State of New Jersey
Board of Public Utilities

CADMUS

Sustainable Energy Advantage, LLC

NJ Solar Transition

Introduction to the Process & Consulting Team

STAKEHOLDER WORKSHOP #2

JUNE 14, 2019

Opening Remarks

BPU

- Welcome
- Process and Consulting Team

Today’s Workshop

Bob Grace, Sustainable Energy Advantage, LLC

- Purpose of today’s workshop
  - Review NJ SREC program and experiences from other states
  - Discuss modeling analysis for Transition Incentive
  - Get stakeholder feedback on the potential policy pathways and incentive mechanisms for the Transition Incentive
  - Introduce potential policy pathways for the Successor Program
  - Review the cost and technical potential survey sent out to stakeholders
- Agenda
- Consulting Team / Facilitators
- Housekeeping items
- Q&A

Disclaimer

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Agenda

Time	Agenda Item
10:00-10:25 AM	• Opening Remarks
10:25 – 11:10 AM	• Plenary #1: Incentive Taxonomy, Experience in NJ and Elsewhere
11:10 – 12:00 PM	• Plenary #2: Transition Incentive - Modeling under Hypothetical Alternatives
12:00 – 12:50 PM	• *Lunch (participants are responsible for own lunch)*
12:50 - 1:20 PM	• Plenary #3: Transition Incentive Policy Pathways
1:20 - 1:30 PM	• *Transition to Breakouts*
1:30 – 2:45 PM	• Breakout: Policy Pathways for Transition Incentive
2:45 – 2:55 PM	• *Break & Return to Presentation*
2:55 – 3:10 PM	• Breakout Session Debrief
3:10 – 3:35 PM	• Plenary #4: Successor Program Candidate Policy Pathways
3:35 – 3:55 PM	• Plenary #5: Cost & Tech Potential Survey Discussion
3:55 – 4:00 PM	• Closing Session: Wrap Up, Next Steps & Adjourn

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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
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Jim Kennerly
SEA Sr. Consultant
Workshop, Interview Support

Courtney Ferraro
Cadmus Sr. Analyst
Workshop, Interview Support

Chad Laurent
Cadmus Principal
SEP Sr. Contributor

Kate Daniel
SEA Consultant
Workshop, Interview Support

BPU Staff will co-facilitate workshop breakouts

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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

Thank You

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NEW JERSEY SOLAR TRANSITION

Incentive Policy Options: Taxonomy & Terminology

STAKEHOLDER WORKSHOP #2

BOB GRACE, SUSTAINABLE ENERGY ADVANTAGE, LLC

JUNE 14, 2019

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Overview

- Identifying Policy Options (Paths) for Transition Incentive (TI) and Successor Program (SP)
- Policy Objectives ➔ Design Criteria for Policy Paths
- Solar Incentive Policies: Taxonomy & Terminology
- Solar Incentive Policies: Applicability to TI and SP (knockouts)

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Identifying Policy Options (Paths)

for Transition Incentive and Successor Program

1. What are we trying to accomplish? Identify and prioritize applicable design criteria
2. Categorize incentives that are applicable to NJ Solar Transition (taxonomy)
3. Describe key features & design options / choices for applicable incentive categories
4. Identify alternative approaches for Transition Incentive and Successor Program
5. Identify other major design issues and options needed to fully define a policy path
6. Develop Transition Incentive candidate policy paths
7. Applying applicable design criteria, select preferred Transition Incentive policy paths

8. Develop SP Incentive candidate policy paths
9. Applying applicable design criteria, select preferred SP policy paths

Design Criteria

Developed from Objectives

Translating NJ Transition Principles into Design Criteria

Transition Principles	Design Criteria
• **Provide maximum benefit to ratepayers at the lowest cost**	• **Maximize ratepayer benefit** • **Minimize ratepayer cost**
• **Support the continued growth of the solar industry**	• **Support solar industry growth**
• **Ensure that prior investments retain value**	• **Ensure 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**	• **Meet 50% Class I RECs by 2030**
• Provide insight and information to stakeholders through a transparent process for developing the Solar Transition and Successor Program	• **N/A**
• **Comply fully with the statute, including the implications of the cost cap**	• **Binding Constraint: Comply with Rate 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	• **N/A**

Translating Objectives from SWS#1 into Design Criteria

Develop Design Criteria

Step: Identify & Articulate Stakeholder Objectives

Process:
- SWS#1

Step: Prioritize Stakeholder Objectives

Process:
- SWS#1 breakout
- Consultants further synthesized

Step: Translate Objectives into Prioritized Design Criteria

Process:
- Consultants drafted
- Stakeholders react

Apply Design Criteria

Step: Evaluate Transition Incentive Policy Paths

Process:
- SWS# 2
- Narrow options for BPU consideration

Step: Evaluate Successor Program Policy Paths

Process:
- Consultants introduce at SWS#2
- Stakeholder input

Translating Objectives from SWS#1 into Design Criteria

Objective from SWS#1	Primary Design Criteria	Transition Incentive	Successor Program
• Fairness to Those Who Have made Past Commitments and Those Who Will Make Future Commitments	1. Fair to those who have made past commitments 2. Fair to those who will make future commitments	✓	✓
• Transparency	3. Clarity and transparency regarding project eligibility and status 4. Implements a fair and transparent process for scrubbing non-performing project from qualification queuing procedures	✓	✓
• Minimize Market Disruption	5. Minimizes market disruption (minimize high transition costs)	✓	✓
• Support Steady Industry Growth	6. Supports Steady Industry Growth	✓	✓
• Favor support to open or rolling market incentives vs. scheduled procurements	7. Maximizes certainty of incentive access	✓	✓
• Minimize Complexity	8. Minimizes Complexity	✓	✓
• Maximize Solar PV Installation Growth	9. Maximizes Solar PV Installation Growth	✓	✓
• Focus on Feasible Implementation	10. Feasibility	✓	✓

Translating Objectives from SWS#1 into Design Criteria

Objectives from SWS#1	Secondary Design Criteria	Transition Incentive	Successor Program
• Ensure Cost Effectiveness	11. Maximize cost-effectiveness (biggest bang for the buck, most MW per ratepayer $)	✓	✓
• Minimize Ratepayer Impact	12. Minimizes Ratepayer Impact. 13. Maximizes ratepayer net benefit (including environmental considerations)	✓	✓
• Transition to Sustainable Market by Reducing Incentive Over Time	14. Reduces incentive levels over time		✓
• Balance solar development between the built environment and green space	15. Maximizes solar development on disturbed land/minimizes reliance on green space		✓
• Encourage Installation Type Diversity	16. Encourages Installation Type Diversity		✓
• Minimize Financing Risk	17. Minimizes Financing Risk	✓	✓
• Encourage Participant Diversity	18. Encourages Participant Diversity		✓
• Create & Keep Permanent In-State Jobs	19. Maximizes near-term jobs in NJ 20. Maximizes long-term jobs in NJ		✓
• Prioritize Competitive Market Structures	21. Maximizes use of competitive market mechanisms 22. Maximizes compatibility with competitive wholesale energy markets 23. Maximizes compatibility with competitive retail energy markets		✓
• Accelerate implementation, timeliness of Transition	24. Allows timely implementation	✓	
• Support PV Location Where Most Needed	25. Support PV Location Where Most Needed		✓

Solar Incentive Policies

Taxonomy & Terminology

Steps to Policy Path Choices

Step 1 Categorize Incentives that are Applicable to NJ Solar Transition

Category	Subcategory / Examples	Applicable to "NJ Solar Transition"	Comment
Direct Up-front Incentive	Pre MA SREC I Grants	X	No funding source to pay for sizable amount of incentive
Direct Long-term Revenue Hedge (L.T. Hedge)	Feed-in Tariff / Standard Offer / PBI Contracts or Tariff	✓	MA SMART, RI REG
	Competitive Long-term PPA	✓	CT ZREC, NY Wind
	L.T. Value of Solar	?	Very hard to implement. Most successful example is NY VDER, a continual work in progress
	Technology-Specific "Avoided Costs"	X	e.g., FERC long-term avoided cost rates. Uncapped, thus, no cost cap limits
Demand-Pull / Demand Obligation (D.O.) w/o Revenue Hedge	RPS / SREC Markets	✓	NJ SREC, MD SREC
Hybrid D.O. / Long-Term Hedge	SREC w/ Floor	✓	MA SREC I & II (Sort of)
Indirect Financial Incentives	Emission Markets	N/A	Exogenous; taken into account
Expenditure-based Tax Incentives	Tax Credit	N/A	Exogenous; taken into account
Net Metering (NM)	NM crediting mechanism, Virtual NM (VNM) Crediting Mechanism, Community Solar	N/A	Co-incentive; taken into account

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Key Features & Design Choices

Direct Long-term Revenue Hedge

- Key Features
  - Provides a long-term "bankable" fixed price "hedged" revenue stream that leads to overall lower financing costs (as revenue risk has been diminished vs. non-hedged revenue)
- Major Design Choices
  - Products Purchased – Attributes only or bundled
  - What to Hedge
    - Premium for environmental attributes, but not energy attributes (e.g., provide a fixed price SREC for the environmental attributes, but let value of the net metering credits vary with the BGS auction results and other market factors)
    - Both premium and energy attributes (e.g., a Standard Offer price for the combined value of the energy, capacity and environmental attributes, or Contract-for-Differences where environmental incentive value varies inversely with energy value and thus energy and environmental values sum to a fixed combined value)
  - Access
    - Open – Once incentive price level is set, no constraint on accessibility of incentive (e.g., FERC QF); if time-limited, queueing procedures apply
    - Open subject to quantity limit and queueing procedures – e.g., MW Block cap
    - Competitive event limited – Entry subject to competitive selection and event frequency
- How to set initial price levels
  - Cost-based (administratively set)
  - Value-based (e.g., FERC QF or Value of Solar tariff) Standard Offer price levels set by BPU)
  - Competitively-set (procurement result, e.g., clearing price, as-bid price)
  - Competitively-derived (e.g., large projects bid to set anchor price, prices for smaller projects set as multiplier of the larger projects' price level)
- Change in Price Levels
  - Preset changes when MW block cap fill up or MW time block expires (e.g., declining block incentive, adjustable block incentive)
  - Periodically administratively reset
  - Periodic competitive bids and thus price resets
- Counterparty
  - Generally EDCs (regardless, needs to be an entity with deep pockets so that revenue stream is "bankable"), who uses or resells products purchased

Key Features & Design Choices

Demand-Pull / Demand Obligation (D.O.) w/o Revenue Hedge

- Key Features
  - Provides a market-based incentive where incentive (e.g., REC or SREC) price is a function of supply, demand and price cap (ACP) → incentive price is volatile and thus "unhedged".
  - The risky revenue stream leads to overall higher financing costs (as revenue risk is greater than with hedged revenue).
  - Incentive only covers the "environmental" attributes, and the energy / capacity is valued via different means
- Major Design Choices
  - How to set market REC / SREC rules?
    - What percent of retail load to set RPS minimum standard (M.S.) to establish demand
    - How M.S. changes over time (e.g., via legislation, via formula, via administrative decision)
    - What is the maximum price (i.e., ACP, could be high e.g., NJ, DC, MA SREC markets, could be low e.g., MD SREC market)
    - What sets a price floor.? NJ Class I RECs are the *de facto* backstop price for NJ SRECs. For NJ Class I RECs the *de facto* backstop price is the highest Class I price for other PJM markets
    - Who can "bank" REC / SRECs (LSEs, generators, any entity)
    - For what duration are RECs / SRECs eligible? [within a single year? over X years?]
- Counterparty
  - Generally Load Serving Entities (LSEs)

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Key Features & Design Choices

Hybrid D.O. / Long-Term Hedge

- Key Features
  - Demand Obligation with a price floor to provide a revenue hedge
- Major Design Choices (beyond those already provided on previous slide)
  - Soft floor vs. firm floor
  - Extent of hedge availability: for all, or limited subset of supply?
  - Mechanisms to set a firm floor price:
    - Who is the credit-worthy 'buyer-of-last-resort' counterparty to purchase the SREC? (e.g. an EDC or the State of NJ, and if not the State, how is EDC induced to act as a counterparty?)
    - What fraction of target eligible to receive the floor?
      - Ex.: PSEG Solar Loan III = a hard-floor open to a subset of the market volume
    - What is the price of the hard-floor?
    - Do participants have to bid to get a fixed hard-floor price, or is it open to all market participants?
- Mechanism to set a soft-floor price (only industry example) coupled soft floor through a 'clearinghouse auction' with a supply responsive demand obligation (e.g., MA SREC I & MA SREC II).
  - Under surplus conditions, demand increased in subsequent years by volume of re-minted SRECs purchased in auction to stimulate demand and support price
  - 'Soft' because (i) no guarantor and (ii) time value of money discount to auction floor
  - Clever construct provides stability in absence of 'buyer of last resort'
  - Choices include: Floor price, how many years of additional eligibility for re-minted SRECs, how and to what degree the demand increases in subsequent years

Alternative Approaches:

Direct Long-Term Revenue Hedges/PBIs:

Alternative Structures	T.I. Small	T.I. Large	S.P. Small	S.P. Large
Cost-Based PBI Tariff: DBI (Open)	X	X	✓	✓
Cost-Based PBI Tariff: ABI (Open)	X	X	✓	✓
Cost-Based PBI Tariff: Admin-established price; periodic reset (Open)	✓	✓	✓	✓
RFP/Auction/Tender Competitive Long-Term PPA (Closed)	X	✓	X	✓
LT Value of Solar Tariff (Open)	X	X	✓	✓ Except utility-scale/grid-connected

Alternative Approaches:

Demand Obligation, Conventional or Hybrid

Alternative Structures	T.I. Small	T.I. Large	S.P. Small	S.P. Large
SREC within existing tier (legacy market continuation) with SREC Factors	X	X	X	X
Separate RPS tier for solar (SREC II)	✓	✓	✓	✓
Separate RPS tier for solar (SREC II) with SREC factors	✓	✓	✓	✓
SREC II with Soft Floor (like MA, supply-response demand formula + clearinghouse auction)	X	X	✓	✓
SREC II with an open firm floor price mechanism (buyer of last resort)	X	X	✓	✓
SREC II with an limited firm floor price mechanism (quantity-limited RFP/buyback)	✓	✓	✓	✓

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Other Major Design Features

So many variants, so little time

- Policy Path-Independent
  - Installation Diversity/favoring mechanism – SREC Factors for D.O. or different incentive values for a Direct Long-term Revenue Hedge
  - Net Metering Interaction – whether the incentives are independent of, or a function of, the net metering rates
  - Trajectory of Incentive Scale – how does the incentive hedge value or SREC ACP change over time
  - Duration of Incentive – How many years (10, 15, 20) does the PBI incentive last
  - Who is allowed to play in the market (e.g., only PV connected to the in-state distribution system [e.g., NJ SREC], any "renewable" MWh delivered to PJM [e.g., NJ Class I])
    - Is eligibility restricted to those that don't get other energy incentives (e.g., precluded from getting incentive if also getting net metering)? The RI REGrowth program, while not a D.O., imposes this restriction
- Policy Path-Dependent Features
  - For Direct Long-term
    - Revenue Hedges: MW Blocks vs. Time Block vs. no blocks
    - Predictability of Annual Market Scale – Is the number of MWs program-based (and thus indifferent to how many MW qualified in a year) or controlled by MW block size for a time period
    - Portability of Incentives btw. segments – e.g., if a time block ends and the MWs qualified does not attain some goal, does it roll over or is it taken up by a different segment?
  - How to differentiate incentive by EDC – e.g., based on the (expected) value of net metering credits, varying SREC Factors by EDC or varying incentives by EDC

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New Jersey Solar Transition

Preliminary Findings from Assessment of New Jersey and Alternative Programs

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Overview

- To help inform policy path forward, helpful to look at and assess precedent, what others are doing or have done
- Touch on salient positive and negative aspects of New Jersey's SREC program
- Look at selected states also served by PJM Interchange: Illinois, Maryland, North Carolina, Pennsylvania, and Virginia
- Highlight solar incentives from other regional markets active in solar: Massachusetts, New York, Connecticut, and Rhode Island markets
- These other states' incentives will also provide guiding examples of different mechanisms under consideration today

Preliminary Assessment of New Jersey Solar Carve-Out

New Jersey: RPS Solar Carve-Out

Program/Incentive Name	Solar Carve-Out under Renewable Portfolio Standard
Incentive Type	Demand Obligation
Structure	• Solar carve-out of 0.01% electricity sales in 2004 to 5.1% in EY 2021 • Third-Party Suppliers and Basic Generation Service required to procure certain percentage of electricity they sell from solar • SREC available for compliance in energy year (EY) of generation or following 4 EYs
Pricing	• Market-based price for environmental attributes • Traded on PJM GATS, ICE, through aggregators/brokers • Multi-year SACP acts as ceiling
Other Features	• One SREC for all • Since Solar Act of 2012, larger projects require BPU review (Subsections q-t) • 15-year eligibility (until recently) • In-state projects only

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Analysis of RPS Solar Carve-Out

	Positive	Negative

Internal	**STRENGTHS**
	• Benefits from competition
	• Deep, liquid market
	• Design choices provide:
	  o flexibility for compliance
	  o opportunities for hedging instruments
	• Program administration
		WEAKNESSES
		• Legislative/regulatory intervention
		• Volatility, boom-bust cycles
		• Regulatory risk
		• Single SREC
		• Cost
		• Responsiveness to project costs
		• Complexity

External	**OPPORTUNITIES** • Energy storage • Net metering	**THREATS** • Solar project development requirements (interconnection, permitting, etc.) • Net metering • ITC sunset • Module tariffs

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Preliminary Assessment of PJM Markets

Illinois

Program/Incentive Name	Renewable Portfolio Standard
Incentive Type	Demand Obligation
Structure	• Solar Carve-out: 0.5% *of the RPS* starting in EY 2013 rising to 6% EY 2016 and beyond (that translated to 0.0035% sales in EY 2013 up to 1.5% by EY 2026) • Illinois Power Agency (IPA) procures SRECs for the IOUs • Alternative retail suppliers meet at least 50% of RPS with ACPs
Pricing	IPA runs annual procurement RFP, resulting in bilateral agreements
Other Features	• RPS also had DG carve-out starting in EY 2014 up to 1% (of RPS) by EY 2016; 50% meant to come from systems <25kW; can be used to satisfy PV carve-out • Solar from in-state and adjoining states prioritized but then can look beyond • Supplemental PV Procurements
Other Solar Incentives	• **NEW**-ish: Future Energy Jobs Act (see next)

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Illinois – PBI

Program/Incentive Name	Adjustable Block Program
Incentive Type	Long-Term Hedge
Structure	• Declining block incentive • Fixed-price, 15-year contracts from IOUs to purchase SRECs from distributed generation (DG) and community solar (CS) projects • Volumetric blocks with flexibility to front-load depending on demand
Pricing	• First block prices set administratively by IPA, then drop 4% • Up to 10 kW (small DG): full payment on operation • >10 kW up to 2 MW (large DG): 20% paid upfront, balance over 4 years
Other Features	• 2 geographic groups: within each group, allocations among three project size categories: 25% small, 25% large, and 25% for community solar (additional 25% discretionary) • Brownfield

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Maryland

Program/Incentive Name	Renewable Energy Portfolio Standard
Incentive Type	Demand Obligation
Structure	• Solar Carve-Out from 0.005% in 2008 up to 2.5% for 2020+ (*but see below*) • 3-year life • Maryland PSC reviews all applications for RE technologies
Pricing	• Market-based price for environmental attributes • Multi-year SACP acts as ceiling • Trading through GATS or through aggregator/broker
Other Features	• Only in-state projects eligible effective 2011 • Solar water heaters qualify for solar carve-out • SRECs for projects <10 kW calculated from PVWatts
Other Solar Incentives	• **NEW**: 50% Renewables by 2030, including 14.5% solar requirement!! • 2015 three-year community solar pilot; permanent program expected soon

North Carolina

Program/Incentive Name	Renewable Energy and Energy Efficiency Portfolio Standard (REPS)
Incentive Type	Demand Obligation
Structure	• Solar Carve-Out: 0.02% solar by 2010 → 0.2% solar by 2018 (through 2021) • Cost caps by customer sector • Administered by North Carolina Utilities Commission (NCUC)
Pricing	• No explicit SACP • NC has its own REC tracking system
Other Features	• RECs must be purchased by electric power supplier within 3 years of generation and retired within 7 years of cost recovery • Various solar-driven technologies beyond PV are applicable • Up to 25% RPS compliance from out of state (no limit for small utilities)
Other Solar Incentives	• PURPA • State Renewable Energy Tax Credit

Pennsylvania

Program/Incentive Name	Alternative Energy Portfolio Standard
Incentive Type	Demand Obligation
Structure	• Solar Carve-out: 0.0013% in RY 2007 to 0.5% by RY 2021 • 3-year life
Pricing	• SACP calculated at 2x weighted average Solar Alternative Energy Credit (i.e., *ex post*) • Trading through GATS or through aggregator/broker
Other Features	• Projects in PJM territory eligible until October 2017
Other Solar Incentives	• **NEW**: Finding Pennsylvania's Solar Future: 10% from in-state solar by 2030

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Virginia

Program/Incentive Name	*Voluntary* Renewable Energy Portfolio Goal
Structure	• RPS *goal* of 4% 2010 sales up to 15% in 2025 • No solar carve-out, but solar gets a 2x credit
Other Features	• Geographic eligibility: PJM service territory • Utilities can get increased rate of return for attaining goals
Other Solar Incentives	• Corporate customers • **NEW**: Grid Transformation & Security Act of 2018: 5 GW of solar target • Dominion Power: PBI of $0.15/kWh for five years; 3 MW program, 60% residential, 40% non-residential

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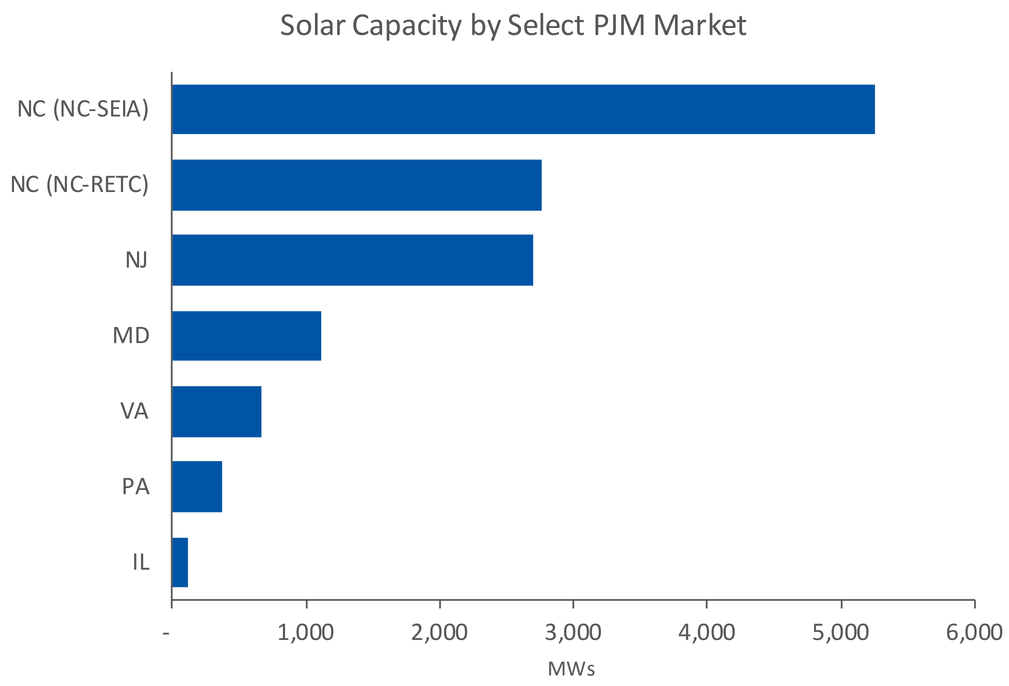
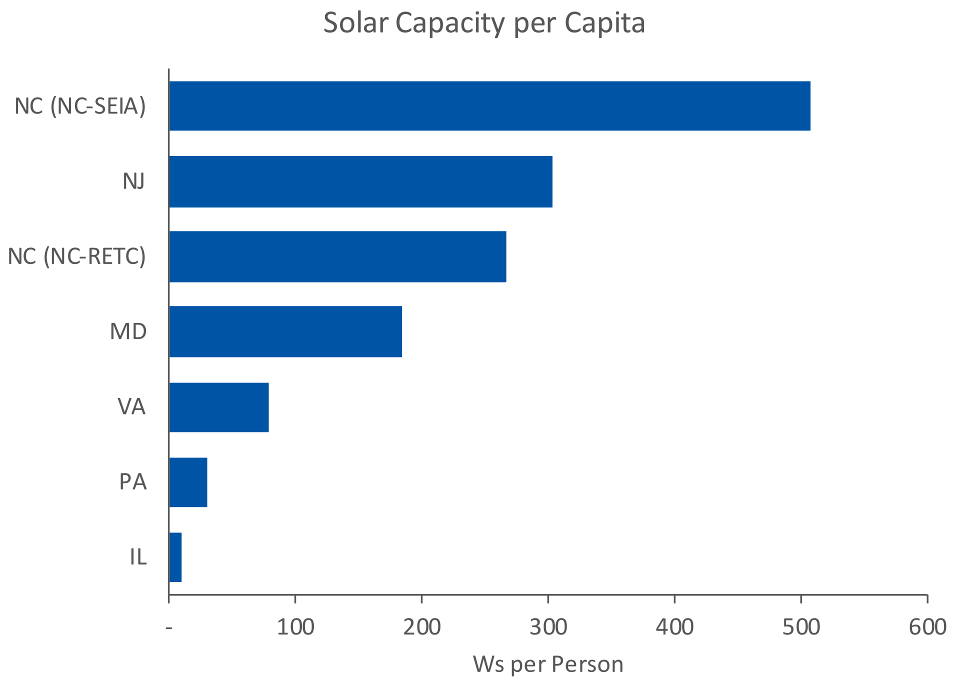
PJM Markets: Solar Capacity





Sources: Capacity from PJM GATS as of May 25, 2019; except NC total data from (i) SEIA as of end 2018 and (ii) from North Carolina Renewable Energy Tracking System as of June 12, 2019; 2018 population estimates from US Census Bureau (www.census.gov).

