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Developments In Renewable Energy Credit Markets

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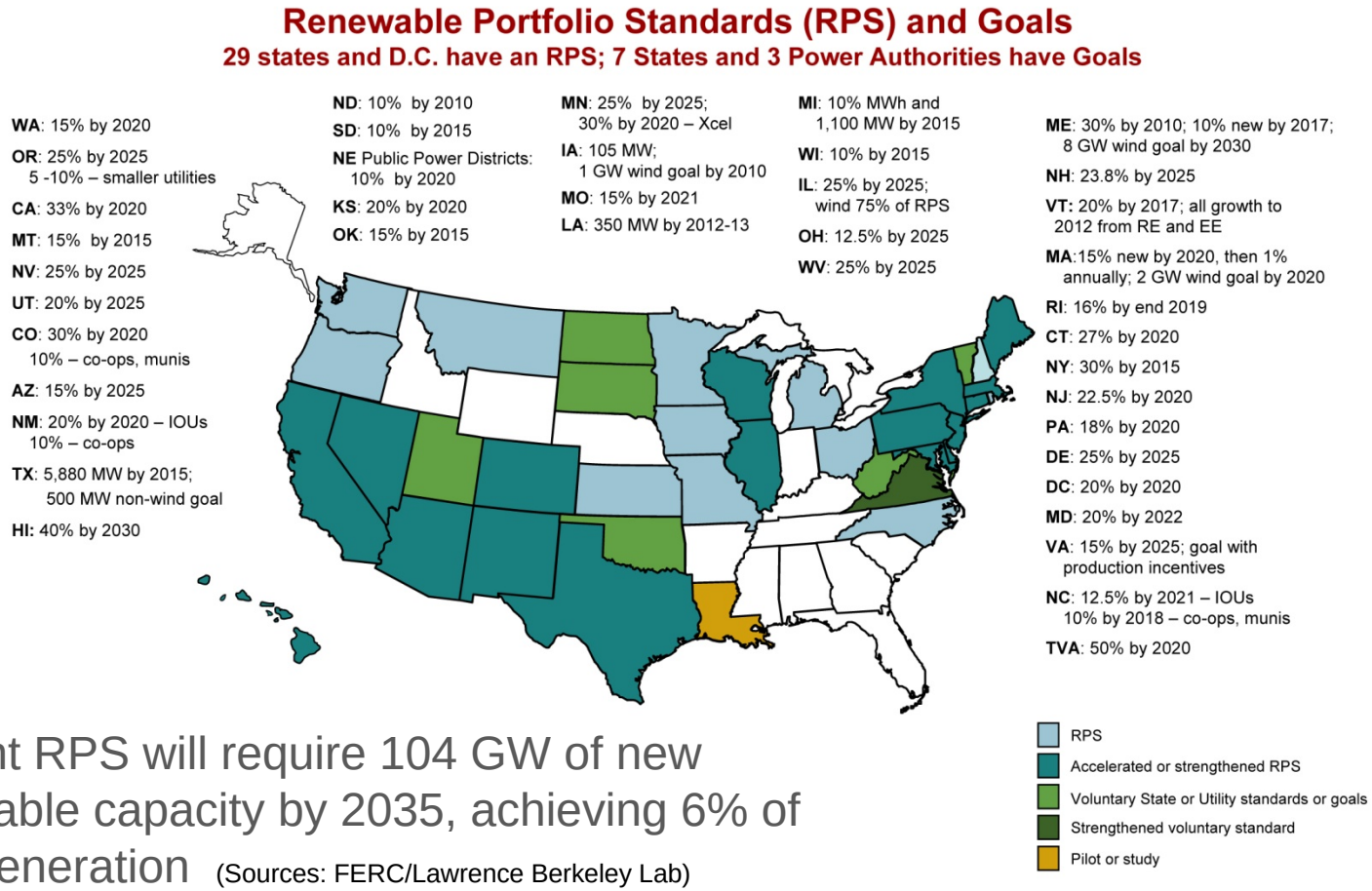
Overview

