Consulting Team Presentation & Discussion of Preliminary Results and Candidate Policy Paths

Massachusetts Net Metering Task Force

Mtg #4 - February 12, 2015

PEREGRINE ENERGY GROUP

Sustainable Energy Advantage, LLC

MEISTER CONSULTANTS GROUP

La Capra Associates

Overview

- Task 0 – Focus Group Interviews
  - Status Update & Summary
- Task 1 – Solar Incentive Policy Summaries
  - Overview and Policy Type Review
- Task 2 - Solar Development in States without Solar Incentive Policies
  - Status Update
- Task 5 - Minimum Bill Survey and Analysis
  - Partial Results Highlight & Status Update
- Task 4 – Provide a Range of Options to Reach the 1600 MW goal… and beyond
  - Present results (candidates)
  - Discussion of Policy Paths for Further C/B Analysis
- Task 3 - Analyze Costs & Benefits of MA Net Metering and Solar Incentive Policy
  - Analysis framing overview (time permitting)

Change of Plans

- Will not be presenting T3 C/B for current policy today
- *Potential* discussion of C/B methodology at next meeting
- (revised timeline TBD)

TASK 0

FOCUS GROUP INTERVIEWS

Task 0: Status Report

- Five focus group sessions completed
- Group E (Task Force Chairs) remains
- Received written responses from several stakeholders and organizations
- Summaries and written responses will be posted shortly
- Diverse set of goals, perspectives and opinions

A	Utilities and Load Serving Entities
B	Utility Customers and Customer Advocates
C	Solar Industry Representatives & IBEW
D	Legislators
E	Task Force Chairs
F	*Other: Market Makers, Finance, Competitive Suppliers, Solar Research Orgs*

Criteria Considered to Help Define & Select Policy Paths

- **Transparency**
  - With respect to total subsidy or policy support
- **Minimum Market Disruption**
  - i.e., likely to trigger high transition costs, smoothest transitions
- **Minimize Ratepayer Impact**
- **Ensure Cost Effectiveness**
  - Incentives set through competition
- **Encourage Supplier Diversity**
  - i.e., large, small, In-state, out-of-state, varying sizes, etc.…
- **Encourage Participant Diversity**
  - low-income, renters, parties without viable roofs, etc.
  - Energy justice and solar democratization
- **Minimize Complexity**
  - Establish a policy that is administratively simple, transparent and verifiable
- **Maximize Solar PV Installation Growth**
  - Ensure targets are met
  - Supports increased investment in distributed solar
- **Create Permanent In-State Jobs**
- **Fairness to Those Who Have made Past Commitments**
- **Support *Steady* Industry Growth**
  - Encourage long term market stability
- **Support Market-Based Approaches**
  - Favor "open" market incentives vs. scheduled procurements
  - Limit market constraints
  - Limit utility control over DG
- **Transition to Sustainable Market**
  - Move away from incentive-dependent market
  - Stimulate self-sustaining solar market beyond 1600 MW
- **Encourage Low-Cost Financing**
  - Minimize financing risk
  - Enhance/enable ability to attract low-cost finance
  - Enable use of debt, new equity vehicles like YieldCos
- **Prioritize Competitive Market Structures**
  - Create a market that is compatible with competition in wholesale and retail energy markets in MA
  - Reduce conflicts with existing rules (i.e., ISO, retail supplier rules)
- **Protect Low-Income Ratepayers**
  - Avoid shift to fixed charges that affect low-income customers
- **Minimize Cost-Shifting Between Participants and Non-Participants**
  - Provide fair cost recovery to T&D utilities
  - Ratepayer equity/reduced cross subsidies
  - Allocates costs equitably among ratepayers
  - Rates set based on appropriate costs and benefits
- **Focus on Feasible Implementation**
  - Establish a policy that is viable within the existing political and legal framework
- **Support PV Location Where Most Needed**
  - Encourage systems to promote solar where it has most value
  - Compensation based on location and grid value
  - System reliability + locational benefits

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Some Other Key Take-Aways

- Cost of policy transitions – how to quantify?
  - only one explicit suggestion = financing cost basis point adder as a proxy

- Widespread support for grandfathering past investments (at least for reasonable period of time) as appropriate

TASK 1

SOLAR INCENTIVE POLICY SUMMARIES, STATUS UPDATE

Task 1: Solar Incentive Policy Summaries

Policies and States Reviewed – draft chapter distributed last week:

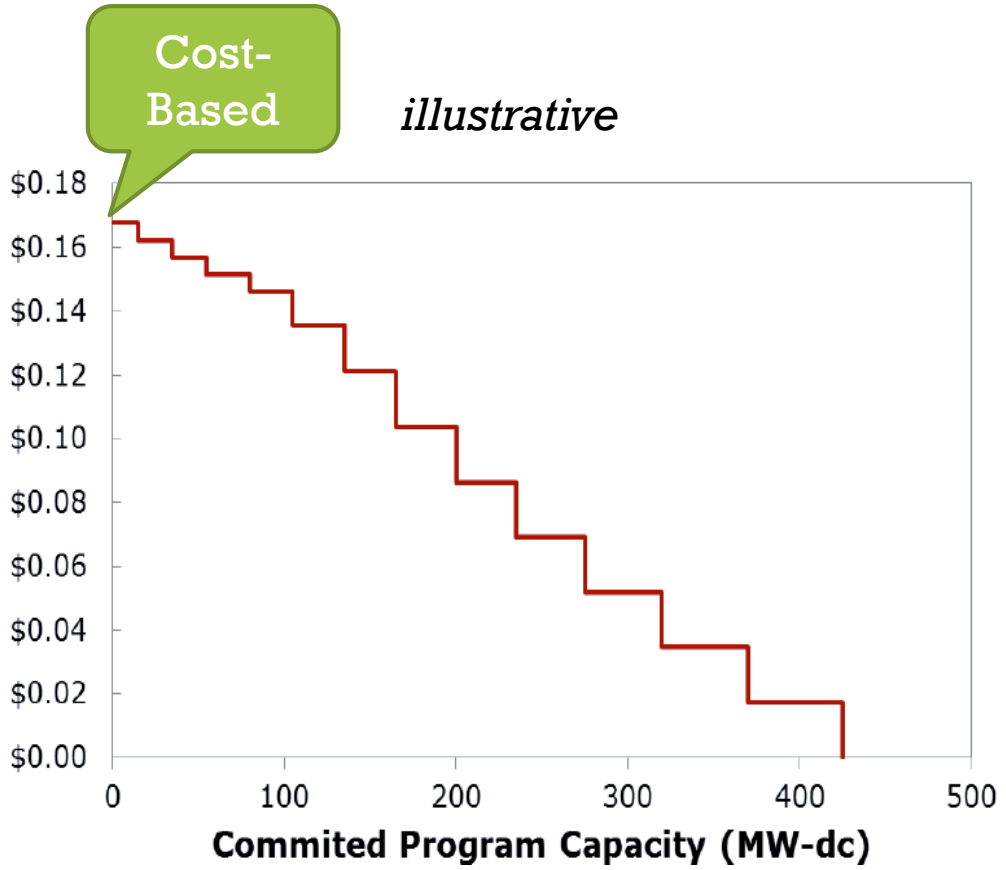
- California RE-MAT, RAM and declining block
- NYSERDA declining block program and solicitation program
- Rhode Island Renewable Energy Growth and DG Standard Contract Programs
- Delaware Long-term Contracting
- Connecticut ZREC Solicitations and Standard Offer
- New Jersey EDC Financing, Ownership, & Long-term Contracting
- Vermont SPEED Standard Offer
- 'Value of Solar' Tariffs

Review of Key Incentive Policy Types

- Declining Block Incentives (NY, CA)
- Market Volume Adjustment Mechanisms (CA Re-MAT)
- Competitive Solicitations (RI, VT, CT, CA, DE, NJ)
- Other Forms of Standard Offer Performance-Based Incentives
  - Administratively-set/cost-based (RI, VT (formerly))
  - Competitively-derived pricing (CT)
- Value-of-Solar Tariffs (VOSTs)

Declining Block Incentives

- Incentive price declines as market grows
  - Typically long-term performance-based $/kWh incentive (PBI)
  - Also used for up-front $/W incentive
- Open-access – first come, first served
- Fixed program budget + fixed program volume
- No fixed timeline



Declining Block Incentives Considerations

- Where implemented, has led to market transition away from incentives
- Provides transparency to market participants about near-term incentive levels
- May not be responsive to outside market changes
- May lead to uneven market activity

Volume Adjustment Mechanisms

- Incentive price responds to market demand
- Open-access – first come, first served
- Regularly-timed MW blocks made available
- Fixed program volume
- Timeline and budget are flexible

Subscription for Program Period MWs	Bi-monthly Period Price Adjustment
< 20% (0.0-0.9 MW)	Price Increase
20-99% (1.0-4.9 MW)	No adjustment
>=100% (5.0+ MW)	Price Decreases

Volume Adjustment Mechanism Considerations

- Limited implementation history
- Provides transparency to market participants about near-term incentive levels
- Responsive to exogenous market changes in cost, value, incentives, etc.
- Allows stable market volumes
- May not lead directly to market transition away from incentives

Competitive Solicitations

- Competitive process used in a number of jurisdictions to award solar incentives
- Requires regular solicitations or auctions
- Typically used for larger PV systems
- Not an 'open-access' incentive
- Defines market volume & pace, but not total incentive cost