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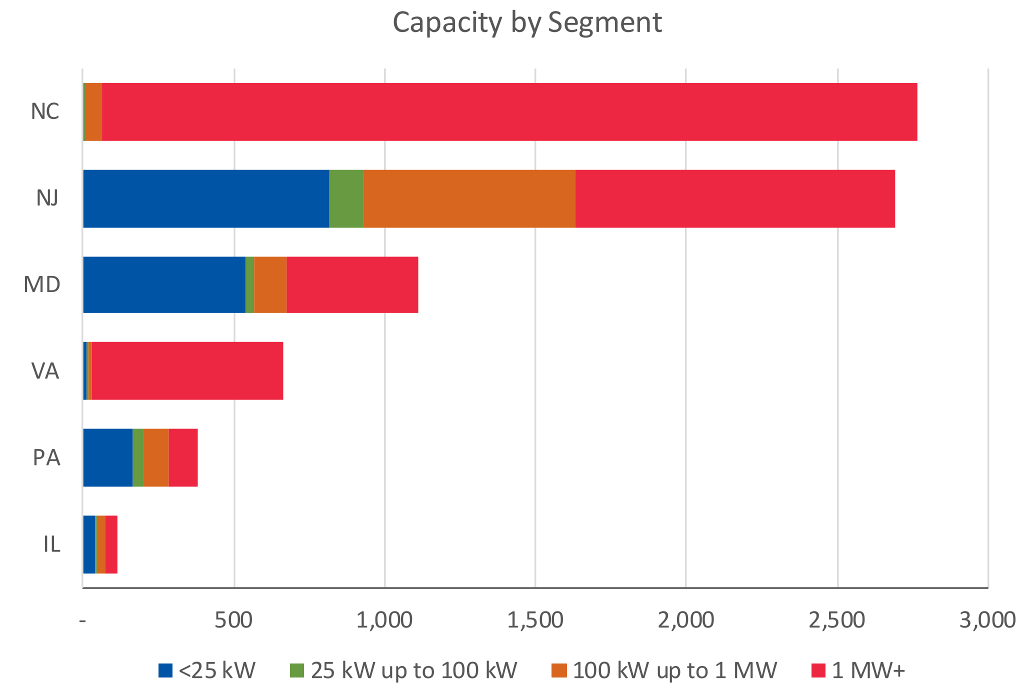
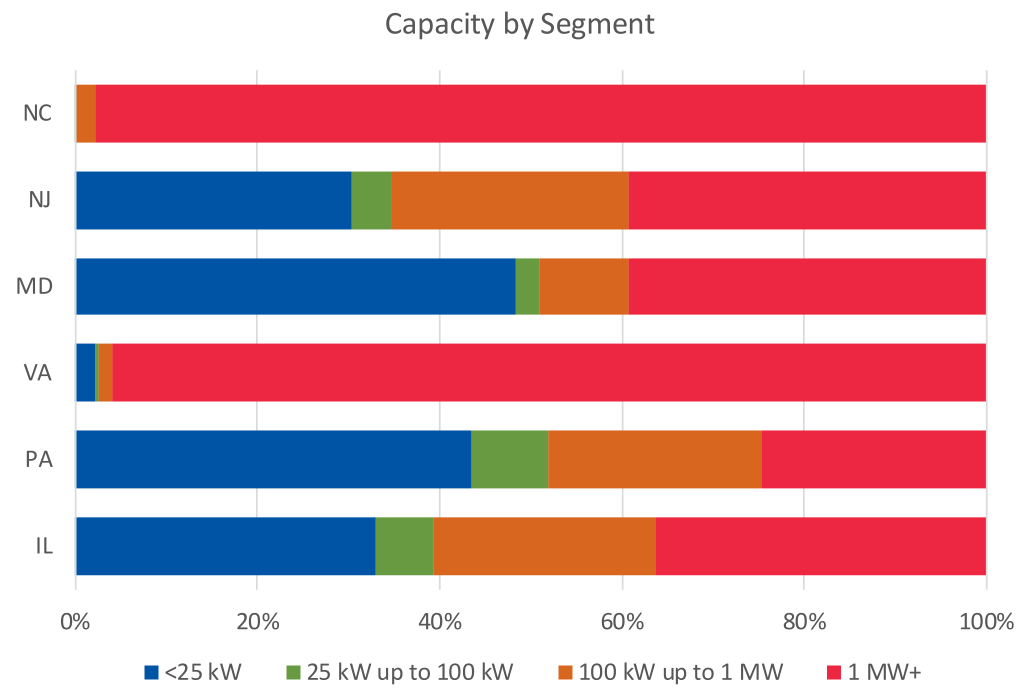
PJM Markets: Capacity by Segment





Note: NC excludes certain projects, presumably very large PURPA-backed ones, that were not registered with the state's renewable energy tracking system.
Source: Capacity from PJM GATS as of May 25, 2019; except for NC from North Carolina Renewable Energy Tracking System as of June 12, 2019.

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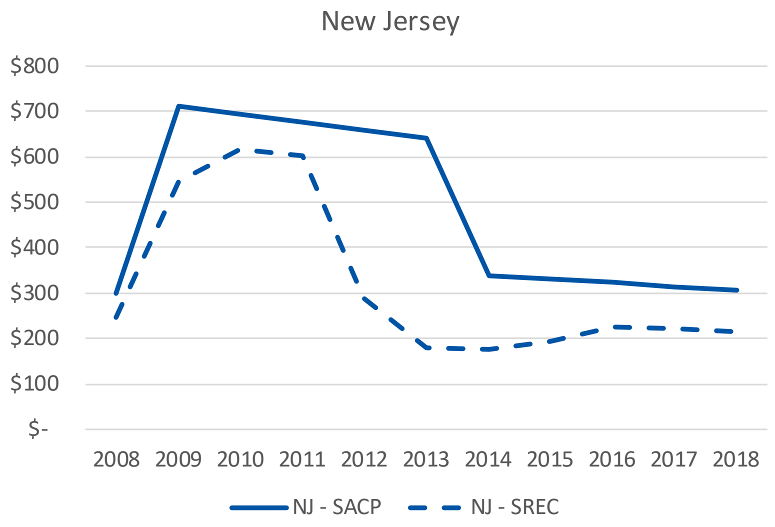
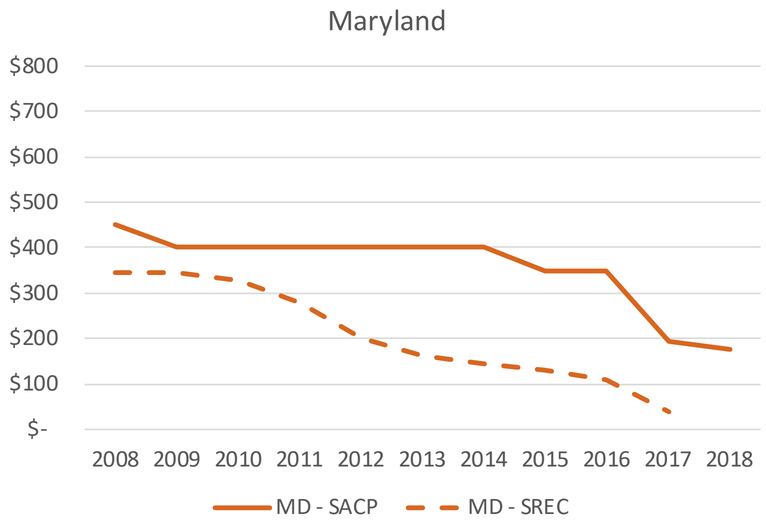
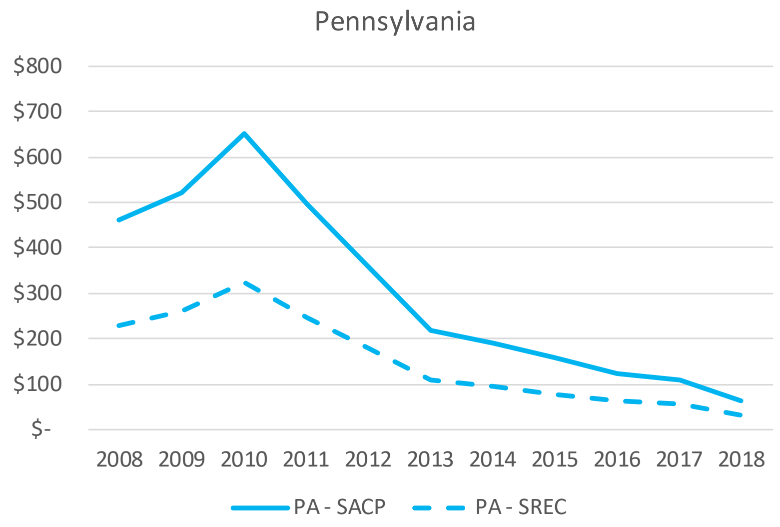
PJM Markets: SRECs vs SACPs







Source: NJ Clean Energy Program; Renewable Energy Portfolio Standard Report (for Calendar Year 2017), Public Service Commission of Maryland; Public Service Annual Reports for Alternative Energy Portfolio Standards Act of 2004 (Pennsylvania PUV and DEP).

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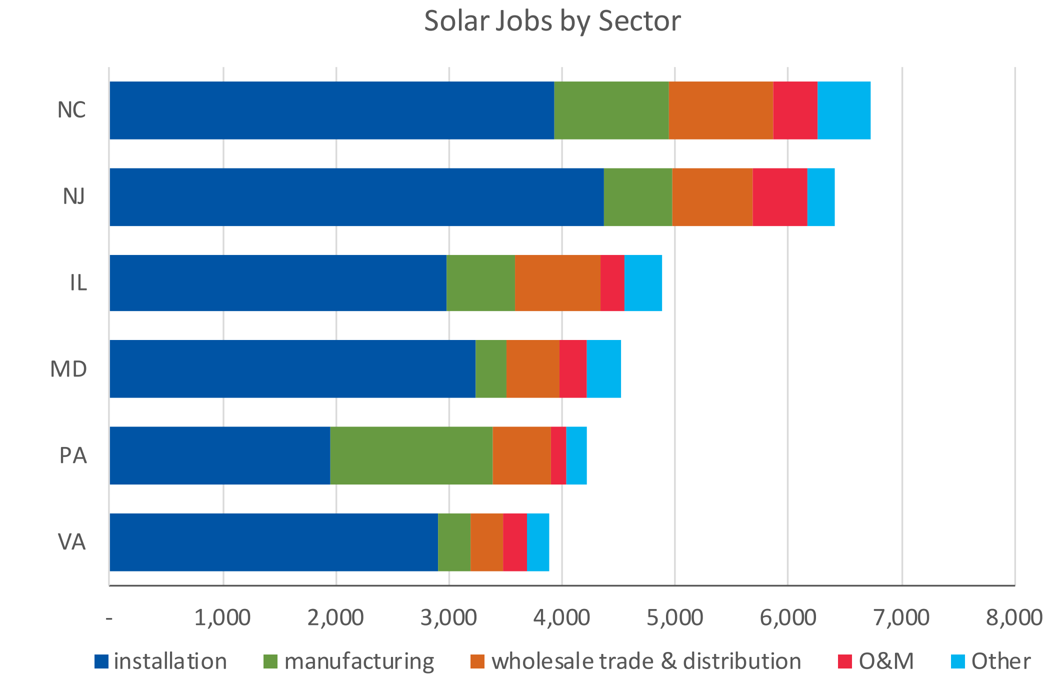
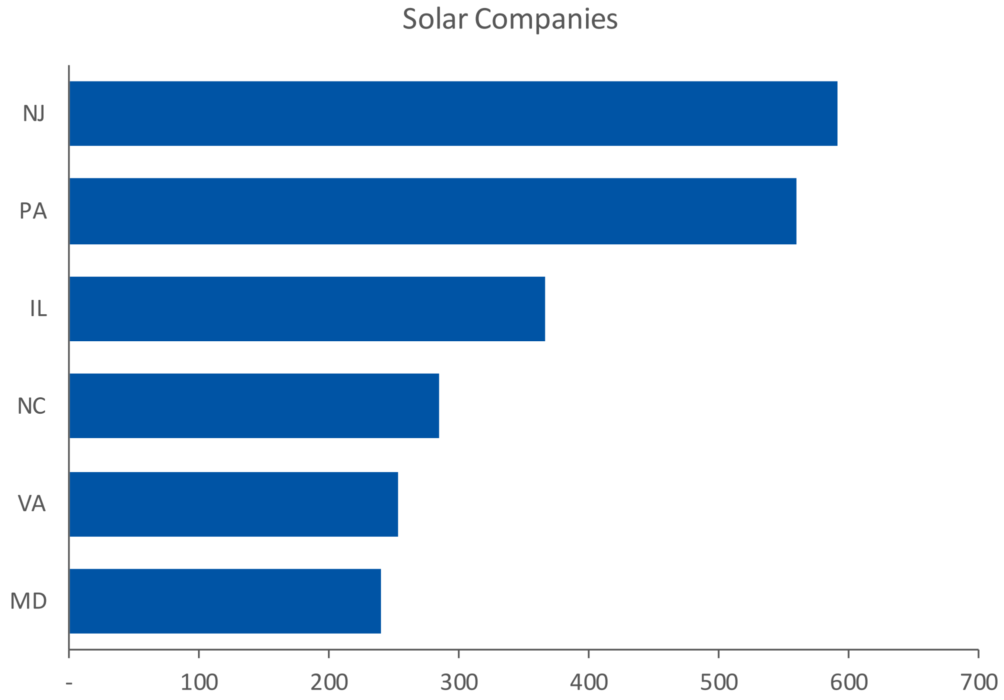
PJM Markets: Solar Jobs and Companies





Source: Solar Jobs Census 2018, The Solar Foundation.

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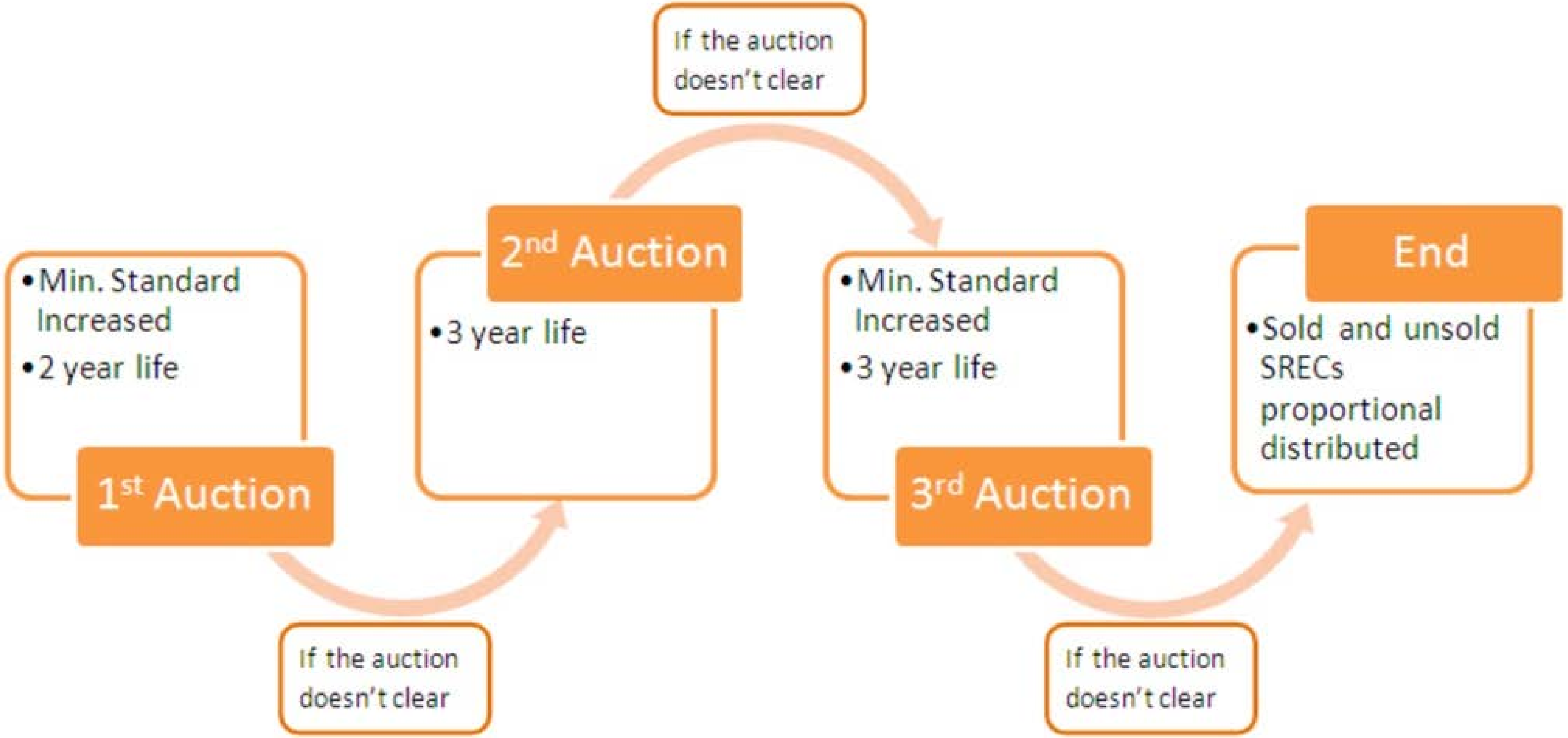
Preliminary Assessment of Selected Non-PJM Solar Incentive Mechanisms

Massachusetts: SREC I and II Programs

Program/Incentive Name	Renewable Portfolio Standard
Incentive Type	Hybrid Demand Obligation / Long-Term Hedge
Structure	• Solar Carve-Out requirements of 400 MW (SREC I) and 1,600 MW (SREC II) • Department of Energy Resources (DOER) administered carve-out, including establishing Compliance Obligation and ACP • Compliance Obligation each year meant to adjust to market conditions, e.g., ACP, banked, and auction volumes
Pricing	• Tradable SRECs • Solar ACP "ceiling" initially set annually, then 8-year rolling schedule • Solar Credit Clearinghouse Auction as last resort; e.g., SREC is reminted, price fixed at $300 ($285 net); potentially 3 rounds with adjustments meant to clear SREC Is
Other Features	• Reporting through centralized Production Tracking System (PTS) • Projects up to 6 MW • SREC II had factors giving full incentive to certain projects (e.g., small projects, canopies, LMI) and reduces compensation for less desired types (e.g., ground mount with less on-site load)

Massachusetts SREC I Auction Mechanism



Massachusetts: SMART Program

Program/Incentive Name	Solar Massachusetts Renewable Target (SMART) Incentive Program
Incentive Type	Long-Term Hedge
Structure	• Declining block incentives • 1,600 MW total allocated among EDCs • Term: 10-year for small projects (up to 25 kW), 20-year >25 kW • 3 compensation mechanisms: NEM, QF, Alternative On-bill Crediting
Pricing	• Initial base compensation established via competitive procurement for larger projects (>1 MW) for each EDC; incentive value administratively set as a multiplier of procurement results and increases for smaller projects, breakpoints: 500 kW, 250 kW, 25 kW • Adders for location, off-taker, energy storage, tracking; *subtractor* for greenfield
Other Features	• Reporting via EDC not centralized PTS

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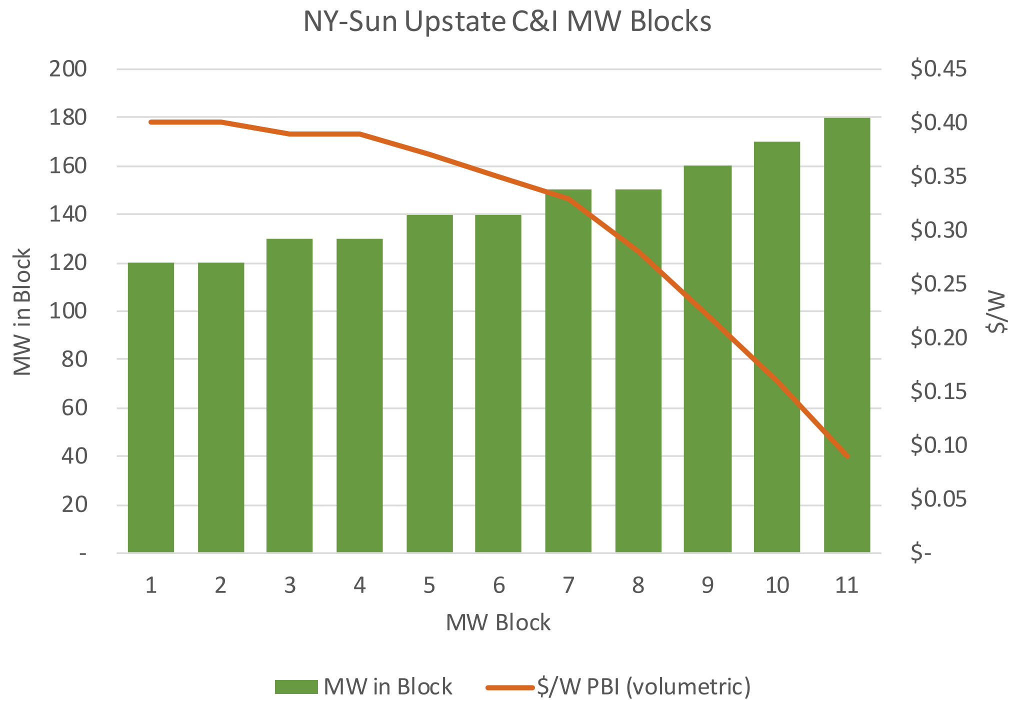
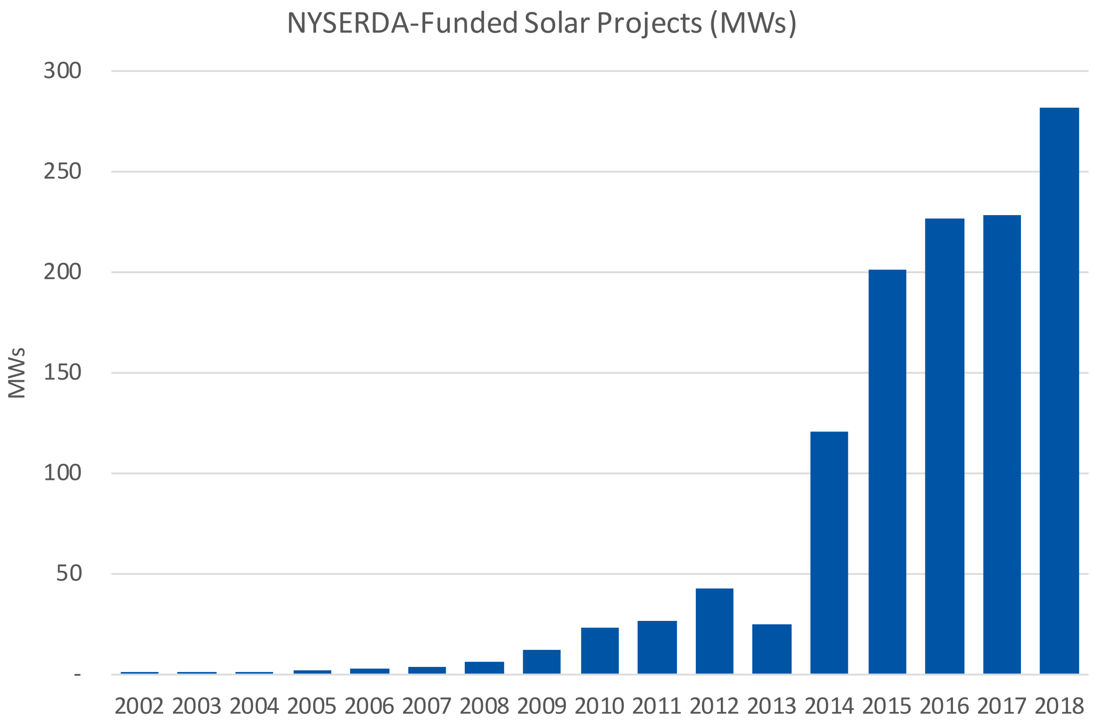
New York: PBI

Program/Incentive Name	NY-Sun Commercial & Industrial MW Block Program (pre- June 2018 redesign)
Incentive Type	Long-Term Hedge
Structure	• Declining block incentives • Applied to projects >200kW • MW targets allocated to three regions (ConEd, Long Island, and Rest of State) • Adders for strategic locations, LMI households, canopies, brownfield/landfill • Storage adder: additional $350/kWh
Pricing	• $/W, not-to-exceed value based on incentive in block in effect • First-come, first-served • Incentive (i) reduced if total solar resources fraction <80% and (ii) provided in installments, based on measured energy output of system vs. estimate upfront
Other Features	• Monetary or volumetric crediting

New York: PBI





Sources: NY-Sun contractors' online dashboard of MW blocks; NY-Sun Annual Performance Report through December 31, 2018.

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Rhode Island: REG

Program/Incentive Name	Renewable Energy Growth Program (RE Growth)
Incentive Type	Long-Term Hedge
Structure	Long-Term Standard Offer Contract with EDC off-taker (National Grid): • Residential: contract for differences for attributes (fixed $/kWh, less bill credits for energy and capacity used on site by customer) • Non-residential: fixed $/kWh for all energy, capacity, RECs and other attributes
Pricing	• Small (<25kW): Levelized cost-based prices administratively determined • Larger: competitively bid up to an administratively determined, cost-based ceiling price
Other Features	• 15- or 20-year contract options for small solar; 20 years for all others • Three enrollments per year

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Connecticut: ZRECs

Program/Incentive Name	Low and Zero Emissions Renewable Energy Credit Program
Incentive Type	Long-Term Hedge
Structure	• Competitive Long-Term PPA • Zero emission includes solar but also wind, hydro • EDCs enter into 15-year contracts to procure ZRECs • Annual ZREC targets $8m (incremental) between two EDCs • 3 sizes: 100 kW (small), 100 kW-250 kW (medium), and 250 kW-1MW (large)
Pricing	• Competitive bidding solicitations for medium and large ZREC projects, small get weighted average for medium + 10% (via tariff rider) • Price Cap at $350 per ZREC in first year (2012), can be reduced 3-7% per year

Thank You

Draft Analysis of Incentive Values and Costs for Potential Transition Incentive

JIM KENNERLY | SENIOR CONSULTANT
TOM MICHELMAN | SENIOR DIRECTOR
TOBY ARMSTRONG | ANALYST

SUSTAINABLE ENERGY ADVANTAGE, LLC

Disclaimer

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Presentation Overview

- Updates to Legacy SREC Analysis
- Developing a Solar Transition “Cost of Entry” Approach
- Illustrative Draft Solar Transition Cost of Entry Analysis Results (2019-2030)
- Estimating Transition Incentive MW Scale & Cost
- Preliminary Transition Incentive Cost Analysis Results
- Appendix: Additional Cost of Entry Analysis Methodology Details and Sources

Draft

Updates to Legacy SREC Modeling/Analysis

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SREC Updates – Methodology

Forecasting Installed Capacity

- Incremental installed capacity per month is assumed to follow historic averages by size bin and EDC, displayed below
  - This method addresses the frontloading of installed capacity that resulted from our previous method which relied upon the calculation of imputed PTO dates for projects in the pipeline
  - We scale these base installation rates upwards during the end of 2019 to reflect developers' response to expiring federal tax credits (detailed later)

Average monthly installations in 2018 (MW)					
Size Bin	**JCP&L**	**ACE**	**PSE&G**	**RECO**	**Total (MW)**
<25 kW	3.1	3.6	4.4	0.1	**11.2**
25 - 250 kW	0.6	0.4	0.9	0.0	**1.9**
250 - 500 kW	0.3	0.4	1.1	0.1	**2.0**
500 - 1000 kW	0.3	0.2	1.5	0.1	**2.1**
1000 - 2000 kW	0.3	0.1	1.5	0.0	**1.8**
2000 - 5000 kW	0.6	0.5	0.7	0.0	**1.8**
5000+ kW	3.1	0.0	1.0	0.0	**4.1**
				Grand Total	**24.9**

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SREC Updates – Methodology

Forecasting Installed Capacity

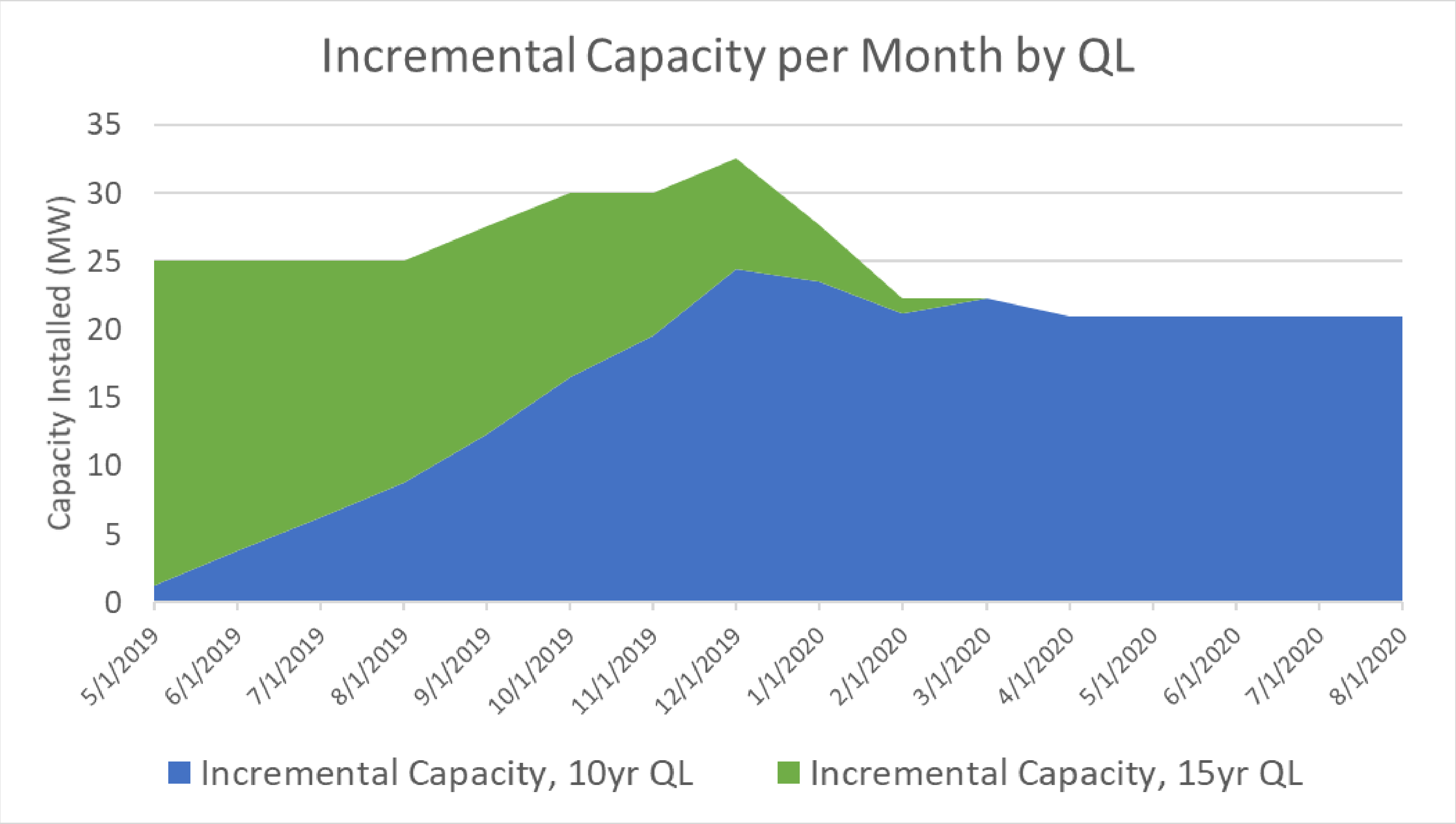
- Each month's build rate is constrained by the pipeline capacity (after de-rates), per size bin
- To calculate this on a rolling basis, we net out the capacity of projects installed against an application rate based on the last six months of applications, per size bin
  - This rate is adjusted to account for attrition (assuming 30% of projects will not reach PTO) and to account for outlier months (April saw over 60 MW of grid supply projects apply)
- The base application rate is scaled down prior to the release of the TI program rules to reflect developer uncertainty

Assumed base application rate (MW)	
Size Bin	**Total (MW)**
<25 kW	6.9
25 - 250 kW	3.3
250 - 500 kW	2.2
500 - 1000 kW	3.7
1000 - 2000 kW	5.4
2000 - 5000 kW	2.4
5000+ kW	4.6
Total	**28.4**

Draft

Forecasted SREC Updates

Incremental Capacity Installed by Month



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SREC Updates – Methodology

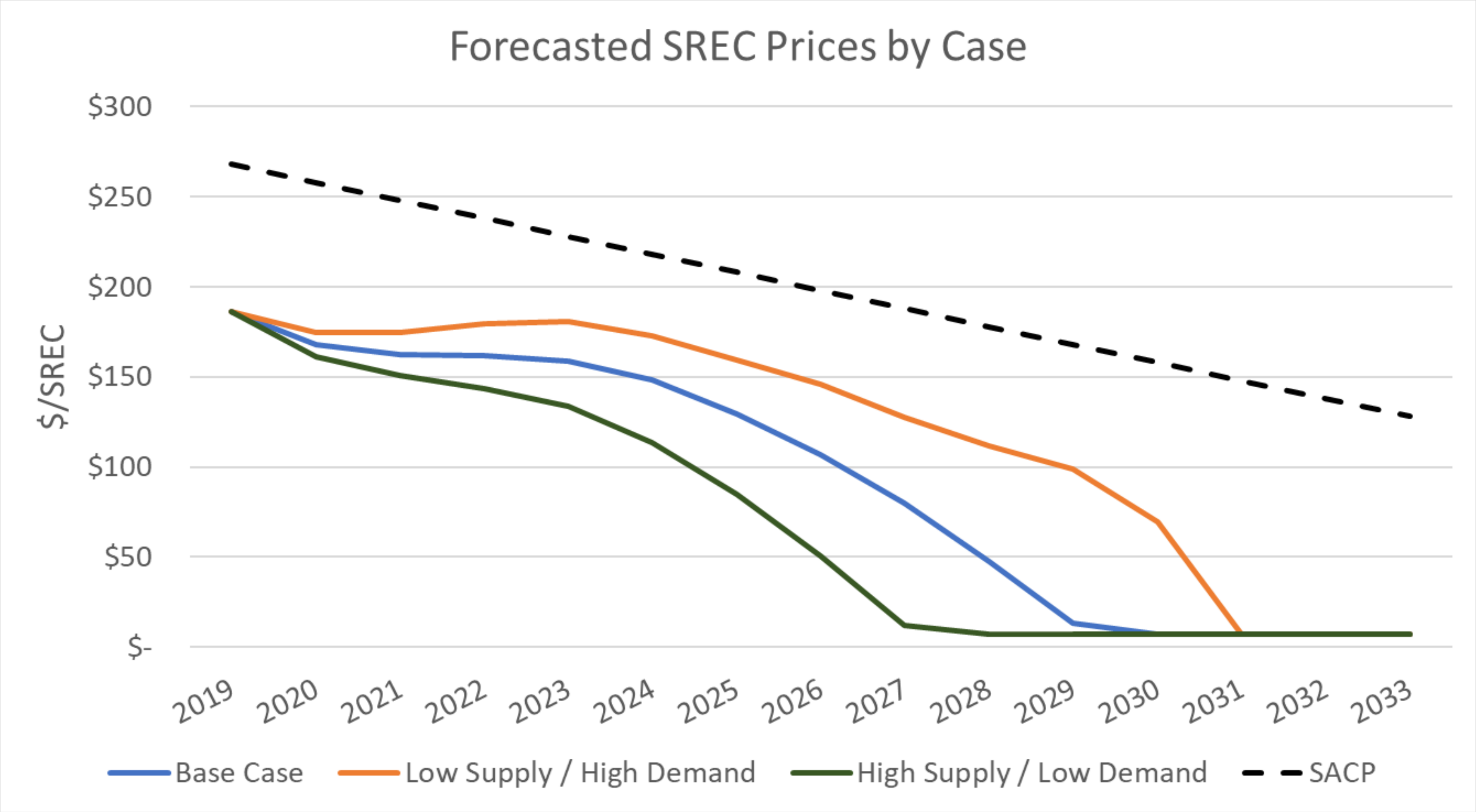
Other Updates

- Whereas we previously only varied demand for our scenarios, we now vary SREC supply by +/- 4%
  - The magnitude of variance chosen is informed by an analysis of monthly irradiance data in NJ
  - Varying supply results in a greater range of possible pricing scenarios (shown next)
- To account for the expected bankruptcy of two Retail LSEs, their assumed load served in Energy Year 2019 is removed from the obligated load (<1% of total load)

Draft

SREC Updates

Updated Pricing Forecast



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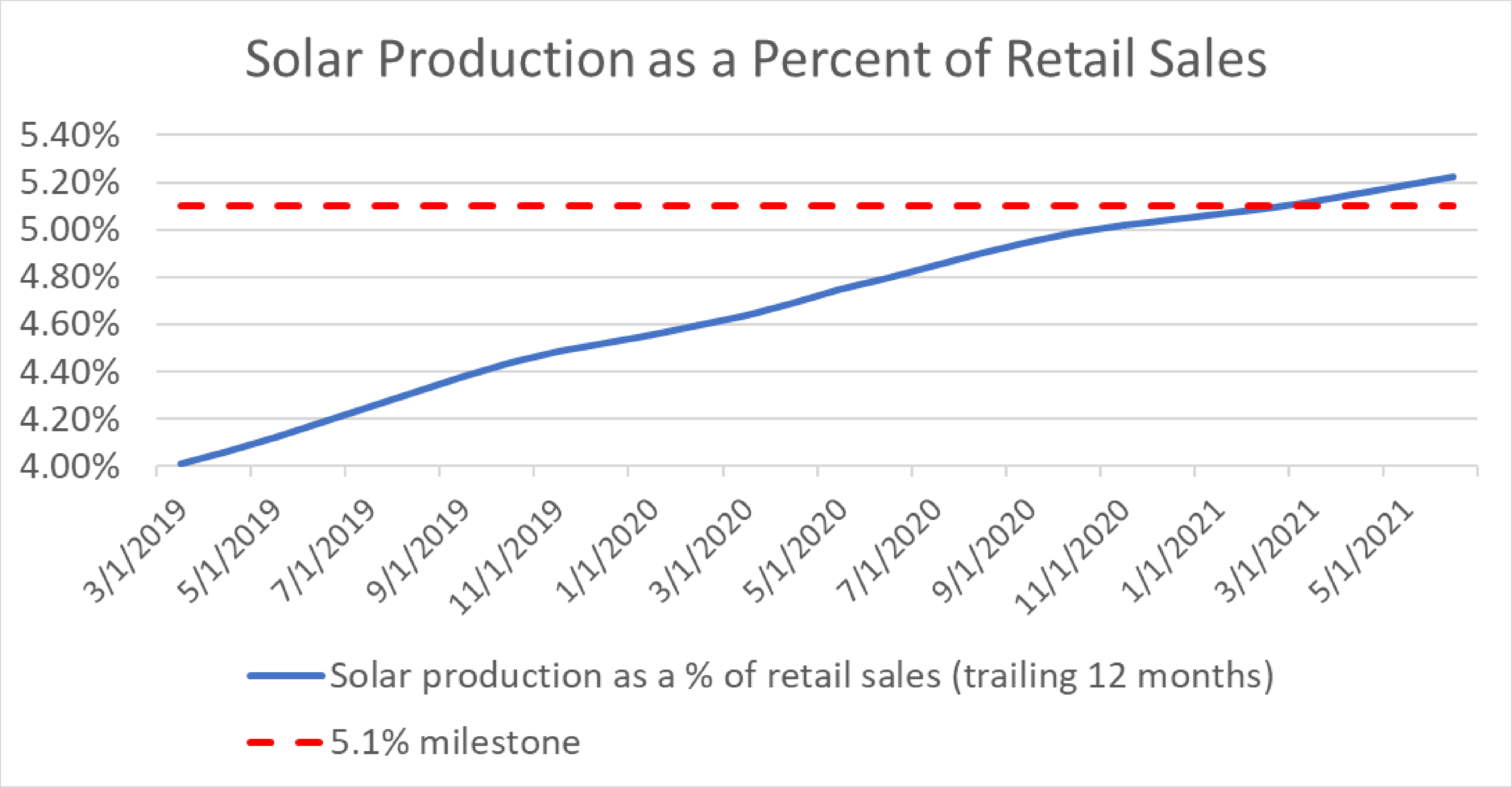
Calculating 5.1% Attainment

- To estimate the attainment of when 5.1% of the kWh sold in NJ is from solar electric power generators connected to the distribution system we:
  - Estimate retail electricity sold going forward based on the most recent 12 months of data provided by EIA (good through March 2019): 75,356,911 MWh (the denominator)
  - Estimate the trailing 12 month average of solar generation by multiplying the latest NJCEP-supplied cumulative installed solar capacity for the previous twelve months by a corresponding solar output factor for each month assuming 1200 MWh/MW_{DC} in annual production (the numerator)
- This method results in 5.1% being attained in March of 2021
  - However, the timing of 5.1% attainment is very sensitive to the assumed production factor as well as retail sales and build rate.

Draft

Calculating 5.1% attainment



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Developing a Solar Transition "Cost of Entry" Approach

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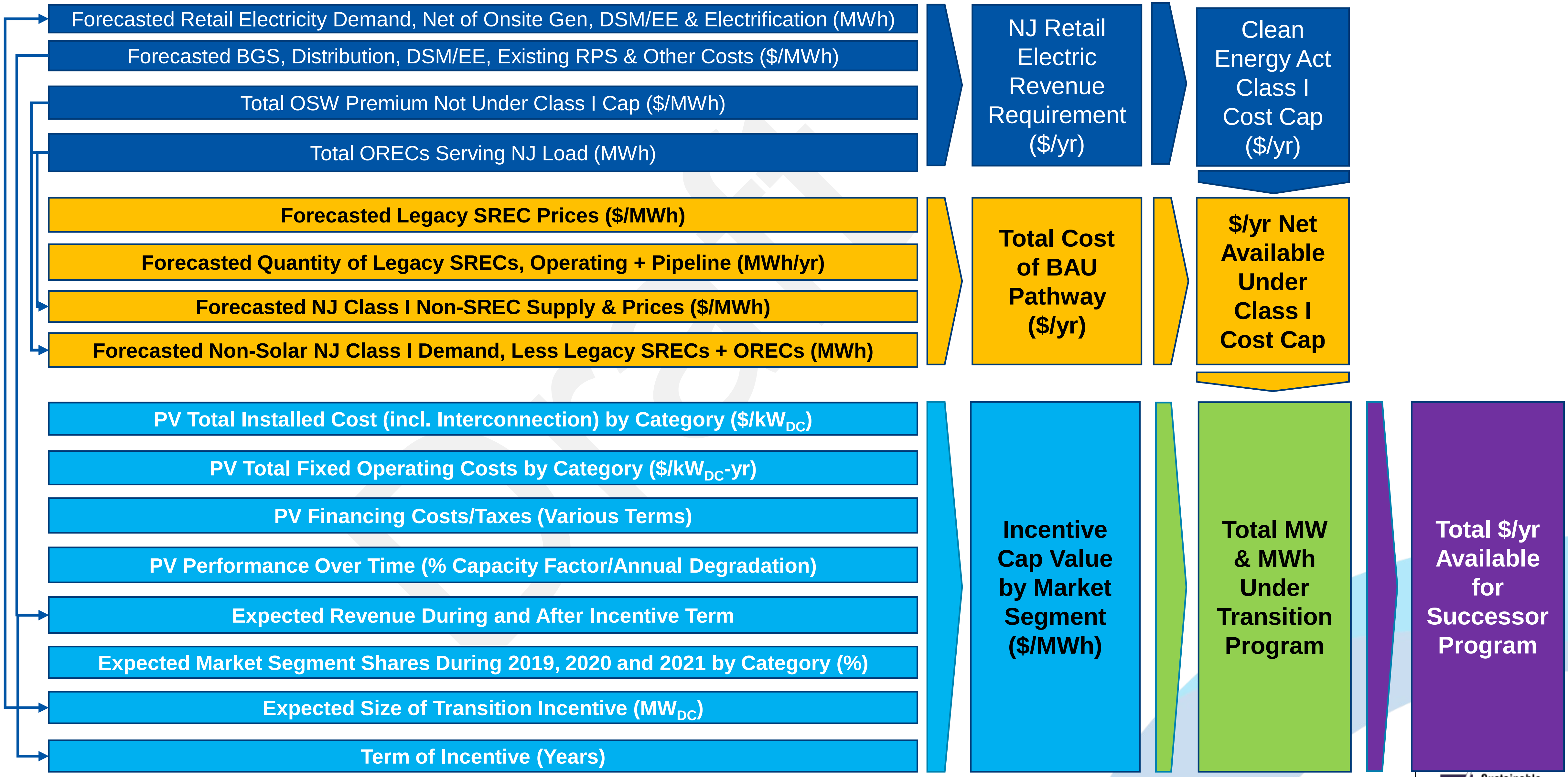
NJ Solar Transition Phase I Analysis Overview



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Calculating Caps Post Transition: Task Methodology Overview

- PV Total Capital and Operating Costs (Various)
- PV Financing Costs & Taxes (Various Terms)
- Expected Revenue During and After Incentive Term
- PV Performance over Useful Life (% Capacity Factor/ Annual Degradation)
- Term of Transition Incentive (Years)
- Potential Market Shares by Category (%)
- Transition Incentive Size (MW_{DC})

"Cost of Entry"/ Incentive Cap Values by Market Segment ($/MWh)

Total MWs & MWhs Under Transition Program

Total $/yr Available for Successor Program

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Subdividing the Market for Modeling

- Market divided into 192 distinct “Supply Blocks”, comprised of
- 24 distinct project configurations expected to come online in New Jersey through 2030, including:
  - <=25 kW (residential & small C&I)
  - Ground Mounted
  - Building Mounted, including LMI
  - Landfill/Brownfield
  - Community Solar (both Ground and Building Mounted), including LMI
  - 3 Solar Carport configurations **(Not Included in Draft Analysis due to data availability – will be included in next round)**
- 4 Utility Groups
  - Atlantic City Electric (ACE)
  - Jersey Central Power & Light (JCP&L)
  - Public Service Electric & Gas Company (PSE&G)
  - Rockland Electric (RECO)
- 2 Ownership Structures
  - 3rd Party
  - Private Host-Owned

Draft

Draft PV Cost Analysis: Approach

- The consulting team utilized NJ-customized Cost of Renewable Energy Spreadsheet Tool (CREST) Model (a tool Sustainable Energy Advantage, LLC developed for the National Renewable Energy Laboratory (NREL))
- Purpose of NJ CREST: Establish incentive requirement (a/k/a “cost of entry” or “incentive cap value”) for NJ solar projects through 2030
  - For Transition Incentive (TI) purposes only: model 2019-2020, to capture projects currently in development that will be eligible for Transition Incentive “program”
- Standard (and customized) modeled inputs in NJ CREST include
  - Installed Costs
  - (If not already included in Installed Cost values) Interconnection Costs
  - Financing Costs (interest on term debt, debt tenor, % of debt, after-tax equity IRR, development and fees (if not captured in equity return)
  - Non-Community “Vanilla” Solar O&M
  - Specialized Incremental Community Solar O&M (ongoing customer servicing/retention costs)
  - Project Management Costs (incl. incremental Community Solar fixed upfront costs)
  - Land Lease
  - Property Tax/PILOTs
  - Financing Costs (interest on term debt, debt tenor, % of debt, after-tax equity IRR, development and fees (if not captured in equity return)
  - Changes (for most of the above) through 2030

Draft

(Very) Simplified Representation of CREST Cost of Energy Model Calculation of "Cost of Entry"

Net Present Value (NPV)/ Discounted Cash Flows Resulting From:

PV Total Capital and Operating Costs (Various)

Compounded/Grossed-Up by…

Risk-Adjusted Financing Costs & Taxes (Various Terms)

LESS…

Expected Revenue/Federal Tax & Depreciation Benefits During and After Incentive Term

All Divided By…

PV Performance over Useful Life (MWh derived from Degradation-Adjusted Capacity Factor

Put it all together and you get…

Cost of Entry/ "Incentive Cap Values" by Market Segment ($/MWh)

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Highlights of Draft PV Cost/Performance Assumptions

- Low, Base and High installed cost estimates (based on NJ SRP data) were set at the 25th, 37.5th and 50th percentiles to 1) simulate outcomes associated with a program intended to reward lower-cost projects and 2) to correct for potential bias associated w/self-reported industry installed cost figures in SRP data
  - Installed costs assumed to decline in all cases through 2030 based on custom internal index based on industry and 3rd-party research, ranging from ~5%/yr in Low Cost cases to ~1%/yr in High Cost cases
- Interconnection costs assumed to vary along 25th-50th-75th continuum based on database of MA/RI costs (NJ-specific costs not obtained prior to draft modeling exercise)
  - Costs assumed to increase at a range between EIA's AEO 2019 T&D forecast for NJ in High cases and forecasted CPI
- Project performance based on location in Trenton, NJ (at near the latitudinal center of the state)
- Capacity factors at non-optimal tilts/azimuths assumed for <=25 kW, Building Mounted and Landfill/Brownfield projects (given that typical sites do not offer optimal conditions)
- 1% incremental improvement over time in Year 1 capacity factor
  - E.g., if 2019 COD assumption = 15.00%, 2020 COD assumption = 15.15%
- Annual degradation assumed at 0.5% as default

Draft

2019 Draft Cost Assumption Highlights

Project Category	Modeled Size Range (kW_{DC})	Yr 1 Capacity Factor (PVWatts)	Total Installed Cost Range ($\$/kW_{DC}$)
<=25 kW	6.5 kW-13.2 kW	15.30%	$2,724-$3,326
Building Mounted	250 kW-2 MW	15.40%	$1,640-$2,377
Ground Mounted	500 kW-10 MW	15.90%	$1,550-$2,010
Community Solar	1 MW-5 MW	15.40%-15.90%	$1,640-$2,000
Low/Moderate Income	250 kW-1 MW	15.40%-15.90%	$1,710-$2,377
Landfill/Brownfield	1 MW-5 MW	15.40%-15.60%	$1,636-$2,275
Grid Supply	5 MW-10 MW	15.90%	$1,550-$2,000

Source for Installed Cost Data: NJ BPU Office of Clean Energy SRP Registrations
Note: Installed costs displayed here include interconnection costs

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Highlights of Draft PV Financing/Tax Assumptions

- The orderly phase-down of the Investment Tax Credit (ITC) under current law through January 1, 2022 (to 0% for host-owned residential systems and 10% for all others)
  - **Simplifying assumption: TI projects expected to reach COD after 1/1/2020 <u>are assumed to be developed in CY 2019 and "safe harbor" their tax credits at 2019 value (30%)</u>**
- Increasing debt shares in capital stack (as tax equity shares fall)
- Increased usage of the bonus depreciation (100% thru 2023, declining 20%/yr thereafter) provisions of the Tax Cuts and Jobs Act of 2017 as tax credit value fades
- Pro forma NJ Class I REC value of $5/MWh assumed after incentive term (intended to represent highly discounted value)
- All applicable NJ tax rates and credits relevant to solar PV projects (or averages where appropriate), and no utilization of PSE&G Solar Loan Program (since program eligibility/access to loan funds not assured)

Draft

Highlights of Draft Financing Cost Assumptions (Cont'd)

Year	*2019*		*2020*		*2021*		*2022*	
Statutory ITC %	*30%*		*26%*		*22%*		*10% for Commercial (0% for Individuals)*	
Weighted Average ITC of Projects Reaching COD*	*30%*		*27.2%*		*23.6%*		*14.0% for Commercial*	
Ownership Case	*TPO*	*Host*	*TPO*	*Host*	*TPO*	*Host*	*TPO*	*Host*
Debt %	30%-55%	30%-55%	35%-60%	35%-60%	35%-60%	35%-60%	40%-65%	40%-65%
Debt Tenor	5-18 yrs	8-20 yrs	5-18 yrs	8-20 yrs	5-18 yrs	8-20 yrs	5-18 yrs	8-20 yrs
Interest %	6.0%-7.5%	6.0%-7.5%	6.0%-7.5%	6.0%-7.5%	6.0%-7.5%	6.0%-7.5%	6.0%-7.5%	6.0%-7.5%
After-Tax Equity IRR	8.9%-10.9%	5.5%-14%	8.7%-10.7%	5.5%^-14%	8.7%-10.7%	5.5%^-14%	8.5%-10.5%	5.5%-14%

***Assumes between 10% and 30% of all projects reaching COD were "safe harbored" in prior years (see Appendix for more details)**
^5.5% IRR expectation aligns with a Low Cost Case estimate for host-owned residential solar, in lieu of clear return expectations held by residential host customers

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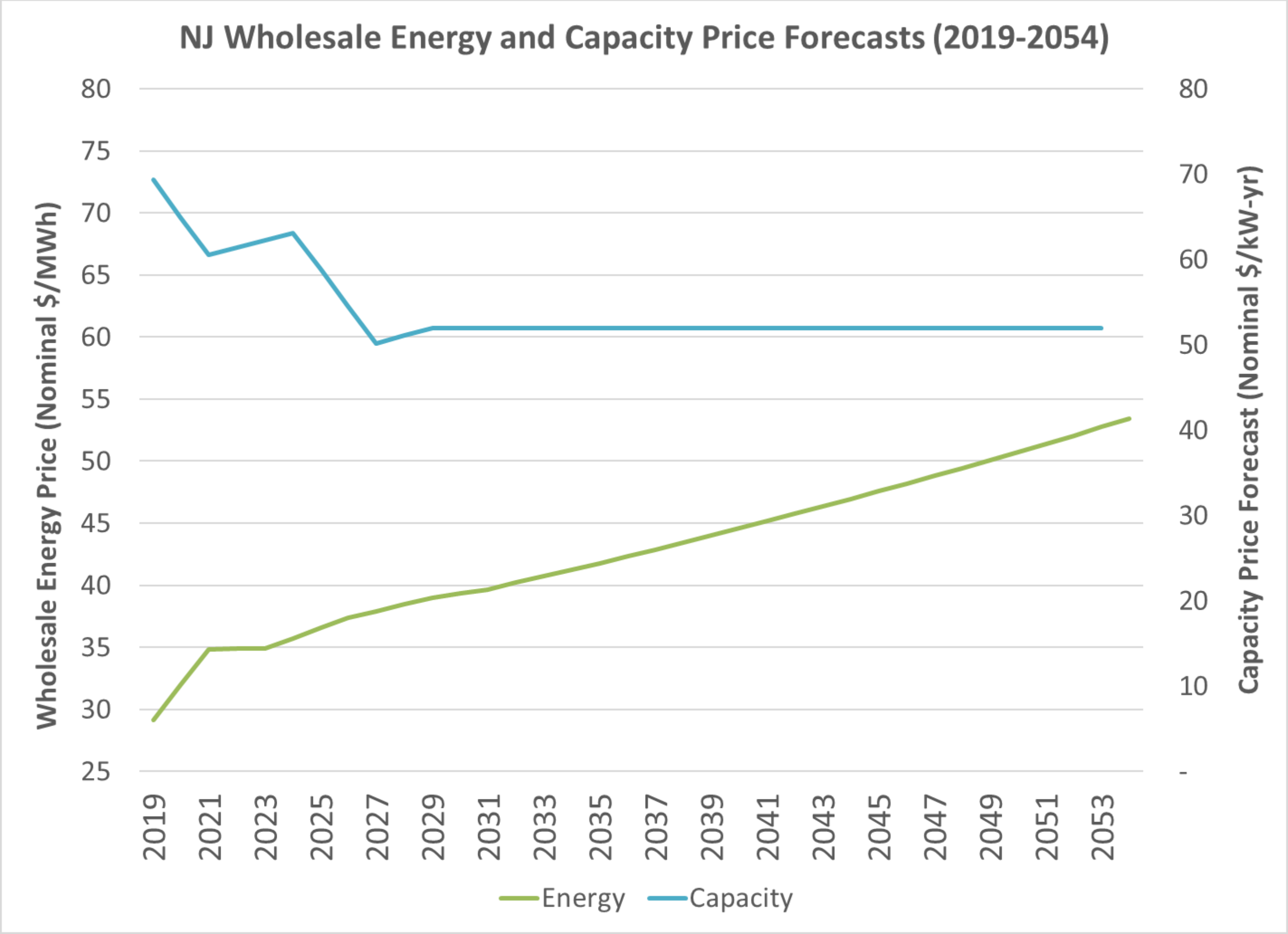
Non-Incentive Compensation (Net Metering/Wholesale, 2019-2054)

- We assume that all projects < 5 MW, and CSS projects up to 5 MW, are net metered
- These projects' non-incentive compensation is determined using to the following rate class designations:
  - Projects <=25 kW are assumed to be on a residential rate class
  - Projects that are 250 kW – 500 kW or CSS of any size are assumed to be on a small/medium C&I rate class
  - Projects >= 1 MW are assumed to be on a large C&I rate class
- Non-CSS projects that are >= 5 MW are assumed to receive compensation on the wholesale market (energy + capacity)
- Net metering/wholesale values are forecasted thorough 2054 (*please see SWS1 presentation for rate forecast methodology*)



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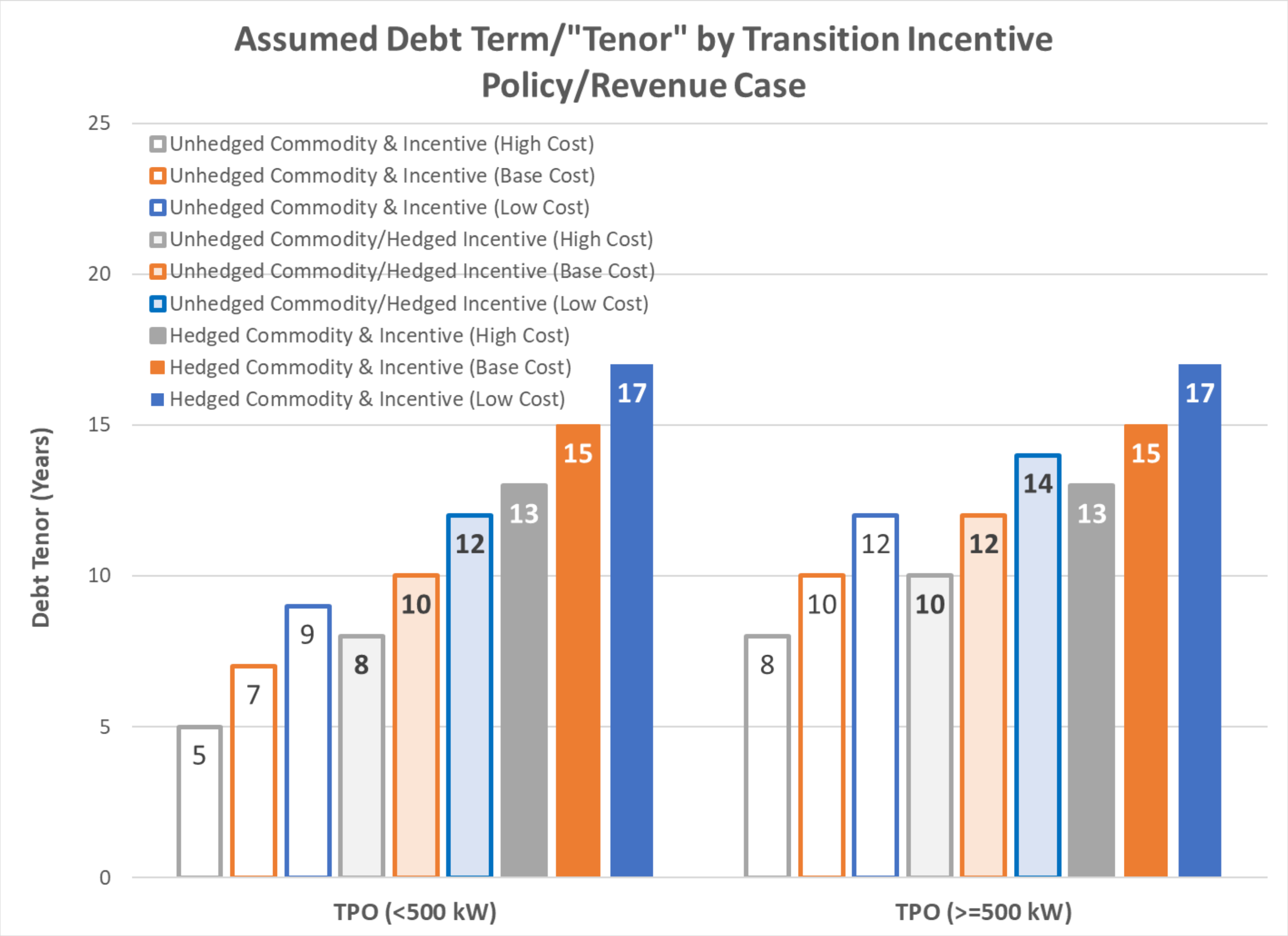
Interaction of Incentive Type and Financing/Revenue Risk

- The unit cost (in $/MWh) of the incentives paid out to a given type of distributed solar project varies based on
  - The term of the incentive
  - The certainty of the “commodity” revenue (in NJ’s case, net metering) and incentive revenue from a Transition Incentive or Successor Program incentive (and conversely the risks associated w/each)
- For modeling purposes, distributed solar incentive policies tend to fall into three broad categories
  - **Unhedged Commodity & Incentive** (e.g., the Legacy SREC program)
  - **Unhedged Commodity/Hedged Incentive** (e.g., fixed REC programs such as CT LREC/ZREC)
  - **Hedged Commodity & Incentive** (e.g., fully bundled, similar to MA SMART/RI REG program)

Draft

Interaction of Incentive Type and Financing/Revenue Risk: Illustrative Financing Assumptions by Policy/Revenue Case

- A more hedged revenue stream can reduce financing (and thus overall) costs by
  - Reducing overall cost of equity (by reducing risk)
  - Increasing the potential debt share a project can take on
  - Increasing the overall debt term/“tenor” (mitigating the impact of the cost of debt on the value of the project)
- Financing cost savings associated with fixing certain project revenue streams are amplified during & after ITC phase-out (*see at right*)



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Illustrative Draft Solar Transition Cost of Entry Analysis Results (2019-2030)

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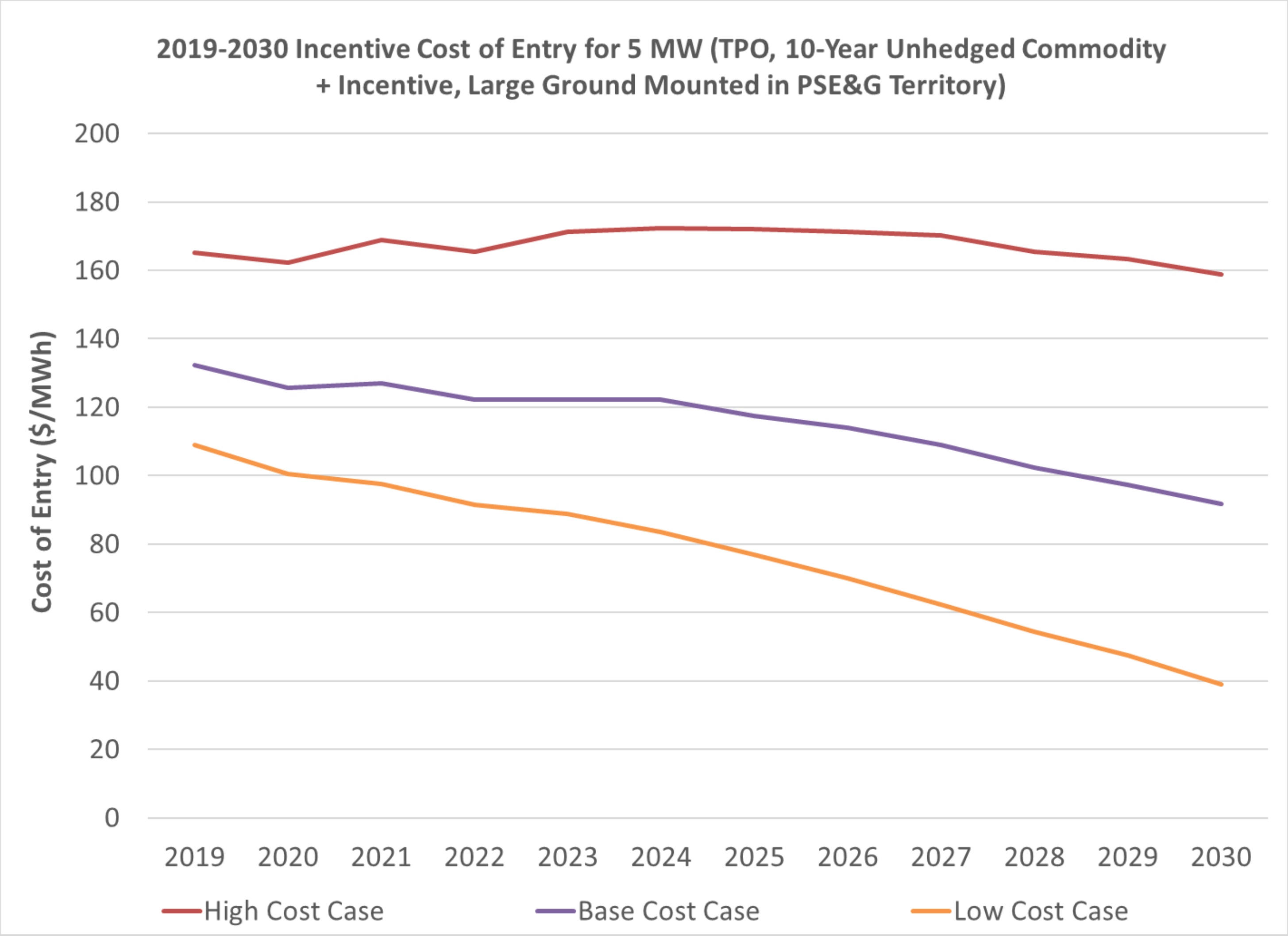
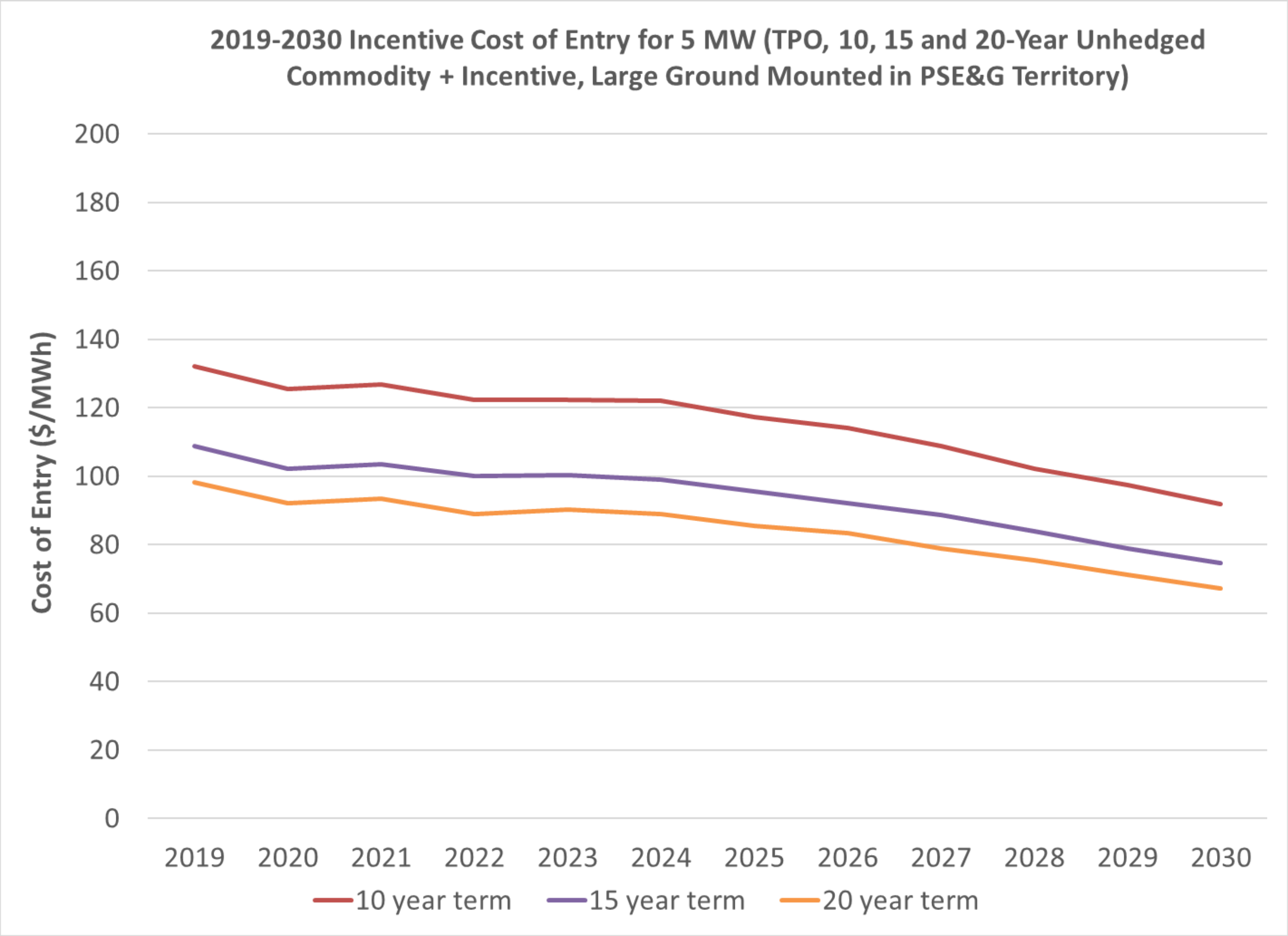
Cost of Entry Driver #1: Cost & Cost Trajectory

- Utilizing high bonus depreciation allowances, greater debt in the capital stack and lower-cost equity likely to allow for significant long-run Base and Low Cost cost of entry reductions
- IC cost increases/more tepid assumed installed cost reductions make less likely to enable reductions in High Cost cases
- Rate of decline in installed solar costs has a major impact on the future viability of a variety of market segments (particularly larger-scale systems more reliant on large C&I net metering credits or wholesale compensation)



Cost of Entry Driver #2: Incentive Term

- (Perhaps unsurprisingly) Projects with longer incentive terms require lower costs of entry
- Longer incentive terms mean:
    - Longer terms to amortize/levelized needed incentive; and
    - Fewer years of post-incentive revenue



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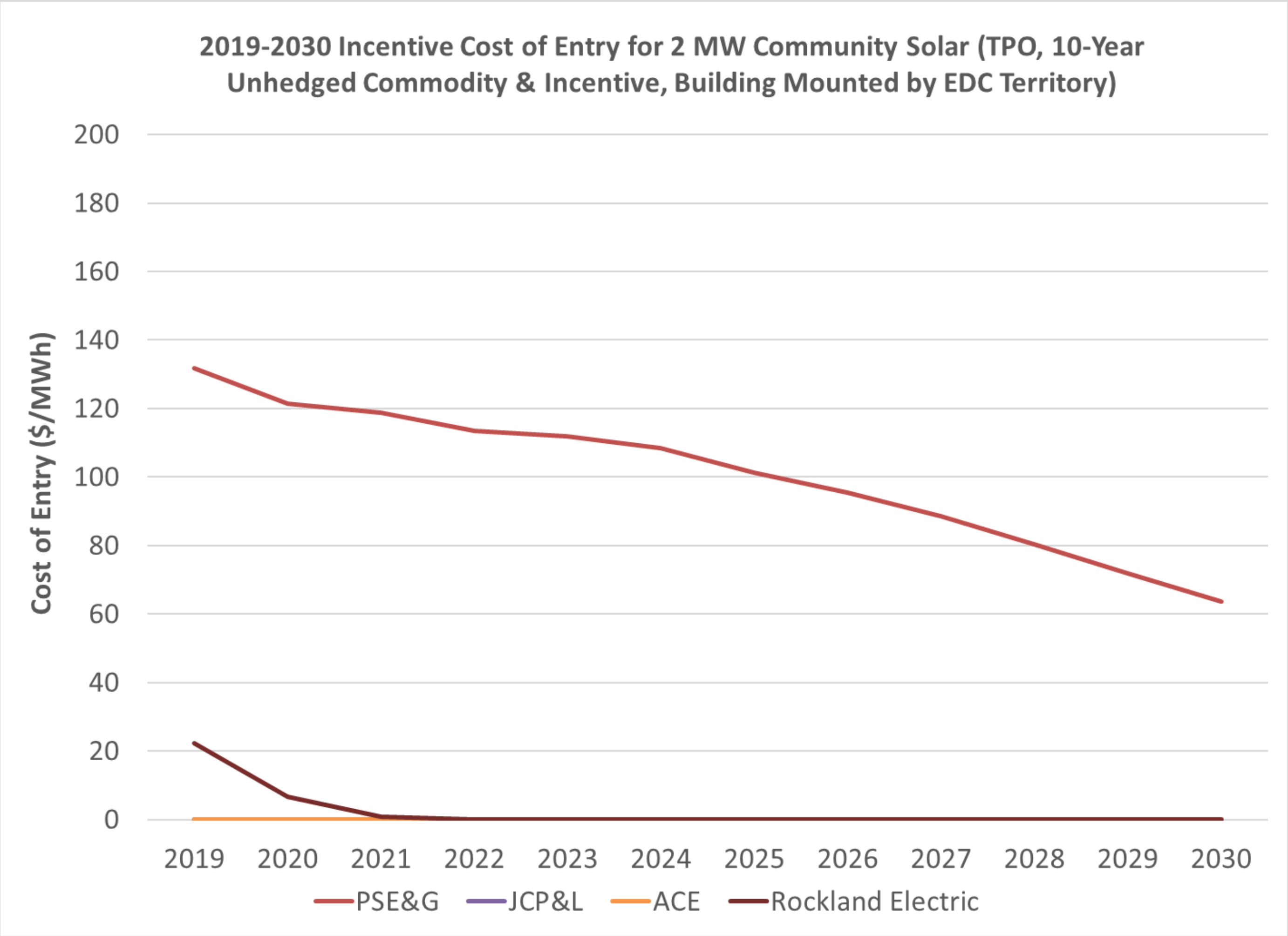
Cost of Entry Driver #3: EDC Territory

- A wide variety of residential and small C&I (<=25 kW) and Building Mounted projects in ACE, JCP&L and Rockland will require very low or no incentive beyond net metering for market entry
- Similarly-situated projects in PSE&G territory tend to have higher cost of entry due to lower forecasted C&I rates



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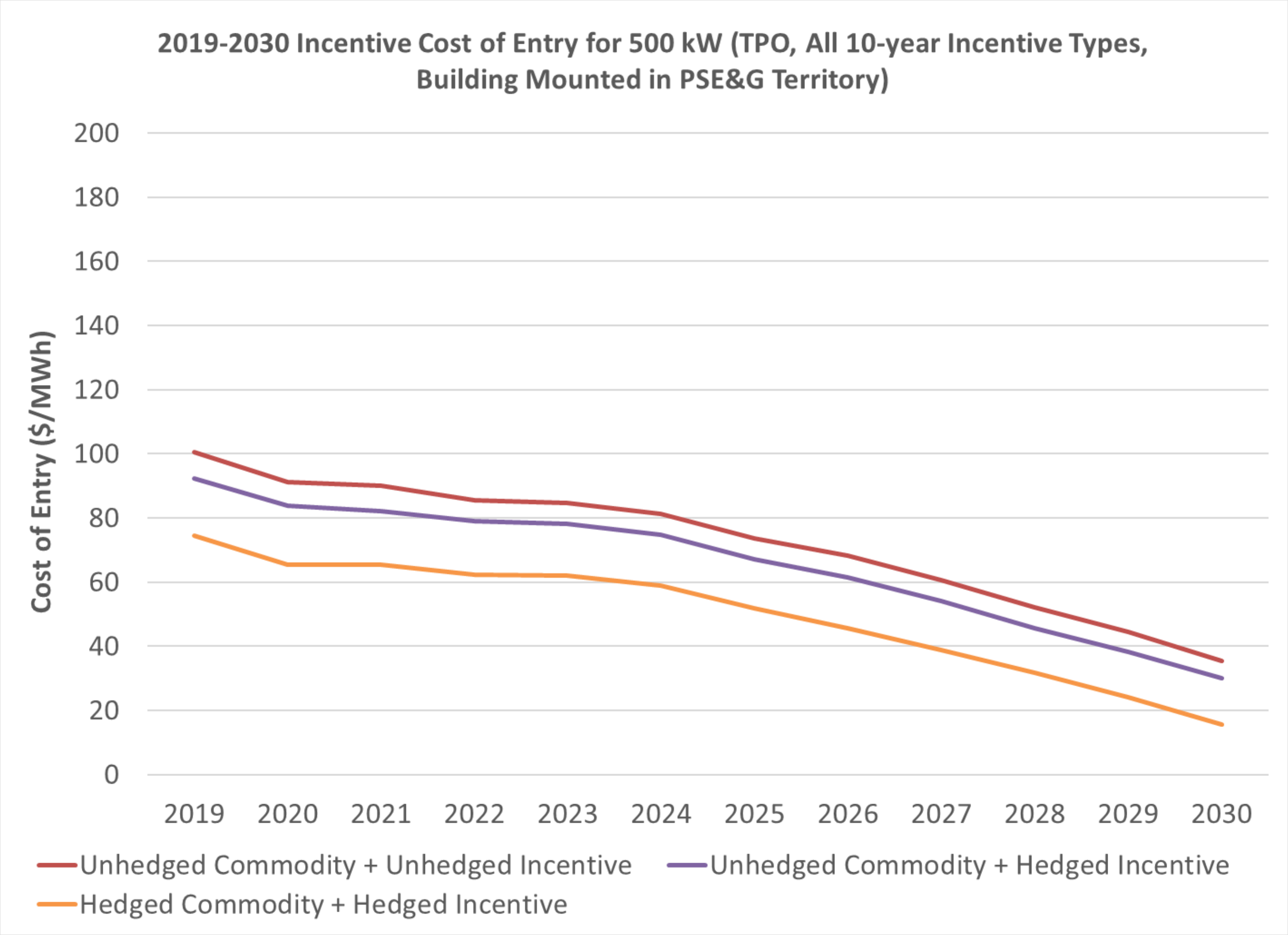
Cost of Entry Driver #4: Policy/Revenue Case

- Projects with more hedged revenue require lower costs of entry
- While partial revenue hedging allows for cost of entry reductions of ~$10/MWh per year through 2030 (depending on the case), full bundling allows for substantially more (~$20-$30/MWh per year through 2030)



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Estimating Transition Incentive MW Scale & Cost

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(Highly) Simplified Representation of TI Size/Cost Calculation

Expected Transition Program Size (MW_{DC})

×

Potential Market Shares by Category (%)

×

PV Performance over Useful Life (% Capacity Factor/ Annual Degradation, from Previous Steps)

×

Term of Transition Incentive (10, 15 or 20 yrs, As Assumed in Each Sensitivity)

=

Total MWs & MWhs Under Transition Program

×

Incentive Req't/ "Incentive Cap Values" by Market Segment ($/MWh, 2019 - 2020 COD, from Prev. Slide)

=

Total Cost of Transition Incentive

Net $/yr Available Under Class I Cost Cap

−

Total Cost of Transition Incentive

=

Total $/yr Available for Successor

Draft

Forecasting Transition Incentive MW Size

- Incremental installed capacity per month under the TI is assumed to follow historic averages by size bin and EDC, subject to the pipeline's constraints
- Pipeline constraints are determined by taking the capacity available in the pipeline, by size bin, at the time of 5.1% attainment
  - *See prior slides on forecast of pipeline capacity*
- This results in a total of **445 MW** being installed under the TI
- Installations are assumed to continue through the end of CY 2023 (given that ITC safe harbor period ends by Jan 1, 2024)

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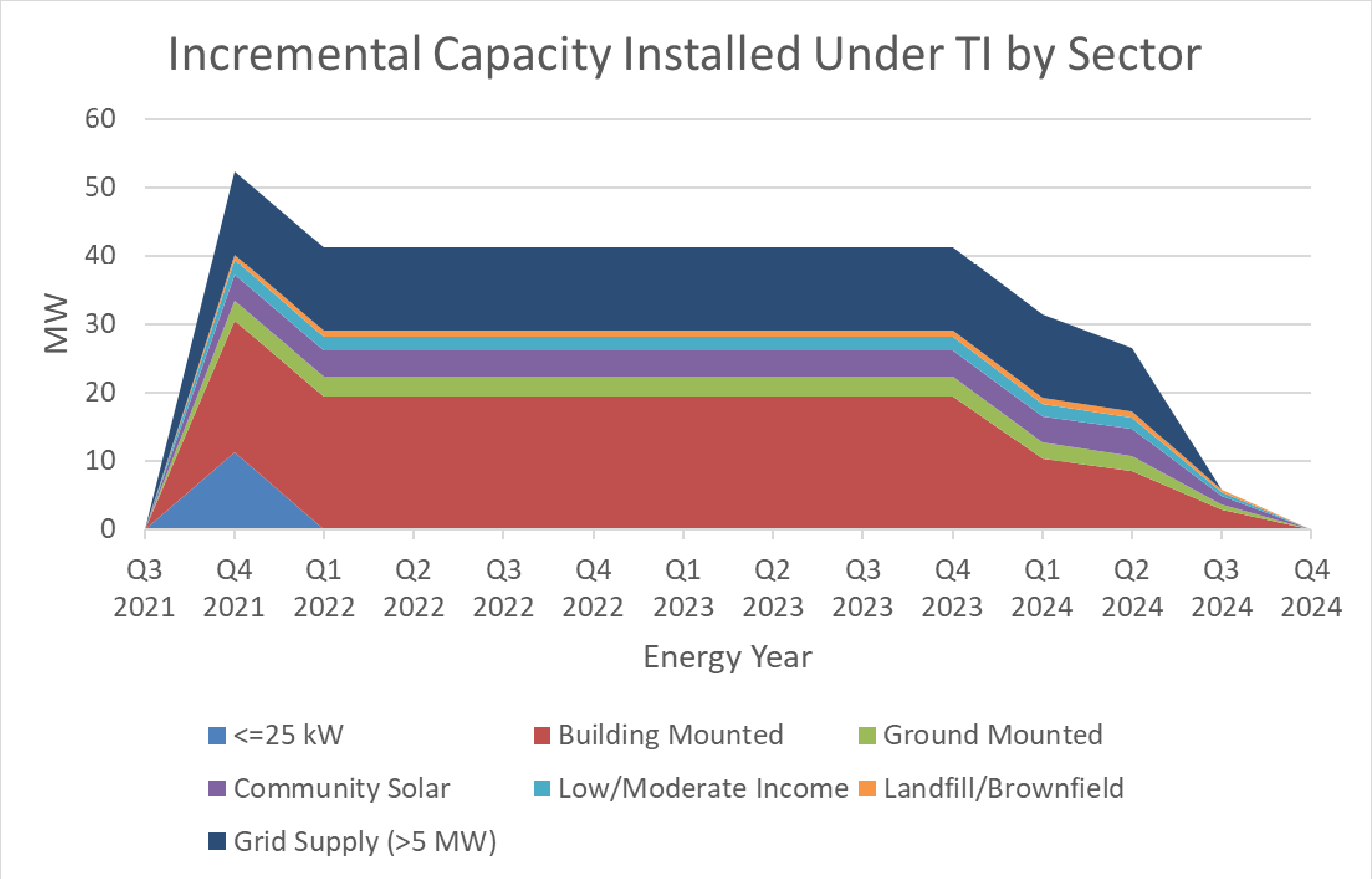
Incremental Transition Incentive MW Forecast



Calculating Production & Comparison to Cost Cap

- For each quarter after the TI is implemented, we calculate the expected production of each project type, per EDC
- Expected production is multiplied by a each project type's 2019 Cost of Entry
  - We use a weighted average of TPO and host owned LCOEs, according to the ownership distribution of installations in 2017 and 2018, per size bin (*see table at right*)
- For projects with a LCOE of $0, we assume these projects' PBI to be at Class I REC prices (assumed at $7 per REC)
  - This may result in a slight overestimation of the cost of the TI, but does not affect overall Class I costs
- Total TI cost per scenario is summed per quarter for use in the cost cap model

Size Bin	% Third Party Ownership (for projects installed 2017/18)
a. <25 kW	73%
b. 25 - 250 kW	48%
c. 250 - 500 kW	58%
d. 500 - 1000 kW	52%
e. 1000 - 2000 kW	49%

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Comparing Transition Incentive COE to Equivalent Legacy SREC Value

- While prices under the SREC program are guided by a declining ACP, a TI may be fixed, or otherwise not follow a generally declining schedule
  - (We in fact assume a flat ACP for our SREC options in assessing its cost to ratepayers)
- Therefore, to compare the cost of a TI on a unit basis ($/MWh) to the Legacy SREC program, necessary to levelize the expected compensation expected by a project reaching its COD in the Legacy program
- To do so, we utilize the levelization term (in years) of the policy option under consideration, as well as an 8% weighted average cost of capital (WACC) associated with Unhedged Commodity & Incentive projects

Draft

Transition Incentive Cost Analysis Scenario Matrix

Analysis Case	Transition Incentive Program Design Policy/Revenue Assumption	Class I Cost Cap Headroom	Legacy SREC Supply/Demand	PV Cost & Cost Trajectory	Incentive Duration
#1: SREC-Based Program Design (Low Cost/High Cost Cap Headroom)	Unhedged Commodity & Incentive	High/ Expanded	High Supply/ Low Demand	Low	20
#2: SREC-Based Program Design (Base Cost & Cost Cap Headroom)	Unhedged Commodity & Incentive	Base	Base Supply & Demand	Base	15
#3: SREC-Based Program Design (High Cost/Low Cost Cap Headroom)	Unhedged Commodity & Incentive	Low/ Limited	Low Supply/ High Demand	High	10
#4: Fixed REC/Other Fixed Premium (Low Cost/High Cost Cap Headroom)	Unhedged Commodity/ Hedged Incentive	High/ Expanded	High Supply/ Low Demand	Low	20
#5: Fixed REC/Other Fixed Premium (Base Cost & Cost Cap Headroom)	Unhedged Commodity/ Hedged Incentive	Base	Base Supply & Demand	Base	15
#6: Fixed REC/Other Fixed Premium (High Cost/Low Cost Cap Headroom)	Unhedged Commodity/ Hedged Incentive	Low/ Limited	Low Supply/ High Demand	High	10
#7: Fully-Bundled Incentive (Low Cost/High Cost Cap Headroom)	Hedged Commodity & Incentive	High/ Expanded	High Supply/ Low Demand	Low	20
#8: Fully-Bundled Incentive (Base Cost & Cost Cap Headroom)	Hedged Commodity & Incentive	Base	Base Supply & Demand	Base	15
#9: Fully-Bundled Incentive (High Cost/Low Cost Cap Headroom)	Hedged Commodity & Incentive	Low/ Limited	Low Supply/ High Demand	High	10

Draft Transition Incentive Cost Analysis Results

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Overarching Observations

- Assuming incentives set at the Cost of Entry results discussed herein, all of the potential TI designs cost substantially less on a weighted average $/MWh basis than the Legacy SREC program.
- TI design approaches that assume a partial or complete revenue hedge cost significantly less overall (and per year) than those in which no hedge is assumed
  - As a result, SREC-based approaches (in which the price for attributes is driven by a tradeable market) have the highest average direct ratepayer costs on an NPV basis
  - However, their direct costs to ratepayers can be mitigated by lengthening the potential incentive term beyond the current 10 years for projects in the Legacy SREC program.

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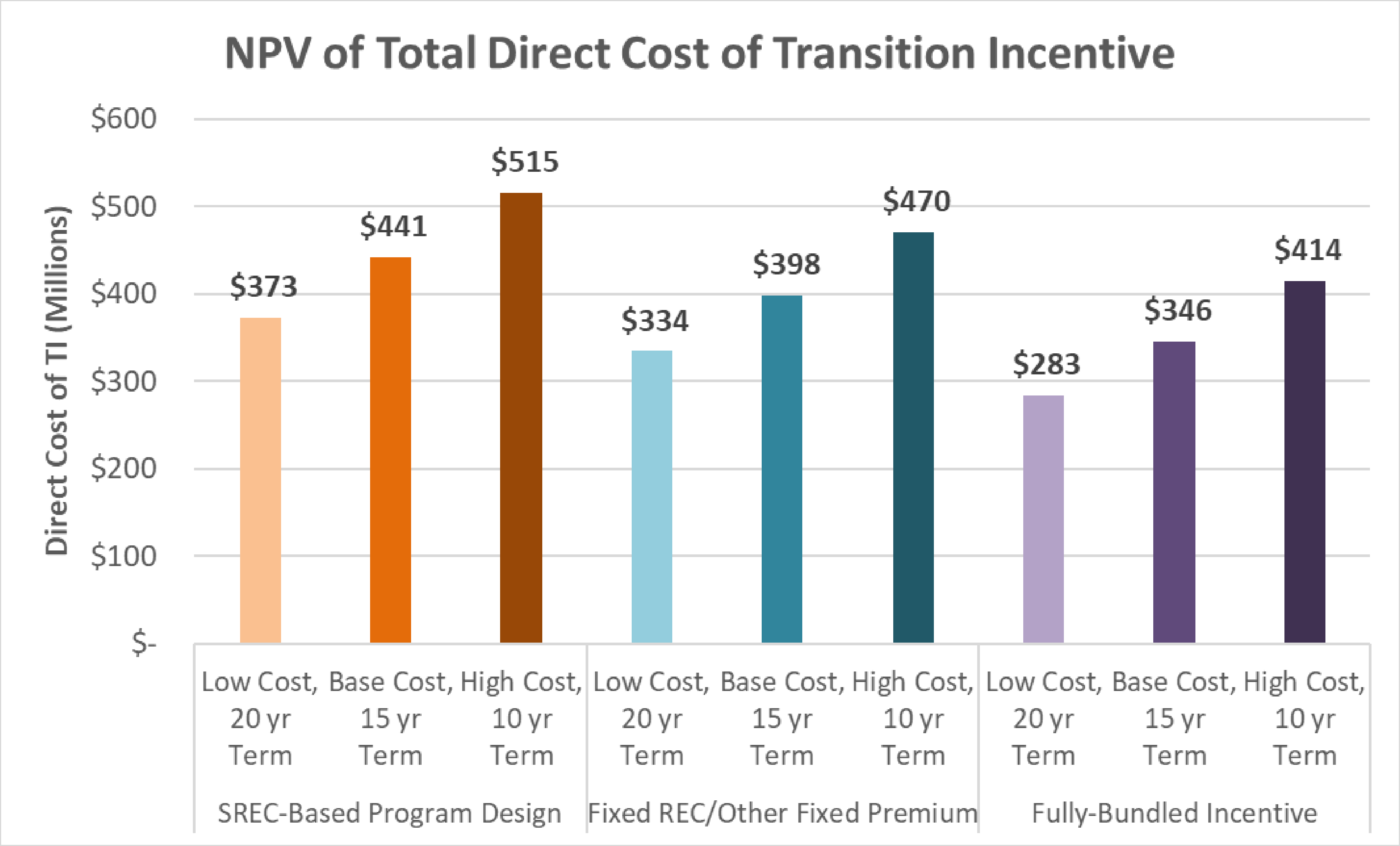
Forecasted TI Cost by Scenario



Transition Incentive Cost Comparison to Legacy SREC ($/MWh)

Transition Incentive Term	**20**		
PV Cost/Cost Cap Headroom	**Low Cost/High Cost Cap Headroom**		
Legacy SREC Case	**High Supply/Low Demand**		
Policy/Revenue Case	**SREC-Based Program Design** (Unhedged Commodity + Incentive)	**Fixed REC/Other Fixed Premium** (Unhedged Commodity/Hedged Incentive)	**Fully-Bundled Incentive** (Hedged Commodity & Incentive)
Levelized Legacy SREC Value Over Transition Incentive Term (2019 COD, $/MWh)	*$82*	*$82*	*$82*
Levelized Legacy SREC Value Over Transition Incentive Term (2020 COD, $/MWh)	*$70*	*$70*	*$70*
Weighted Avg. Cost of Entry of Transition Projects (2019 Costs & Safe Harbor, $/MWh)	**$55**	**$49**	**$41**
Difference from 2019 COD Legacy SREC ($/MWh)	**$27**	**$33**	**$41**
Difference from 2020 COD Legacy SREC ($/MWh)	**$15**	**$21**	**$29**
% Change from 2019 COD Legacy SREC Value (%)	**-33%**	**-40%**	**-50%**
% Change from 2020 COD Legacy SREC Value (%)	**-21%**	**-30%**	**-41%**

Overarching Observations (Cont'd)

- TI design approaches that assume partial-to-complete revenue hedging also cost substantially less on an annual basis (as TI projects reach commercial operation), and are more likely to leave sufficient room for a Successor Program.
  - Under scenarios with Low/Limited Headroom, market-based SREC designs (which could cost between $34-$72 million/year) run the greatest risk of breaching the Cost Cap in EY 2022 and 2023
- Regardless of the potential Transition Incentive design, Legacy SREC prices and the cost of the Legacy program remains the most influential factor influencing Cost Cap headroom for Solar Transition
  - In all Low/Limited Headroom cases, we now forecast that the cost of the Transition Incentive is likely to consume nearly all of the room under the Cap, and (in some cases) exceed it in both 2022 and 2023 (making both years "Kink Years")
  - The tighter Headroom outcomes suggest that policy paths/options that legally allow for adjustment of the Cost Cap (or mitigation of the cost of the Legacy SREC program) may mitigate risk of breach (and reduction of Class I requirements)
- Beyond EY 2023, the Cost Cap permits substantial headroom for a Successor program that could permit development and operation of substantial new distributed solar capacity (which will be a key facet of future consulting team analysis)

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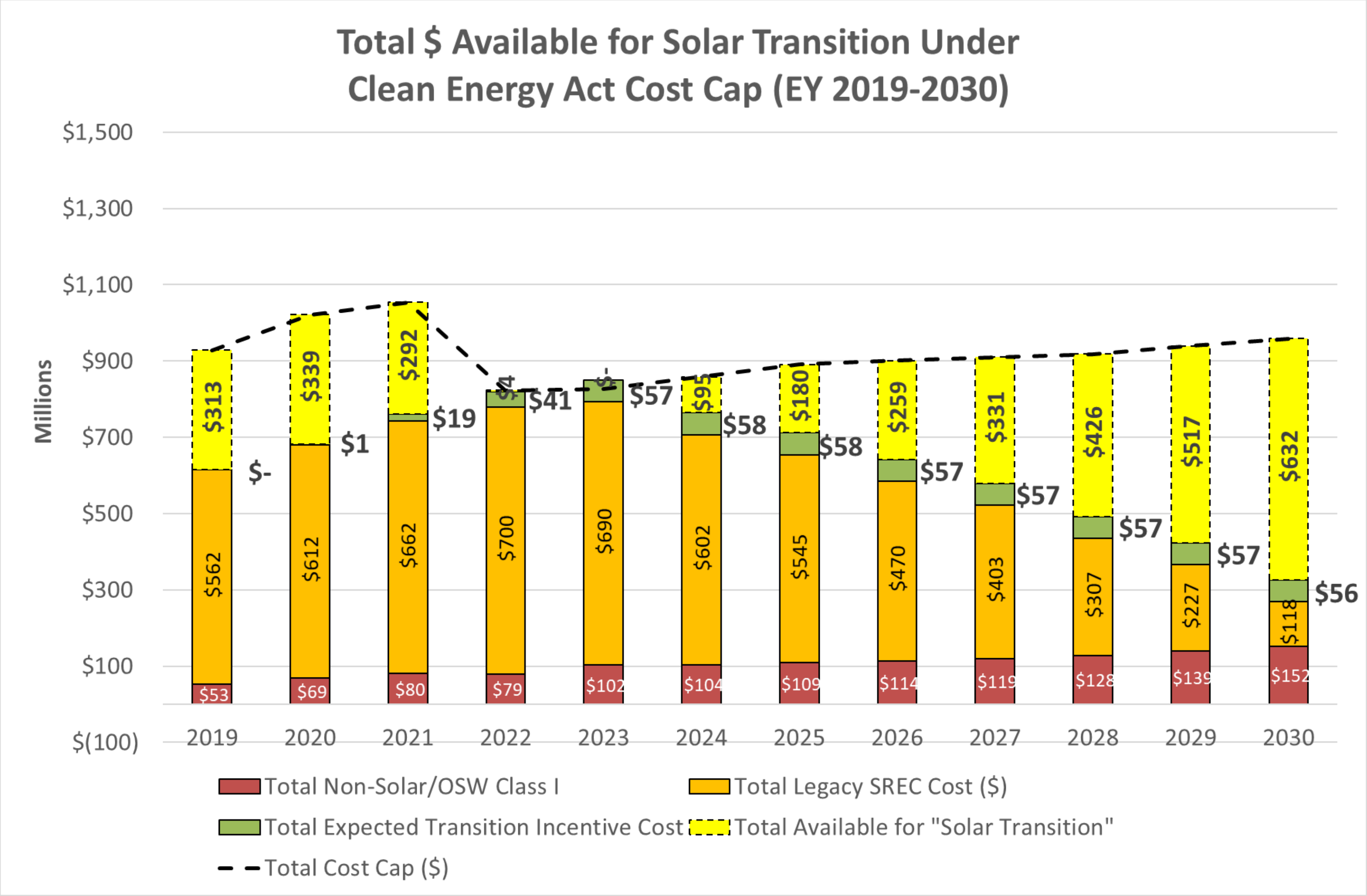
TI Impact on Solar Transition Interaction with Cost Caps



#9: Fully-Bundled Incentive (High Cost/Low Cost Cap Headroom)

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Thank You

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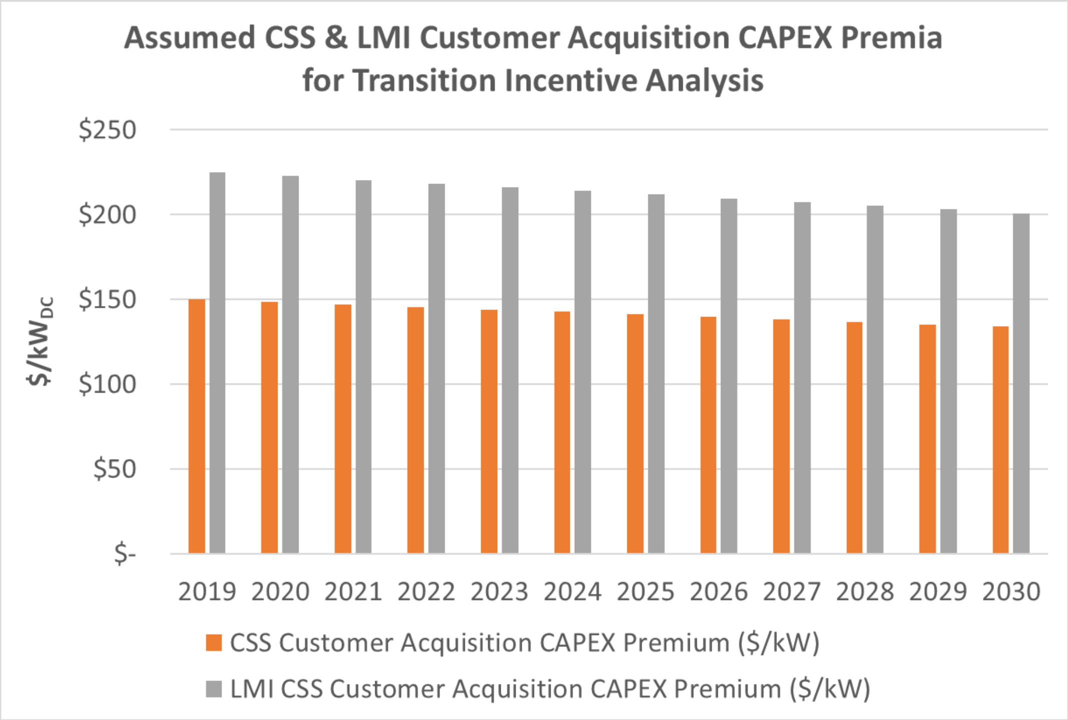
Appendix: Additional Cost of Entry Analysis Methodology Details and Sources

Scenario Matrix for Illustrative Cost of Entry Results

Transition Incentive (TI) Program Design Policy/Revenue Assumption	Capital & Operating Costs + Trajectory	Financing Costs	Incentive Term (Years)	Net Metering?
Unhedged Commodity & Incentive	Base	Base	10	Yes
Unhedged Commodity & Incentive	Base	Base	15	Yes
Unhedged Commodity & Incentive	Base	Base	20	Yes
Unhedged Commodity & Incentive	Low	Low	10	Yes
Unhedged Commodity & Incentive	Low	Low	20	Yes
Unhedged Commodity & Incentive	Low	Low	20	Yes
Unhedged Commodity & Incentive	High	High	10	Yes
Unhedged Commodity/Hedged Incentive	Base	Base	10	Yes
Hedged Commodity & Incentive	Base	Base	10	Yes

Detailed Draft NJ 2019 CAPEX Premium Assumptions (Community Solar, LMI and Landfill/Brownfield) & Interconnection

- **Community Solar**
  - Assumed $150/kW CAPEX premium over similarly-situated ground or building mounted project, declining through 2030 (shown at right)
  - ***Source:*** *Industry feedback from multiple sources, including RI Renewable Energy Growth 2019 Ceiling Price Development Process*
- **Low/Moderate Income (LMI)**
  - Assumed 50% increase on top of Community Solar CAPEX premium on similarly-situated ground or building mounted project (representing average of TPO/Host responses, and declining through 2030, as shown at right)
  - ***Source:*** *Ratio analysis based on industry responses from Developing a Post-1,600 MW Solar Program*
- **Landfill/Brownfield**
  - **For 1 MW modeled size:** 5% premium over similarly situated ground mounted project
  - **For >1 MW modeled size:** 15% premium over similarly-situated ground mounted project
  - ***Source:*** *Ratio analysis based on industry responses from Developing a Post-1,600 MW Solar Program*
- **Interconnection**
  - Assumed to be included in costs reported in SRP data, but backed out and increase at rates ranging between EIA's AEO 2019 T&D forecast for NJ in High cases and forecasted CPI
  - **Average IC Costs:** $133/kW
  - ***Source:*** *National Grid in MA/RI, and utilized in RI Renewable Energy Growth 2019 Ceiling Price Development Process* ***(expectation is that NJ specific costs will come from participant survey and/or EDCs)***



NOTE: All kW numbers are in nameplate direct current (DC)

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Detailed Draft NJ 2019 OPEX Assumptions (1)

- **"Vanilla" Fixed O&M**
  - **Initial Estimate:** Assumed $35/kW for <25 kW, $14/kW for 25-500 kW, and $12/kW for >500 kW
  - **CSS O&M Premium:** Assumed $25/kW incremental to base O&M costs
  - ***Source:*** *Industry feedback gathered in kWh Analytics' 2019 Solar Risk Assessment and RI Renewable Energy Growth 2019 Ceiling Price Development Process*
- **Inverter Replacement**
  - **Replacement year:** Assumed inverter replacement necessary every 13 years
  - **Replacement cost:** Assumed $50/kW (in replacement year) for <25 kW, $21/kW for >25 kW
  - ***Source:*** *Industry feedback gathered in RI Renewable Energy Growth 2019 Ceiling Price Development Process*
- **Insurance**
  - Assumed 0% of total costs for <25 kW, 0.27% for 250 kW, and 0.45% for >250 kW
  - ***Source:*** *Industry feedback gathered in RI Renewable Energy Growth 2019 Ceiling Price Development Process*
- **Project Management Costs**
  - Assumed $0/yr for <25 kW, $750/yr for 250 kW, $3,000/yr for 250-1000 kW, and $12,000/yr for >1 MW
  - ***Source:*** *Industry feedback gathered in RI Renewable Energy Growth 2019 Ceiling Price Development Process*
- **Site/Land Lease Costs**
  - Assumed $23/kW for projects >25 kW
  - ***Source:*** *Industry feedback gathered in RI Renewable Energy Growth 2019 Ceiling Price Development Process, adjusted for the difference between RI and NJ land costs according to the USDA Land Values 2018 Summary report*
- **Indexed OPEX Growth During Project Life:**
  - All above OPEX categories assumed to escalate 2%/year
- **Change in O&M/Project Management/Insurance Costs Over Time**
  - Assumed to decline at rates observed in *2018 Annual Technology Baseline (ATB)*

Draft

Detailed Draft NJ 2019 OPEX Assumptions (2)

- **Property Tax/PILOT Costs**
  - **Initial Estimate:** Assumed $5/kW for projects 5 MW or greater
  - **Change Over Time:** Assumed to be constant
  - ***Source:*** *Industry feedback gathered in RI Renewable Energy Growth 2019 Ceiling Price Development Process*
- **Decommissioning**
  - **Decommissioning Cost:** Assumed $20/kW for all projects
  - **Bond Expense for Decommissioning (%):** Assumed 2% of decommissioning costs for all projects
  - **Change Over Time:** Assumed to be constant
  - ***Source:*** *Industry feedback gathered in RI Renewable Energy Growth 2019 Ceiling Price Development Process*

Draft

Detailed Draft NJ Solar Financing Assumptions (1)

- **Debt %**
  - **Initial Estimate (Associated w/Fully Unhedged):** Projects w/no long-term contract or tariff cannot exceed 35% (NREL estimate associated with Large Distributed PV Portfolios, and NJ is largest TPO state in the country) for <=250 kW systems (w/40% for systems >250 kW, since larger systems are usually associated w/more creditworthy TPO borrowers)
  - **Change Over Time:** Share of debt increases up to 10% of total capital costs by the time ITC fully disappears, and 5% during ITC step-down period (industry assumed to desire to mitigate costs as ITC fades out)
  - **High/Low Variance Within Policy/Revenue Cases:** Assumed +/- 5%
  - **TPO/Host Variance:** None
  - **Change Between Policy/Revenue Base Cases:** +7.5% for Unhedged Commodity/Hedged Incentive (fixed REC, translating to 42.5% for <25 kW and 47.5% for >25 kW), +15% for Hedged Commodity & Incentive (50% for <25 kW and 55% for >25 kW, in line w/RI 2019)
- **Lender's Fee**
  - 2% for TPO, 0% for Host (from *RI Renewable Energy Growth 2019 Ceiling Price Development Process*)

Draft

Detailed Draft NJ Solar Financing Assumptions (2)

- **Interest on Term Debt**
  - **Initial Estimate (for all cases):** Assumed 7% for <=250 kW, 6.50% for >250 (*RI Renewable Energy Growth 2019 Ceiling Price Development Process*)
  - **Change Over Time:** Fed unlikely to raise interest rates again (but unclear when they might fall again), so interest rates assumed flat to be small-c conservative
  - **High/Low Variance Within Policy/Revenue Cases:** +/- 50 basis points
  - **TPO/Host Variance:** For larger scale host systems, assumption is financing w/corporate bonds, which are general obligation in nature and non-recourse to the project. Host-owned residential systems assumed at Mass Solar Loan Program terms (6% during trailing 4 quarters)
  - **Change Between Policy/Revenue Base Cases:** Not varied (in line with Northeast market participant feedback, which does not assume more costly debt interest for lack of a long-term contract/tariff)
- **Debt Tenor**
  - **Initial Estimate (Associated w/Fully Unhedged):** Less hedging leads to shorter expected tenors – smallest amount is 7 years for <=250 kW, and 10 years for >250 kW (break point is in line w/ *RI Renewable Energy Growth 2019 Ceiling Price Development Process* and *Developing a Post-1,600 MW Solar Program*)
  - **Change Over Time:** No change
  - **High/Low Variance Within Policy/Revenue Cases:** +/- 2 years
  - **TPO/Host Variance:** +3 years for Host financed systems (in line w/*Developing a Post-1,600 MW Solar Program* assumption of general obligation corporate bonds, per discussion below), except for
  - **Change Between Policy/Revenue Base Cases:** 10/12 years for Unhedged Commodity/Hedged Incentive, and 15 years for all sizes associated w/Hedged Commodity & Incentive

Draft

Detailed Draft NJ Solar Financing Assumptions (3)

- **After-Tax Equity IRR (Levered)**
  - **Initial Estimate (for Hedged Commodity & Incentive case):** 9.4% (from 2019 *RI Renewable Energy Growth 2019 Ceiling Price Development Process*)
  - **Change Over Time:** Assumed to drop 0.4% from highest (30%) to lowest (10%) ITC (roughly in line w/Northeast market participant feedback, rounded up from 0.35%). Drops 0.2% during ITC transition, and remaining 0.2% in 2022
  - **High/Low Variance Within Policy/Revenue Cases:** +/- 50 basis points
  - **TPO/Host Variance:** While TPO based on typical third-party sponsor/tax equity finance, host-owned systems larger than 25 kW assumed based on corporate hurdle rates of 12% (<=25 kW assumed equal to 6% Mass Solar Loan Program value discussed previously)
  - **Change Between Policy/Revenue Base Cases:** +50 basis for Unhedged Commodity/Hedged Incentive, and additional +50 for Unhedged Commodity & Incentive

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Calculating Transition Incentive Market Shares

Monthly build rates per size bin are allocated to specific project types as follows

Resource Block	Size Bin	Market Share per Size Bin					
Residential Roof Mount	<25 kW	90%					
Small Commercial Roof Mount	<25 kW	10%					
Medium Commercial Roof Mount	25 - 250 kW		95%				
Medium Commercial Roof Mount (LMI)	25 - 250 kW		5%				
Medium Commercial Building Mounted	250 - 500 kW			90%			
Medium Commercial Ground Mounted	250 - 500 kW			10%			
Large Commercial Building Mounted	500 - 1000 kW				65%		
Large Commercial Ground Mounted	500 - 1000 kW				10%		
Small Landfill/Brownfield	500 - 1000 kW				5%		
Small Community Solar	500 - 1000 kW				10%		
Small Community Solar (LMI)	500 - 1000 kW				10%		
Very Large Building Mounted	1000 - 5000 kW					40%	
Very Large Building Mounted Community Solar	1000 - 5000 kW					10%	
Medium Community Solar	1000 - 5000 kW					10%	
Medium Community Solar (LMI)	1000 - 5000 kW					5%	
Large Community Solar	1000 - 5000 kW					10%	
Large Community Solar (LMI)	1000 - 5000 kW					5%	
Large Landfill/Brownfield	1000 - 5000 kW					5%	
Large Ground Mounted	1000 - 5000 kW					15%	
Very Large Ground Mounted (Fixed Tilt)	5000+ kW						100%

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NEW JERSEY SOLAR TRANSITION

Transition Incentive Policy Pathways

STAKEHOLDER WORKSHOP #2

BOB GRACE, SUSTAINABLE ENERGY ADVANTAGE, LLC

JUNE 14, 2019

Disclaimer

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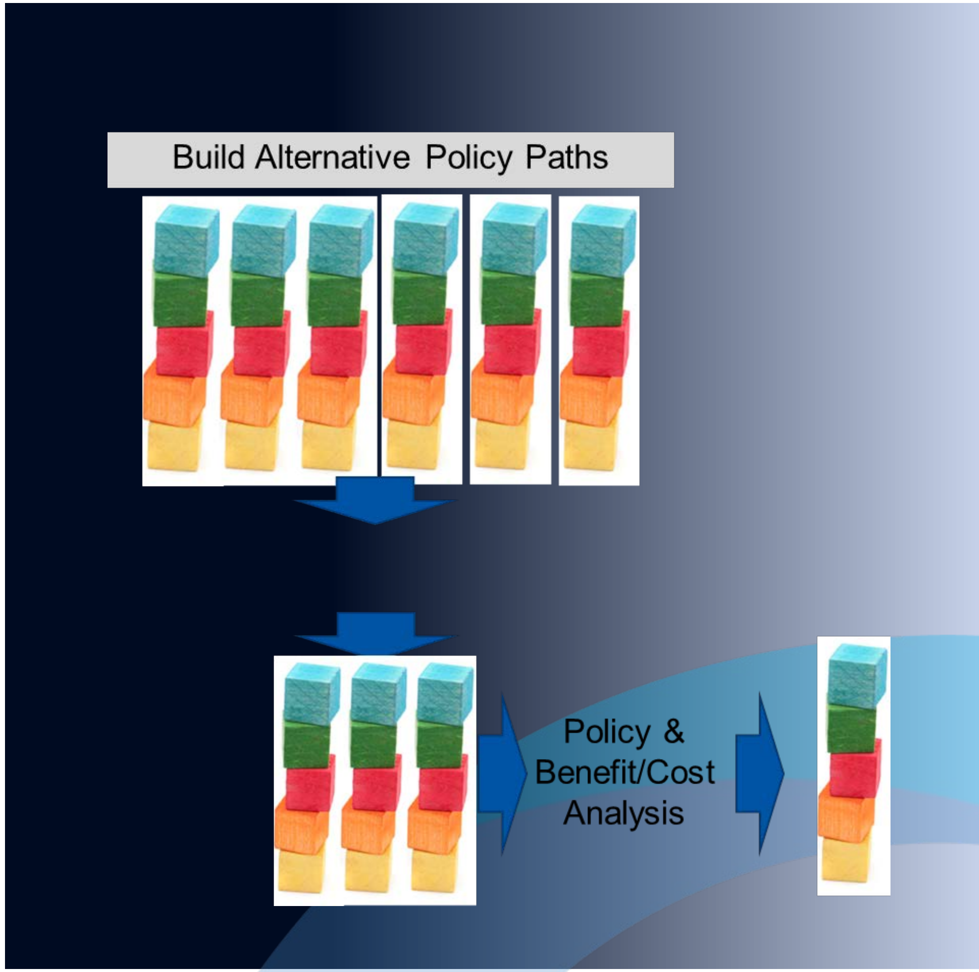
Overview

- Policy Paths – what and why?
- Candidate Transition Incentive Policy Paths – Overview
- Candidate Transition Incentive Policy Paths – Detailed Descriptions
- Getting Stakeholder Input: Breakout session game plan
  - Prioritized Design Criteria applicable to Transition Incentive
  - Candidate Policy Path Summary
  - Breakout session goals

Potential Policy Paths…

For Transition Incentive and Successor Program

- Are developed by the Consulting Team by selecting a choice from each menu of building blocks
  - Thousands of possible combinations
- Aim to have a limited, but diverse and distinct set of alternatives for consideration
  - To highlight major differences between possible paths
  - Doesn't preclude fine-tuning candidate policy paths later
- Goal:
  - Consulting Team ID preliminary candidate policy paths
  - Initial stakeholder input to guide refinement (adjustment, sharpen definition, etc.) and/or identify interesting alternatives
  - Subsequent stakeholder input to guide selecting a subset for benefit and cost analysis
  - Consultant analysis of 2-3 scenarios
- Board to make decisions on the Solar Transition based on their criteria, *with Consultant's analysis available for the Board's consideration.*



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Candidate 'Policy Paths' for Transition Incentive

Path #/Name:	Summary Description
TI-1. Minimize disruption: Same Game, New Ballpark	Separate RPS tier for solar (SREC II) (large & small)
TI-2. Minimize disruption with differentiation: Factorized SRECs	Separate RPS tier for solar (SREC II) with SREC factors (large & small)
TI-3. Minimize disruption with differentiation and price stability: Factorized SRECs with an SREC Buyback Program	Separate RPS tier for solar (SREC II) with SREC factors (large & small) Parallel limited firm floor price mechanism (quantity-limited RFP/buyback)
TI-4. Lower financing costs, keep it simple: PBIs for all via a standard offer	Cost-Based PBI Tariff: Admin-established price (no change over time) (large & small differentiated); Cost-based standard offer w/ MW cap
TI-5. Achieve project diversity goals: PBIs for all with MW allocations by segment	Cost-Based PBI Tariff: Admin-established price (no change) with MW allocations by segment
TI-6. Even Lower financing costs: Competition for large, admin. set PBIs for the rest, no differentiation by EDC	Cost-Based PBI Tariff: Admin-established price (Small) (no change) RFP/Auction/Tender Competitive Long-Term PPA (Large or largest)
TI-7. EDC Custom: Competition for large, admin. set PBIs for the rest, incentive differentiation by EDC	Cost-Based PBI Tariff: Admin-established price with incentive-matching step-up (Small) RFP/Auction/Tender Competitive Long-Term PPA (Large) Incentive differentiation by EDC

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Key Assumptions across all Policy Paths

- BGS Auctions: no change
- May 31, 2020 = end of application period for T.I. (Successor Program starts June 1, 2020)
- Same SRP rules for reserving a queue spot
- Net metering continues to be available
- Community Solar pilot constrained to 75 MW / year

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Policy Path #TI-1:

Minimize disruption: Same game, different ballpark

Description / Policy Component	Separate RPS tier for solar (SREC II) (large & small)
Incentive Type	Demand obligation
Analog	NJ SREC
Counterparty	LSEs buy RECs
Price-setting and adjustments	Market-based (a function of supply vs. demand, banking eligibility, and ACP); no other adjustment
Incentive Access; Queueing	Open, SRP application acceptance = qualification
Attributes purchased, hedged	SRECs purchased, no hedge
Installation Diversity/favoring mechanism	None
EDC Installation Diversity	N/A
Portability of Incentives btw Segments	N/A
Net Metering Interaction	Separate from Net Metering
Predictability of Annual Market Scale	Target defined by % of load targets in aggregate (not by market segment) (however, no constraint on market response)
Trajectory of Incentive Scale	N/A
Binding Constraints	Rate Cap + Class I RPS+ Solar Market Size=Binding. Solar Segment Share Not Binding
Other Features	Duration: 10 years of SRECs, Class I RECs thereafter
Other Potential Options/Variations	Energy Storage Interactions; None
Threshold issues	Maybe None

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Policy Path #TI-2:

Minimize disruption with differentiation: Factorized SRECs

Description / Policy Component	Separate RPS tier for solar (SREC II) with SREC factors differentiating incentives to installations based on relative revenue gap by system type/size
Incentive Type	Demand obligation
Analog	**NJ Solar/MA SREC II Combo**
Counterparty	LSEs buy RECs
Price-setting and adjustments	Market-based (a function of supply vs. demand, banking eligibility, and ACP); no other adjustment
Incentive Access; Queueing	Open, SRP application acceptance = qualification
Attributes purchased, hedged	SRECs purchased, no hedge
Installation Diversity/favoring mechanism	**Vary SREC Factors by type/size based on cost gap or policy preference**
EDC Installation Diversity	N/A
Portability of Incentives btw Segments	N/A
Net Metering Interaction	Separate from Net Metering
Predictability of Annual Market Scale	Target defined by % of load targets in aggregate (not by market segment) (however, no constraint on market response)
Trajectory of Incentive Scale	N/A
Binding Constraints	Rate Cap + Class I RPS+ Solar Market Size=Binding. Solar Segment Share Not Binding
Other Features	Duration: 10 years of SRECs, Class I RECs thereafter
Other Potential Options/Variations	Energy Storage Interactions; what is factorized – size, or size/type/offtaker; duration of SRECs
Threshold issues	Maybe None

Policy Path #TI-3:

Minimize disruption with differentiation and price stability: Factorized SRECs w/ buyback

Description / Policy Component	**Separate RPS tier for solar (SREC II) with SREC factors differentiating incentives to installations based on relative revenue gap by system type/size, plus limited firm floor price mechanism via limited quantity buyback**
Incentive Type	Hybrid demand obligation with long-term hedge
Analog	NJ SREC w/ PSEG Loan, MA SREC II
Counterparty	LSEs buy RECs
Price-setting and adjustments	Market-based (a function of supply vs. demand, banking eligibility, and ACP)**; buyback mechanism creates firm price floor *for a subset of SRECs***
Incentive Access; Queueing	Open, SRP application acceptance = qualification
Attributes purchased, hedged	**SRECs purchased. A limited quantity of SRECs have an implicit price floor w/ put option associated w/ buyback mechanism; otherwise, no hedge**
Installation Diversity/favoring mechanism	Vary SREC Factors by type/size based on cost gap or policy preference
EDC Installation Diversity	N/A
Portability of Incentives btw Segments	N/A
Net Metering Interaction	Separate from Net Metering
Predictability of Annual Market Scale	Target defined by % of load targets in aggregate (not by market segment) (however, no constraint on market response)
Trajectory of Incentive Scale	N/A
Binding Constraints	Rate Cap + Class I RPS+ Solar Market Size=Binding. Solar Segment Share Not Binding
Other Features	Duration: 10 years of SRECs, Class I RECs thereafter
Other Potential Options/Variations	Energy Storage Interactions; what is factorized – size, or size/type/offtaker; duration of SRECs
Threshold issues	Maybe None

Policy Path #TI-4:

Lower financing costs, keep it simple: PBIs with administratively established price

Description / Policy Component	Cost-Based PBI Tariff: Admin-established price (no change), differentiated prices based on revenue gap by system type/size w/ MW cap
Incentive Type	Long-term hedge
Analog	RI Distributed Generation Standard Offer
Counterparty	EDCs
Price-setting and adjustments	Administratively-established standard offer, cost-based (not adjusted; Transition Incentive “program” enrollment period too short)
Incentive Access; Queueing	Open, SRP application acceptance secures queue position
Attributes purchased, hedged	Premium incentive: Fixed price paid for attribute. (Incentive hedged; Energy & capacity unhedged)
Installation Diversity/favoring mechanism	Vary PBI level by type/size based on cost gap and other policy preferences, Minimum set-aside for < 25 kW segment (so that projects not shut out of queuing process)
EDC Installation Diversity	No inter-EDC allocation constraints
Portability of Incentives btw Segments	N/A (given duration of transition incentive)
Net Metering Interaction	Separate from net metering
Predictability of Annual Market Scale	Separate “program” MW caps for (i) ≤25kW, and (ii) all others [lesser of MW caps and MW securing incentive by end of TI]
Trajectory of Incentive Scale	N/A
Binding Constraints	Rate Cap + Class I RPS+ Solar Market Size=Binding. Solar Segment Share Not Binding except for ≤25 kW vs. >25 kW allocation
Other Features	Duration: 20 year tariff; EDC resells products purchased into markets; COD sunset per SRP/EDC interconnection
Other Potential Options/Variations	Energy Storage Interactions; Which products flow to EDCs in exchange for payment (e.g., capacity) Bundled incentive: Fixed price for energy (capacity) & RECs, fully hedged [net metering projects earn a calculated fixed net incentive]; Upfront payment with PB true-up after x years
Threshold issues	Maybe None

Policy Path #TI-5:

Achieve project diversity goals: PBIs for all with MW allocations by segment

Description / Policy Component	Cost-Based PBI Tariff: Admin-established price, differentiated prices and availability based on solar market segment
Incentive Type	Long-term hedge
Analog	RI Distributed Generation Standard Offer, **NY-Sun MW Block Program**
Counterparty	EDCs
Price-setting and adjustments	Administratively-established standard offer, cost-based (not updated; Transition Incentive “program” enrollment period too short)
Incentive Access, Queuing	Open, SRP application acceptance secures queue position
Attributes purchased, hedged	Premium incentive: Fixed price paid for attribute. (Incentive hedged; Energy & capacity unhedged)
Installation Diversity/favoring mechanism	Vary PBI level by type/size based on cost gap and other policy preferences. **MW goal set for each of several distinct market segments.**
EDC Installation Diversity	No inter-EDC allocation constraints
Portability of Incentives btw Segments	N/A (given duration of transition incentive)
Net Metering Interaction	Separate from net metering, but for administratively set incentive, the size of net metering credit factored into size of incentive
Predictability of Annual Market Scale	**Firm Target**
Trajectory of Incentive Scale	N/A
Binding Constraints	**Rate Cap + Solar Segment Share + Solar Market Size=Binding. Class I RPS=Not Binding**
Other Features	Duration: 20 year tariff; EDC resells products purchased into markets; COD sunset per SRP/EDC interconnection
Other Potential Options/Variations	Energy Storage Interactions; Which products flow to EDCs in exchange for payment (e.g., capacity) Bundled incentive: Fixed price for energy (capacity) & RECs, fully hedged [net metering projects earn a calculated fixed net incentive]; **Upfront payment with PBI true-up after x years**
Threshold issues	Maybe None

Policy Path #TI-6:

Even Lower financing costs: Competition for larger, administratively set PBI for smaller

Description / Policy Component	Cost-Based PBI Tariff: Price set competitively for large projects and administratively for small projects
Incentive Type	Long-term hedge
Analog	**RI RE Growth; SMART (without the DBI)**
Counterparty	EDCs
Price-setting and adjustments	**Prices set by competitive auction for large(st) projects over a certain size threshold; only one auction held because short duration of "program"** Cost-based, administratively-established for smaller projects. Not adjusted.
Incentive Access; Queueing	**Auction for large(st) projects**; SRP application acceptance secures queue position for smaller projects
Attributes purchased, hedged	**Fixed price for energy and incentive**
Installation Diversity/favoring mechanism	Small: Vary PBI level by type/size based on cost gap and other policy preferences, **Large: MW sought in RFP**
EDC Installation Diversity	No inter-EDC allocation constraints
Portability of Incentives btw Segments	N/A (given duration of transition incentive)
Net Metering Interaction	**Fixed total compensation → Higher Net Metering credits results in lower incentive payment a/k/a contract-for-differences with fixed total compensation as strike price**
Predictability of Annual Market Scale	MW Cap, Bids / Solicitations would have a target quantity of MW
Trajectory of Incentive Scale	N/A
Binding Constraints	Rate Cap + Class I RPS+ Solar Market Size=Binding. Solar Segment Share Not Binding
Other Features	Duration: 20 year tariff
Other Potential Options/Variations	Energy Storage Interactions; Smaller projects incentive based on pre-determined multiplier of auction results; EDC allocation
Threshold issues	Maybe None

Policy Path #TI-7:

EDC Custom: Competition for large, administratively set PBI for small; incentive differentiation by EDC

Description / Policy Component	Cost-Based PBI Tariff: Price set competitively for large projects and administratively for small
Incentive Type	Long-term hedge
Analog	**CT ZREC**
Counterparty	EDCs
Price-setting and adjustments	Prices set by competitive auction for large(st) projects over a certain size threshold; only one auction held because short duration of “program” Cost-based, administratively-established for smaller projects. Not adjusted.
Incentive Access; Queueing	Auction for large(st) projects; SRP application acceptance secures queue position for smaller projects
Attributes purchased, hedged	**Premium incentive: Fixed price for attribute. (Incentive hedged; Energy & capacity unhedged)**
Installation Diversity/favoring mechanism	Small: Vary PBI level by type/size based on cost gap and other policy preferences, Large: MW sought in RFP **and by EDC**
EDC Installation Diversity	**Allocate quota by EDC**
Portability of Incentives btw Segments	N/A (given duration of transition incentive)
Net Metering Interaction	Separate from net metering, but for administratively set incentive, the size of net metering credit factored into size of incentive
Predictability of Annual Market Scale	MW Cap, Bids / Solicitations would have a sought quantity of MW
Trajectory of Incentive Scale	N/A
Binding Constraints	Rate Cap + Class I RPS+ Solar Market Size=Binding. Solar Segment Share Not Binding
Other Features	Duration: 20 year tariff
Other Potential Options/Variations	Energy Storage Interactions; only Grid Supply projects in auction or additionally large net metered projects
Threshold issues	Maybe None, but getting complicated

Getting Stakeholder Input: Breakout Session Game Plan

Incentive Policy Design Criteria Applicable to T.I.

from BPU Transition Principles	T.I.	S.P.
a. Maximize ratepayer benefit	✓	✓
b. Minimize ratepayer cost	✓	✓
c. Support solar industry growth	✓	
d. Ensure prior investments retain value	✓	✓
e. Meet 50% Class I RECs by 2030	✓	✓
f. Binding Constraint: Comply with Rate Cap	✓	✓

Primary Design Criteria from SWS#1	T.I.	S.P.
1. Fair to those who have made past commitments	✓	✓
2. Fair to those who will make future commitments		
3. Clarity and transparency regarding project eligibility and status	✓	✓
4. Implements a fair and transparent process for scrubbing non-performing project from qualification queuing procedures		
5. Minimizes market disruption (minimize high transition costs)	✓	✓
6. Supports Steady Industry Growth	✓	✓
7. Maximizes certainty of incentive access	✓	✓
8. Minimizes Complexity	✓	✓
9. Maximizes Solar PV Installation Growth	✓	✓
10. Feasibility	✓	✓

Secondary Design Criteria from SWS#1	T.I.	S.P.
11. Maximize cost-effectiveness (biggest bang for the buck, most MW per ratepayer $)	✓	✓
12. Minimizes Ratepayer Impact.	✓	✓
13. Maximizes ratepayer net benefit (including environmental considerations)		
14. Reduces incentive levels over time		✓
15. Maximizes solar development on disturbed land/minimizes reliance on green space		✓
16. Encourages Installation Type Diversity		✓
17. Minimizes Financing Risk	✓	✓
18. Encourages Participant Diversity		✓
19. Maximizes near-term jobs in NJ		✓
20. Maximizes long-term jobs in NJ		
21. Maximize use of competitive market mechanisms		✓
22. Maximize compatibility with competitive wholesale energy markets		
23. Maximize compatibility with competitive retail energy markets		
24. Allows timely implementation	✓	
25. Support PV Location Where Most Needed		✓

Transition Incentive Policy Path → Attribute ↓	TI-1. Minimize disruption: Same game, different ballpark	TI-2. Minimize disruption with differentiation: Factorized SRECs	TI-3. Minimize disruption with differentiation and price stability: Factorized SRECs w/ buyback	TI-4. Achieve project diversity goals: PBIs allocated by market segment	TI-5. Achieve project diversity goals: PBIs for all with MW allocations by segment	TI-6. Even Lower Financing Costs: Competition for larger, admin.-set PBI for smaller	TI-7. EDC Custom: Competition for large, admin-set PBI for small; incentive differentiation by EDC
Incentive Type	Demand obligation			Long-term hedge			
Analog	NJ SREC	NJ Solar/ MA SREC II Combo	NJ SREC w/ PSEG Loan, MA SREC II	RI DG Standard Offer	RI DG Standard Offer	RI RE Growth; SMART (w/o DBI)	CT ZREC
Counterparty	LSEs buy RECs			EDCs			
Price-setting and adjustments	Market-based		Market-based. Buyback mechanism creates firm price floor *for a subset of SRECs*	Administratively-established standard offer, cost-based; not adjusted		Competitive auction for large(st) projects; Cost-based, administratively-established for smaller projects	
Incentive Access; Queueing	Open, SRP application acceptance = qualification			Open, SRP application acceptance secures queue position		Auction for large(st) projects; SRP application acceptance secures queue position for smaller projects	
Attributes purchased, hedged	SRECs purchased, no hedge		SRECs purchased. Implicit price floor w/ buyback mechanism for limited quantity of SRECs	Premium incentive: Fixed price paid for attribute. (Incentive hedged; Energy & capacity unhedged)		Fixed price for energy and incentive	Premium incentive: Fixed price paid for attribute. (Incentive hedged; Energy & capacity unhedged)
Installation Diversity/ favoring mechanism	None	Vary SREC Factors by type/size based on cost gap or policy preference		Vary PBI level by segment based on cost gap & policy preferences, Min.set-aside for < 25 kW segment	Vary PBI by segment based on cost gap & policy preferences. MW goal set for each distinct market segment	Small: Vary PBI by type/size based on cost gap and policy preferences, Large: MW sought in RFP	Small: Vary PBI by type/size based on cost gap & policy preferences, Large: MW sought in RFP & by EDC
EDC Diversity	N/A			No inter-EDC allocation constraints			Allocate quota by EDC
Net Metering Interaction	Separate from Net Metering				Separate from net metering, but size of NMC factored into incentive size	Fixed total compensation → Higher NMC results in lower incentive payment	Separate from net metering, but for admin.-set incentive, size of NMC factored into incentive size
Predictability of Annual Market Scale	Target defined by % of load targets in aggregate (not by market segment) (however, no constraint on market response)			Separate “program” MW caps for (i) ≤25kW, (ii) all others	Firm Target	MW Cap,; Solicitations have a target quantity of MW	
Other Features	Duration: 10 years of SRECs, Class I RECs thereafter			Duration: 20 year tariff; EDC resells products purchased into markets; COD sunset per SRP/EDC interconnection		Duration: 20 year tariff	

Breakout Session: Transition Incentive Policy Paths

Overview & Instructions

- 4 Breakout Groups based on the letter on your nametag ➔ Please proceed to your designated location (starting promptly in 10 minutes)
- Handout =
  - Summary of candidate T.I. policy paths
  - Design Criteria Cheat Sheet
- Facilitated discussion: As a group, provide input/feedback on candidate policy paths
  - What do you like/not like about the pathway?
  - What are your concerns about the pathway?
  - How could those concerns be addressed?
- Then… Each group will prioritize
  - Identify your top three (3) objectives
  - Identify any path you think *should not* merit consideration… and why (optional)

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Report Back

Major take-aways from 4 Breakout Groups

- To be summarized by facilitators

<table>
<tr><th>Transition Incentive Policy Path ➔
Attribute 🡫</th><th>TI-1. Minimize disruption: Same game, different ballpark</th><th>TI-2. Minimize disruption with differentiation: Factorized SRECs</th><th>TI-3. Minimize disruption with differentiation and price stability: Factorized SRECs w/ buyback</th><th>TI-4. Achieve project diversity goals: PBIs allocated by market segment</th><th>TI-5. Achieve project diversity goals: PBIs for all with MW allocations by segment</th><th>TI-6. Even Lower Financing Costs: Competition for larger, admin.-set PBI for smaller</th><th>TI-7. EDC Custom: Competition for large, admin-set PBI for small; incentive differentiation by EDC</th></tr>
<tr><td>Incentive Type</td><td colspan="3">Demand Obligation</td><td colspan="4">Long-term Hedge</td></tr>
<tr><td>Analog</td><td>NJ SREC</td><td>NJ Solar/ MA SREC II Combo</td><td>NJ SREC w/ PSEG Loan, MA SREC II</td><td>RI DG Standard Offer</td><td>RI DG Standard Offer</td><td>RI RE Growth; SMART (w/o DBI)</td><td>CT ZREC</td></tr>
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<tr><td>EDC Diversity</td><td colspan="3">N/A</td><td colspan="3">No inter-EDC allocation constraints</td><td>Allocate quota by EDC</td></tr>
<tr><td>Net Metering Interaction</td><td colspan="4">Separate from Net Metering</td><td>Separate from net metering, but size of NMC factored into incentive size</td><td>Fixed total compensation → Higher NMC results in lower incentive payment</td><td>Separate from net metering, but for admin.-set incentive, size of NMC factored into incentive size</td></tr>
<tr><td>Predictability of Annual Market Scale</td><td colspan="3">Target defined by % of load targets in aggregate (not by market segment) (however, no constraint on market response)</td><td>Separate “program” MW caps for (i) ≤25kW, (ii) all others</td><td>Firm Target</td><td colspan="2">MW Cap,; Solicitations have a target quantity of MW</td></tr>
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Cheat Sheet: Incentive Policy Design Criteria Applicable to T.I.

from BPU Transition Principles
a. Maximize ratepayer benefit
b. Minimize ratepayer cost
c. Support solar industry growth
d. Ensure prior investments retain value
e. Meet 50% Class I RECs by 2030
f. Binding Constraint: Comply with Rate Cap

Primary Design Criteria from SWS#1
1. Fair to those who have made past commitments
2. Fair to those who will make future commitments
3. Clarity and transparency regarding project eligibility and status
4. Implements a fair and transparent process for scrubbing non-performing project from qualification queuing procedures
5. Minimizes market disruption (minimize high transition costs)
6. Supports Steady Industry Growth
7. Maximizes certainty of incentive access
9. Minimizes Complexity
10. Maximizes Solar PV Installation Growth
11. Feasibility

Secondary Design Criteria from SWS#1
12. Maximize cost-effectiveness (biggest bang for the buck, most MW per ratepayer $)
13. Minimizes Ratepayer Impact.
14. Maximizes ratepayer net benefit (including environmental considerations)
17. Encourages Installation Type Diversity
18. Minimizes Financing Risk
24. Maximize compatibility with competitive retail energy markets
25. Allows timely implementation

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NEW JERSEY SOLAR TRANSITION

Successor Program
Candidate Policy Pathways

STAKEHOLDER WORKSHOP #2

BOB GRACE, SUSTAINABLE ENERGY ADVANTAGE, LLC

JUNE 14, 2019

Disclaimer

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Overview

Successor Program Policy Path Development

- 12 High-Level Candidate Successor Program Policy Paths
- Policy Path-Dependent Design Features, Choices
- Policy Path-Independent (or Partially Independent) Design Features
- 5 Illustrative Policy Paths
- Incentive Policy Design Criteria Applicable to S.P.
- Next Steps

Successor Program Policy Path Development

Candidate 'Policy Paths' for Successor Program

Demand Obligations & Hybrid with Long-Term Hedge Approaches (1 of 2)

Path #/Name/Theme:	Summary Description
SP-1. Minimize disruption: Same Game, New Ballpark	Separate RPS tier for solar (SREC II) (large & small)
SP-2. Minimize disruption with differentiation: Factorized SRECs	Separate RPS tier for solar (SREC II) with SREC factors (large & small)
SP-3. Minimize disruption with differentiation: Factorized SRECs with Soft Floor	Separate RPS tier for solar (SREC II) with SREC factors with Soft Floor (large & small)
SP-4. Minimize disruption with differentiation: Factorized SRECs with Firm Floor	**Separate RPS tier for solar (SREC II) with SREC factors with Firm Floor (large & small)** **Parallel unlimited firm floor price mechanism (via Buyer of Last Resort)**
SP-5. Minimize disruption with differentiation and price stability: Factorized SRECs with an SREC Buyback Program	Separate RPS tier for solar (SREC II) with SREC factors (large & small) Parallel limited firm floor price mechanism (quantity-limited RFP/buyback)

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Candidate 'Policy Paths' for Successor Program

Long-Term Hedge approaches (2 of 2)

Path #/Name/Theme:	Summary Description
SP-6. Declining Block Incentive for all w/ Administrative Price setting	Cost-Based PBI Tariff: Admin-established initial price (large & small differentiated); Declining block incentive; w/ MW cap
SP-7. Declining Block Incentive for all w/ Competitive Price setting	**Competitively-Derived PBI Tariff: Initial Competitively-established price for large systems, with small system price established as a function of large competitive price; Declining block incentive; w/ MW cap [MW block variant]**
SP-8. Adjustable Block Incentive for all w/ Competitive Price setting	**Competitively-Derived PBI Tariff: Initial Competitively-established price for large systems, with small system price established as a function of large competitive price, with small price established as a function of large competitive price; Time-based Adjustable Block Incentive; w/ MW cap**
SP-9. PBI with Periodic Administrative Price Reset for all	Cost-Based PBI Tariff: Periodically administratively-established price (large & small differentiated); w/ MW cap
SP-10. Ongoing competition for large, cost-based administratively set PBIs w/ periodic reset for the rest	**Cost-Based PBI Tariff: Periodically Admin-established price (Small) RFP/Auction/Tender Competitive Long-Term PPA (Large or largest)**
SP-11. Ongoing competition for large, cost-based Declining Block Incentive for the rest	Cost-Based PBI Tariff: DBI w/ administratively-established initial price (Small); RFP/Auction/Tender Competitive Long-Term PPA (Large or largest)
SP-12. Ongoing competition for large/ Grid-Supply; Value of Solar for all others	**Hybrid Value-based/Administratively-set PBI (Small) RFP/Auction/Tender Competitive Long-Term PPA (Large grid-supply)**

Policy Path-Dependent Design Features, Choices

Path #/Name/Theme:	What is purchased?	What is, hedged?	Block units	Installation Diversity, favoring mechanism	Incentive differentiation by EDC	Initial Price Setting approach
SP-1. Minimize disruption: Same Game, New Ballpark	SRECs	None	n/a	None	None	n/a
SP-2. Minimize disruption with differentiation: Factorized SRECs	SRECs	None	n/a	Factors	None	n/a
SP-3. Minimize disruption with differentiation: Factorized SRECs with Soft Floor	SRECs	Premium	n/a	Factors	None	n/a
SP-4. Minimize disruption with differentiation: Factorized SRECs with Firm Floor	SRECs	Premium	n/a	Factors	None	n/a
SP-5. Minimize disruption with differentiation and price stability: Factorized SRECs with an SREC Buyback Program	SRECs	Premium	n/a	Factors	None	n/a
SP-6. Declining Block Incentive for all w/ Administrative Price setting	RECs, energy &/or capacity	Premium, bundled	**MW** vs. Time	Price and/or tranches	Y/N	Bid, derived, **admin**
SP-7. Declining Block Incentive for all w/ Competitive Price setting	**RECs**, energy &/or capacity	**Premium**, bundled	**MW** vs. Time	**Price and**/or **tranches**	Y/**N**	**Bid**, **derived**, admin
SP-8. Adjustable Block Incentive for all w/ Competitive Price setting	**RECs**, energy &/or capacity	**Premium**, bundled	Time	Price and/or tranches	Y/**N**	**Bid**, **derived**, admin
SP-9. PBI with Periodic Administrative Price Reset for all	RECs, energy &/or capacity	Premium, bundled	MW vs. Time	**Price** and/or tranches	Y/N	Bid, derived, **admin**
SP-10. Ongoing competition for large, cost-based administratively set PBIs w/ periodic reset for the rest	**RECs, energy &/or capacity**	Premium, **bundled**	Time	**Price and**/or **tranches**	**Y**/N	**Bid**, derived, **admin**
SP-11. Ongoing competition for large, cost-based DBI for the rest	RECs, energy &/or capacity	Premium, bundled	MW vs. Time	Price and/or tranches	Y/N	**Bid**, derived, **admin**
SP-12. Ongoing competition for large / Grid-Supply; Value of Solar for all others	**RECs**, energy &/or capacity	**Premium**, bundled	Time	**Price** and/or tranches	**Y**/N	**Bid (Lg); Market (Sm)**

Selected choices for each path in **bold**. Not all choices defined for SP-6, 9 & 11

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Policy Path-Independent (or Partially Independent) Design Features

Different Flavors within broader Policy Path Choices

- What's Favored (disfavored)
  - (e.g., rooftop, low-income, solar carport, Grid Supply, nothing favored)?
  - Favoring Mechanism (e.g., SREC Factors, Co-Incentives [e.g., Grants], Segmentation of Incentive, Competitive Points)
- Incentive Duration (e.g., 10, 15, 20 years)
- Blocks defined as MWs or Blocks defined by time available
- Broad or narrow MW allocations (e.g., Block size=20 MW or 200 MW)
- Incentive differentiation by EDC (Y/N)
- Hedge of premium only, or fully hedged revenue?
- One initial auction, or periodic reset of auctions
- Portability of Incentives btw Segments (e.g., Reallocated to "more successful" segment, or rolled forward & available at later time)
- Queue Access Management
  - Time of Entry (e.g., early, mid, late maturation)
  - Skin in the Game (e.g., low, mid, high ante up)

Illustrative Policy Path #SP-4:

Minimize disruption with differentiation: Factorized SRECs with Firm Floor

Description / Policy Component	Separate RPS tier for solar (SREC II) with SREC factors (large & small); Parallel unlimited firm floor price mechanism (via Buyer of Last Resort)
Incentive Type	Demand Obligation
Analog	NJ SREC w/ PSEG Loan
Counterparty	LSEs or EDCs or Investment Bank
Price-setting and adjustments	Market-based (a function of supply vs. demand, banking eligibility, and ACP**); buyback mechanism creates firm price floor *for full market***
Incentive Access, Queuing	Open, SRP application acceptance = qualification
Attributes purchased, hedged	SRECs with an implicit floor price
Installation Diversity/favoring mechanism	Vary SREC Factors by type/size based on cost gap or policy preference
EDC Installation Diversity	N/A
Portability of Incentives btw Segments	N/A
Net Metering Interaction	Separate from Net Metering
Predictability of Annual Market Scale	Target defined by % of load targets in aggregate (not by market segment) (however, no constraint on market response)
Trajectory of Incentive Scale	Customized to Navigate the Choke Point or Rate Cap Kink
Binding Constraints	Rate Cap + Class I RPS+ Solar Market Size=Binding. Solar Segment Share Not Binding
Other Features	Duration: 10 years of SRECs, Class I RECs thereafter
Other Potential Options/Variations	Energy Storage Interactions; what is factorized – size, or size/type/offtaker; duration of SRECs
Threshold issues	Willingness and ability to identify a party to act as buyer of last resort

Illustrative Policy Path #SP-7:

Declining Block Incentive for all w/ Competitive Price Setting

Description / Policy Component	Competitively-Derived PBI Tariff: Initial Competitively-established price (large & small differentiated), with small price established as a function of large competitive price; Declining block incentive; w/ MW cap
Incentive Type	Performance Based Incentive
Analog	SMART
Counterparty	EDCs
Price-setting and adjustments	Initial prices set by competitive auction for large(st) projects over a certain size threshold; small projects receive a price equal to a multiplier of the weighted average auction results; Prices decline over MW Capacity blocks
Incentive Access, Queuing	Auction for large(st) projects for initial enrollment period, compensated at applicable at subsequent block rate for additional development. SRP application acceptance secures queue position for smaller projects
Attributes purchased, hedged	Premium incentive: Fixed price for attribute. (Incentive hedged; Energy & capacity unhedged)
Installation Diversity/favoring mechanism	Vary incentives by size based on cost gap or policy preference
EDC Installation Diversity	No inter-EDC allocation constraints
Portability of Incentives btw Segments	N/A
Net Metering Interaction	Separate from net metering
Predictability of Annual Market Scale	MW Cap, Bids / Solicitations have a sought quantity of MW
Trajectory of Incentive Scale	Customized to Navigate the Choke Point or Rate Cap Kink
Binding Constraints	Rate Cap + Class I RPS+ Solar Market Size=Binding. Solar Segment Share Not Binding
Other Features	Duration: 20 year tariff
Other Potential Options/Variations	Energy Storage Interactions; Hold periodic reset auctions; only Grid Supply projects in auction or additionally large net metered projects
Threshold issues	Nothing special

Illustrative Policy Path #SP-8:

Adjustable Block Incentive for all w/ Competitive Price Setting

Description / Policy Component	Competitively-Derived PBI Tariff: Initial Competitively-established price (large & small differentiated), with small price established as a function of large competitive price; Time-based Adjustable Block Incentive; w/ MW cap
Incentive Type	Performance Based Incentive
Analog	**SMART; CA ReMAT**
Counterparty	EDCs
Price-setting and adjustments	Initial prices set by competitive auction for large(st) projects over a certain size threshold; small projects receive a price equal to a multiplier of the weighted average auction results; **Prices decline over Time blocks w/ MW Block Cap**
Incentive Access, Queuing	Auction for large(st) projects for initial enrollment period, compensated at applicable at subsequent block rate for addn'l development. SRP application acceptance secures queue position for smaller projects
Attributes purchased, hedged	Premium incentive: Fixed price for attribute. (Incentive hedged; Energy & capacity unhedged)
Installation Diversity/favoring mechanism	Vary incentives by size based on cost gap or policy preference
EDC Installation Diversity	No inter-EDC allocation constraints
Portability of Incentives btw Segments	N/A
Net Metering Interaction	Separate from net metering
Predictability of Annual Market Scale	MW Cap, Bids / Solicitations have a sought quantity of MW
Trajectory of Incentive Scale	Customized to Navigate the Choke Point or Rate Cap Kink
Binding Constraints	Rate Cap + Class I RPS+ Solar Market Size=Binding. Solar Segment Share Not Binding
Other Features	Duration: 20 year tariff
Other Potential Options/Variations	Energy Storage Interactions; Hold periodic reset auctions; only Grid Supply projects in auction or additionally large net metered projects
Threshold issues	**Complicated: Need to figure out what the appropriate adjustment mechanisms up or down are**

Illustrative Policy Path #SP-10:

Ongoing competition for large, cost-based administratively set PBIs w/ periodic reset for the rest

Description / Policy Component	Cost-Based PBI Tariff: Periodically Admin-established price (Small); RFP/Auction/Tender Competitive Long-Term PPA (Large or largest)
Incentive Type	Performance Based Incentive
Analog	**CT ZREC**
Counterparty	EDCs
Price-setting and adjustments	Initial **and periodic update** of prices set by competitive auction for large(st) projects over a certain size threshold; small projects receive a price equal to a multiplier of the weighted average auction results
Incentive Access, Queuing	**Periodic MW Blocks for defined customer segments.** SRP application acceptance secures queue position for smaller projects
Attributes purchased, hedged	**Energy, capacity, and RECs; fully hedged**
Installation Diversity/favoring mechanism	Vary incentives by size/type based on cost gap or policy preference
EDC Installation Diversity	**Inter-EDC allocation constraints via MW Blocks assigned to each EDC**
Portability of Incentives btw Segments	N/A
Net Metering Interaction	**Choose net metering or Incentive, not both**
Predictability of Annual Market Scale	MW Cap, Bids / Solicitations have a sought quantity of MW
Trajectory of Incentive Scale	Customized to Navigate the Choke Point or Rate Cap Kink
Binding Constraints	**Rate Cap + Solar Segment Share + Solar Market Size=Binding. Class I RPS=Not Binding**
Other Features	Duration: 20 year tariff
Other Potential Options/Variations	Energy Storage Interactions; No Inter-EDC allocation constraints; Can vary incentives by project type, offtaker type, etc; only Grid Supply projects in auction or additionally large net metered projects
Threshold issues	**Ongoing auctions and setting ongoing multipliers for other projects**

Illustrative Policy Path #SP-12:

Ongoing competition for large / Grid-Supply; Value of Solar for all others

Description / Policy Component	Value of Solar PBI Tariff (Small); Periodic RFP/Auction/Tender Competitive Long-Term PPA (Large or largest)
Incentive Type	Performance Based Incentive
Analog	**NY VDER for small; CT ZREC for large**
Counterparty	EDCs
Price-setting and adjustments	**Initial and periodic update** of prices set by competitive auction for large(st) projects over a certain size threshold; for small projects, some subcomponents of incentive (e.g., energy and capacity) vary w/ market prices, while other subcomponent (e.g., environmental value, distribution investment reduction value) are locked-in for incentive duration
Incentive Access, Queuing	**Periodic auction / RFP for larger projects.** SRP application acceptance secures queue position and (for smaller projects) some subcomponents of the Value of Solar incentive values
Attributes purchased, hedged	**All components purchased by EDCs for small;** **Only RECs fully hedged for large projects; RECs, distribution investment reduction value hedged for small**
Installation Diversity/favoring mechanism	Vary incentive by type/size based on cost gap or policy preference
EDC Installation Diversity	**Inter-EDC allocation constraints via MW Blocks assigned to each EDC**
Portability of Incentives btw Segments	N/A
Net Metering Interaction	**Net metering not needed except for CS projects**
Predictability of Annual Market Scale	MW Cap, Bids / Solicitations have a sought quantity of MW; CS incentives are MW Block declining block incentives
Trajectory of Incentive Scale	Customized to Navigate the Choke Point or Rate Cap Kink
Binding Constraints	**Rate Cap + Class I RPS + Solar Market Size=Binding. Solar Segment Share=Not Binding**
Other Features	Duration: 20 year tariff
Other Potential Options/Variations	Energy Storage Interactions; No Inter-EDC allocation constraints; Can vary incentives by project type, offtaker type, etc.
Threshold issues	**Ongoing auctions and setting ongoing multipliers for other projects**

Note on Finalizing Policy Paths for Modeling & C/B Analysis

- Installation diversity options not yet defined
  - A set of choices still must be specified prior to any Cost /Benefit modeling

- The following characteristics are yet to be defined for the Policy Paths, and are relevant under most of the paths. This set of choices must be specified for any C/B modeling
  - Timing of Transitions
  - Targets/Constraints
  - Quantity Target/Timeline

Incentive Policy Design Criteria Applicable to S.P.

from BPU Transition Principles	T.I.	S.P.
a. Maximize ratepayer benefit	✓	✓
b. Minimize ratepayer cost	✓	✓
c. Support solar industry growth	✓	
d. Ensure prior investments retain value	✓	✓
e. Meet 50% Class I RECs by 2030	✓	✓
f. Binding Constraint: Comply with Rate Cap	✓	✓

Primary Design Criteria from SWS#1	T.I.	S.P.
1. Fair to those who have made past commitments 2. Fair to those who will make future commitments	✓	✓
3. Clarity and transparency regarding project eligibility and status 4. Implements a fair and transparent process for scrubbing non-performing project from qualification queuing procedures	✓	✓
5. Minimizes market disruption (minimize high transition costs)	✓	✓
6. Supports Steady Industry Growth	✓	✓
7. Maximizes certainty of incentive access	✓	✓
8. Minimizes Complexity	✓	✓
9. Maximizes Solar PV Installation Growth	✓	✓
10. Feasibility	✓	✓

Secondary Design Criteria from SWS#1	T.I.	S.P.
11. Maximize cost-effectiveness (biggest bang for the buck, most MW per ratepayer $)	✓	✓
12. Minimizes Ratepayer Impact. 13. Maximizes ratepayer net benefit (including environmental considerations)	✓	✓
14. Reduces incentive levels over time		✓
15. Maximizes solar development on disturbed land/minimizes reliance on green space		✓
16. Encourages Installation Type Diversity		✓
17. Minimizes Financing Risk	✓	✓
18. Encourages Participant Diversity		✓
19. Maximizes near-term jobs in NJ 20. Maximizes long-term jobs in NJ		✓
21. Maximize use of competitive market mechanisms 22. Maximize compatibility with competitive wholesale energy markets 23. Maximize compatibility with competitive retail energy markets		✓
24. Allows timely implementation	✓	
25. Support PV Location Where Most Needed		✓

Next Steps to Developing, Prioritizing S.P. Policy Paths

- Refined candidate policy path list
- Full descriptions of remaining policy paths
- Stakeholder input/feedback (survey, other mechanisms)

- Questions?

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NEW JERSEY SOLAR TRANSITION

Cost and Technical Potential Survey Discussion

STAKEHOLDER WORKSHOP #2

TOM MICHELMAN, SUSTAINABLE ENERGY ADVANTAGE, LLC

JUNE 14, 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.

Cost & Tech Potential Survey Overview

- Goal – To elicit input from Stakeholders in order to improve model inputs of potential costs of Transition Incentive and Successor Program
- Structure of Survey includes sections on
  - Costs
    - Total Installed Capital Cost
    - O&M
    - Financing Costs & Assumptions
    - Risk Profile relative view of
      - Fixed Bundled Incentive vs. Fixed Premium Incentive vs. Floating Premium Incentive w/ Floor vs. Floating Premium Incentive w/o Floor
  - Technical Potential
  - Other / Miscellaneous

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Dos and Don’ts

- Do
  - Collect information from your colleagues
  - Give yourself enough time to finish the survey
  - Skip questions if you do not have significant experience / knowledge of the topic
  - Remember your responses are confidential
    - Even the BPU does not have access to, nor will be asking for responses in any but an aggregated format
- Don’t
  - Answer questions for which you or your colleagues have little or no experience and/or knowledge
    - It will just add noise to the responses and you will save time by skipping
  - Let perfection be the enemy of the good. We do not expect perfection, just responses informed by stakeholder’s combined wisdom. The survey responses won’t be the final word on the model inputs, just one more method to inform the modeling
  - Collaborate with other Stakeholders on responses
    - Do respond to the survey independently
    - For example, if you are developer and work with a financier, encourage the financier to answer the survey themselves

Walk Through the Survey and Show the Structure

Q&A Time

- Draft PDF of Survey - http://www.seadvantage.com/Documents/NJ_BPU/NJ_Solar_Transition_ProjCost_Tech.Potential_Survey_2019.pdf
- Live SurveyMonkey is found here https://www.surveymonkey.com/r/YQPDHT5
  - Survey can be started and then re-started at a later session

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Reminders

Deadlines, deadlines, deadlines

- Fill out Cost and Technical Potential survey, that is New Jersey Solar Transition Cost and Technical Potential survey. Also found here
  - https://www.surveymonkey.com/r/YQPDHT5
  - Please address all questions to Solar.transitions@bpu.nj.gov
- Deadline for Participation is midnight (EDT) Tuesday June 18, 2019

Thank You

State of New Jersey
Board of Public Utilities

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NJ Solar Transition

Wrap Up & Next Steps

STAKEHOLDER WORKSHOP #2

JUNE 14, 2019

Next Steps

Bob Grace, Sustainable Energy Advantage, LLC

Reminder #1: Fill out Cost and Technical Potential survey

- https://www.surveymonkey.com/r/YQPDHT5
- Please address all questions to Solar.transitions@bpu.nj.gov

Reminder #2: Fill out Participation Survey

- If you haven't already, you must complete the stakeholder process participation survey in order to receive future surveys
- https://www.surveymonkey.com/r/Stakholder_Process_Notice_Collector
- Please address all questions to Solar.transitions@bpu.nj.gov

Upcoming: Stakeholder Feedback on Successor Program Policy Paths:

- Survey: Successor Program Policy Path Preferences
- Other stakeholder outreach to be announced

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Next Stakeholder Workshop:
Fall 2019

- Topics (from April 8, 2019 Notice):
  - Modeling assumptions for Successor Program
  - Potential MW Targets and Incentive Caps for Successor Program
  - Potential Policy Pathways for Successor Program

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Thank You