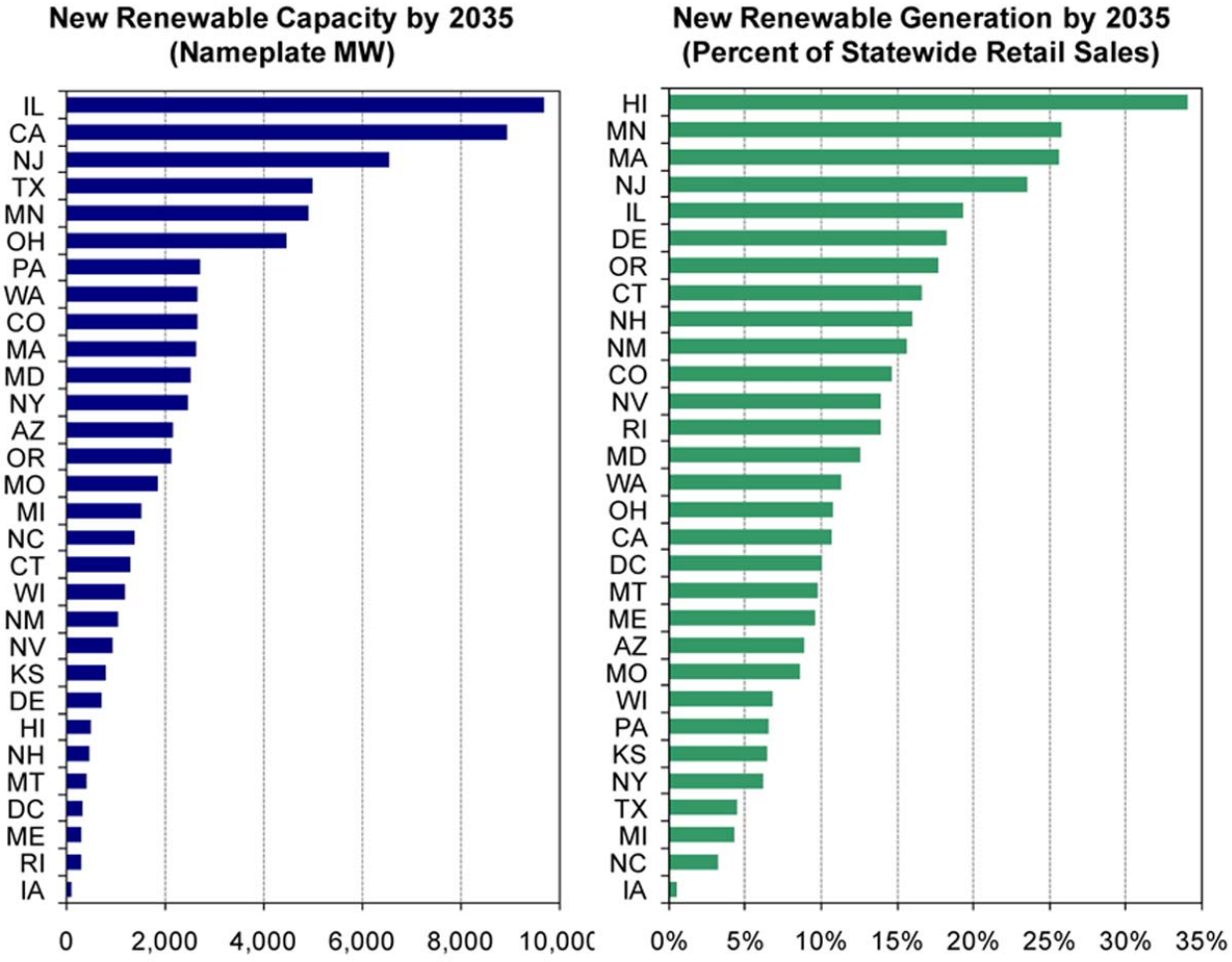
- **Renewable Portfolio Standard (RPS) and Renewable Energy Credit (REC) Markets**
- **PJM, New Jersey and California Developments**
- **Developing Issues in 2011**
- **Questions and Answers**

Renewable Portfolio Standard Markets



Current RPS will require 104 GW of new renewable capacity by 2035, achieving 6% of U.S. generation (Sources: FERC/Lawrence Berkeley Lab)

Where Will New Generation Be Needed?



Source; Lawrence Berkeley

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RPS Foundations

- **Variety of RPS designs require close analysis of state regulations and activity in both renewable project development and energy markets.**
- **RPSs are continuing to evolve, and this requires keeping multiple stakeholder interests in mind:**
  - Utilities are focused on compliance, cost, risk – and increasingly opportunities
  - Developers are focused on projects, offtake agreements, market growth – and the competition
  - Other stakeholders focused on growth and cost of compliance

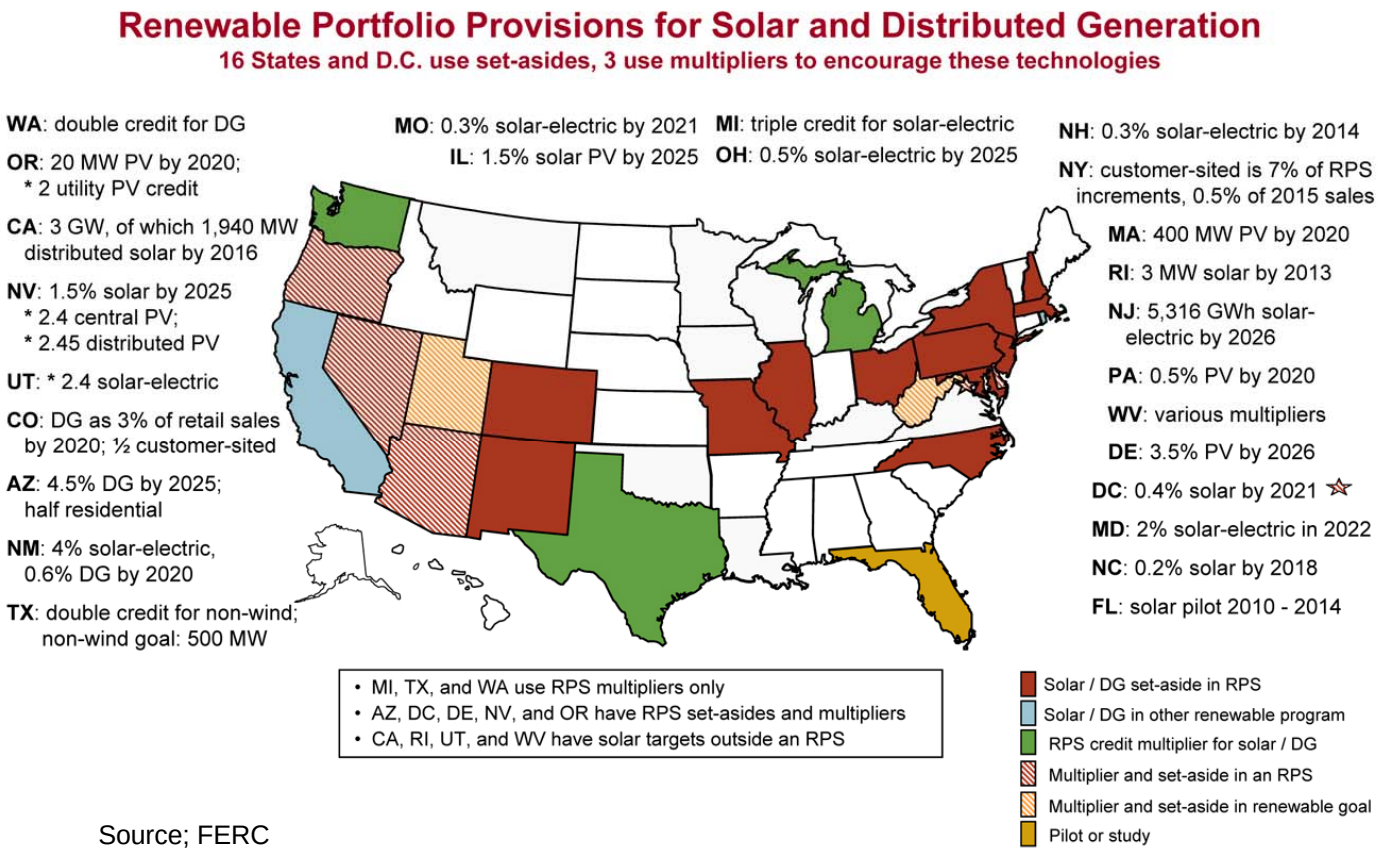
RPS Foundations, Continued

- **RPS design issues requiring close analysis include:**
  - Percentage requirements for load-serving entities
  - Eligible resources and geographic requirements
  - Set-asides and multipliers for specific technologies
  - Penalties and Force Majeure, cost recovery, and cost caps
  - Contracting requirements and standardization
- **Analysis must be integrated with examination of wholesale energy markets and interconnection issues**

RECs – The Currency of the Realms

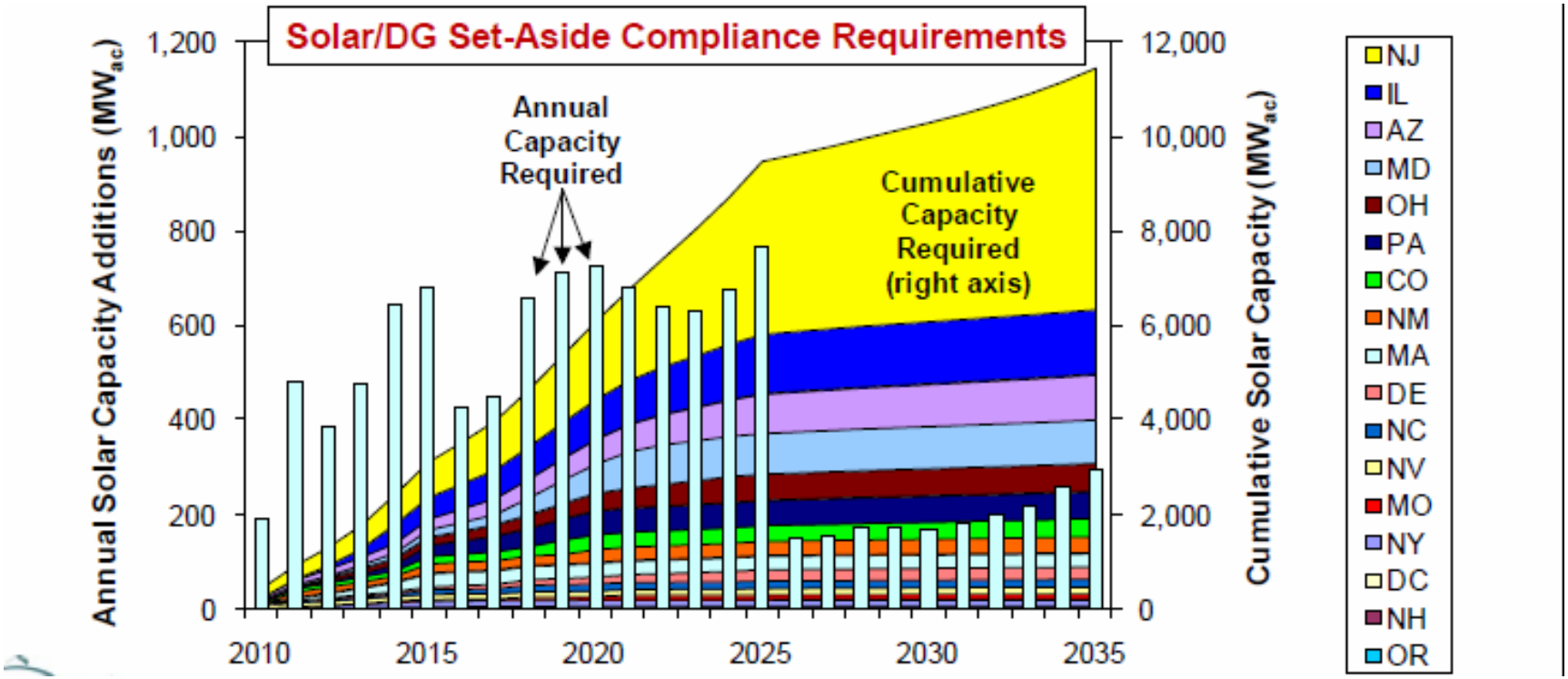
- Compliance with RPSs is generally measured in Renewable Energy Credits (RECs)
- There is no one REC Market – RECs are often (but not always) eligible for multiple RPSs, with corresponding different potential values
- Most states connected to REC one tracking system, but some overlap
- Solar RECs typically subject to separate carve-out to foster development given higher costs, with separate geographical restrictions

Solar and Distributed Generation "Set-Aside" / Multipliers



Source; FERC

Solar RPS Markets

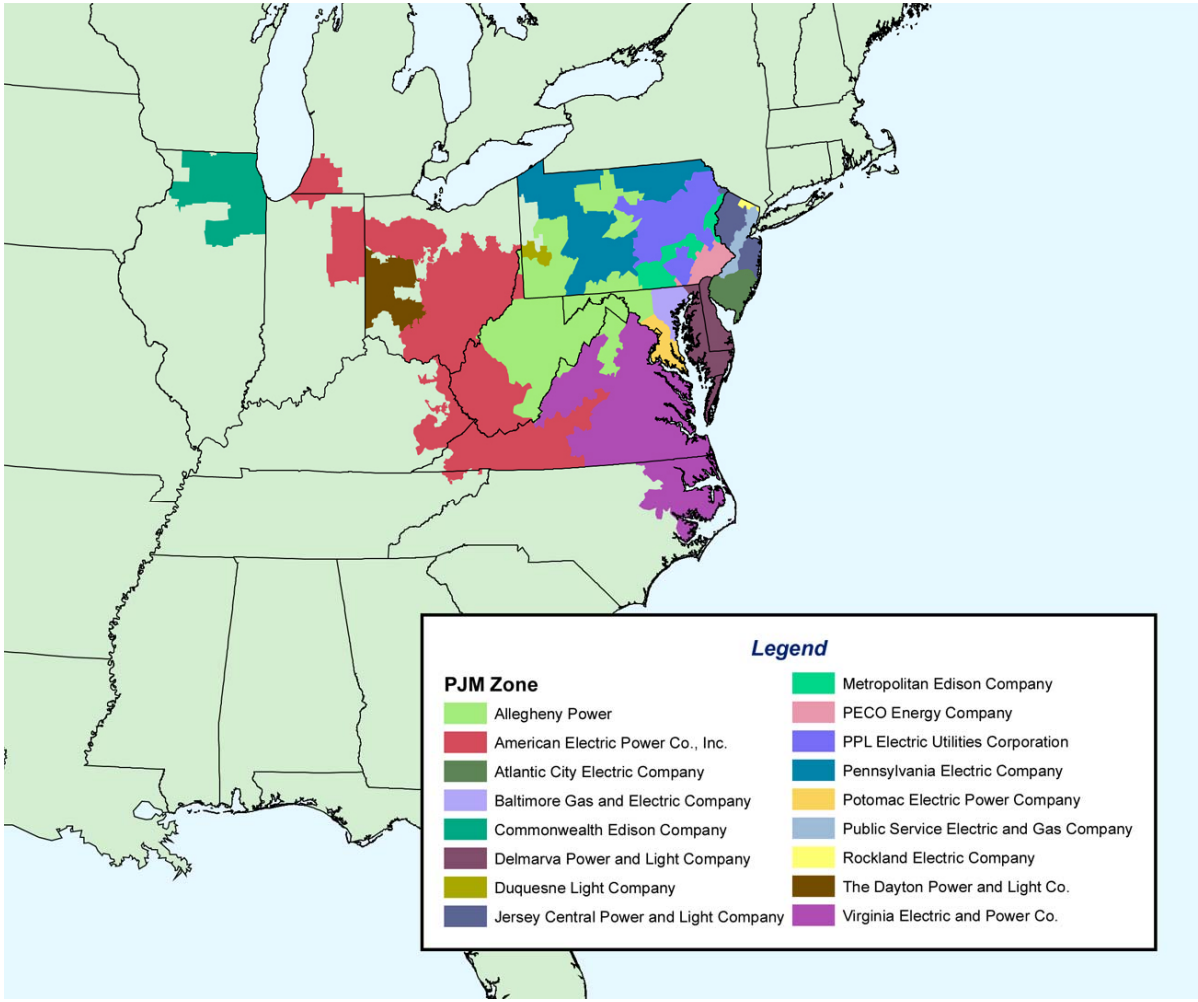


Source: Lawrence Berkeley Lab

The PJM Market

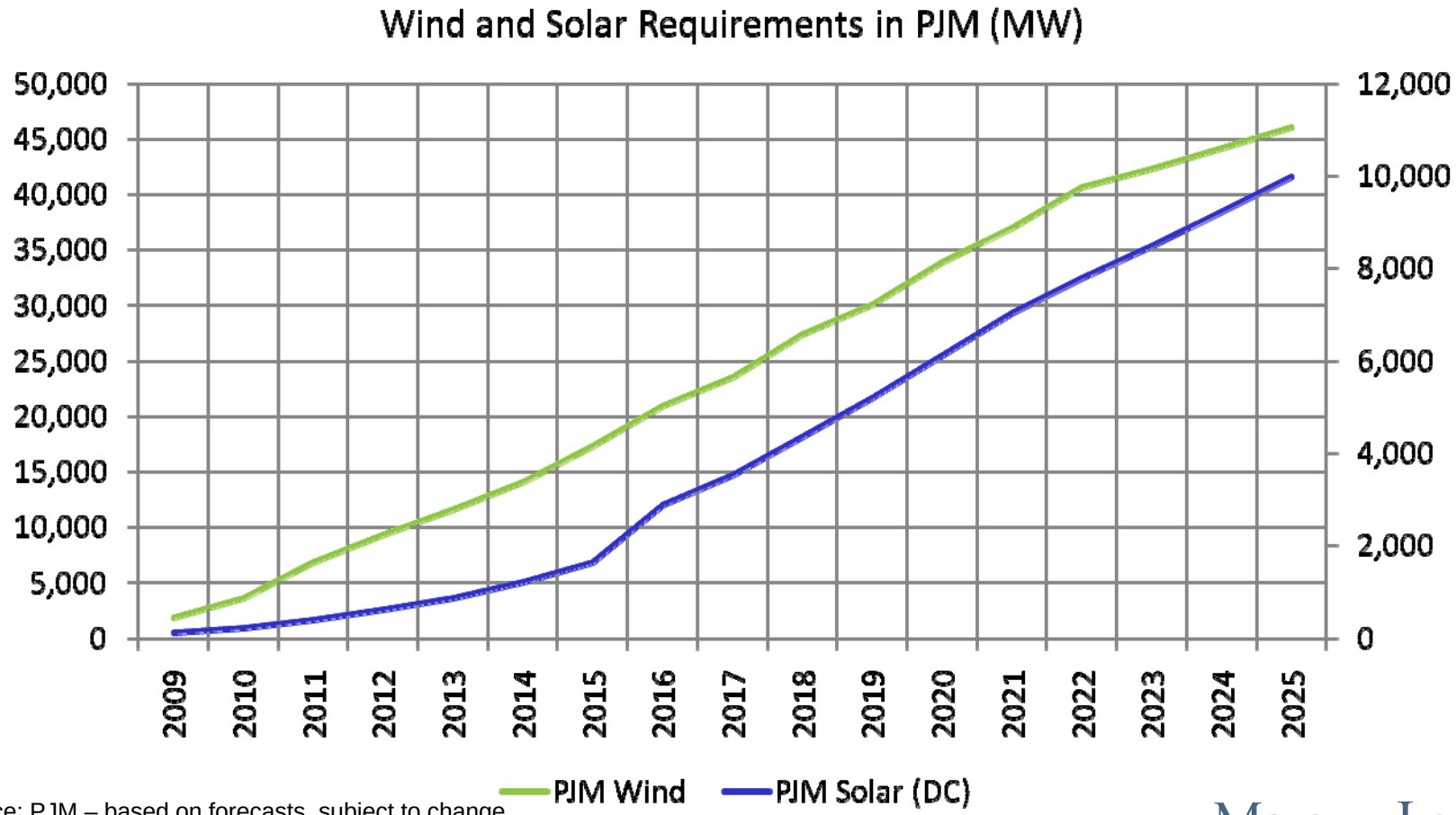
- 13 States, with 10 Renewable Portfolio Standards ranging up to 25% by 2026

- In 2010, Delaware raised solar carve-out from 2.0% to 3.5%



What Are The Total RPS Requirements?

By 2020: Estimated **34,000 MW** of wind and **6,000 MW** of solar will be required in PJM



Source: PJM – based on forecasts, subject to change

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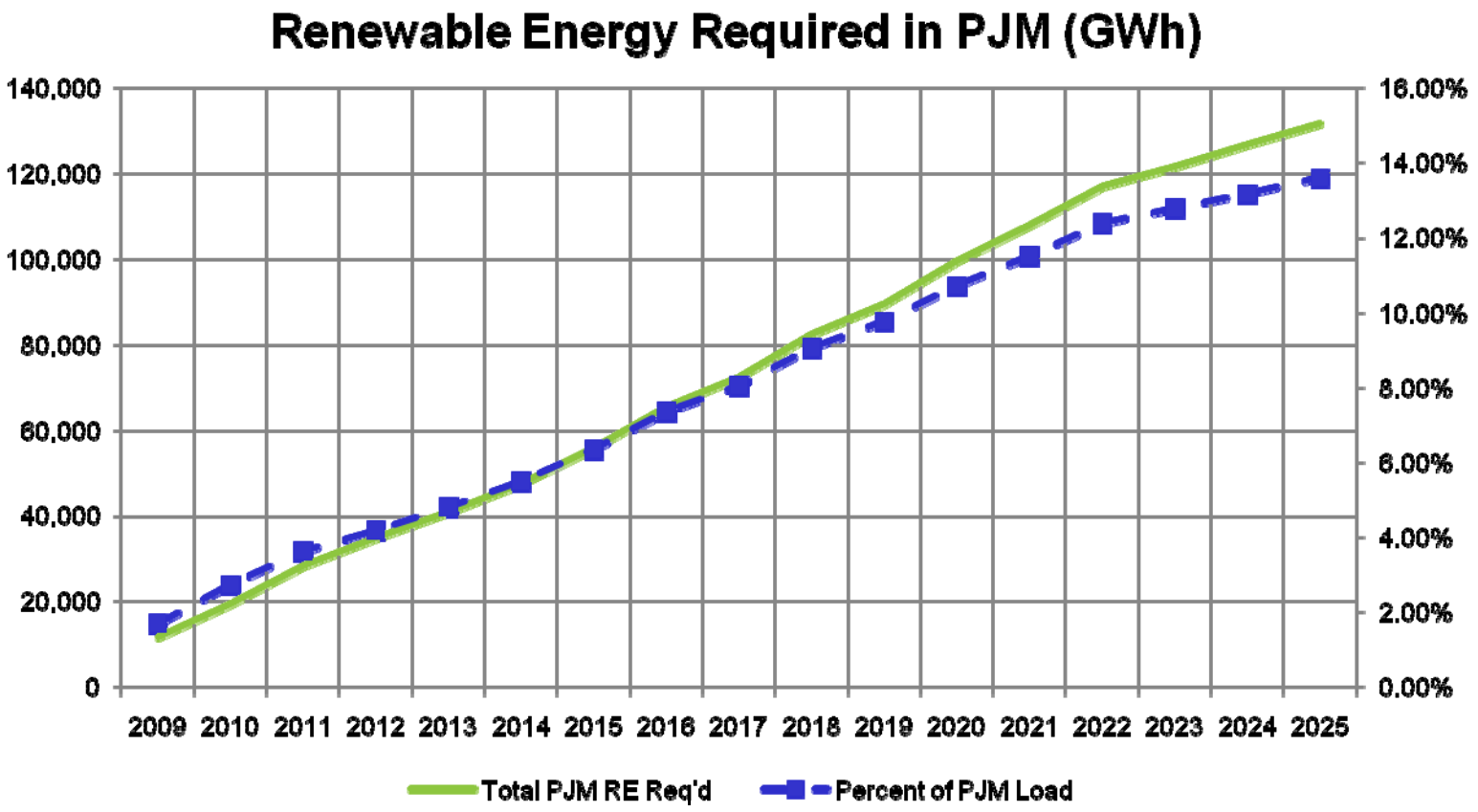
What Are The Total RPS Requirements?

By 2020: Estimated **100,000 GWh** of renewable energy, 10.7% of PJM annual net energy



Source: PJM – based on forecasts, subject to change

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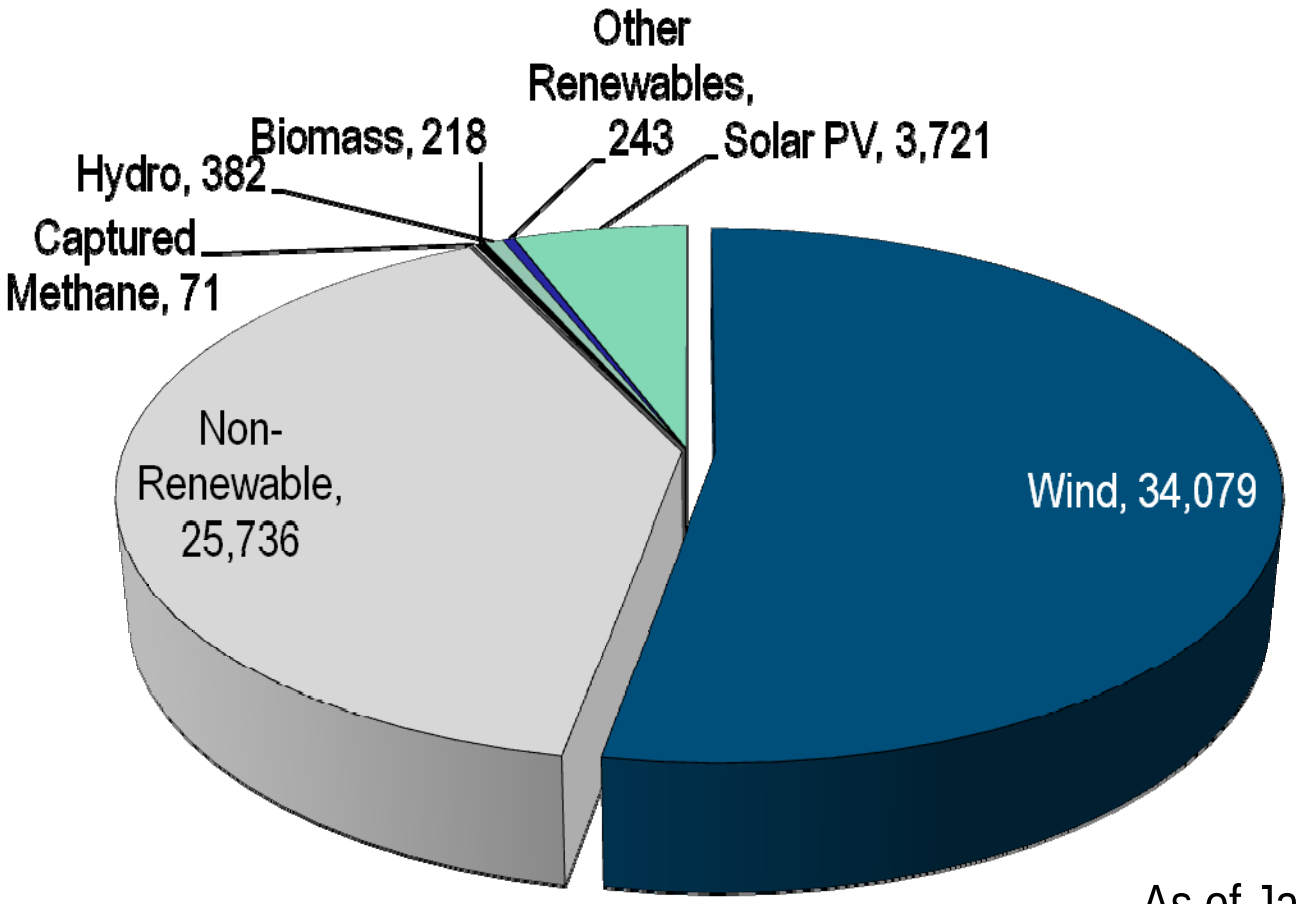
Looking Ahead: The PJM Queue



As of January 4, 2011

PJM Queue Drop-out Rates (New Generation – all types)

	Drop out Rates	Commercial Probability
Feasibility Study	**90%**	**10%**
Impact Study	**75%**	**25%**
Facility Study	**53%**	**47%**
ISA	**39%**	**61%**

Source: PJM

Geographic Restrictions (or lack of) Are Critical Components In Current Market

- **Pennsylvania –** RECs from anywhere in PJM, plus MISO for limited area
- **New Jersey –** RECs from PJM, except for solar carve-out with in-state restriction
- **Delaware –** RECs from PJM, except for carve-out with in-state restriction
- **Maryland –** RECs from PJM or from adjacent control area

The Results

- **Renewables coming on-line in PJM are driving prices down substantially**
- **PJM Capacity Auction: 5349 MW of wind, 120 MW of solar**
- **PA Tier I REC**
  - April 2010: $4.38 April 2011: $0.55
- **PA Tier I Solar REC:**
  - July 2010: $337.50 May 2011: $100.00
- **PA Solar Compliance requirement is 32 MW, but over 400 MW in PJM**

New Jersey Background

The NJ RPS requires each supplier/provider to include its portfolio electricity generated from renewable energy sources so as to:

- Encourage renewable development
- Minimize emissions impacts
- Minimize the environmental impacts of Deregulation
- Support reliability of supply

See N.J.A.C. 14:8-2.1

2011 RPS Rules Developments

- **The New Jersey RPS Rules for Solar have evolved:**
  - The solar set-aside was first extended to 2021 with a target percentage requirement for solar of 2.12% of retail electric sales
  - Effective March 30, 2011, in a Special Adoption, the NJBPU has modified its RPS Rules to codify new statutory requirements enacted through the Solar Energy Advancement and Fair Competition Act (SEAFCA), P.L. 2009, c. 289, requiring:
    - a schedule of gradually increasing solar energy requirements, which are higher than previous solar requirements.
    - a change in the calculation method for each supplier/provider's solar obligation from a percentage of the supplier/provider's entire electricity portfolio to a specific targeted statewide amount that is divided among supplier/providers. (This new volumetric method applies only to solar requirements).

Current Requirements

- **Currently, New Jersey Solar RPS Enhanced Requirements grow from:**
  - 306 GWh in Energy Year (EY) 2011 (ending May 31, 2011) to
  - 5,316 GWh in EY2026 (ending May 31, 2026)
  - Continuing thereafter, at least, at that level.
  - Beginning with EY 2013 the solar RPS requirement can automatically increase by 20% if:
    - Number of SRECs generated meets or exceeds three consecutive EY's requirements, and
    - Average prices for compliance SRECs decline in the same period.

Source: N.J.S.A. 48:3-87 d. (3) and N.J.A.C. 14:8-2.2 and 2.3

Solar Alternative Compliance Payments

- 2003 - Set at $300/MWh
- In 2007, the NJPBU approved a rolling 8 year schedule:

Year	2009	2010	2011	2012	2013	2014	2015	2016
SACP	$711	$693	$675	$658	$641	$625	$609	$594

N.J.A.C. 14:8-2.10 (f).

The Evolving Costs of Compliance (I)

- **Solar RPS – Costs of Compliance**
  - 2009:
    - The RPS percentage requirement for solar electricity in RY09 was 0.16% of retail sales, a RY09 obligation to provide 130,266 SRECs or their equivalent in SACPs.
    - Regulated entities
      - