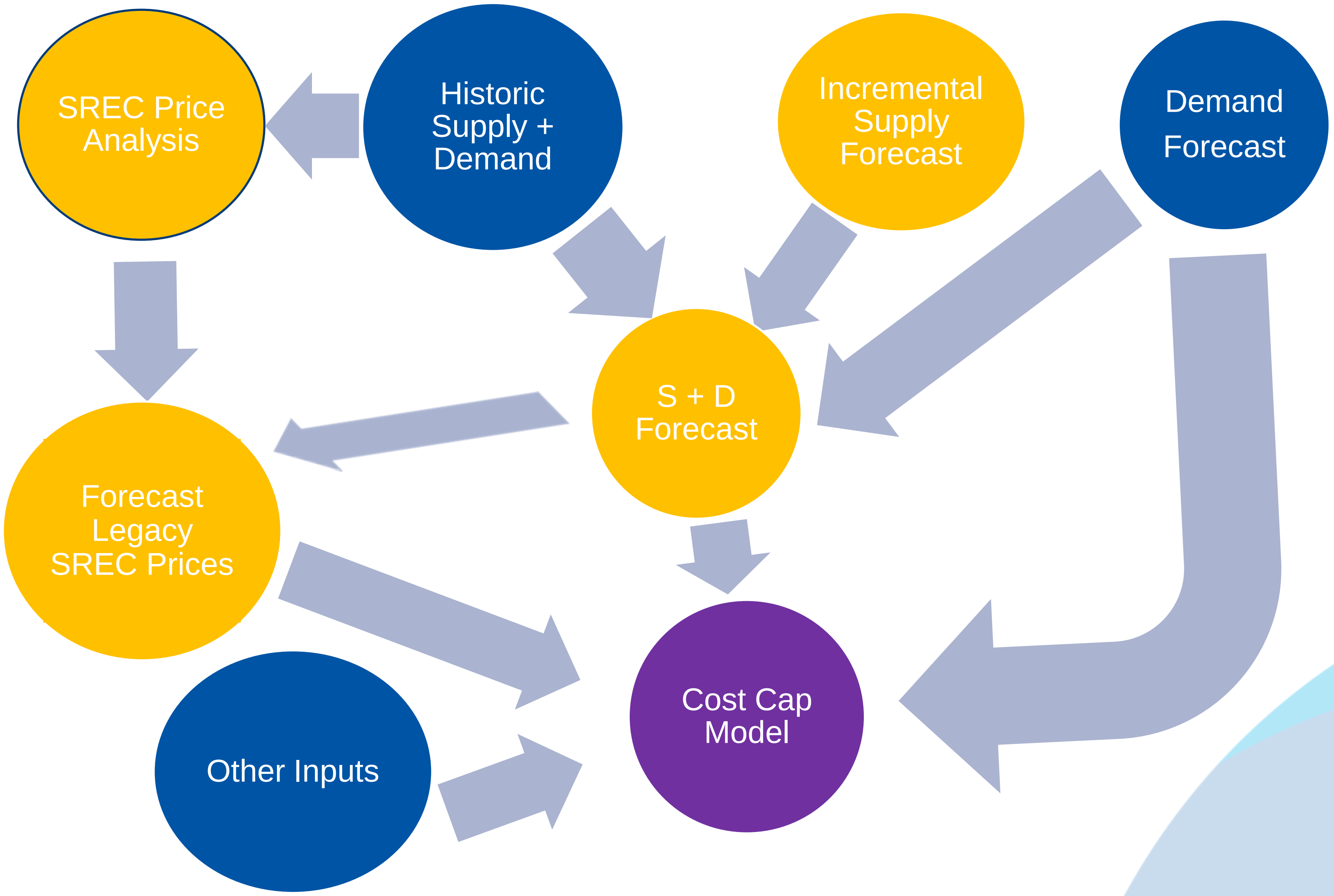


CADMUS

Sustainable Energy Advantage, LLC

Modeling Inputs for the Cost Cap

SREC Focused



Historical SREC Prices

Analysis & Forecast

SREC Price Drivers

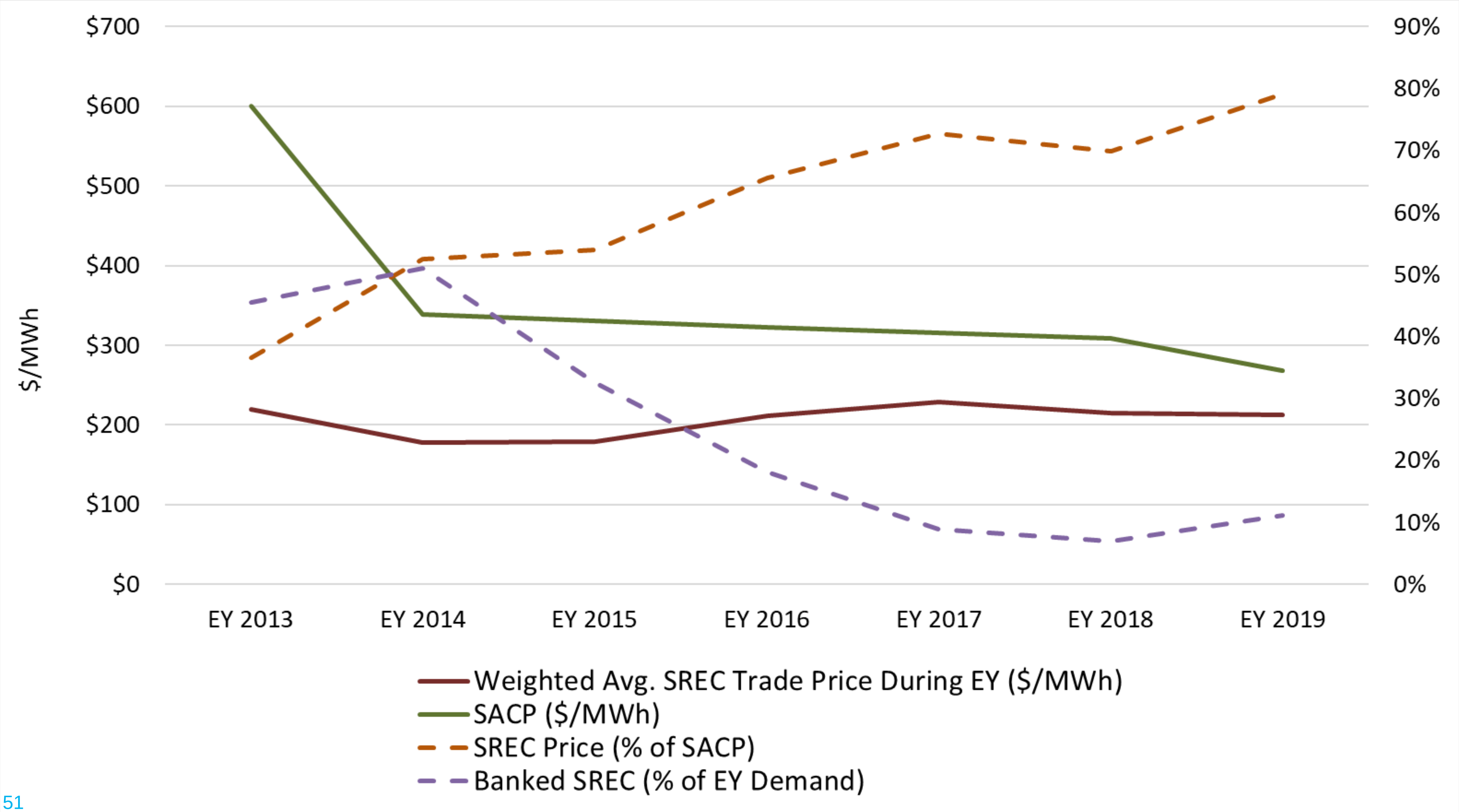
Historic & Future

- Historic
  - Demand
    - Total Retail Load
    - RPS %
    - % Load Exempt
  - Supply
    - MWs Currently Installed
    - Anticipated MWs Installed
    - Capacity Factors
    - Banking Behavior
  - Price Bounds
    - SACP – High
    - Class I – Low
  - Market Belief in Exogenous Intervention

- Future
  - Demand
    - Total Retail Load
    - RPS %
    - % Load Exempt (*time limited*)
  - Supply
    - MWs Currently Installed
    - Anticipated MWs Installed (*fast decreasing*)
    - Capacity Factors
    - Banking Behavior
  - Price Bounds
    - SACP – High
    - Class I – Low
  - Market Belief in Exogenous Intervention

CADMUS | Sustainable Energy Advantage, LLC

Relationship of Banking Volume to SREC Prices – Yearly



CADMUS

Sustainable Energy Advantage, LLC

Statistical Relationship of Banked SRECs & SREC Prices

It's Strongly Negative

Correlation Coefficients of	Total SRECs Banked (MWh)	Weighted Avg. SREC Trade Price During EY ($/MWh)	SREC Price (% of SACP)	SREC Price (% of SACP EY+1)	Banked SREC (% of EY Demand)
Total SRECs Banked (MWh)	100%				
Weighted Avg. SREC Trade Price During EY ($/MWh)	-93%	100%			
SREC Price (% of SACP)	-35%	33%	100%		
SREC Price (% of SACP EY+1)	-81%	77%	73%	100%	
Banked SREC (% of EY Demand)	70%	-60%	-88%	-85%	100%

Regression Statistics: Dependent Variable = Avg. SREC Price as % of SACP (n=7)	Coefficients	Standard Error	t Stat	Interpretation
Intercept	0.792	0.050	15.695	If Banking is at 0%, then predicted Avg. SREC Price will be 79.2% of SACP
Banked SRECs (as % of EY Demand)	-0.712	0.168	-4.232	For each 1% increase in banked SRECs (as % of EY Demand), Avg. SREC Prices will drop by 0.712% of the SACP level

Regression used as basis of SREC Price Forecasts, with "in practice" model capping SREC prices: Ceiling @ SACP; Floor @ Assumed Class I REC Price (i.e., $6)

Incremental SREC Supply Forecast

Incremental Legacy SREC Supply Forecast

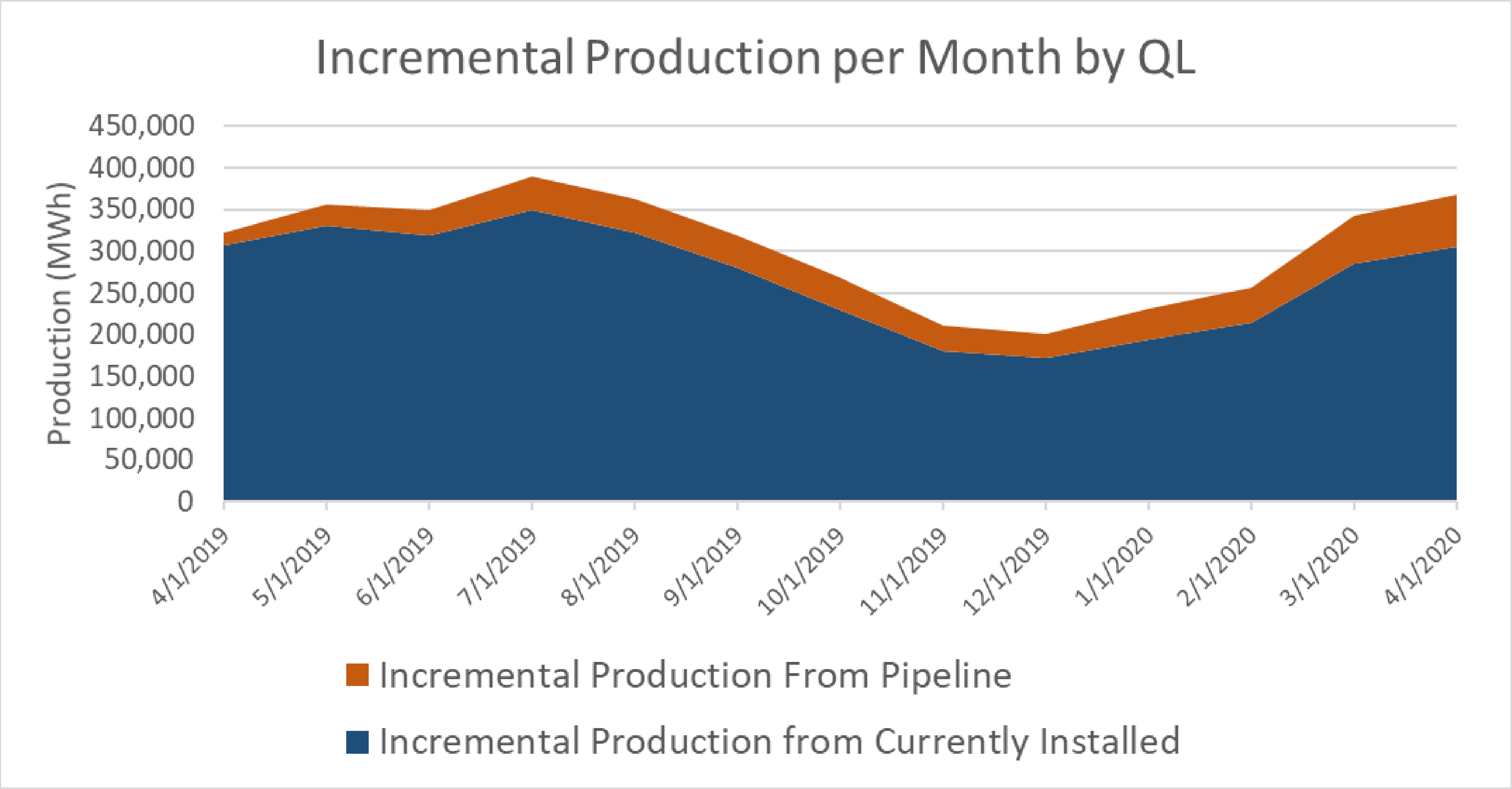
Intermediate Steps to Forecasting SREC Supply & Prices

- Steps include:
  - Cohort analysis
    - Project pipeline scrub rate
    - Project pipeline SRP Completion date
  - Separate assumptions and analysis
    - Young projects; not near their expiration date
    - Older projects approaching expiration date
    - By project size
    - For projects with unusual delays w/ SRP milestones
    - Projects not in the pipeline yet (mostly <25 kW projects)
    - Assignment of assumed CFs by Size and Project Type
      - And QCing assigned CFs
      - CFs by month
    - Qualification Life in Years (i.e., 10 or 15)
    - When 5.1% milestone is reached
      - And projects that qualify after the 5.1% milestone

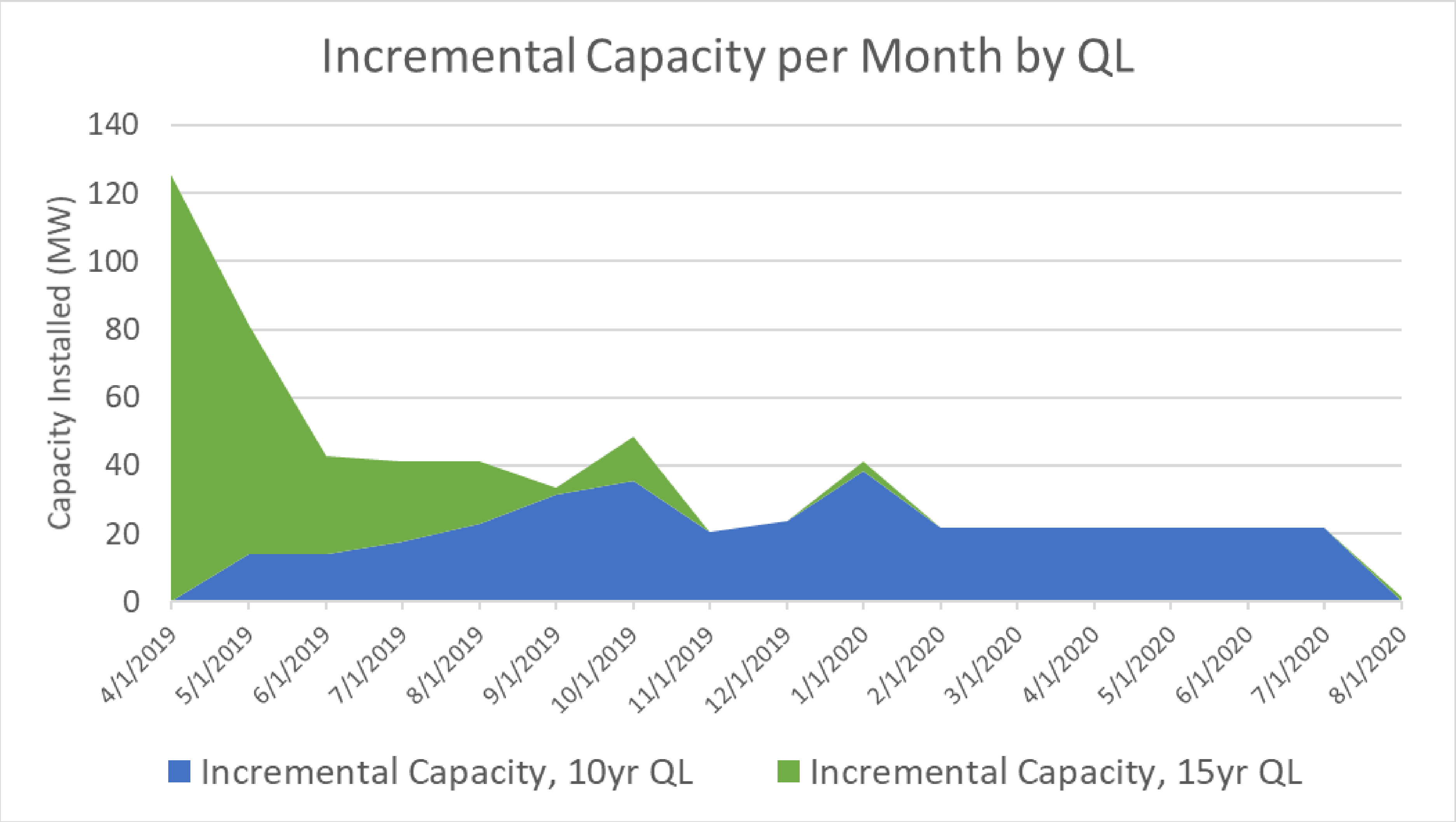
See Appendix A for more details

CADMUS | Sustainable Energy Advantage, LLC

Incremental Supply Forecast – Preliminary Results



Incremental Supply Forecast – Preliminary Results



CADMUS | Sustainable Energy Advantage, LLC

Legacy SREC Supply & Demand

Dynamics & Forecast

Legacy SREC Load Exemptions

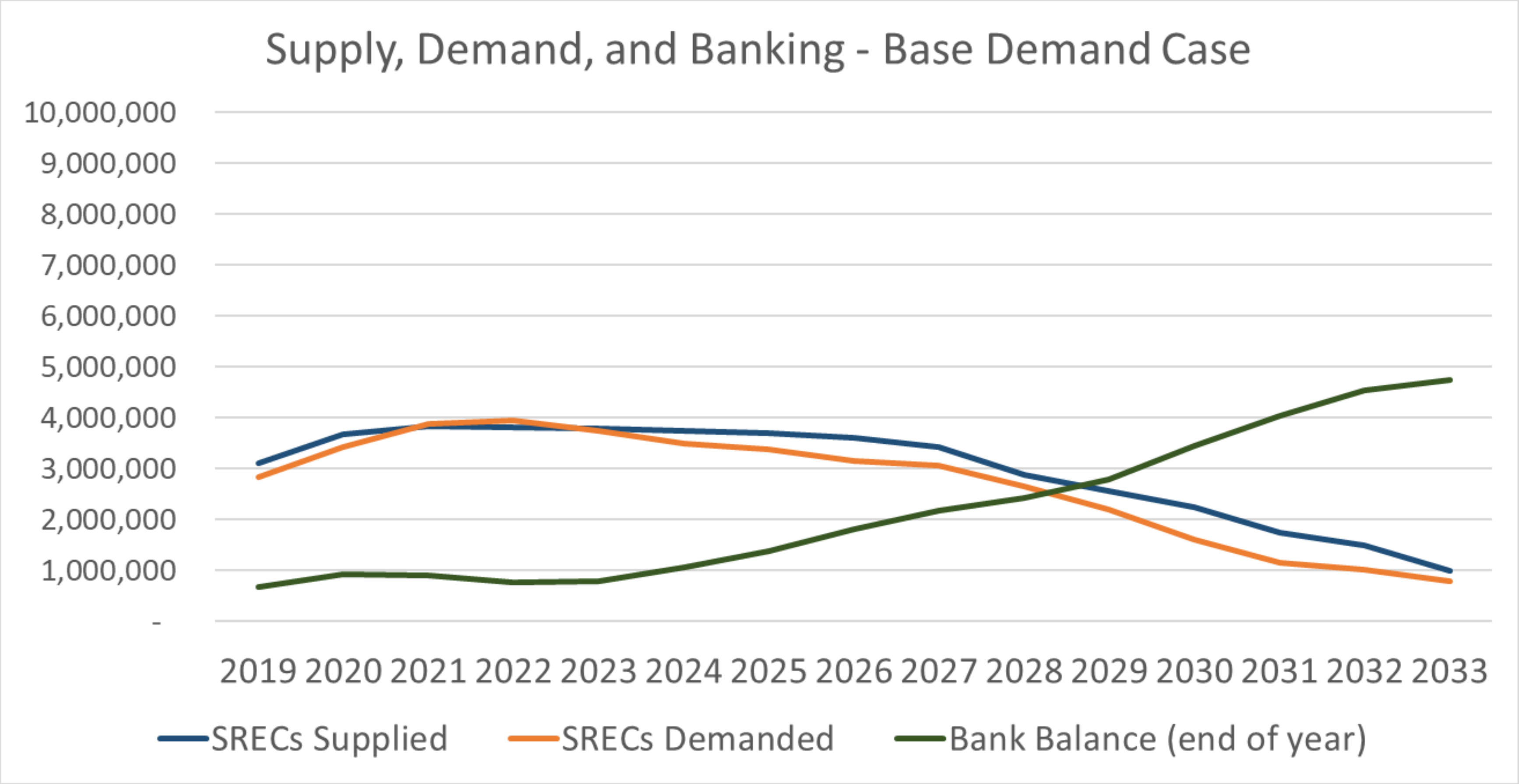
- Per the December 28, 2018 BPU Order in two BGS Dockets, BGS providers are partially exempt from increases in Solar RPS requirements as included in the Energy Act of 2018
  - Top table to the right displays the default general requirements and the lower requirements for BGS providers w/ exempt load through EY 2021
- We assume given the three-year laddering of BGS procurement that the exempt load of BGS providers decreases by 1/3 each year and is 0% starting EY 2022 for the remainder of the program
  - Lower table to the right displays inputs and the final row results of the average in practice SREC requirements taking into account BGS providers with exempt load being allocated to the following two energy years in equal proportions

Dates	Requirement Type	Solar	Class I	Class II
6/1/2018-5/31/2019	General Requirement	4.30%	14.175%	2.50%
	Req't for BGS Providers w/Exempt Load	3.29%	14.175%	2.50%
6/1/2019-12/31/2019	General Requirement	4.90%	16.029%	2.50%
	Req't for BGS Providers w/Exempt Load	3.38%	16.029%	2.50%
1/1/2020-5/31/2020	General Requirement	4.90%	21.00%	2.50%
	Req't for BGS Providers w/Exempt Load	3.38%	21.00%	2.50%
6/1/2020-5/31/2021	General Requirement	5.10%	21.00%	2.50%
	Req't for BGS Providers w/Exempt Load	3.47%	21.00%	2.50%
6/1/2021-5/31/2022	General Requirement	5.10%	21.00%	2.50%

Energy Year	EY 2019	EY 2020	EY 2021	EY 2022	EY 2023
Statutory Solar Req't	4.30%	4.90%	5.10%	5.10%	5.10%
Req't for BGS Providers w/Exempt Load	3.29%	3.38%	3.47%	5.10%	5.10%
% Share of BGS Using Exemptions	100%	66.67%	33.33%	0%	0%
% Share of BGS of Retail Load	52%	52%	52%	52%	52%
% Share of BGS Not Exempt	0%	33.33%	66.67%	100%	100%
In practice avg. SREC Req't, taking into exempt load	3.77%	4.65%	5.35%	5.51%	5.24%

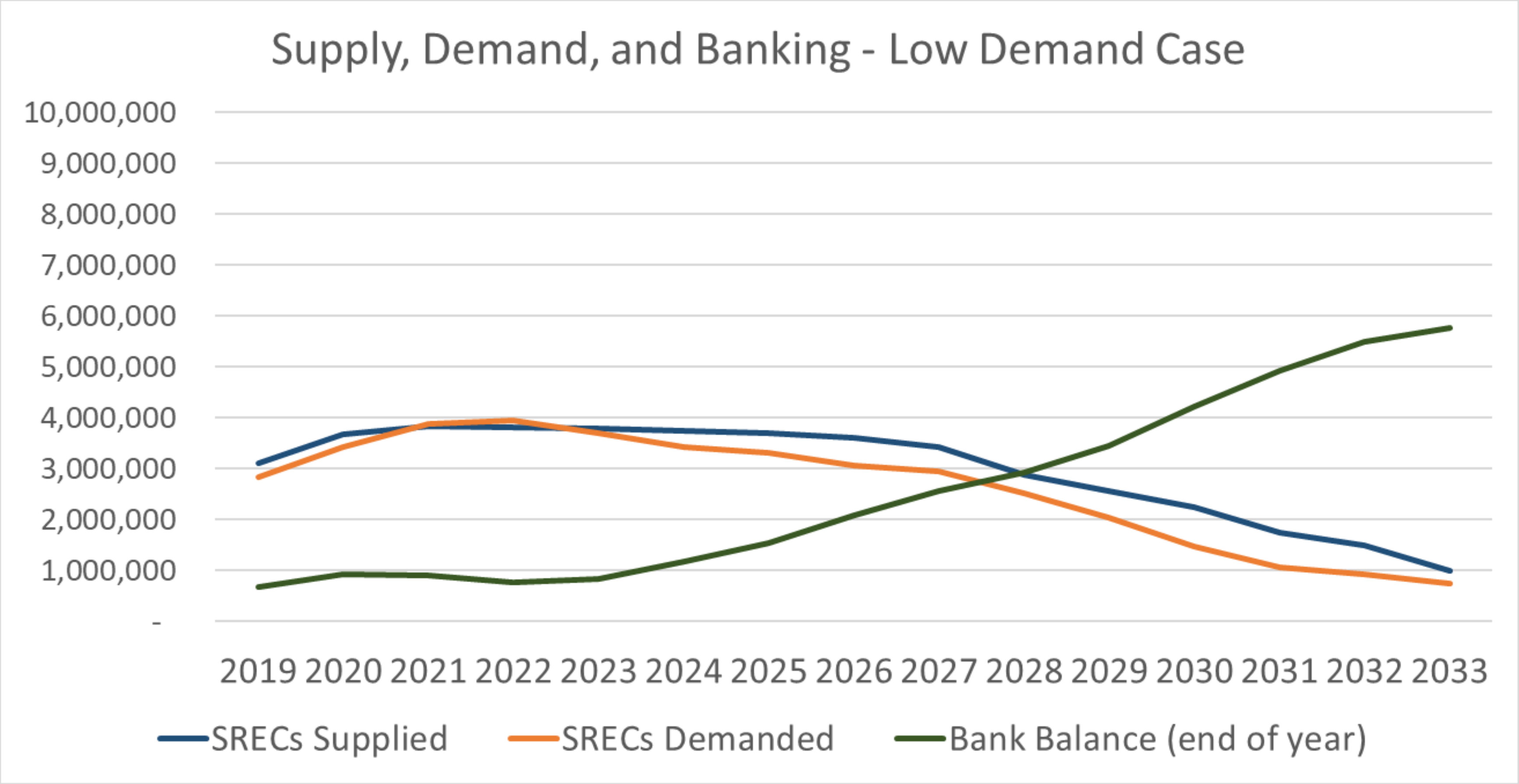
Preliminary Forecasted Supply / Demand Dynamics

Supply / Demand / Banked Balances



Preliminary Forecasted Supply / Demand Dynamics

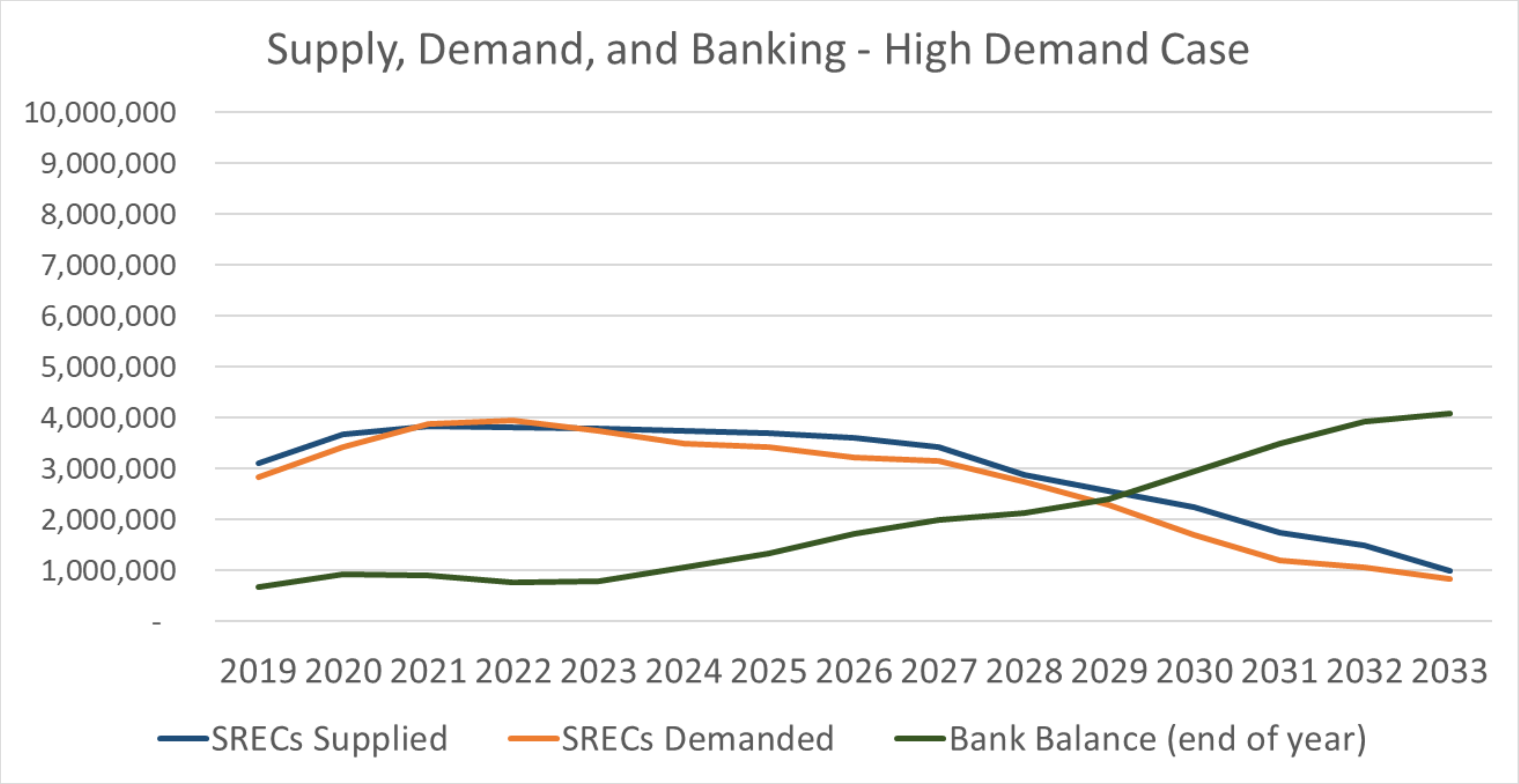
Supply / Demand / Banked Balances



CADMUS | Sustainable Energy Advantage, LLC

Preliminary Forecasted Supply / Demand Dynamics

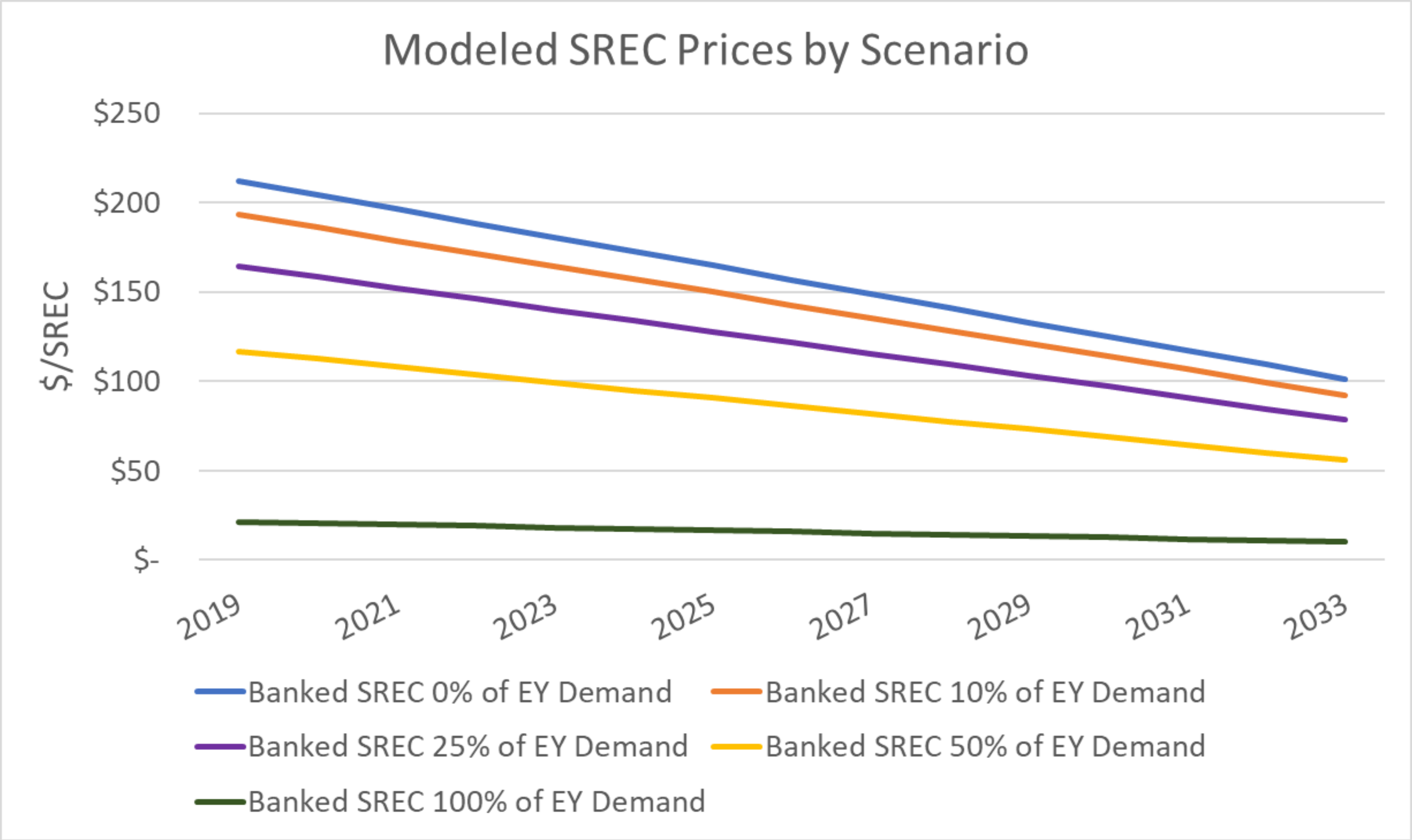
Supply / Demand / Banked Balances



CADMUS | Sustainable Energy Advantage, LLC

Supply / Demand Preliminary Forecast

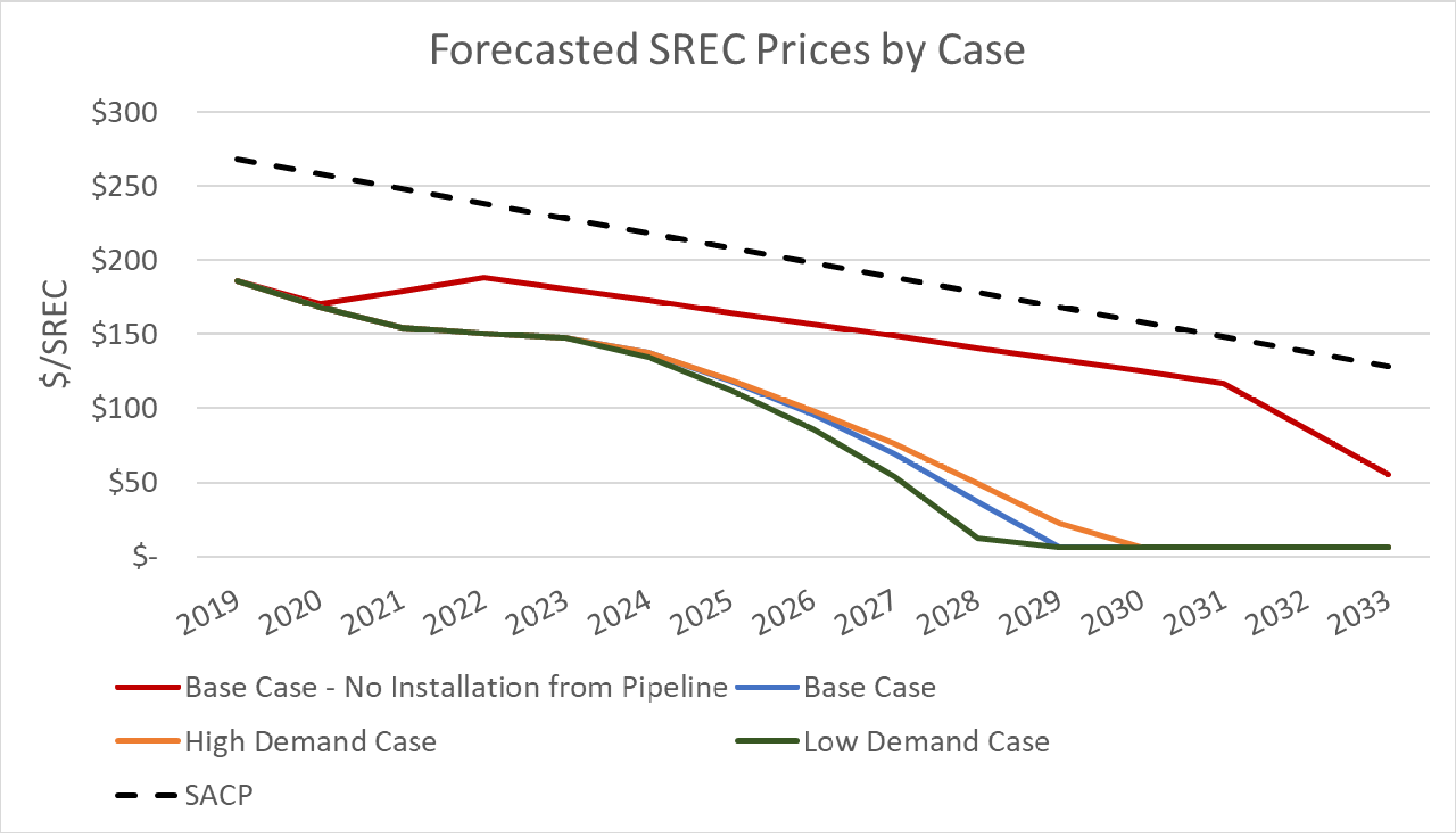
Price Model Outputs by Scenario



CADMUS | Sustainable Energy Advantage, LLC

Supply / Demand Preliminary Forecast

Price Forecasts



CADMUS

Sustainable Energy Advantage, LLC

Forecast of Clean Energy Act Class I Cost Cap Headroom

CADMUS

Sustainable Energy Advantage, LLC

Roadmap to Calculating Solar Transition Headroom

Forecasted Retail Electricity Demand, Net of Onsite Gen, DSM/EE & Electrification (MWh)