Competitive Solicitation Programs
Ct. ZREC
California RAM
Rhode Island Renewable Energy Growth Program
New Jersey EDC Auctions
Vt. SPEED
Delaware SREC Contracting Program

Competitive Solicitation Considerations

- Requires more projects to be sold by developers than will ultimately be built
- Can result in fewer projects being built than win contracts due to contract failure rate
- Requires regular solicitations to maintain market activity… frequency matters
- Can result in low incentive prices
- Can be responsive to outside market forces

Observations: Competitive Solicitation for LT contracts vs. SREC-II

Costs:

- Enhance financing tools realize savings with revenue certainty
  - Debt
  - Yieldco equity

➔ Realized lower cost premiums

Experience also shows…

- Tip of iceberg (prices not uniform… there is low-hanging fruit ➔ can't get high quantity at low quantity competitive prices)
- Attrition ➔ MWs lag target (speculative bidding, deadlines, shortfall rollover)
- Market impacts
  - Falling participation, competition
  - Episodic solicitations ➔ less conducive to LT in-state jobs
- Segments undersubscribed

- Compared to SREC markets, some price convergence
  - Solicitation programs thin out as speculative bidders thin out, low-hanging fruit consumed
  - Falling costs ➔ smaller % of cost benefits from rev. certainty
  - SREC market experience ➔ investors gaining comfort w/ risk, treat discount to auction floor akin to stable revenue;
  - Private equity creates liquidity in exchange for margins
    - Can YieldCo capital be tapped without guaranteed offtake?

Other Forms of Standard Offer Performance-Based Incentives

- Administratively-set/cost-based (RI, VT (formerly))
  - Typically, cost-based modeling, updated periodically
  - Modeled, through stakeholder process
  - Implicit choices – conservative vs. aggressive
  - Can be responsive to outside market forces

- Competitively-derived pricing (CT)
  - Applied to smaller size segments where transaction costs, lack of sophistication militates against competitive bidding
  - e.g. predetermined adder to recent RFP pricing result, to account for diseconomies of scale

Other Forms of Standard Offer PBIs - Considerations

Certainty attractive to system owners

Administratively-set/cost-based

- Establishing administratively-set price levels may be time consuming and require complex negotiations
- Pricing is tricky, if process for adjustment not frequent
  - If too high, can get overbuild (or, overcompensate until MW caps reached)
  - If too low, can bring market to a crawl

Competitively-derived pricing

- Setting the adder may be tricky… similar issues to administratively set

Value of Solar Tariffs

- Provide a performance based incentive to PV production based on market value
- Value can include range of factors including
  - Avoided power costs
  - Avoided/deferred T&D costs
  - Avoided environmental compliance costs
  - And many others
- Value established through stakeholder process
- If properly set, results in no cross-subsidy as system owners paid only for the value of their production to other ratepayers/society

Value of Solar Tariff Considerations

- Value of Solar incentive may not be sufficient to support PV market growth
- Very limited industry experience with this incentive model
- Establishing consensus tariff levels may be time consuming and require complex negotiations
- Theoretically results in a long-term incentive mechanism that is cost-neutral from perspective of non-solar customers

TASK 2

SOLAR DEVELOPMENT IN STATES WITHOUT SOLAR INCENTIVE POLICIES

Task 2: Solar Development in States w/o Incentives

- Report is pending, draft to be distributed to TF chairs tomorrow

TASK 5

MINIMUM BILL SURVEY AND ANALYSIS

Analysis of Minimum Bill Provisions

- "The task force shall…also include in its findings an analysis on the impact of a minimum bill, paid by all ratepayers in all rate classes, as a mechanism to support a reliable electric distribution system."

- Two subtask from consultant scope of work:
  - Review of minimum bill programs in other states
  - Analysis of a potential minimum bill on Massachusetts ratepayers & the impact on reaching 1,600MW solar goal.

Analysis of Minimum Bill Provisions

- States with currently operating minimum bill rates:
  - California:
    - Sacramento Municipal Utility District (SMUD): Minimum charge since 2012
      - Currently around ~$16/mo for residential customers
    - Los Angeles Department of Water and Power (LADWP): Minimum charge since 2008
      - Currently around ~$10/mo for residential customers
  - Hawaii:
    - Long-standing minimum charges for all utility rates
    - Differentiated by rate class (~$18/mo for residential, demand-based for large commercial)
    - HECO has recently proposed significant increase ($71/mo for solar, $55/mo for others) in minimum charges with a reduction in volumetric charges
  - Both Hawaii and the two California utilities have robust solar markets. No discernable minimum bill effects were apparent from available installation data.
- Four other states with active minimum bill discussions: Oklahoma, Arizona, Texas and Kansas

Analysis of Minimum Bill Impacts on Massachusetts

- Utility representatives suggest minimum bill or other similar mechanisms should be set through DPU ratemaking process
  - Rates specific to different rate classes

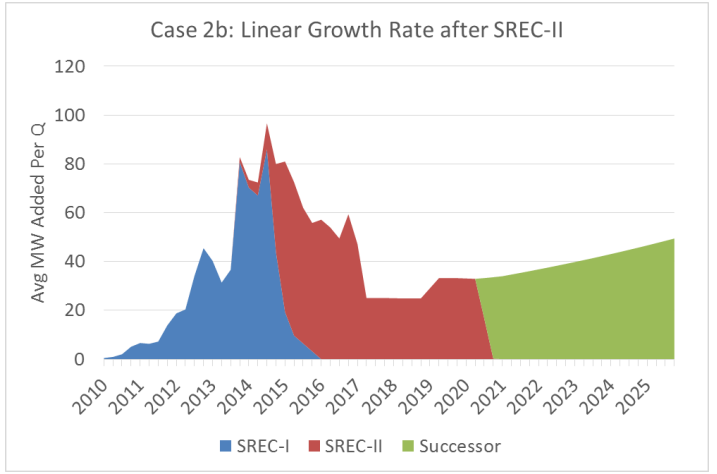
- For modeling purposes, consultant team considering exploring hypothetical minimum bill's impacts at a hypothetical rates on:
  - Cost recovery and distributional affects
  - PV system economics and potential impacts on solar market growth

TASK 4

PROVIDE A RANGE OF OPTIONS TO REACH THE 1600 MW GOAL… AND BEYOND

Task 4: Objective

- Based on research, analysis, findings from Tasks 0, 1, 2 & 5, input from Task Force, other stakeholders & public…
- "*Provide a range of options for appropriate structures for providing support to reach the 1600 MW goal & provide opportunity for additional development.*"
- Select a subset to be analyzed, compared in cost/benefit analysis to Current Policy
  - SREC Carve-out + Current Net Metering Regime, 1600 MW goals, Current NM caps
  - To allow for more robust comparisons between options, DOER considering expanding modeling (for benchmarking purposes) of hypothetically extending current regime to 2500 by 2025 under Net Metering regime TBD



The Value of Modeling

- Limited time and budget precludes detailed modeling of all appealing futures
- Focus on what can be learned from modeling
  - What do we want to take a more quantitative look at, what will we learn?
- TF may ultimately may recommend something different than do quantitative comparison of)
  - Including different combinations of features
- We can (in report) address qualitative differences among options for paths not modeled

Outline

- Key assumptions
- Options to adjust/modify current net metering &/or solar incentives capable of reducing costs without reducing benefits
- Alternative structures for solar and/or net metering policy
  - Categories
  - Dimensions
  - Options
  - Criteria - for what might be deemed ‘appropriate’ or ‘desirable’
  - Stakeholder goals
  - Analysis
- Screen and group policy ‘elements’ into (up to 6) ‘**Policy Paths**’

Key Assumptions

- Not constrained to 1600 MW by 2020
  - 1600 not max
  - Nothing magic about either MW amount or date by which a target is reached
- On the table:
  - No change
  - All new
  - Modifications
  - Hybrids
- Changes generally presume grandfathering past investments

Options to adjust/modify current net metering &/or solar incentives (1)
Capable of reducing costs without reducing benefits

- No Brainers
  - Refunding (percentage of) ACP pmts. to ratepayers
    - (model: recent CT PA 13-303)
  - EDCs participation in auctions.
    - Require/consider/analyze/justify why not/have DPU consider prudence of abstaining?
    - Systematic abstention impacts cost of EDC purchases *and* spot market prices for all
  - Shift incentives (greater SREC factors) to favor location "to support & enhance needs of distribution system"
    - as also suggested for LREC/ZREC program in recent CT draft IRP (p. 113)
  - EDCs Monetize FCM benefits. Options:
    - Options: revenue flow-back to customers (while mitigating EDC exposure to performance risk); EDCs auction FCM rights to others; or let system owners keep rights

Options to adjust/modify current net metering &/or solar incentives (2)
Capable of reducing costs without reducing benefits

- Other (more involved) options Include:
  - Long-Term contracting within SREC program
    - NGRID competitive pilot proposal w/in SREC (2013)
    - model: MA 83A or NJ EDC programs
    - *Note: may have modest distribution effects on benefits*
  - Firm the floor?
    - Source of $?
    - Masking market price signals, impact on market, etc. (stimulating build when surplus?)
  - Stretch SREC life to 15 yrs and lower cap & floor?
    - More directly comparable to CT ZREC, RI Renewable Energy Growth and DG Standard Contract prices
    - Can prices converge to Class I more quickly?

Alternative Structures for Solar and/or Net Metering

Treating Different Solar PV Categories Differently

- 'Large' vs. 'Small' Distributed Generation; Utility-scale (wholesale)
- Bifurcating treatment of large and small may be desirable
  - Rationale – sophistication/expertise, transaction cost, efficiency
  - Several studies have concluded different approaches preferable
  - Of examples studies (T1) → many take different approach to large vs. small, or DG vs. wholesale
    - CA, NY, RI, VT, CT, NJ, MA, DE;
    - VOST has only been used for small
    - MA (historically and now)

Dimensions Considered

- Solar Incentive (Small vs. Large)
- Installation Diversity/Encouraging targeted types
- Net Metering Approach (Projects sized to load, oversized/VNM)
- Timing of Transitions
- Targets/Constraints
- Quantity target/timeline (set, or for analysis)

Options: Solar Incentives

Key:
- Already considered
- Unlikely to be politically acceptable
- Identified of interest by TF
- Other options to consider

Small Projects (unsophisticated)

- SREC
- SREC-modified
- Financing within SREC (NJ/PSE&G)
- Standard Offers (SO):

Structure → Price Formation ↓	PBI/SO*	Upfront Cost Reduction (rebate)/SO
Administratively-set price	RI REG (small)	CT (res-HOPBI)
Competitive benchmark	CT ZREC (small)	
DBI pricing mechanism	CA (small C)	NY (small), CA (Small R)

- PBI/Solicitations (aggregated vs. individual)*
- None

Large/Utility-Scale Projects (conducive to competition)

- SREC
- SREC-modified
- PBI with long-term fixed price contract/tariff
  - **Solicitations** e.g. CT ZREC, RI REG, DE, VT, NY, NJ EDC
  - Adjustable Block Incentive (ABI) (CA ReMAT)
  - PBI/DBI (CA)
- EPBI/SO/Rebate
  - (NY: hybrid DBI w/3-yr PBI)
- Solar avoided cost /LT EDC purchase obligation
- None

Installation Distribution: Diversity/Encouraging Targeted Types

- Un-stratified
  - head to head, low price (or premium) wins
- Limits to larger projects, or not?
- Stratified by size (sub-tiers of specified size)
- Stratified by type (like SREC-II)
- MW distributed by EDC pro-rata to load
  - like CT ZREC, CSI
- What Favored (disfavored)?
  - Brownfields/LFG
  - Municipal
  - Aggregate (common ownership, municipalities)
  - Community-Shared Solar (CSS)
  - Low-income
  - Support/enhance distribution system
  - Host-owned vs. 3rd-party-owned
- How favored?
  - SREC Factors
  - Co-incentives (e.g. SBC pmts)
  - Segmentation of incentive, or competitive points
- Design choice can have the effect of…
  - favoring national/large players, or maintaining a role for local firms too?
  - Impacting degree to which policy supports adding permanent local jobs

Options: Net Metering Approach
(credit for on-site production)

Key:
- Already considered
- Unlikely to be politically acceptable
- Identified of interest by TF
- Other options to consider

Net Metering Credits (projects sized to load)

- As-is - *With or without caps?*
- NM netted from solar incentive
- Value of Solar Tariff (VOST)
  - (Small only?)
  - alone or with other incentives?
- Separate rate class Modified w/rate changes, 1 or more of:
  - Min. Bill
  - Shift D rates to more demand-based revenue
  - Demand charges on outgoing flow
- None

Virtual Net Metering Credits (Oversized)

- As-is - Capped at what level?
- NM netted from solar incentive
- Limited to Aggregate
  - municipal & other common ownership
- Targeted to CSS
- Modified w/rate changes, 1 or more of:
  - Min. Bill
  - Shift D rates to more demand-based revenue
  - Demand charges on outgoing flow
  - Remove D charge from credit for Class II and III VNM public sector and CSS projects
- None

Options: Timing of Transitions

Key:
- Already considered
- Unlikely to be politically acceptable
- Identified of interest by TF
- Other options to consider

1. Set date*
   a) End of ITC (new program @ 1/1/2017)
   b) Other
2. Set MW*
   a) Post-1600 MW
   b) Other
3. End of SREC-II as currently defined*
4. End of NM caps
   a) Current
   b) Expanded
   - *Practical barrier: EDCs will hit NM caps at different times*

Options: Targets/Constraints

- MW Goal with Timeline
  - Firm timeline (e.g., RI, VT)
  - Soft timeline (e.g., MA, CA ReMAT (hybrid?))
- MW Goal without Timeline (e.g., DBI in NY, CA)
- Budget-defined & limited (quantity moves inversely with price) (e.g., CT ZREC)
- Unconstrained
  - (e.g., avoided cost, VOST, SO/FIT without caps, NM/VNM-only w/o caps, with TVRs)

Quantity Target/Timeline (set, or for analysis)

- If applicable
- MW Goal or Target, e.g.:
  - 2500 MW
  - Other
- Timeline, e.g.:
  - 2020
  - 2025
  - other

Policy Paths

- Comprised by selecting a choice from each menu
  - Thousands of possible combinations
- Aim to have a limited, but diverse and distinct set of alternatives for consideration
  - To highlight major differences
  - Doesn't preclude fine-tuning later
- Goal (from scope/budget):
  - Team to ID 6 paths
  - TF to select from those a subset for benefit and cost analysis
  - Analysis of 2 scenarios in Consultant scope/budget
    - *Additional analysis requires more budget and time*

Proposed 'Policy Paths'

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

1. SREC Program Modifications incl. LT Contracting Pilot

Description	**Keep the current incentive model but make adjustments that reduce costs while maintaining benefits**
Analog	• Mass. SREC-II Program, N.J. PSE&G loan program, proposed National Grid SREC pilot (2013)
Solar Small	• Current SREC-II Model; plus Implement utility SREC performance-based (PBI) incentive standard offer program with REC resales for a portion of the market
Solar Large	• Current SREC-II Model; plus Implement utility SREC long-term contracting program through PBI solicitations with REC resales for a portion of the market
Distribution	• Increase SREC factor for locations that enhance grid reliability
Net Metering	• As-is, uncapped
Virtual Net Metering	• As-is
NM Caps & Timing of Transitions	• Net metering cap as-is • Transition target: 1/1/16 (or ASAP
Targets, Constraints	• MW goal with soft timeline
Quantity Target, Timeline	• 1600 MW by 2020
Other Features	• Refund Alternative Compliance Payments (ACP) to ratepayers • Promote utility participation in SREC auction • Require monetization of forward capacity market (FCM) revenues
Other Potential Options	• Firm the SREC price floor • Extend SREC life to 15 years

2. Competitive Solicitations

Description	Incentives set based on results of regular competitive solicitation to ensure only the most cost effective installations are built, minimizing ratepayer impacts
Analog	• Rhode Island Renewable Energy Growth, Connecticut ZREC
Solar Small	• Performance-based incentive (i.e., $/kWh produced) • Incentive rates indexed to large-scale competitive solicitation rates • First-come, first-served access (i.e., standard offer) • Rates based on bundled electricity value and RECs
Solar Large	• Performance-base incentive (i.e., $/kWh produced) • Set through competitive solicitations 3X per year • Rates based on bundled electricity value and RECs
Distribution	• Limited differentiation between installation types; maximize economies of scale
Net Metering	• Reduce incentives by net metering credit compensation, + minimum bill
Virtual Net Metering	• Reduce incentives by net metering credit compensation, + minimum bill
NM Caps & Timing of Transitions	• Remove net metering caps before transition • Transition target: 1/1/17 (end of federal incentives)
Targets, Constraints	• MW goal with timeline (annual targets)
Quantity Target, Timeline	• 2,500 MW by 2025

3. Orderly Market Evolution

Description	Offer declining block incentive (DBI) to create market certainty and lower cost of financing while transitioning away from state incentives
Analog	• California Solar Incentive (CSI), New York Megawatt Block Program
Solar Small	• Rebates (i.e., upfront payments) • First-come, first-served (i.e., standard offer) • Rates set via declining block incentive (DBI)
Solar Large	• Performance-based incentive (i.e., $/kWh produced) or hybrid rebate/performance-based incentive • First-come, first-served (i.e., standard offer) • Rates set via declining block incentive (DBI)
Distribution	• Separate incentive pools for each utility • Incentive adders for different system types/locations
Net Metering	• Keep current net metering rates but add minimum bill or transition to Value of Solar Tariff (VOST)
Virtual Net Metering	• Limit to aggregate net metering and community shared solar • Keep current net metering rates but add minimum bill or transition to Value of Solar Tariff (VOST)
NM Caps & Timing of Transitions	• Remove net metering caps before transition • Transition target: end of SREC-II or 1/1/17 (end of federal incentives)
Targets, Constraints	• MW goal with fixed-quantity blocks, no firm timeline
Quantity Target, Timeline	• 2,500 MW at program close

4. Sustained Growth Adapting to Market Changes

Description	Incentives rates automatically adjust (up or down) to market conditions through volume-based price setting
Analog	• California Renewable Market Adjusting Tariff (ReMAT)
Solar Small	• Rebates (i.e., upfront payments) • First-come, first-served (i.e., standard offer) • Adjustable Block Incentive with incentive pricing adjusting (up or down) to program participation levels
Solar Large	• Performance-base incentive (i.e., $/kWh produced) • First-come, first-served (i.e., standard offer) • Adjustable Block Incentive with incentive pricing adjusting (up or down) to program participation levels
Distribution	• Separate incentive pools for each utility • Incentive adders for different system types/locations
Net Metering	• Keep current net metering rates but add minimum bill or transition to Value of Solar Tariff (VOST)
Virtual Net Metering	• Limit to aggregate net metering and community shared solar • Keep current net metering rates but add minimum bill or transition to Value of Solar Tariff (VOST)
NM Caps & Timing of Transitions	• Remove net metering caps before transition • Transition target: end of SREC-II or 1/1/17 (end of federal incentives)
Targets, Constraints	• MW goal with fixed-quantity blocks, soft timeline
Quantity Target, Timeline	• 2,500 MW at program close

5. Maximize federal incentives w/ Managed Growth Boost + Sustainable Growth

Description	**Incentives rates automatically adjust (up or down) to market conditions through volume-based price setting** **Add tailored incentive for "managed growth" sector to capture max federal incentives before 2017**
Analog	• California Renewable Market Adjusting Tariff (ReMAT)
Solar Small	• Rebates (i.e., upfront payments) • First-come, first-served (i.e., standard offer) • Adjustable Block Incentive with incentive pricing adjusting (up or down) to program participation levels
Solar Large	• Before 1/1/2017: Administratively set performance-based incentive below SREC price floor for "managed growth" sector (i.e., large, greenfield solar) • After 1/1/2017: Performance-base incentive (i.e., $/kWh produced) • After 1/1/2017: First-come, first-served (i.e., standard offer) • After 1/1/2017: Adjustable Block Incentive with incentive pricing adjusting (up or down) to program participation levels
Distribution	• Separate incentive pools for each utility • Incentive adders for different system types/locations • Before 1/1/2017: Tailored incentive for "managed growth" sector
Net Metering	• Keep current net metering rates but add minimum bill. or transition to Value of Solar Tariff
Virtual Net Metering	• Limit to aggregate net metering and community shared solar • Keep current net metering rates but add minimum bill or transition to Value of Solar Tariff
NM Caps & Timing of Transitions	• Remove net metering caps before transition • Transition target: end of SREC-II or 1/1/17 (end of federal incentives) • Provide managed growth incentive ASAP
Targets, Constraints	• MW goal with fixed-quantity blocks, soft timeline
Quantity Target, Timeline	• 2,500 MW at program close

6. Prioritize Distribution System

Description	Target PV to support & enhance needs of the distribution system Max system owners contributions the distribution system
Analog	• Hybrid w/ CT ZREC budget approach
Solar Small	• Performance-based incentive (i.e., $/kWh produced) • Incentive rates indexed to large-scale competitive solicitation rates • First-come, first-served access (i.e., standard offer) • Rates based on bundled electricity value and RECs • Incentive adder for systems in designated reliability support grid zones
Solar Large	• Performance-base incentive (i.e., $/kWh produced) • Set through competitive solicitations 3X per year • Rates based on bundled electricity value and RECs • Incentive adder for systems in designated reliability support grid zones
Distribution	• Limited restrictions of system size • Geographic targeting for enhances distribution system support • Separate incentive pools for each utility
Net Metering	• Add minimum bill or shift transmission and distribution charges to demand-based charges
Virtual Net Metering	• Sunset virtual net metering • Implement buy-all, sell-all compensation
NM Caps & Timing of Transitions	• Remove net metering caps before transition • Transition target: 1/1/17 (end of federal incentives)
Targets, Constraints	• Total MW limited by pre-defined program budget • 2/3 of budget targeted to specific grid reliability regions
Quantity Target, Timeline	• Whatever budget supports by program 2025

7. Maximize Installed MW within Defined Budget

Description	Apply measures to drive down cost premium, while limiting outlays to explicit preset budget
Analog	• Connecticut ZREC; Rhode Island DG Growth Program
Solar Small	• Performance-based incentive (i.e., $/kWh produced) • Incentive rates indexed to large-scale competitive solicitation rates • First-come, first-served access (i.e., standard offer) • Rates based on SRECs only
Solar Large	• Performance-base incentive (i.e., $/kWh produced) • Set through competitive solicitations 3X per year • Rates based SRECs only for net metered systems; SRECs and energy for virtual net metered systems
Distribution	• Incentives stratified by size
Net Metering	• As-is or add minimum bill
Virtual Net Metering	• Sunset virtual net metering • Implement buy-all, sell-all compensation
NM Caps & Timing of Transitions	• Remove net metering caps before transition • Transition target: 1/1/17 (end of federal incentives)
Targets, Constraints	• Total MW limited by pre-defined program budget
Quantity Target, Timeline	• Whatever budget supports by program 2025

Note on Finalizing Policy Paths

- Installation Diversity Options
  - Design features to support diversity of installation types, sizes, participants, installers while encouraging optimal location… **Can be superimposed upon most other paths**
- The following can be altered under most of the paths, a set of choices that still must be specified for any C/B modeling
  - Timing of Transitions
  - Targets/Constraints
  - Quantity Target/Timeline

Discussion of Policy Paths for Further Analysis

	1. SREC-MOD	2. Competitive Solicitations	3. Orderly Market	4. Sustained Growth	5. Maximize ITC	6. Prioritize Distribution	7. Maximize MW w/ Budget
Small Solar	Current SREC-II Model Implement utility SREC PBI standard offer with REC resales	PBI Rates indexed to large-scale competitive solicitation rates First-come, first-served Rates based on bundled electricity value and RECs	Rebates First-come, first-served Rates set via DBI	Rebates First-come, first-served ABI (pricing adjusts up or down)	Rebates First-come, first-served ABI (pricing adjusts up or down)	PBI Incentive rates indexed to large-scale competitive solicitation rates First-come, first-served Rates based on bundled electricity value and RECs Adder in designated reliability zones	PBI Incentive rates indexed to large-scale competitive solicitation rates First-come, first-served Rates based on SRECs only
Large Solar	Current SREC-II Model Implement utility long-term contract PBI solicitations with REC resales	PBI Solicitations 3X per year Rates based on bundled electricity value and RECs	PBI or hybrid rebate/PBI First-come, first-served Rates set via DBI	PBI First-come, first-served ABI (pricing adjusts up or down)	Before 1/1/17: Administratively set PBI for MG sector After 1/1/17: PBI Standard Offer ABI (pricing adjusts up or down)	PBI Solicitations 3X per year Rates based on bundled electricity value and RECs Adder in designated reliability zones	PBI Solicitations 3X per year Rates based on SRECs for NEM system; SRECs and energy for VNM systems
Distribution	Increase SREC factor for locations that enhance grid reliability	Limited differentiation between installation types; maximize economies of scale	Separate incentive pools for each utility Incentive adders for different system types/locations	Separate incentive pools for each utility Incentive adders for different system types/locations	Separate incentive pools for each utility Adders for different system types/locations	Limited Restrictions of system size Geographic targets for enhanced distribution system support Separate incentive pools for each utility	Incentives stratified by size
NEM	As-is , uncapped	Reduce incentives by NEM credit compensation Add minimum bill	Keep current net rates Minimum bill or transition to VOST	Keep current net rates Minimum bill or transition to VOST	Keep current net rates Minimum bill or transition to VOST	Add minimum bill or shift T&D charges to demand charges	As-is or add minimum bill
VNM	As-is	Reduce incentives by NEM credit compensation Add minimum bill	Limit to certain classes (aggregate and CSS) Keep same rates Add minimum bill or transition to VOST	Limit to certain classes (aggregate and CSS) Keep same rates Add minimum bill or transition to VOST	Limit to certain classes (aggregate and CSS) Keep same rates Add minimum bill or transition to VOST	Sunset VNM Implement buy-all, sell-all compensation	Sunset VNM Implement buy-all, sell-all compensation
Other Components & Options	Refund ACP Require FCM participation Firm SREC Floor 15-year SREC	Remove NEM caps	Remove NEM caps MW goal w/ fixed MW blocks, no firm timeline	Remove NEM caps MW goal w/ fixed MW blocks, soft timeline	Remove NEM caps MW goal w/ fixed MW blocks, soft timeline	Remove NEM caps MW limited by program budget 2/3 of Budget targeted to reliability zones	Remove NEM caps MW limited by program budget

Acronym Guide

ABI: Adjustable Block Incentive

CSS: Community Shared Solar

DBI: Declining Block Incentive

FCM: Forward Capacity Market

NEM: Net Energy Metering

PBI: Performance Based Incentive

REC: Renewable Energy Certificate

VNM: Virtual Net Metering

VOST: Value of Solar Tariff

TASK 3

ANALYZE COSTS & BENEFITS OF MA NET METERING AND SOLAR INCENTIVE POLICY

Task 3: Status Update

- Analysis of current policy suite to commence this week
  - *We may be reaching out with research questions or data requests in near future*
- Analysis of alternative policies to follow Task 4

- Analysis framing: carve-out from Class I RPS
  - Assume near-term, PV displaces natural gas
  - After 2018 (sufficient lead-time to add more wind), if not for PV, assumes carve-out volumes met by land-based wind