Forecasted BGS, Distribution, DSM/EE, RPS Class I/II, Legacy SREC & Other Costs ($/MWh)

Total OSW & ZEC Premium Not Under Class I Cap ($/MWh)

Total ORECs/ZECs Serving NJ Load (MWh)

NJ Retail Electric Revenue Requirement ($/yr)

Clean Energy Act Class I Cost Cap ($/yr)

Forecasted Legacy SREC Prices ($/MWh)

Forecasted Quantity of Legacy SRECs, Operating + Pipeline (MWh/yr)

Forecasted Non-Solar NJ Class I Demand, Less Legacy SRECs + ORECs (MWh)

Forecasted NJ Class I Non-SREC Supply & Prices ($/MWh)

Total Cost of BAU Pathway ($/yr)

$/yr Net Available Under Class I Cost Cap

Part I: Calculating Clean Energy Act Class I Cost Cap

[Total Forecasted Retail Electric Demand (Net of On-Site Generation, DSM/EE & Electrification) (MWh) × Total Forecasted BGS, Distribution, DSM/EE, RPS Class I/II, SREC & Other Costs ($/MWh)] + [(Total OSW Premium Not Under Class I Cap ($/MWh) / Total ZEC Premium Not Under Cost Cap) × Total ORECs/ZECs Serving NJ Load (MWh)] =

NJ Retail Electric Rev. Req't ($/yr) × Cost Cap %s by Year = **Clean Energy Act Class I Cost Cap by Year**

Part II: Calculating Cost Cap Headroom Available to NJ Solar Transition

[Forecasted Quantity of Retired Legacy SRECs (Operating + Pipeline Up to 5.1%, MWh/yr) × Forecasted Legacy SREC Prices ($/MWh)] + [Forecasted NJ Class I Obligations, Less Legacy SRECs, ORECs & Exempt Load (MWh) × Forecasted NJ Class I Prices ($/MWh)] = **Total Cost of Class I BAU Pathway ($/yr)**

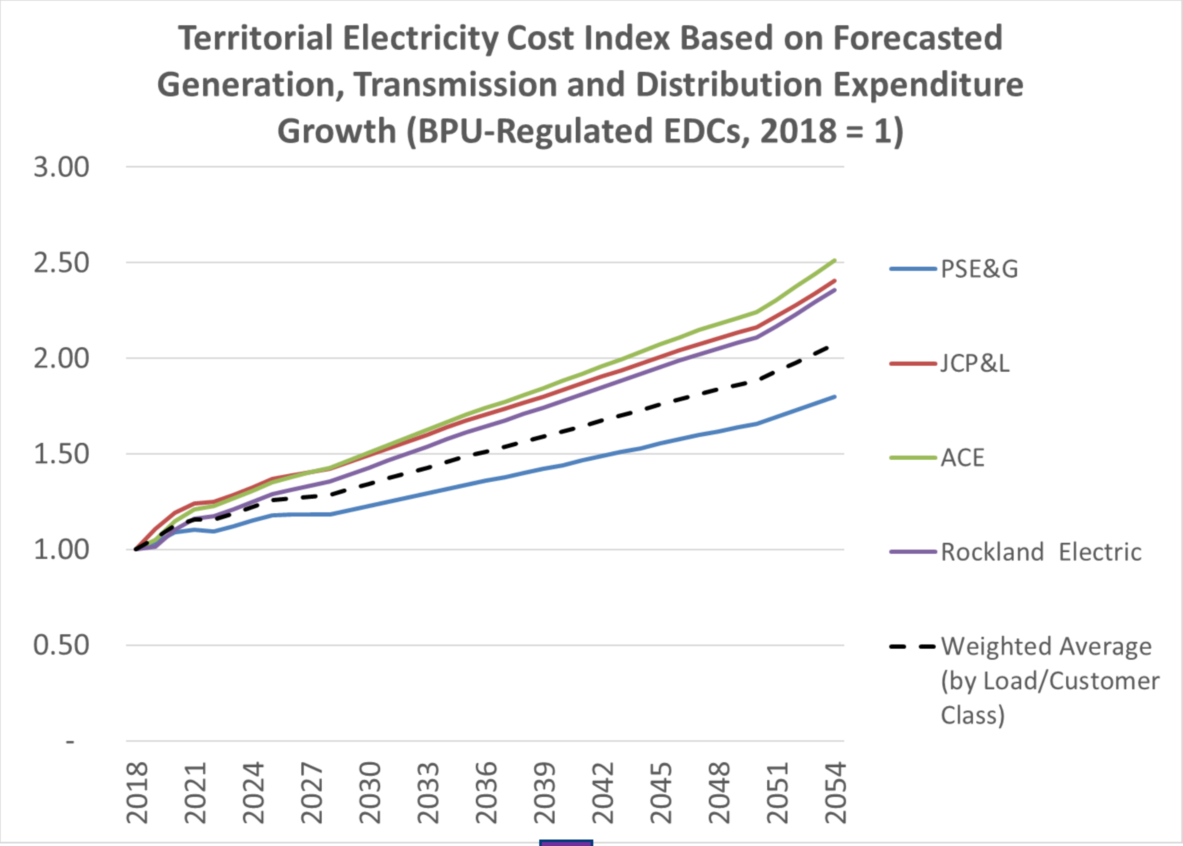
Clean Energy Act Class I Cost Cap by Year (From Prev. Slide) − Total Cost of Class I BAU Pathway ($/yr) = **Net $/yr Available Under Class I Cost Cap**

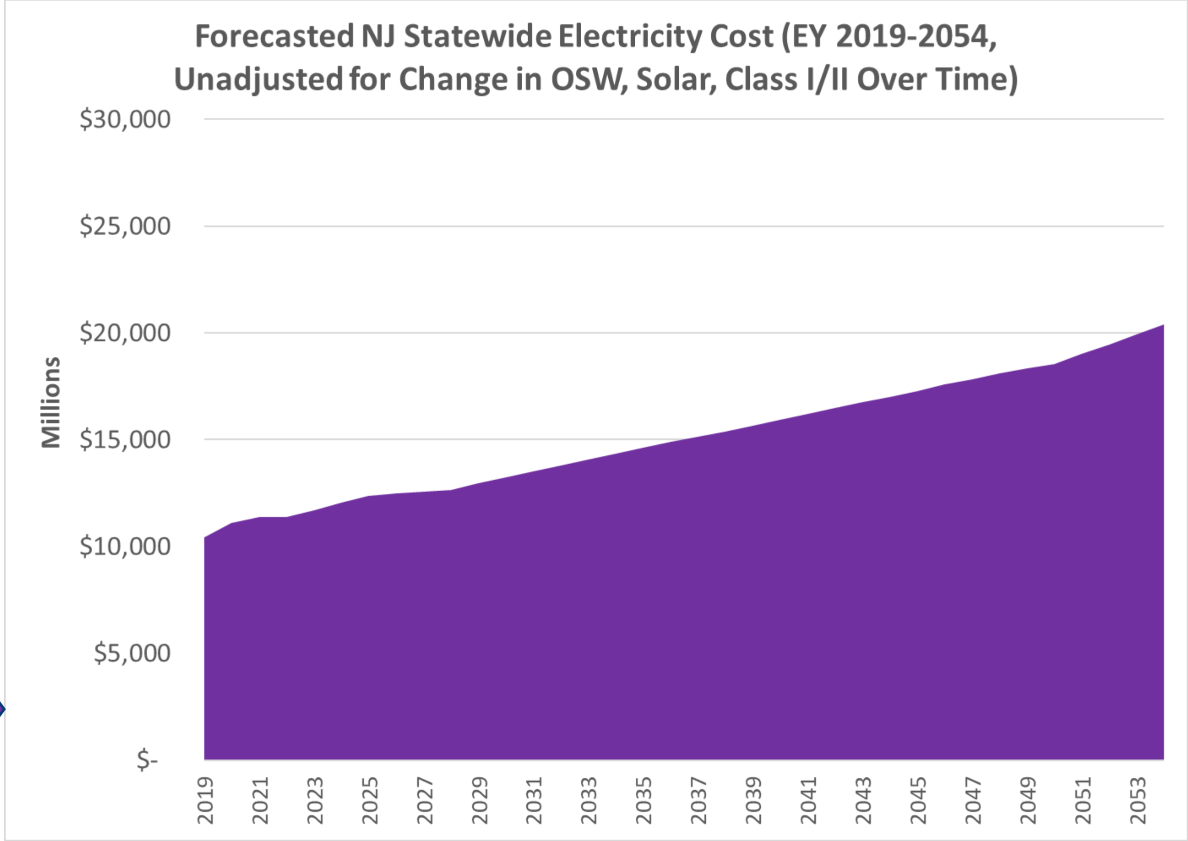
CADMUS

Sustainable Energy Advantage, LLC

Base Headroom Case Development

Step 1: Calculate 1st Cut Total NJ Electricity Cost





CADMUS | Sustainable Energy Advantage, LLC

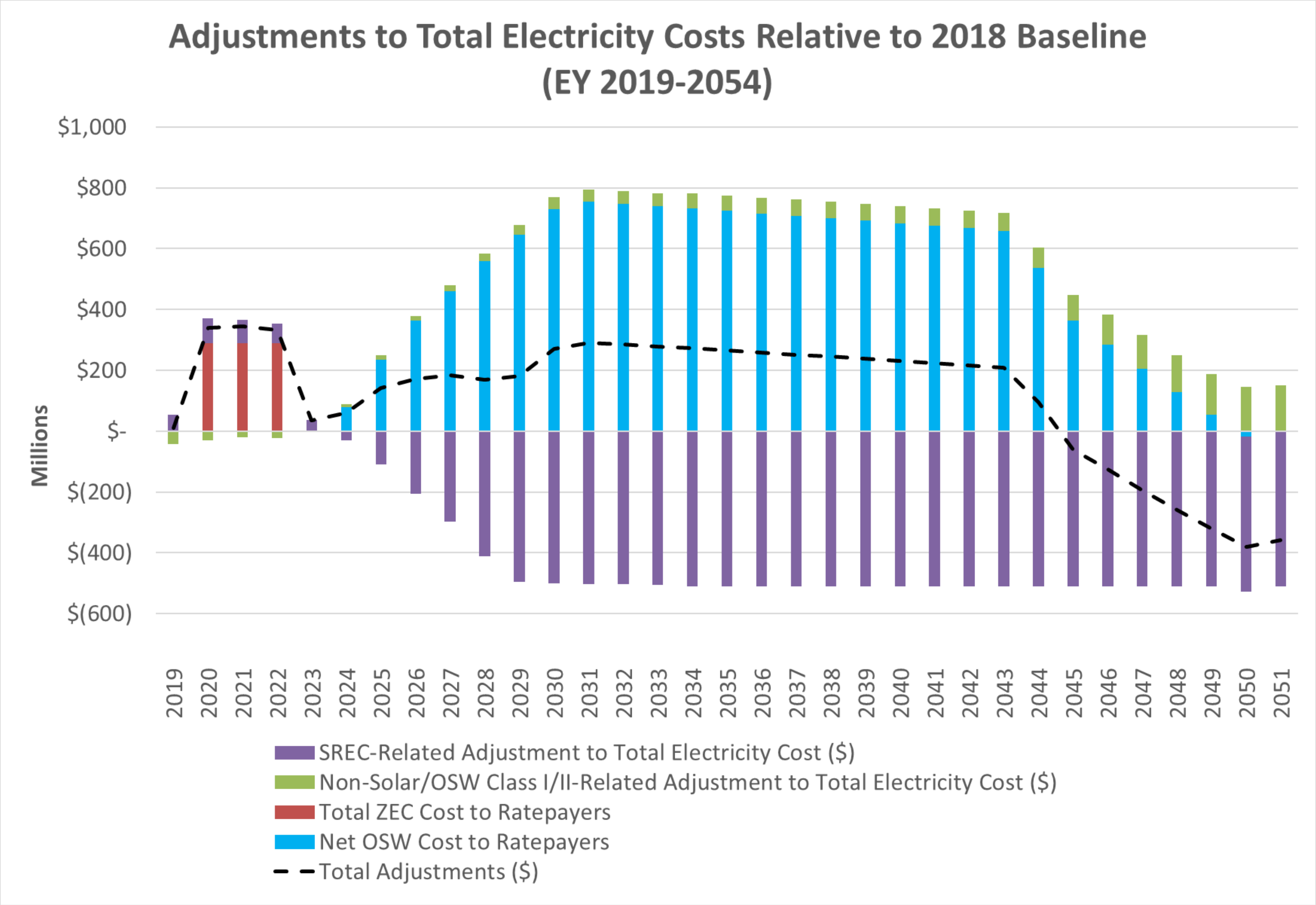
Step 2: Calculate Adjustments Based on New/Existing Policies Modified by 2018 Legislation

- Several programs created or modified by 2018 energy legislation (and thus are now part of BAU) have significant costs (or significant positive or negative impacts on total cost) that impact the cost cap
  - **Offshore Wind Renewable Energy Certificate (OREC) Program:** 3,500 MW by 2030 program counts as fully accretive to Solar Transition headroom (i.e., totally accretive relative to 2018 baseline, and also excluded from counting under cap)
  - **Legacy SREC Program:** Program cost forecasted to be high through mid-2020s, but set to decline rapidly thereafter. Counts against cap, but also reduces overall cost of electricity as prices and requirements fall below 2018 baseline
  - **Zero Emission Credit (ZEC) Program:** April 18th program approval expected to add $290 million/year for three years to total electricity cost (no increases assumed thereafter, given BAU nature of case). Like ORECs, counts as fully accretive, given $0 impact in 2018 baseline electricity cost value
  - **Non-Solar/OSW Class I:** Requirements expected to significantly expand through 2030 (and rise proportionate with electricity sales/costs thereafter)
- **Most significant long-run dynamics:** increase in net ratepayer costs associated with OREC program, offset by roll-off of Legacy SREC program costs

CADMUS | Sustainable Energy Advantage, LLC

Step 3: Calculate Aggregated Adjustments to Base Case Associated with Changes to New/Existing Policies

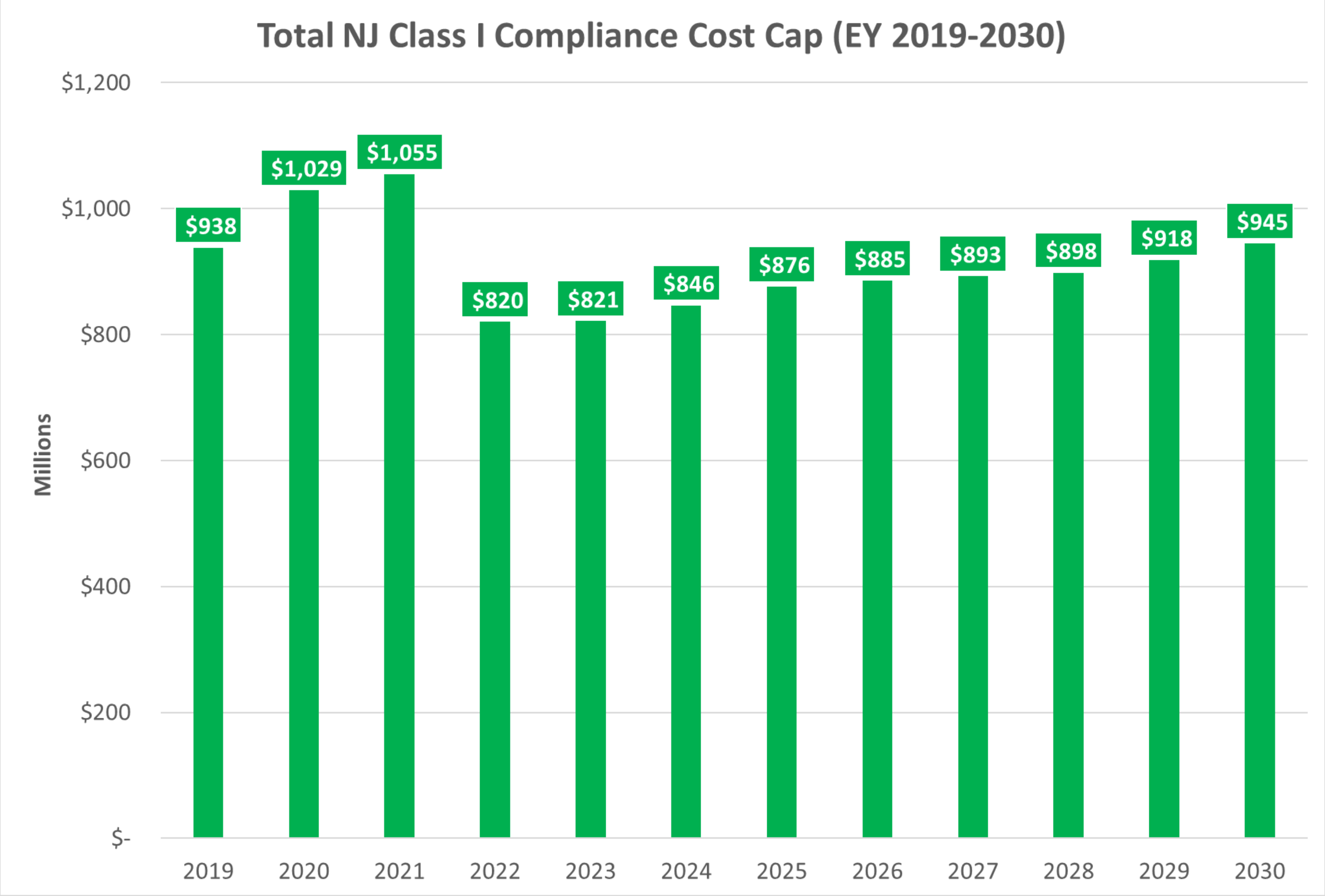
- OREC program net cost to ratepayers expected to ramp up in 2020s, topping out at **$754 million** in 2031
- Legacy SREC program costs expected to disappear in 2034 after long, slow decline beginning in 2023 (wiping **$509 million** off of total costs relative to 2018 baseline)
- Class I non-solar/OSW costs expected to stay low, but likely to increase substantially in 2040s as OREC/Class I REC substitution slows



CADMUS | Sustainable Energy Advantage, LLC

Step 4: Calculate Adjusted Base Case Class I Cost Cap

- EY 2022 referred to in remainder of presentation as "Kink Year" in which Cost Cap significantly contracts year-on-year, (thereby sharply "kinking" downward)
    - In Base Case, Cost Cap assumed to fall by **~$235M from EY 2021 to EY 2022** (shown at right)
- If no banking of cap or net benefits assumed, **<u>the Kink Year becomes year against which Solar Transition funding in preceding years likely needs to be gauged</u>.**



CADMUS | Sustainable Energy Advantage, LLC

Cost Cap Outlook & Preliminary Results

Cost Cap/Solar Transition Headroom Availability Scenario Matrix

Sensitivity	Base Headroom	High/Expanded Headroom	Low/Limited Headroom	Very Low/ Limited Headroom
Statewide Cost of Electricity	Base	High	Low	Low
Electricity Cost Scenario Variance	N/A	+5% to All Years in Base Case	-5% to All Years in Base Case	-5% to All Years in Base Case
Total Statewide Sales/ Class I & Carve-Out Requirements	ICF RGGI Base Sales & Class I Req't Case	ICF RGGI Low Sales & Class I Req't Case**	ICF RGGI High Sales & Class I Req't Case	ICF RGGI High Sales & Class I Req't Case
SREC Market Fundamentals	Base Demand	Low Demand	High Demand	Base Case – No Installation from Pipeline
OSW Commercial Operation Timing	Base (1st 400 MW Online in EY 2024)	"Sooner" (1st 400 MW Online in EY 2023)	"Later" (1st 1.1 GW Online in EY 2025)	"Later" (1st 1.1 GW Online in EY 2025)
% Ratepayer Monetization of OSW Energy + Capacity*	100%	100%	100%	100%
Class I REC Prices	2019 NJ Class I Historical Avg	75% of NJ Class I 2019 Historical Avg	2019 NJ Class I Historical Avg	2x 2019 NJ Class I Historical Avg

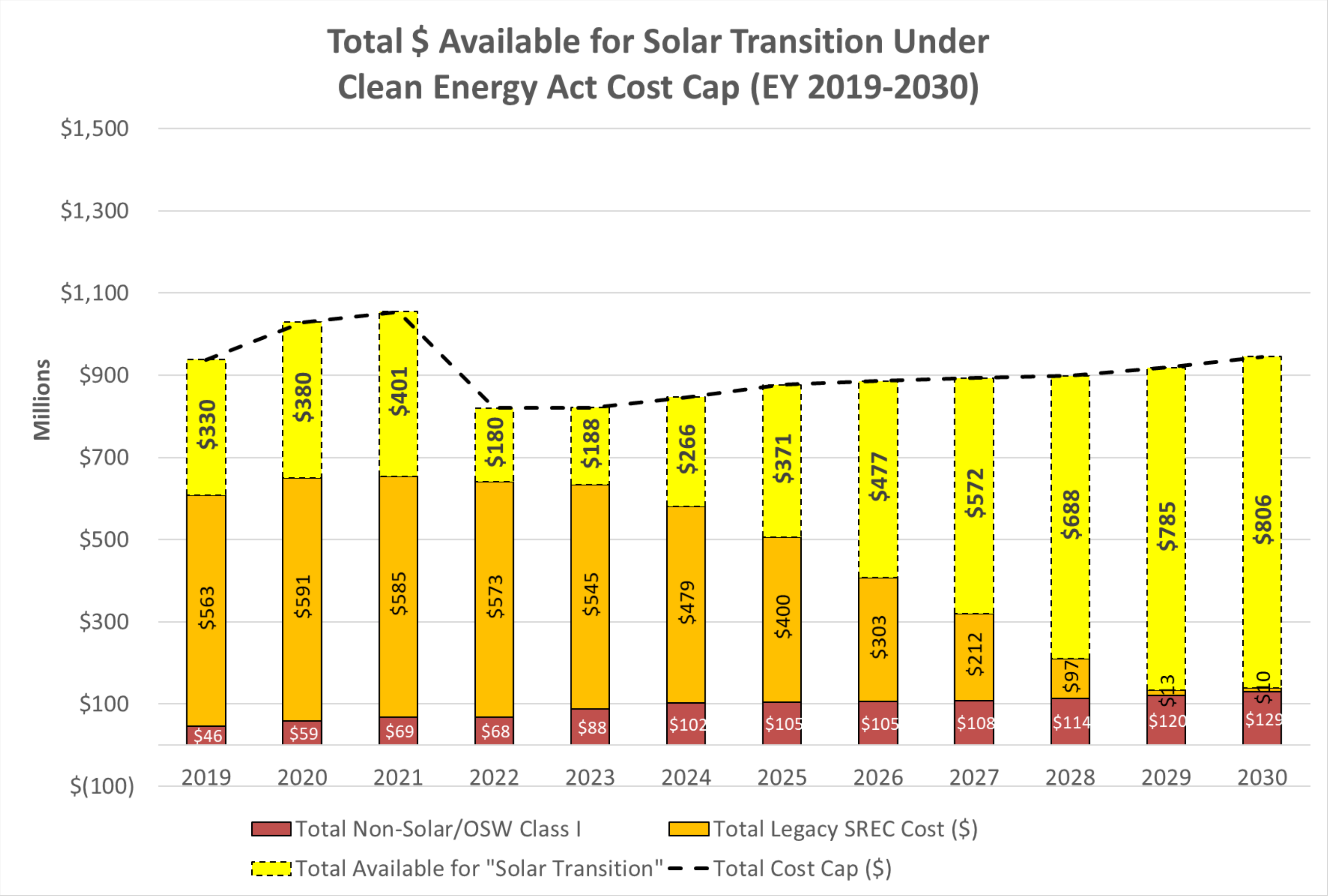
***May vary more significantly by sensitivity in future analysis drafts**

****For the purposes of this analysis (in which we do not yet possess publicly-available high/low energy and capacity price outlooks), a year with lower sales (but higher total electricity cost) would produce the smallest amount of demand for SRECs and Class I RECs, thereby taking up the least amount of room under the Cap, along with the largest amount of Cost Cap headroom.**

Observations/Implications

- Under the Base, Low/Limited and High/Expanded Headroom Cases, we find that even in the Kink Year, it is reasonable to expect a modicum of Cost Cap headroom for a Solar Transition
- In all cases, the vast majority of near-term BAU spending under the Cost Cap is associated with the Legacy SREC program
  - The Legacy SREC program ceases to be a major contributor to the cost cap in mid-to-late 2020s in Base and High Cases, but remains a major contributor through 2030 in the Low and Very Low Cases
- Overall, the Legacy SREC market is forecasted to be so oversupplied that it would need to be hindered from reaching 5.1% at all (as depicted in the Very Low Headroom case) to lack available funds for a Solar Transition on a consistent basis
- The non-Solar/OSW share of NJ Class I costs are likely to remain very low in the Base and High Cases, given assumptions of relative oversupply in such markets

Preliminary Draft Results: Funds Available for Solar Transition Under Cost Cap through 2030

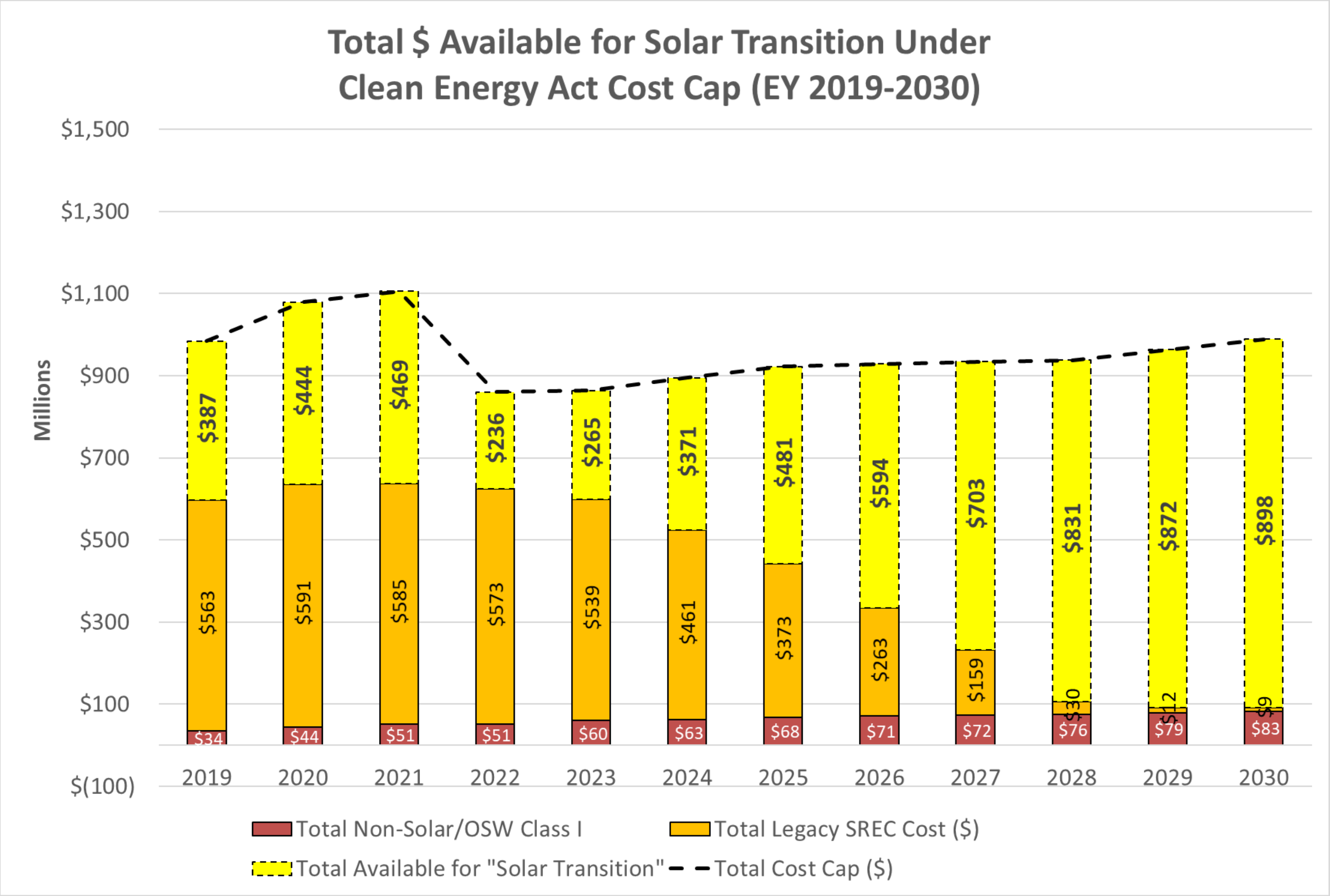


Base Headroom Case

- **$180M available in Kink Year (EY 2022)**
- Declining Legacy SREC prices due to oversupply conditions allows for a modicum of headroom to manage reduction in cap from 9% to 7%
- Current low prices in Class I markets assumed to be maintained; OREC production (not under cap) start in mid-2020s reduces total Class I allocation, mitigating cost under cap

CADMUS | Sustainable Energy Advantage, LLC

Preliminary Draft Results: Funds Available for Solar Transition Under Cost Cap through 2030

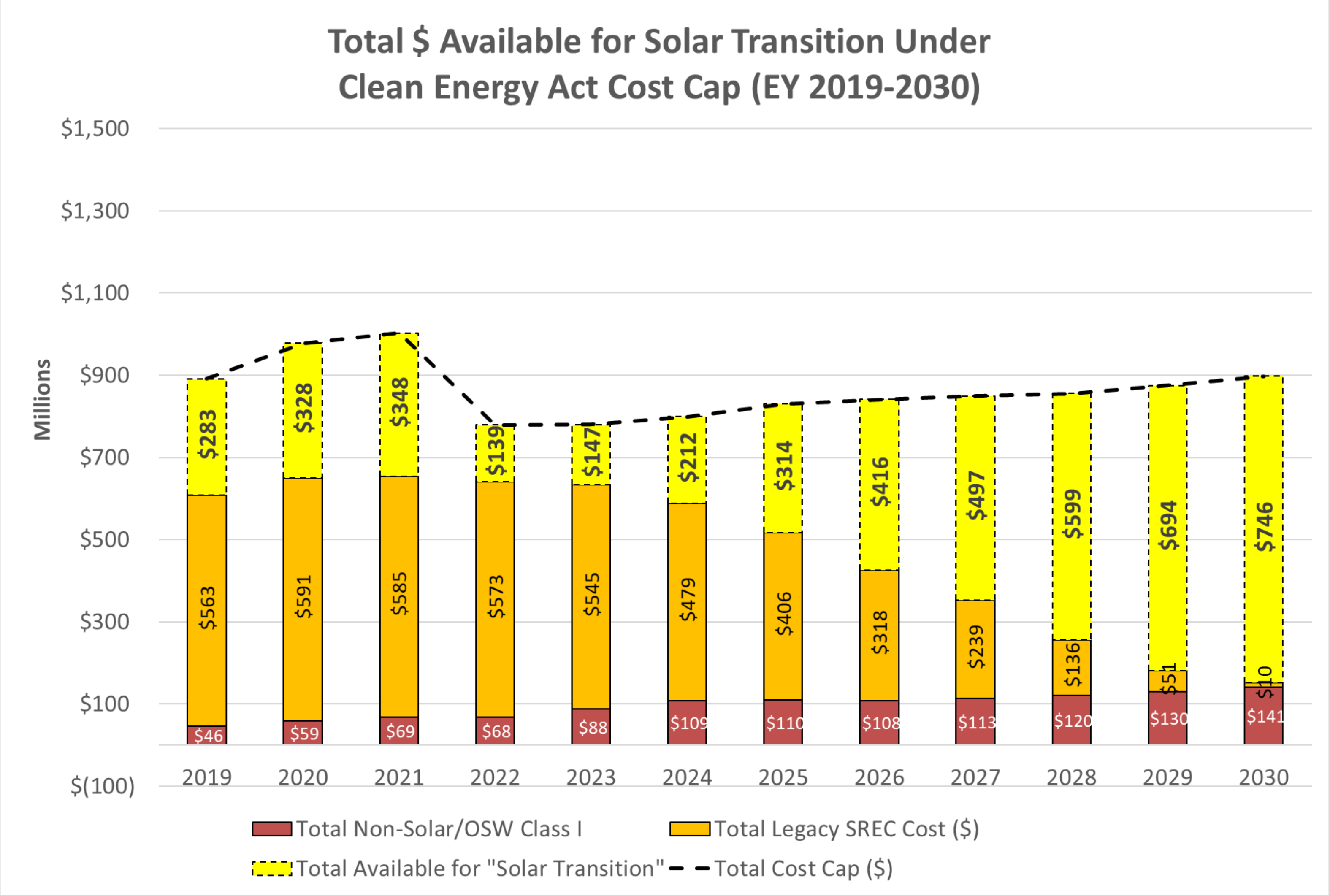


High/Expanded Headroom Case (Base Total NJ Elec Cost + 5%/yr)

- **$236M (+$56M from Base Case) available in Kink Year (EY 2022)**
- Slight rise in total electricity costs responsible for lion's share of added headroom
- Legacy SREC costs slightly lower due to more pronounced oversupply in out-years
- Low NJ Class I prices assumed to be depressed further from extended oversupply (potentially caused by increases in other PJM state Class I RPS targets)

CADMUS
Sustainable Energy Advantage, LLC

Preliminary Draft Results: Funds Available for Solar Transition Under Cost Cap through 2030

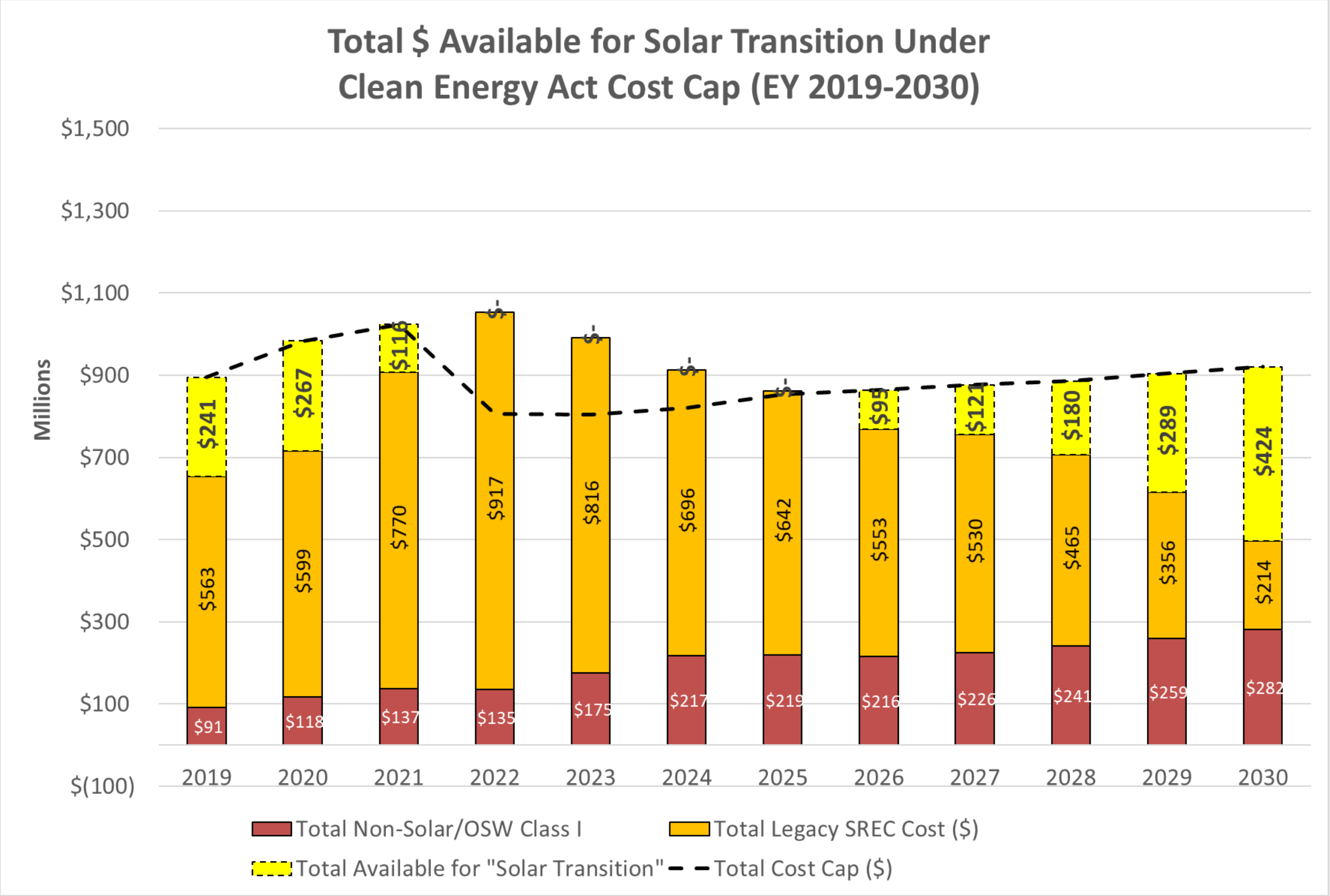


Low/Limited Headroom Case (Base Case NJ Elec Cost -5%/yr)

- **$139M (-$41M from Base Case) available in Kink Year (EY 2022)**
- Lower assumed total electricity costs substantially shrinks available headroom
- Legacy SREC costs modestly higher due to modestly lower degree of oversupply in out-years
- Class I prices assumed same as Base Case

CADMUS | Sustainable Energy Advantage, LLC

Preliminary Draft Results: Funds Available for Solar Transition Under Cost Cap through 2030

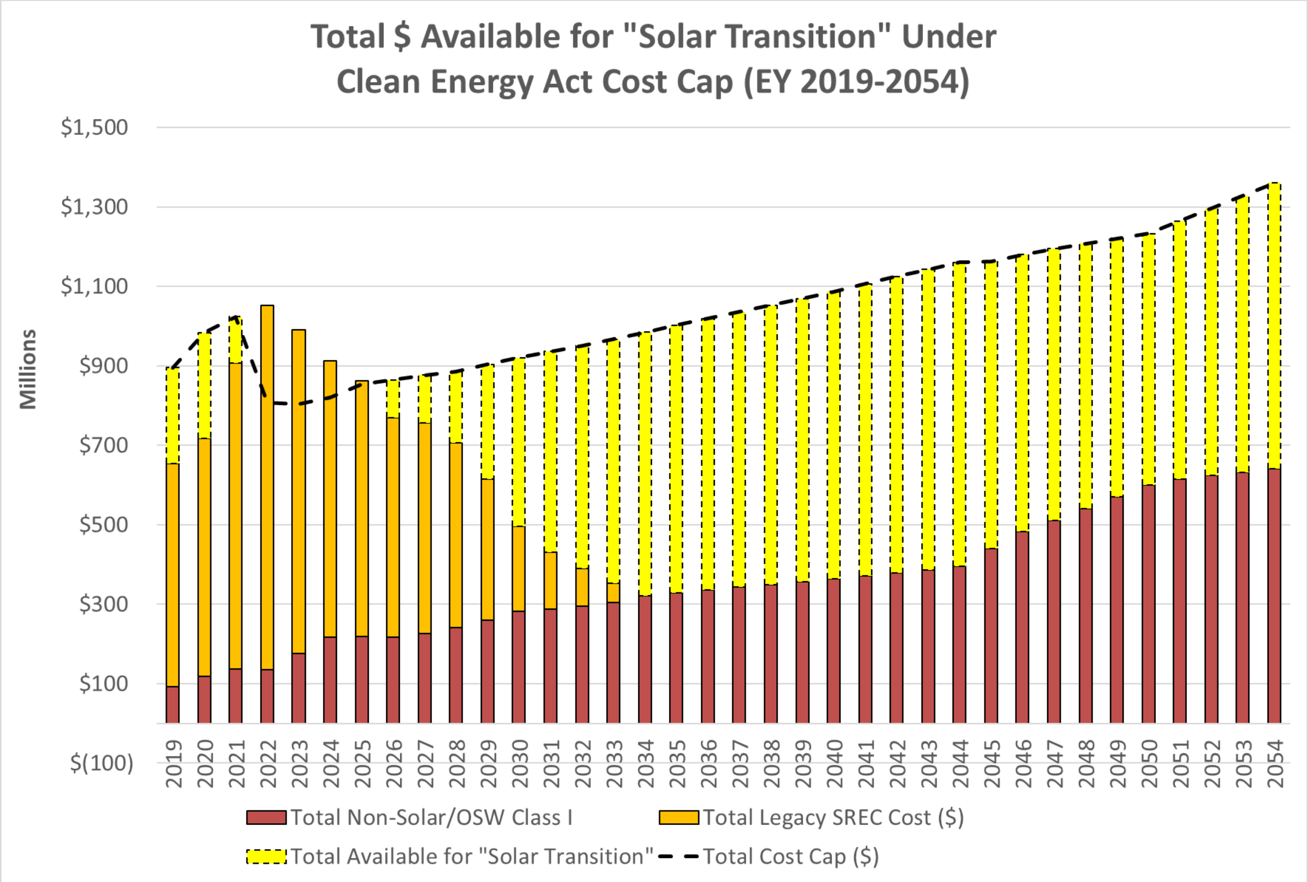


Very Low/Limited Headroom (Base Case NJ Elec Cost -5%/yr + High ACPs & Class I Price)

- **No headroom available in Kink Year (EY 2022), <u>plus very limited headroom until EY 2026-2027</u>**
- Risk of headroom elimination in any given year greatest if:
  - Class I prices are high;
  - Expenditures on electricity are low; and
  - Legacy SREC market closes prior to reaching 5.1% (resulting in high and sustained ACP Volume)

CADMUS | Sustainable Energy Advantage, LLC

Preliminary Draft Results: Long-Term Cost Cap Outlook for Solar Transition



- Even in the Very Low/Limited Headroom case (***shown at right***), total Solar Transition budget grows through 2030s and begins to contract in 2040s (but is still large)
- Additionally, **<u>no cases displayed today assume OSW procurement beyond 3,500 MW in 2030</u>** (which would further reduce the amount available to non-solar/OSW Class I projects)
- **Main Takeaway:** Incremental growth in headroom suggests Cost Cap could notionally accommodate **<u>significant long-term capacity expansions (or a transition to the Class I program).</u>**

CADMUS | Sustainable Energy Advantage, LLC

Illustrative Example of Capacity Under Cost Cap

CADMUS | Sustainable Energy Advantage, LLC

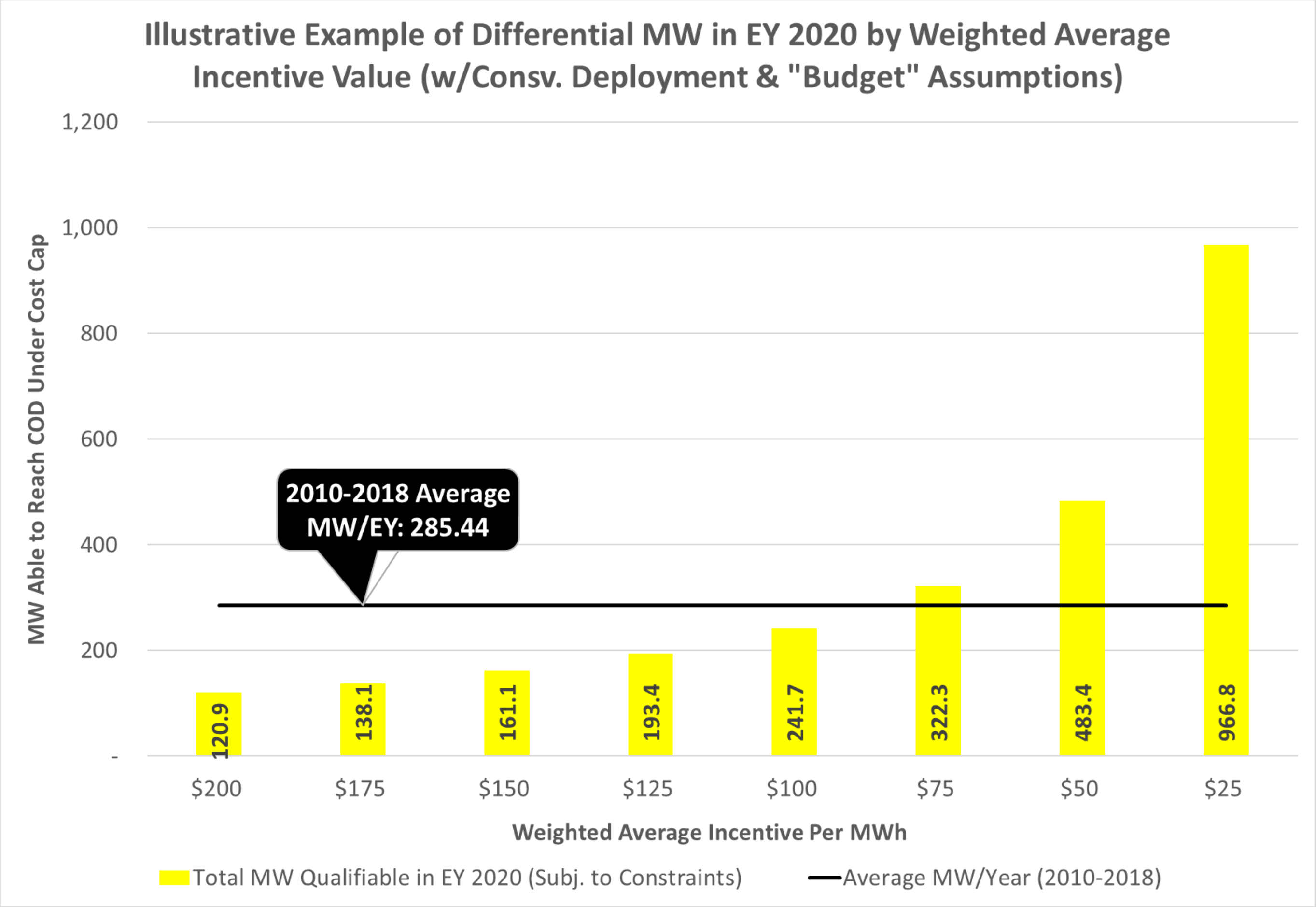
What Might All This Mean?

- To answer this, we developed an example of potential MW_{DC} able to deploy in EY 2020 under the cap in the Base Headroom Case, given various potential incentive levels and deployment parameters
- Assume (for simplicity's sake) that the budget for prior years needs to work backwards from the Kink Year and be phased over 3 years
- Also for simplicity's sake, we assume 50% of projects receiving an EY 2020 incentive come online in that year

Parameter	Value
Gross Base Case "Kink Year" (EY 2022) Solar Transition Headroom	$179,658,158
Notional EY 2020 Headroom (Assuming 3-Year Phase-In of "Kink Year" Headroom)	$59,287,192
% Share of EY 2020 Eligible Capacity Reaching COD in EY 2020	50%
Total Adjusted EY 2020 "Budget" for Transition (in order to meet "Kink Year" Headroom)	$29,643,596
Weighted Avg. Capacity Factor	14%
Hours/Yr	8,760

DISCLAIMER: THIS IS ONLY AN ILLUSTRATIVE EXAMPLE

Preliminary Potential MW Available Under Base Case (w/ Varying Illustrative Incentive Amounts)



DISCLAIMER: THIS IS <u>ONLY AN ILLUSTRATIVE EXAMPLE</u>

- Relative to historical averages, Class I Cost Caps in Kink Year may not be a substantial barrier to solar development
  - In Base Case (**at left**) incentives of $75-$100/MWh or less yield enough headroom under Cost Cap for deployment of (potentially far) more than the 2010-2018 historical average NJ solar deployment
- **Key Takeaway:** Creative consideration of alternative policy parameters to BAU (particularly incentive term) could yield significant benefits for solar industry and ratepayers

CADMUS | Sustainable Energy Advantage, LLC

CADMUS | Sustainable Energy Advantage, LLC

Thank You

Appendix A

Incremental SREC Supply Forecast: Interim Calculations

Incremental Supply Forecast

Cohort Analysis – Evaluating Scrub Rate by project size

Size Bin	# of Projects Accepted In Pipeline as of November 2016	# of Projects with PTO or still in Pipeline as of Dec 2018	Scrub Rate	Scrub Rate Adopted for Modeling
<25 kW	86	60	30%	30%
25 - 250 kW	267	172	36%	30%
250 - 500 kW	41	30	27%	30%
500 - 1000 kW	36	26	28%	30%
1000 - 2000 kW	10	7	30%	30%
2000 - 5000 kW	6	5	17%	35%
5000+ kW	9	4	56%	35%

Due to a their small sample size, these two size bins were averaged

Take away: There are a total of 604 MW in the pipeline as the of the March 2019 report. Per the scrub rate (in combination with de-rates for project delay and expiration) we estimate that 406 MW ultimately will reach PTO and produce SRECs

CADMUS | Sustainable Energy Advantage, LLC

Incremental Supply Forecast

Cohort Analysis – Evaluating expected time to PTO by project size

Size Bin	Sample Size	Average Time Accepted -> PTO (days)	Number Assumed for Modeling (days)
<25 kW	92	247.1	230
25 - 250 kW	289	200.5	230
250 - 500 kW	44	254.8	230
500 - 1000 kW	38	215.4	230
1000 - 2000 kW	12	258.9	320
2000 - 5000 kW	6	120.4	320
5000+ kW	10	584.0	320

Given similar numbers, these categories were averaged to remove statistical noise

Due to a their small sample size, these size bins were averaged

Incremental Supply Forecast

Modifying expected time to PTO for projects with delays

- Projects in the Pipeline are given an imputed PTO date based on the results of the cohort analysis (Acceptance Date + average days to PTO for the project's size)
- However, many Projects are slower than average at reaching PTO, resulting in an imputed PTO date that has already passed
  - This resulted in significant front-loading of incremental capacity being installed in our models
- To address this, we identify projects where the number of days from their Acceptance Date to the release of the March report is greater than 75% of the average days to PTO for the project's size
- These projects are given an imputed PTO date by multiplying the number of days to the project's Expiration Date by a random number ranging from 0 to 1
  - This method is applied to 328 MW of the Pipeline (or 206 MW after de-rates are applied, detailed later)

Current approach is rough justice; we will analyze whether alternative approaches to imputing PTO date will be more appropriate.

Incremental Supply Forecast

Evaluating expected time to SRP Completion of installed projects by size

- 894 projects in the March Installation report have not been completed yet, meaning they are operational but need to finalize paperwork to generate SRECs
- We compute an imputed completion date based on each project's size for the purposes of projecting when these projects will generate SRECs
- Given a small sample size and a lack of "starting" cohort for a situation so specific, these numbers cannot be based on the cohort analysis

Size Bin	Days from Release of Last Installation Report until Completed	Number of Projects With Status
<25 kW	30	818
25 - 250 kW	30	19
250 - 500 kW	30	1
500 - 1000 kW	30	0
1000 - 2000 kW	30	0
2000 - 5000 kW	40	0
5000+ kW	60	0

CADMUS | Sustainable Energy Advantage, LLC

Incremental Supply Forecast

De-rating projects with unusual delays

- For the purposes of accounting incremental capacity coming online, we apply de-rates to projects with unusual delays in their SRP milestones
- First, we apply a de-rate to projects who are expected to have already achieved PTO
- Second, we apply a de-rate to projects that are operational but have not been deemed complete
  - After consulting with TRC, we believe many of these older projects are generally associated 3rd Parties that are now out of business

Delay De-rate for Operational Projects without SRP Completion		
Year PTO was reached	De-rate	MW associated with each de-rate
2019	1	1173.2
2018	0.6	0.8
2017	0.2	0.8
2016 - 2010	0	0.3

Delay De-rate for Projects not Operational Past Expected PTO Date		
Days passed from imputed PTO date*	De-rate	MW associated with each de-rate
60	1	469.0
90	0.9	80.0
120	0.8	8.3
150	0.75	11.4
180	0.7	10.1
210	0.65	1.2
240	0.6	0.3
270+	0.5	24.1

*Compared to the last date accounted for in the March Pipeline Report (3/31/19)

Incremental Supply Forecast

Forecasting Supply Beyond the Pipeline

- These results are based on an analysis of the incremental capacity added to the installation list per month in 2017 and 2018
- We assume no 5000+ kW projects will come online after the pipeline is exhausted, as projects of that scale are likely in the pipeline currently
- For the <25 kW sector, we assume 12.2 MW achieves PTO every month until the 5.1% milestone is achieved rather than using imputed PTO dates

Size Bin	Average MW of capacity reaching PTO each month
<25 kW	12.2
25 - 250 kW	1.7
250 - 500 kW	1.7
500 - 1000 kW	2.3
1000 - 2000 kW	1.6
2000 - 5000 kW	2.0
5000+ kW	0 assumed for modeling (actual 5.6)

Incremental Supply Forecast

Capacity Factor Designations

- Each project is assigned a Resource Class based on its customer type and size, which then determines its capacity factor
- Currently, capacity factors per Resource Class are uniform across all years, however our model will accept variation across years

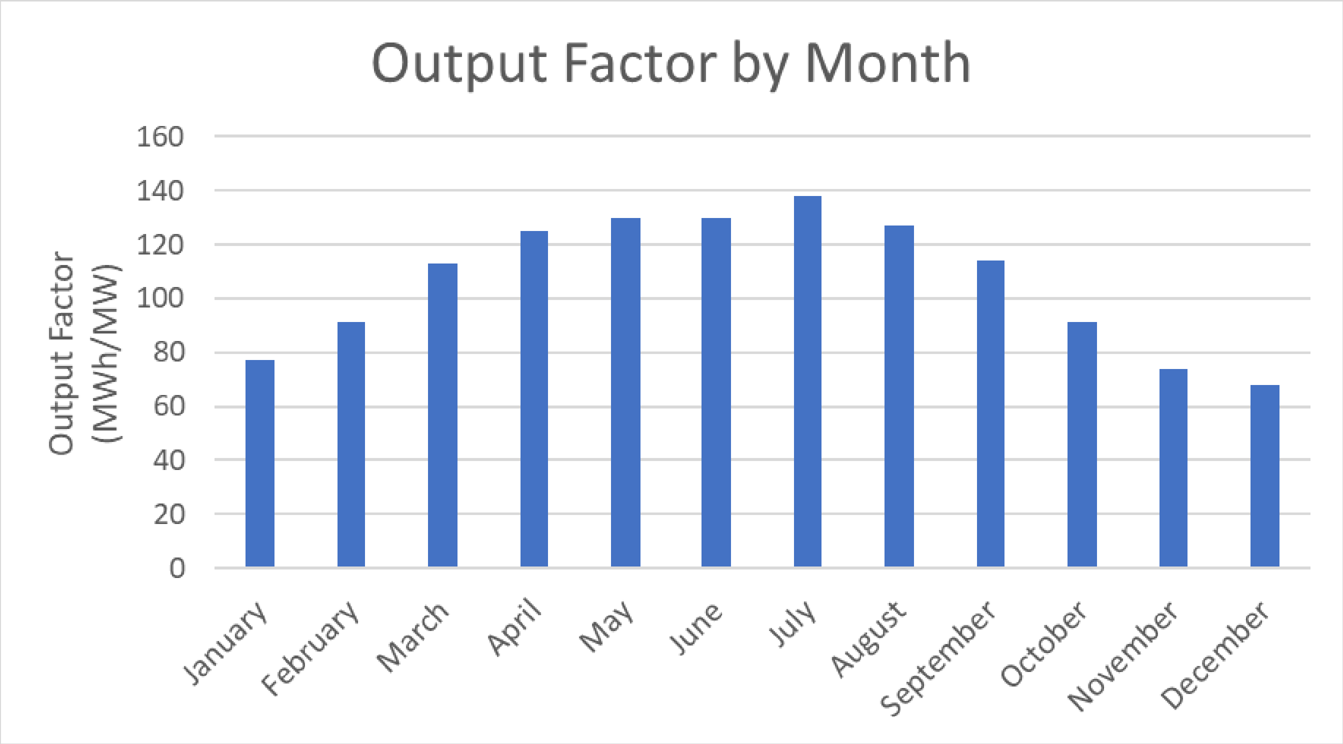
Resource Class	Assumed Capacity Factor
Resource Class A	15.0%
Resource Class B	14.5%
Resource Class C	14.0%
Resource Class D	13.5%
Resource Class E	13.0%

Size Bin	Commercial	Farm	Government Facility	Municipality	Non-Profit	Public University	Residential	School
>25 kW	D	D	E	E	E	E	E	E
25 - 250 kW	D	D	D	D	D	D	E	E
250 - 500 kW	D	D	D	D	D	D	D	D
500 - 1000 kW	C	C	D	C	C	C	D	D
1000 - 2000 kW	B	B	C	B	B	C	C	C
2000 - 5000 kW	B	B	B	B	B	B	B	B
5000+ kW	A	A	A	A	A	A	A	A

Incremental Supply Forecast

Scaling monthly production

- Yearly capacity factors are scaled based on an index of each month’s output factor to determine monthly production
- BPU’s output factors result in a yearly capacity factor of 14.6% before degradation



Incremental Supply Forecast

Historic SREC Production: QC of Actual vs. Modeled

- To forecast the monthly production of solar facilities that are currently installed, we modeled the incremental supply of SRECs from 2004-present
- By comparing our model's estimate to actuals, we assessed the accuracy of our forecast going forward
- Results are generally strong, with more significant overestimation in 2018

Energy Year	2014	2015	2016	2017	2018
Modeled Estimate	1,384,929	1,652,917	1,855,646	2,231,811	2,704,829
Actual	1,363,095	1,623,269	1,891,439	2,235,989	2,532,728
Estimate/Actual	102%	102%	98%	100%	107%

Proposed Model Improvement: To understand what is driving over/under estimation, we intend to look at each energy year's average irradiance compared to a 20-year average and if first year CFs should change over time.

Appendix B

Cost Cap Base Case Development: Interim Calculations

CADMUS | Sustainable Energy Advantage, LLC

Step 1: Calculate 1st Cut Total NJ Electricity Cost

- Key Modeling Principles & Assumptions for Estimating Total Cost
  - Short of engaging in production cost modeling, growth index of electric distribution company (EDC) rates is best proxy for future statewide electricity cost
  - Index is multiplied by **$9.84B** (total cost of electricity for all providers in NJ found in EIA Form 861 data for EY 2018)
  - Reductions in sales from DSM/EE assumed to be reconciled, permitting full EDC lost revenue recovery
- Forecasted EDC rates = function of forecasted energy, capacity, transmission and distribution
  - Energy and Capacity: based on ICF RGGI re-entry analysis for NJ DEP in December 2018
    - Energy assumed to **grow 0.6%/year through 2030** (Assumed at same rate thereafter)
    - Capacity prices **fall 2.8%/year through 2030** (Assumed flat thereafter)
  - Transmission and Distribution: based on EIA AEO 2019 forecasted transmission and distribution prices for the RFC-East region

    T&D index expected to **grow at 3.5%/year through 2050** (assumed same rate through 2054), in line with significant historical and expected growth in T&D investment in NJ and nationwide
  - Forecasted rates indexed to 2018 = 1, and weighted by residential/non-residential customer share
- Results in revenue requirement index based on all four BPU-regulated EDCs, which is rolled into a statewide index and multiplied by EY 2018 total electricity cost
- High/low scenarios assume +/- 5% annual potential variance in total cost

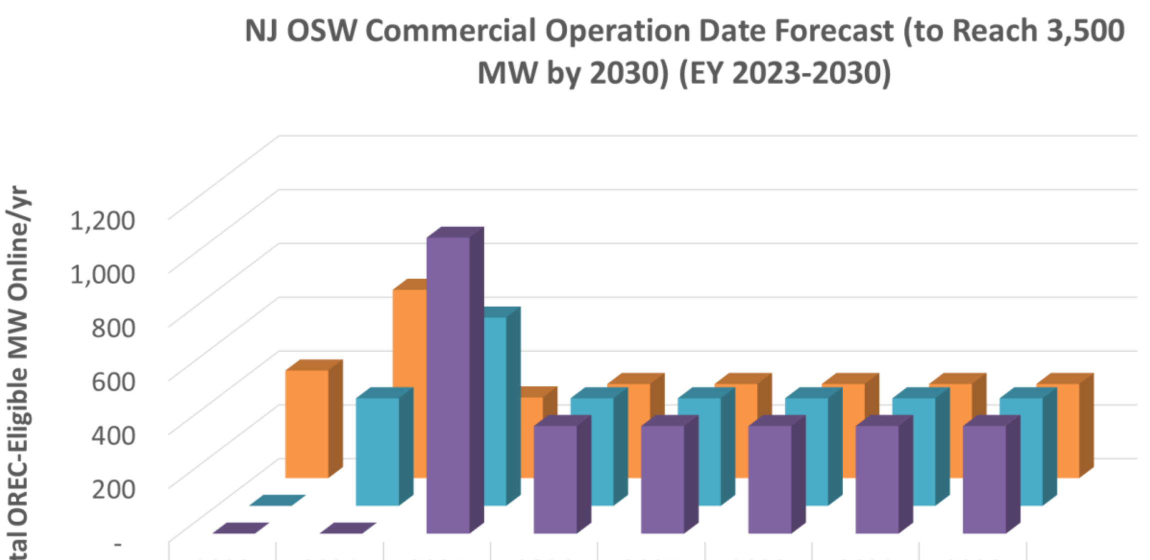
CADMUS | Sustainable Energy Advantage, LLC

Step 2a: Calculate OSW Net Ratepayer Cost

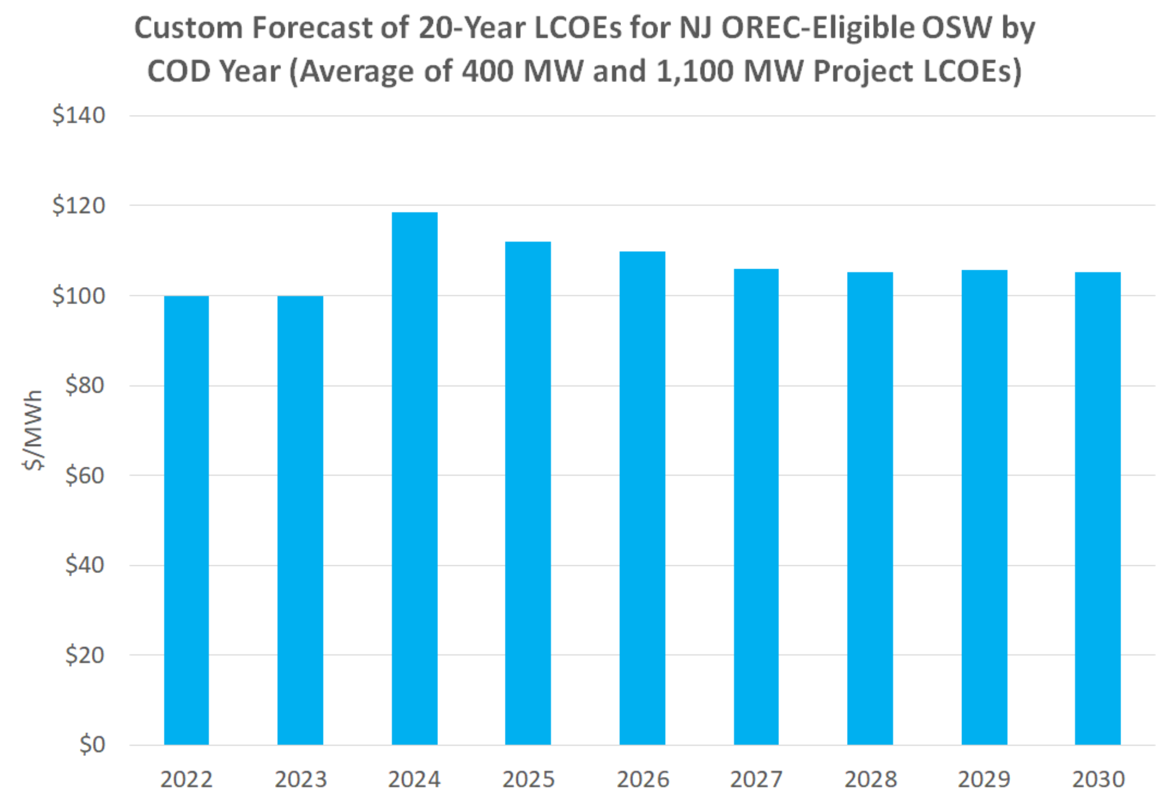
- ORECs assumed to act like carve-out (1-for-1 substitution of ORECs for NJ Class I RECs)
  - **Therefore, displacement of Class I RECs by higher-cost ORECs not under cap is more than fully accretive to amount allowed under Class I Cost Cap**
- OSW deployment pathways vary based on aggressiveness of assumed CODs for initial 1,100 MW subject to procurement in CY 2019/EY 2020
- ICF RGGI re-entry analysis (modified to assume late fall commercial operation to approximate OSW construction schedules) assumed three deployment pathways depicted on next page
  - **"Sooner"**, where initial 400 MW of initial 1,100 MW is assumed to reach commercial operation in 10/1/2022
  - **"Base"**, where initial 400 MW of initial 1,100 MW is assumed to reach commercial operation 10/1/2023
  - **"Later"**, where the full initial 1,100 MW reaches commercial operation 10/1/2024
- OSW Resource Costs:
  - Utilized an "average of averages" from a proprietary internal forecast of 20-year OREC contracts by COD year (see next page)
- Calculating OSW production/market revenue/net ratepayer premium
  - **Capacity Factor:** ICF RGGI re-entry analysis assumes 50% capacity factor
  - **Energy & Capacity:** OSW assumed to receive 104% of flat block energy rates and 31% PJM summer capacity credit (See Mills 2018), which were calculated against ICF RGGI re-entry forecast of energy and capacity. Assumed 100% monetized by EDCs on behalf of NJ ratepayers
  - **Net Ratepayer Costs:** OREC costs assumed to be incurred in tranches based on COD, whereas market revenue assumed to be monetized at annual market values

CADMUS | Sustainable Energy Advantage, LLC

Assumed 20-Year Costs/Deployment of OSW for OREC Program (to Reach 3,500 MW by 2030)



	2023	2024	2025	2026	2027	2028	2029	2030
Later	-	-	1,100	400	400	400	400	400
Base	-	400	700	400	400	400	400	400
Sooner	400	700	300	350	350	350	350	350

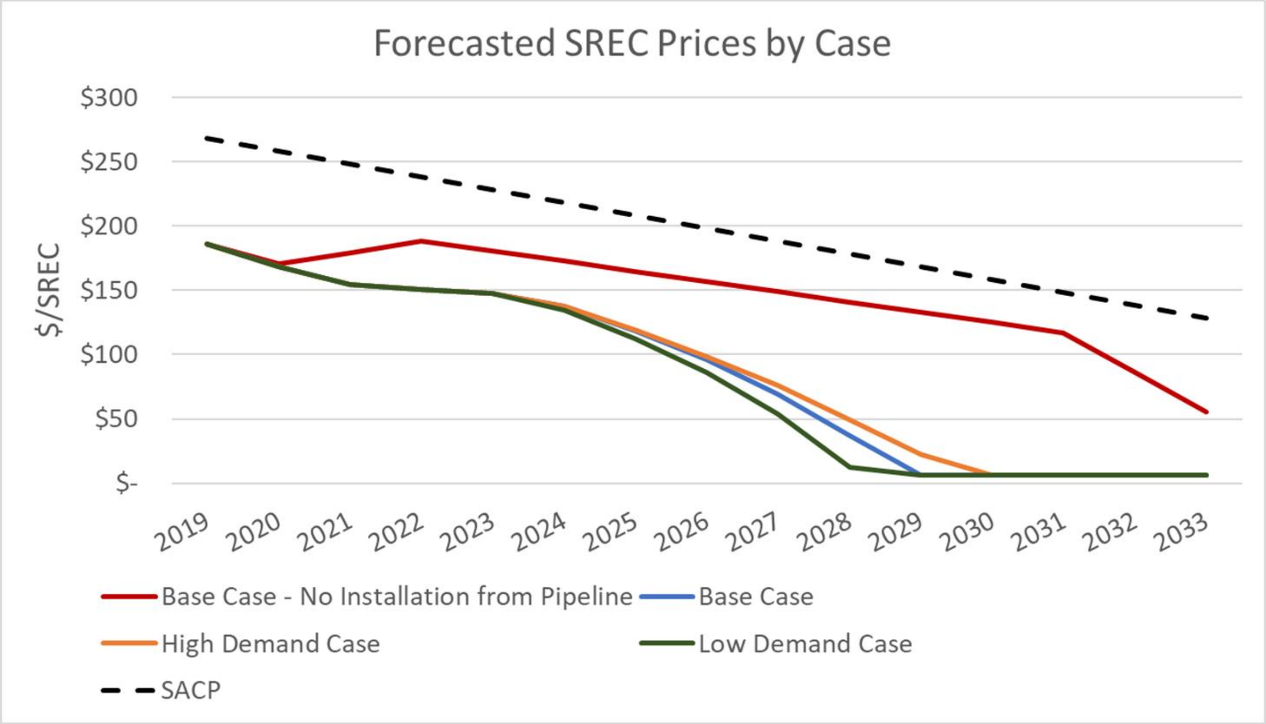


CADMUS

Sustainable Energy Advantage, LLC

Step 2b: Calculate Legacy SREC/Class I & II Costs

- Clean Energy Act of 2018 mandated extensive changes to Legacy SREC program (***see prior presentation for more***)
- **Total Cost of Legacy SREC Program:** Calculated as product of total retired Legacy SRECs, multiplied by SREC forward prices (***shown at right***), plus any ACP volume (which we did not find, given expected oversupply conditions)
- **Class I & II RECs:** Forward Class I and Class II REC prices calculated parametrically, assumed to be $6/MWh and $5.56/MWh, respectively, in perpetuity based on EY 2019 averages
  - Sensitivities assume (for the “high” Solar Transition budget case) a 25% derate to $4.50/MWh, while lowest case assume doubling to $12/MWh
  - Assumption of continuity partially based on observations of substantial and ongoing oversupply in PJM Class I markets (and potential for more as other states consider RPS increases and large-scale solar/wind cost decline)



CADMUS

Sustainable Energy Advantage, LLC

Step 2c: Calculate ZEC Ratepayer Cost

- On April 18, 2019, BPU approved ZEC applications for Hope Creek, Salem One and Two generating stations
  - BPU approved maximum remuneration (**$0.004/kWh**) allowed under An Act Concerning Nuclear Energy for each plant, which BPU noted would be "approximately" $100M per nuclear unit
  - In April 18 order, BPU requested the filing of compliance tariffs, which are likely to indicate full scope of cost to ratepayers
- Cost Cap analysis assumes $290M cost per year for initial 3-year period, with no renewals (given BAU/current law nature of analysis)
- Future drafts of Cost Cap analysis likely to reflect more granular impact of ZEC approvals

State of New Jersey
Board of Public Utilities

CADMUS

Sustainable Energy Advantage, LLC

NJ SOLAR TRANSITION

Project Cost and Technical Potential Modeling Assumptions: Starting the Discussion

STAKEHOLDER WORKSHOP #1

MAY 2, 2019

Disclaimer

The information and views in this presentation do not necessarily represent the views of the New Jersey Board of Public Utilities, its Commissioners, its Staff or the State of New Jersey. This presentation is provided by the Consulting Team (Cadmus and Sustainable Energy Advantage) for discussion purposes only. It does not provide a legal interpretation of any New Jersey statutes, regulations, or policies, nor should it be taken as an indication or direction of any future decisions by the Board of Public Utilities.

Goals for Model Development

Stakeholder Input on Costs & Technical Potential

- **To engage stakeholders into the process of acquiring realistic model inputs of project costs and technical potential to be used when modeling / forecasting the implications of different policy paths and futures for the NJ Solar Transition**
- Specifically, model inputs will be used when crafting, calculating and forecasting for the Successor Program and Transition Incentive (as applicable)
  - Inputs to LCOE calculations to derive the Incentive Payment Value ($/MWh)
  - Inputs to Potential MW targets and incentive payment caps
  - Inputs to Potential Total MW & MWh

CADMUS | Sustainable Energy Advantage, LLC

Major Items Affecting Modeling (1)

Requesting stakeholder input over the next month

- Installed costs on $/kW$_{DC}$ basis (including interconnection costs) for various project types and size bins
  - How such costs will vary over time and as the market matures (e.g., industry experience may drive down costs, while market saturation may drive up costs. For example, as distribution feeders get saturated → *ceteris paribus* increases interconnection costs)
- Operating costs
  - "Plain vanilla" O&M vs. O&M estimates specific to Community Solar projects or solar canopies
  - Estimating costs for:
    - PILOTs / Taxes
    - Land lease costs

CADMUS | Sustainable Energy Advantage, LLC

Major Items Affecting Modeling (2)

Requesting stakeholder input over the next month

- ITC qualification assumptions
- Financing costs
  - Including how financing costs and capital stack may vary:
    - Under different incentive structures and terms of incentives
    - For project size and type categories
    - With or without ITC
    - With MACRS vs. 100% depreciation provisions of Tax Cuts and Jobs Act of 2017 (particularly in a post-tax credit environment)
- PV performance 1st year and over time
  - How technological changes (e.g., improved module and inverter efficiency over time, battery storage) affect performance over time
- Technology deployment – Fixed, single-tracking, dual tracking, bifacial, other?
- Expected revenue during and after the incentive term
  - Retail rate outlook
  - Post-contract/incentive market revenue (e.g. energy/capacity, Class I, etc.) and other revenue

Major Items Affecting Modeling (3)

Requesting stakeholder input over the next month

- How to estimate technical potential of various sectors (and as low-hanging fruit is picked, how costs will be affected)? What sectors are saturated (or might be) getting saturated and what might keep that from happening?
- Host and host locations of interest include
  - Residential rooftop
    - Low and moderate income
    - Higher income
  - Commercial rooftop
    - By size category
  - Community Solar offtakers by customer type
  - Viable locations for solar canopies. For example
    - Strip malls with canopies blocking signage may be less viable
    - Corporate campuses may be more viable
  - Large scale (> 2 MW) BTM systems
  - Direct grid supply
    - Availability of brownfields, landfills, disturbed land, open space, farm land
  - Interconnection constraints and costs as it affects any of the above

Methods for Eliciting Cost Inputs

Generally like to ask for reaction to starting point assumptions

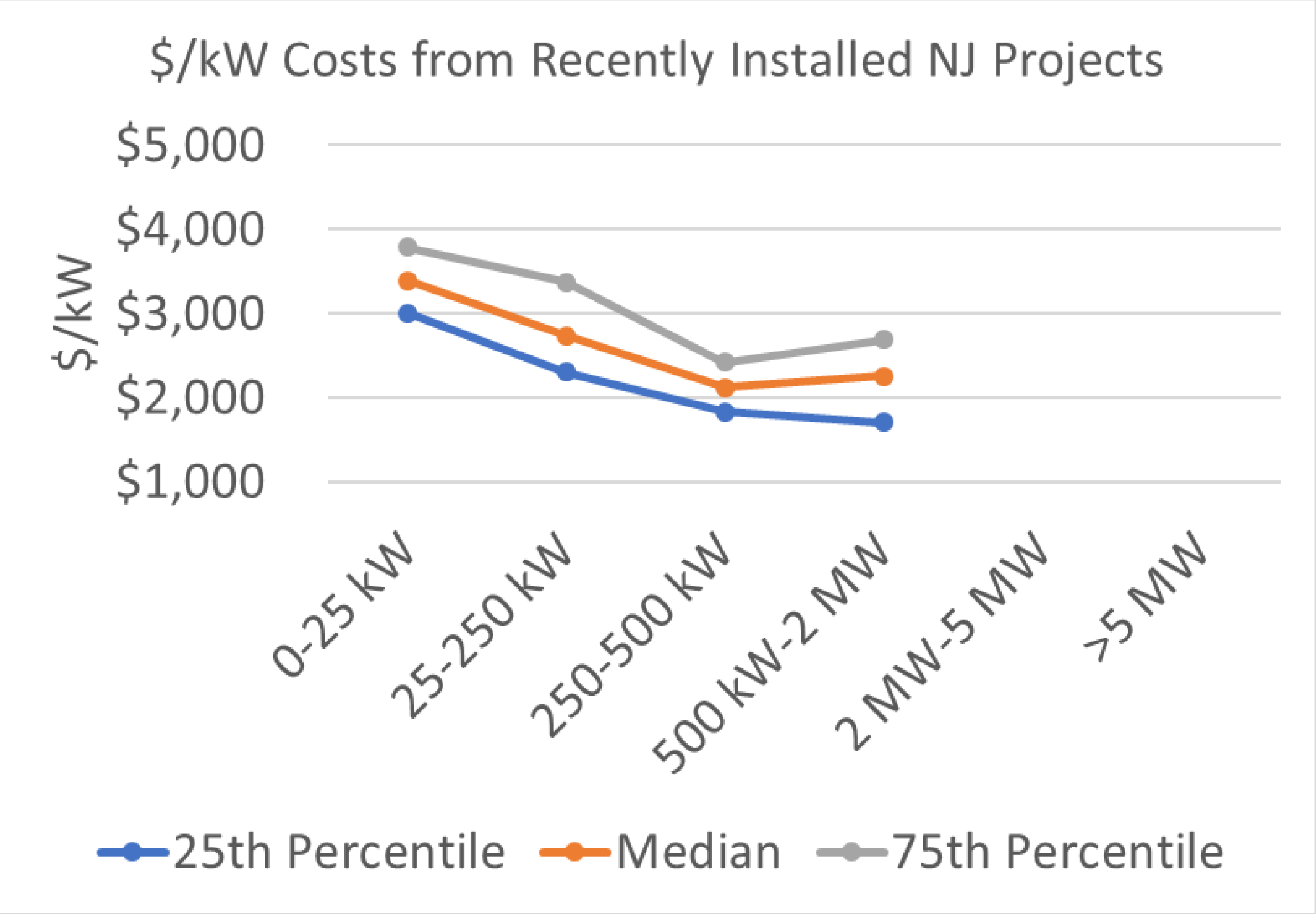
- Sources of these inputs include
  - Aggregation of confidential NJ SRP cost data
  - Analysis / leverage of public cost data from other states and federal government (e.g., NY, MA, RI, MD, CA, NREL)
  - Private source data that becomes publicly available (e.g., WoodMac/GTM reports)

- Today you as stakeholders have the opportunity to provide feedback on
  - Preliminary historic $/W installed cost statistics (NJ & NY)
  - Feedback on development cost inputs
  - Sources / ideas for estimating technical potential for different type of projects and customer classes

Preliminary Aggregated Cost Statistics

$/kW$_{DC}$ Installed Costs from Recently Installed NJ Projects (as of March 31, 2019)

Size Bin	25th Percentile	Median	75th Percentile	# of Cases
0-25 kW	$3,000	$3,390	$3,785	9561
25-250 kW	$2,301	$2,731	$3,367	139
250-500 kW	$1,833	$2,117	$2,416	16
500 kW-2 MW	$1,703	$2,250	$2,687	13
2 MW-5 MW	N/A	N/A	N/A	0
>5 MW	N/A	N/A	N/A	1



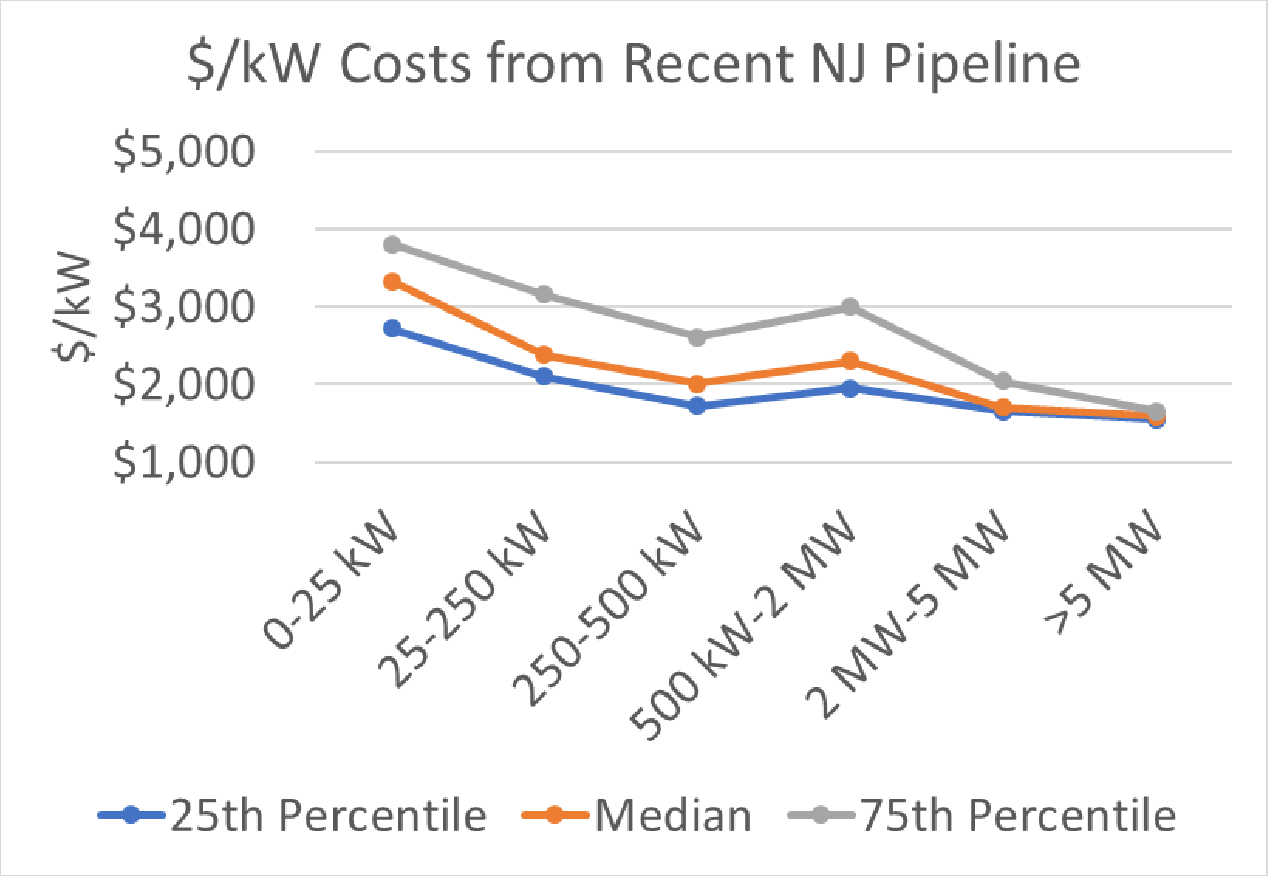
Data Cleaning Steps:

1. Remove divide by zero errors
2. Removed data <$1/W and >$10/W (assumed outliers)
3. Removed TSLA and VSLR data for 0-25 kW size bin (given "value basis" approach to reporting cost)
4. Removed all data prior to 4/1/2018 Acceptance Date (to capture last 12 months of projects)

CADMUS | Sustainable Energy Advantage, LLC

$\$/kW_{DC}$ Installed Costs from Recent NJ Pipeline (as of March 31, 2019)

Size Bin	25th Percentile	Median	75th Percentile	# of Cases
0-25 kW	$2,724	$3,326	$3,806	8138
25-250 kW	$2,100	$2,377	$3,155	624
250-500 kW	$1,725	$2,010	$2,613	140
500 kW-2 MW	$1,950	$2,300	$3,000	156
2 MW-5 MW	$1,656	$1,700	$2,040	11
>5 MW	$1,550	$1,594	$1,651	156



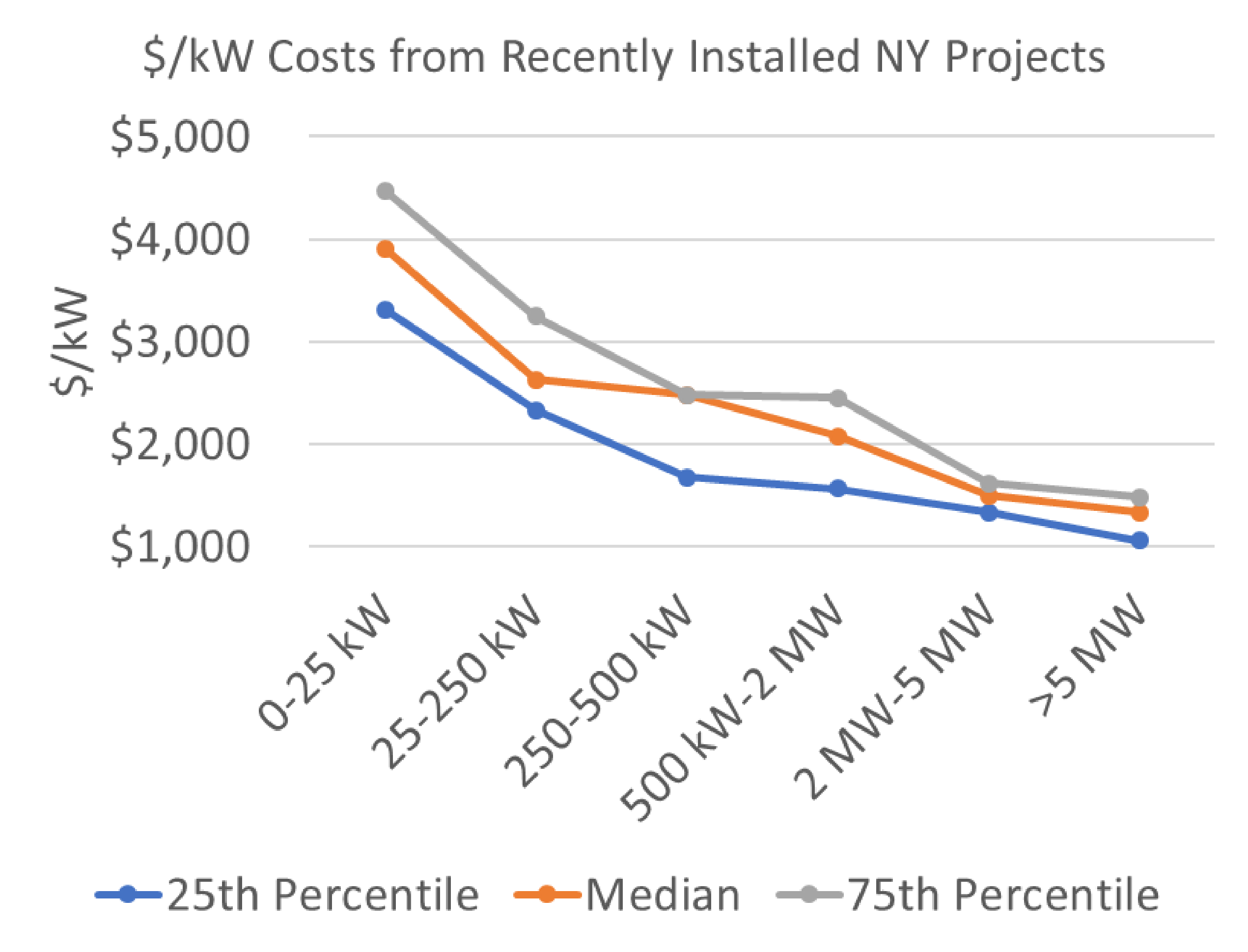
Data Cleaning Steps:

1. Remove divide by zero errors
2. Removed data <$1/W and >$10/W (assumed outliers)
3. Removed TSLA and VSLR data for 0-25 kW size bin (given "value basis" approach to reporting cost)

CADMUS Sustainable Energy Advantage, LLC

$\$/kW_{DC}$ Installed Costs from Recently Installed NY Projects (as of March 31, 2019)

Size Bin	25th Percentile	Median	75th Percentile	# of Cases
0-25 kW	$3,318	$3,910	$4,472	10,912
25-250 kW	$2,335	$2,632	$3,250	264
250-500 kW	$1,677	$2,480	$2,480	40
500 kW-2 MW	$1,570	$2,080	$2,449	33
2 MW-5 MW	$1,336	$1,501	$1,616	31
>5 MW	$1,062	$1,335	$1,483	33



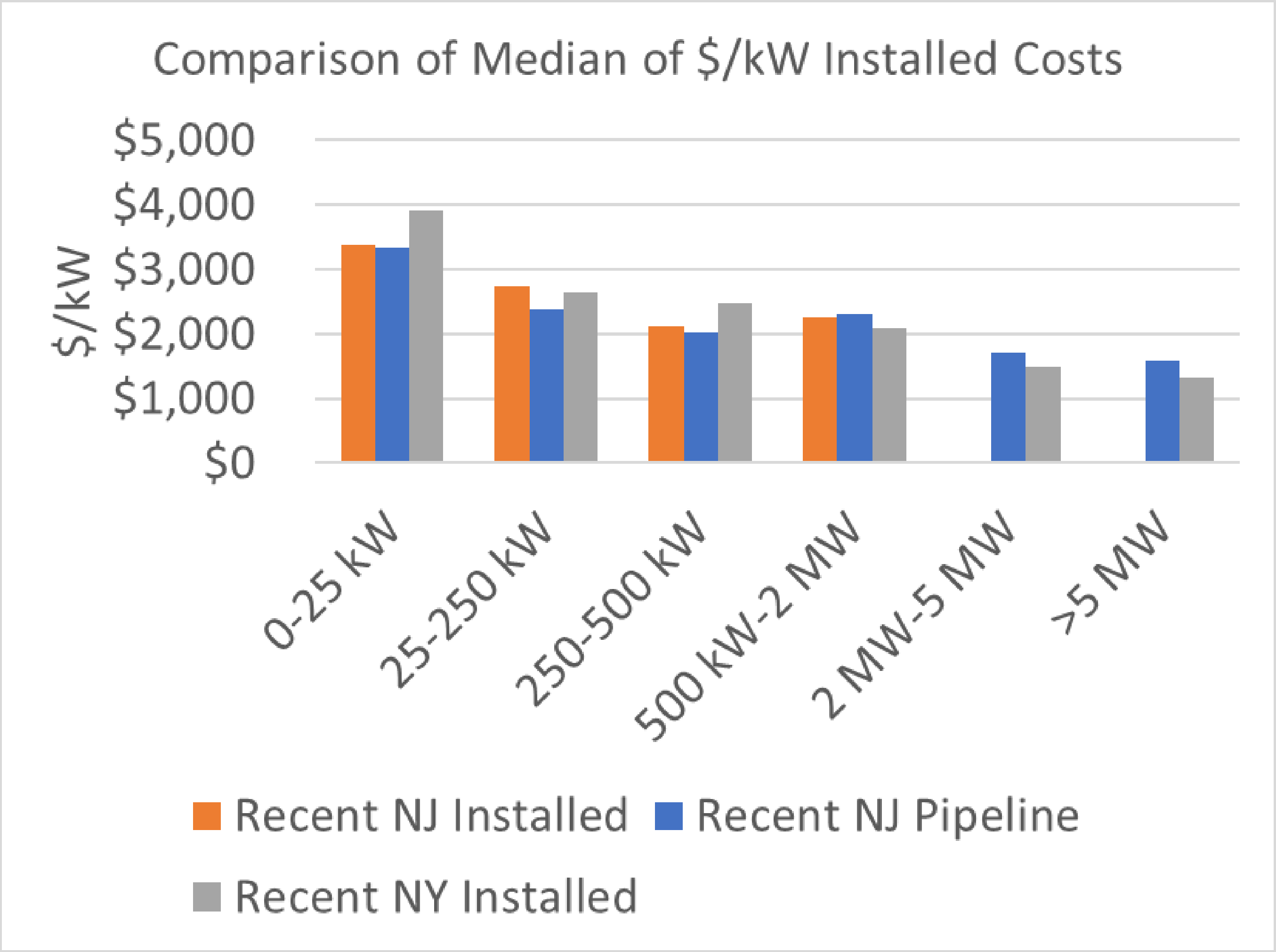
Data Cleaning Steps:

1. Remove divide by zero errors
2. Removed data <$1/W and >$10/W (assumed outliers)
3. Removed TSLA and VSLR data for 0-25 kW size bin (given "value basis" approach to reporting cost)

CADMUS | Sustainable Energy Advantage, LLC

Compare the Median (50th Percentual) $/$kW_{DC}$ Installed Costs

Size Bin	Recent NJ Pipeline	Recent NJ Installed	Recent NY Installed
0-25 kW	$3,326	$3,390	$3,910
25-250 kW	$2,377	$2,731	$2,632
250-500 kW	$2,010	$2,117	$2,480
500 kW-2 MW	$2,300	$2,250	$2,080
2 MW-5 MW	$1,700		$1,501
>5 MW	$1,594		$1,335



Moderated Q&A

Opportunity to Start Providing Feedback on Modeling Approach & Assumptions

CADMUS | Sustainable Energy Advantage, LLC

Next Steps

Reminder: Fill out Participation Survey

- You must complete the stakeholder process participation survey in order to receive future surveys
- https://www.surveymonkey.com/r/Stakholder_Process_Notice_Collector
- (that's how we'll know to send you future surveys)
- Please address all questions to Solar.transitions@bpu.nj.gov

Upcoming

- Survey: Incentive Mechanisms & Building Blocks of Policy Paths
- Survey: Cost & Technical Potential Modeling Assumptions

CADMUS | Sustainable Energy Advantage, LLC

Thank You

NJ Solar Transition

Sneak Peek: Building Blocks Comprising Alternative Policy Paths for the Successor Program

STAKEHOLDER WORKSHOP #1, MAY 2, 2019

CLOSING PLENARY (3)

BOB GRACE, SUSTAINABLE ENERGY ADVANTAGE, LLC

Disclaimer

The information and views in this presentation do not necessarily represent the views of the New Jersey Board of Public Utilities, its Commissioners, its Staff or the State of New Jersey. This presentation is provided by the Consulting Team (Cadmus and Sustainable Energy Advantage) for discussion purposes only. It does not provide a legal interpretation of any New Jersey statutes, regulations, or policies, nor should it be taken as an indication or direction of any future decisions by the Board of Public Utilities.

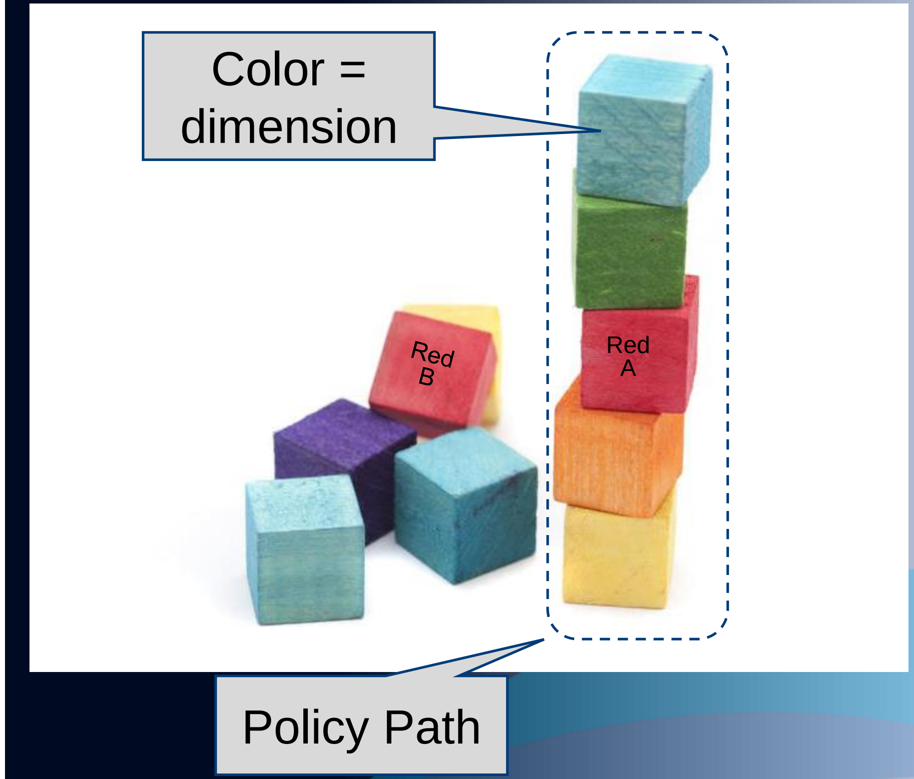
Overview

- Objectives
- Finding the NJ Solar Successor
- Example of a structure for a future policy path (from MA)
- Options for constructing policy paths for NJ
  - Potential Policy Path Dimensions
  - Potential Policy Building Blocks
- Tools & criteria for narrowing options
- Stakeholder Survey

Longer Term Objectives

Previewing June 14th Workshop

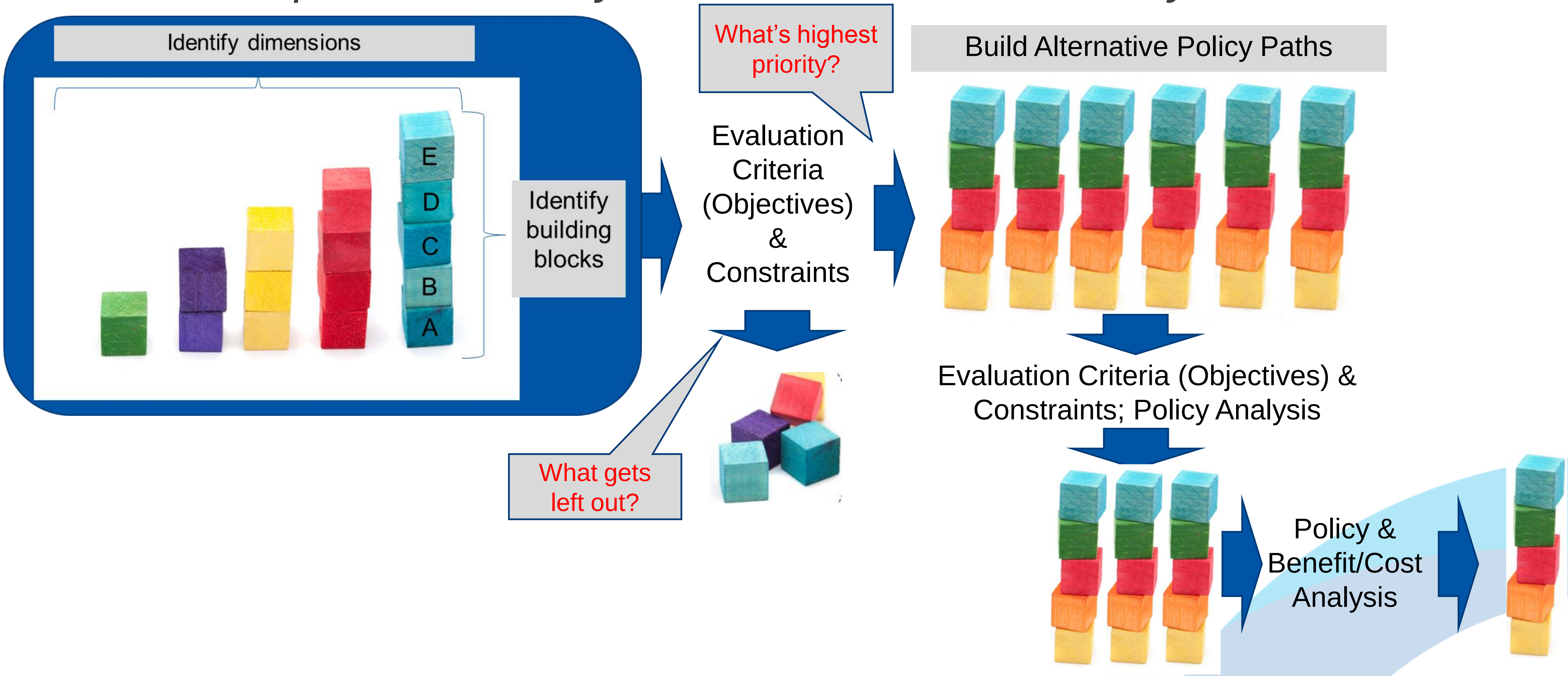
- We'll be developing *Policy Paths*
  - Alternative futures to be considered by BPU for NJ's Solar Successor program design
  - Comprised by selecting a choice from each menu
    - Thousands of possible combinations
- Aim to have a limited, but diverse and distinct set of alternatives for consideration
  - To highlight major differences
  - Doesn't preclude fine-tuning later
  - Initial goal: identify a discrete initial set of ~6 Policy Paths (next workshop)
  - With further stakeholder input: winnow to subset of preferred Policy Paths for benefit and cost analysis
- Introduce Building Blocks & Dimensions Comprising Policy Paths
  - Dimensions: Categories of issues for which there will be design options
  - Building Blocks of a Policy Path: Specific design options
- Prepare for survey seeking stakeholder input



CADMUS | Sustainable Energy Advantage, LLC

Finding the Solar Successor

Goal: Distill to preferred Policy Paths for benefit/cost analysis, recommendation



CADMUS | Sustainable Energy Advantage, LLC

Policy Path Examples

From: Massachusetts Net Metering and Solar Task Force (2015)

MA NMSTF developed 7 'Policy Paths' for consideration

Path #/Name:	Description
1. SREC Program Modifications incl. LT Contracting Pilot	Keep the current incentive model but make adjustments that reduce costs while maintaining benefits
2. Competitive Solicitations	Incentives set based on results of regular competitive solicitation to ensure only the most cost-effective installations are built, minimizing ratepayer impacts
3. Orderly Market Evolution	Offer declining block incentive (DBI) to create market certainty and lower cost of financing while transitioning away from state incentives
4. Sustained Growth Adapting to Market Changes	Incentives rates automatically adjust (up or down) to market conditions through volume-based price setting
5. Maximize federal incentives w/ Managed Growth Boost + Sustainable Growth	Incentives rates automatically adjust (up or down) to market conditions through volume-based price setting Add tailored incentive for "managed growth" sector to capture max federal incentives before 2017
6. Prioritize Distribution System	Target PV to support & enhance needs of the distribution system Max system owners' contributions the distribution system
7. Maximize Installed MW within Defined Budget	Apply measures to drive down cost premium, while limiting outlays to preset budget

Contrasting 2 illustrative policy paths

Description	3. Orderly Market Evolution Offer declining block incentive (DBI) to create market certainty and lower cost of financing while transitioning away from state incentives	7. Maximize Installed MW within Defined Budget Apply measures to drive down cost premium, while limiting outlays to explicit preset budget
Policy Analog(s)	CA Solar Incentive (CSI), New York Megawatt Block Program	Connecticut ZREC
Dimension ➜	Building Blocks ➜	Building Blocks ➜
Solar Small	• Rebates (i.e., upfront payments) • First-come, first-served (i.e., standard offer) • Rates set via declining block incentive (DBI)	• Performance-based incentive (i.e., $/kWh produced) • Incentive rates indexed to large-scale competitive solicitation rates • First-come, first-served access (i.e., standard offer) • Rates based on SRECs only
Solar Large	• Performance-based incentive (i.e., $/kWh produced) or hybrid rebate/performance-based incentive • First-come, first-served (i.e., standard offer) • Rates set via declining block incentive (DBI)	• Performance-based incentive (i.e., $/kWh produced) • Set through competitive solicitations 3X per year • Rates based SRECs only for net metered systems; SRECs and energy for virtual net metered systems
Distribution	• Separate incentive pools for each utility • Incentive adders for different system types/locations	• Incentives stratified by size
Net Metering	• Keep current net metering rates but add minimum bill or transition to Value of Solar Tariff (VOST)	• As-is or add minimum bill
Virtual Net Metering	• Limit to aggregate net metering and community shared solar • Keep current net metering rates but add minimum bill or transition to Value of Solar Tariff (VOST)	• Sunset virtual net metering • Implement buy-all, sell-all compensation
NM Caps & Timing of Transitions	• Remove net metering caps before transition • Transition target: end of SREC II or 1/1/17 (end of federal incentives)	• Remove net metering caps before transition • Transition target: 1/1/17 (end of federal incentives)
Targets, Constraints	• MW goal with fixed-quantity blocks, no firm timeline	• Total MW limited by pre-defined program budget
Quantity Target, Timeline	• 2,500 MW at program close	• Whatever budget supports by program 2025

Policy Path Dimensions

Potential Candidate Dimensions to Consider

- Solar Incentive (Small vs. Large)
  - Incentive mechanism / payment structure
  - Incentive price-setting mechanism
  - Incentive changing mechanism
  - Incentive duration
  - Scope of hedge/payment structure
- Installation Diversity
- Co-incentives
  - Net Metering Approach (Projects sized to load, oversized/VNM)
  - Community Solar
  - Solar w/ Storage
- Market Scale and Timing
  - Timing of/Trigger to Start of Successor (to be determined by BPU in context of Transition Incentive design)
  - Quantity Target Trajectories, Timelines & Constraints
  - Incentive Payment Cap: Design Details
  - Scale of PV Market, Pace of Target Growth

Building Blocks for each Dimension

Solar Incentive: Potential Mechanisms & Payment Structures

Incentive Mechanism & Payment Structure	Comments / Observations
Contract	Contract with EDC or other entity
Tariff	EDC Tariff (reduced transaction cost burden when many installations)
SREC – NJ Legacy Market Continuation	Potentially different incentive values (e.g., SREC Factor of 0.7), but same SREC market
SREC II	New SREC II market & structure, separate from current / legacy SREC Market
Upfront Cost Reductions	Typically focused on smaller participants; sometimes applied as hybrid with other incentive mechanisms (grant/PBI, like NY Sun)
Performance Based Incentive (PBI)	All the above use or could use a PBI (e.g., $/kWh) payment structure; except “Upfront Cost Reductions”, unless there is a claw-back mechanism
None	The ultimate goal?
Other?	

CADMUS | Sustainable Energy Advantage, LLC

Solar Incentive:
Potential Price-Setting Mechanisms & Durations

Incentive Price-Setting Mechanism	Comments / Observations
Standard Offer	Open offer (with or without a volume or cost cap) Variants include: Cost based, value based (i.e., avoided costs), or competitively-derived
Competitive Solicitation	Buyer selection is a gating factor e.g., RFPs, tenders, auctions (many different flavors: price-only vs. multi-attribute, etc.) offering predictable long-term revenue stream
Market-Based	Variants include: SREC (no floor), SREC w/ firm floor, SREC w/ supply adjusted demand and soft floor. SREC Factors can overlay with any variant
Other?	

Incentive Duration	Comments / Observations
Years	Number of Years, e.g. 10 - 25 years
Stages?	For example, SREC eligibility for 10 years, then Class I REC eligibility for 15 years
Other?	

Solar Incentive:
Potential Price- Changing Mechanisms

Solar Incentive Changing Mechanism	Comments / Observations
Administratively-determined	e.g., objective independent analysis establishes rate. Variants include: • lead time on when to reset incentive • reset applicable to all projects or only new projects (i.e., grandfathering the incentive), • criteria for incentive reset (e.g., stalled market → higher incentive)
Declining Block Incentive (DBI)	Variants include: • Size of blocks, • Blocks as volume vs. time • block-to-block incentive change, • queuing and attrition rules (do projects move up incentive blocks if projects ahead of them drop out?)
Adjustable Block Incentive	Variant of DBI, but allows incentives to increase when market stalls (e.g., CA ReMAT)
Market-Based	Like NJ legacy SREC program, creates demand Variants include: • Technology-specific RPS tier or carve-out (SREC vs. Class I) or head-to-head with other technologies • REC Multipliers
Other?	

Solar Incentive:
Potential Scopes of Hedge / Payment Structure

Solar Incentive Scope of Hedge / Payment Structure	Comments / Observations
Fixed Price	For example, a fixed all-in price $/kWh PBI for all production from a solar array • Easy to envision for a stand-alone project with no host load • For BTM projects may only be applicable to all exported generation
Fixed Premium	For example, a fixed all-in price $/kWh PBI for all production (e.g., RECs) from a solar array, but is in addition to any other (commodity revenue or costs avoided) • For a BTM project the premium would be on top of the avoided retail rates • For a stand-alone project the premium would be on top of QF / wholesale rates
Floating Premium	• SREC
Contract-for-Differences	• e.g., a monthly floating $/kWh PBI where the sum of the floating premium and the value of production would equal a fixed $/kWh target renumeration level
Other?	

CADMUS | Sustainable Energy Advantage, LLC

Installation Diversity/Encouraging Targeted Types

Choices, choices, choices

- Un-stratified
  - Head-to-head, low price/low premium wins
- Stratified by size
  - sub-tiers of specified size
- Stratified by type
- MW allocated by EDC pro-rata to load
- What Favored (disfavored)? e.g.,
  - Brownfields / landfills / solar canopy
  - Municipal host or ownership
  - Aggregate (common ownership, municipalities)
  - Community Solar
  - Low-income
  - Support/enhance distribution system
  - Host-owned vs. 3rd-party-owned
- How favored? e.g.,
  - SREC Factors
  - Co-incentives (e.g., up-front grants)
  - Segmentation of incentive, or competitive points
- Design choice can have the effect of (for example)…
  - Favoring national/large players, or maintaining a role for local firms too
  - Impacting degree to which policy supports adding permanent local jobs

Co-incentives

Traditional and Community Solar Net Metering

- How is Solar Successor Policy designed to interact with net metering approach?
- What is degree of integration of Successor Policy with net metering?
  - For traditional net metering (BTM, sized to monthly load)?
  - For virtual net metering as a component of Community Solar?
  - Options: Successor incentive is:
    - Separate and in addition to benefits of net metering (e.g., current NJ SREC policy, MA SREC I & II)
    - Reduced to reflect benefits of net metering (e.g., MA SMART, RI REGrowth)
    - Other?

Co-incentives

Energy Storage

- For a Successor Program solar project that implements a (co-located or virtually paired) energy storage system, what is the degree of integration/interaction of the Successor Policy with solar w/storage?
- Issues:
  - If incremental cost of adding energy storage < incremental benefit. Successor incentive is:
  - Separate and in addition to benefits of energy storage (upside is additive to generator)?
    - Reduced to reflect net benefits of adding energy storage (allowing more solar to be developed under rate cap)?
    - Other?
  - Treatment of round-trip charge-discharge losses when solar used to charge storage
    - # of kWh to which a PBI incentive applies is reduced (Combined output of solar+storage measured)
    - # of kWh to which a PBI incentive applies is not reduced (solar production measured prior storage injection)
    - Other?
  - Other Metering & interconnection issues (beyond our scope)

Potential Quantity Target Trajectories, Timelines & Constraints

- Meet MWh goal on a firm temporal schedule (e.g., SREC)
- Meet MW Goal on a firm (or quasi-firm) temporal schedule (e.g., RI REGrowth, VT)
  - If so, can attrition or shortfall be rolled forward to later years? (Yes, No)
- Meet MW Goal without a firm timeline (e.g., MA SMART, DBI in NY, CA)
- Budget limited (quantity moves inversely with price) (e.g., CT ZREC)
- Any of above, subject to a rate cap or cost cap constraint
- Unconstrained (e.g., uncapped standard offer, PURPA avoided cost rates, etc.)
- Other?

Incentive Payment Cap: Design Details

- The cost cap defines the maximum level of incentive allocation to the Successor Program, but it still leaves open some policy design options, e.g.:
  - If one customer segment can’t keep up with its MW Targets, should the MW be reallocated to a “more successful” customer segment? (e.g., RI, CT)

Potential Scale of PV Market, Pace of Target Growth

- Scale:
  - Administratively-determined MW by 2030
  - Specific share of broader (50% renewables by 2030) goal
  - Should the Successor Program be structured to use as much of the cost cap as possible?
  - Other?
- Pace:
  - Maintain recent historical status quo MW/yr buildout
  - Acceleration of MW/yr over time
  - Decelerate MW/yr over time (reflecting some segments becoming economic without incentives while others still require incentive)
  - Other?

Tools for narrowing the Policy Paths

Binding constraints

What can, and can't, 'give' to fit within cost caps?

- ✓Binding constraints (how to fit the rate cap?) Can vary:
  - ✓ RPS (non-solar) targets
  - ✓ Market scale
  - ✓ Market segmentation priority

Approach ➔	Size and Segmentation are binding	Size and RPS targets are binding	Segmentation and RPS targets are binding
Size of Solar Market (MW)	Fixed	Fixed	Scale market to fit within cap
Solar Segment Market Share	Fixed (e.g. historical share)	Shift towards lower cost segments to fit within cap	Fixed (e.g. historical share)
RPS (non-solar) targets	Reduce targets to fit Solar Successor within cap	Fixed	Fixed

Policy Paths will ultimately be narrowed in Consultant Analysis

Later in the process, considering factors such as…

- Objectives
  - BPU Transition Principles
  - Stakeholder objectives from Breakout #1
  - Some will conflict
- Evaluation criteria
  - Crafted based on objectives
  - Prioritized
- Structural continuity with Transition Incentive
  - Scale
  - Approach (different businesses will or won't fit certain structures)
- Application of constraints
  - e.g., subject to statutory rate cap
- Cost / Benefit analysis
  - Much later in process

Board to make decisions on the Solar Transition based on their criteria, *with Consultant's analysis to provide input for Board's consideration.*

Stakeholder Survey

Stakeholder Survey

To be issued in the period before next Stakeholder Workshop (June 14)

- Seeking input to help define and prioritize the building blocks for consulting team to use in building Policy Paths for upcoming analysis

Thank You

State of New Jersey
Board of Public Utilities

CADMUS

Sustainable Energy Advantage, LLC

NJ Solar Transition

Wrap Up & Next Steps

STAKEHOLDER WORKSHOP #1

MAY 2, 2019

Next Steps

Bob Grace, Sustainable Energy Advantage, LLC

Reminder: Fill out Participation Survey

- You must complete the stakeholder process participation survey in order to receive future surveys
- https://www.surveymonkey.com/r/Stakholder_Process_Notice_Collector
- (that's how we'll know to send you future surveys)
- Please address all questions to Solar.transitions@bpu.nj.gov

Upcoming

- Survey: Incentive Mechanisms & Building Blocks of Policy Paths
- Survey: Cost & Technical Potential Modeling Assumptions

Next Stakeholder Workshop:
Friday, 14 June 2019, 10 AM – 4 PM, Newark

- New Jersey Institute of Technology
  150 Bleeker Street, Newark, NJ 07102
  The Atrium, first floor of Campus Center

Topics (from April 8, 2019 Notice):

- Findings from the surveys
- Potential policy pathway elements and dimensions
- Potential incentive mechanisms and policies
- Cost and technical potential modeling assumptions
- Potential MW targets and incentive caps for Transition incentive
- Experience of other states

CADMUS | Sustainable Energy Advantage, LLC

Thank You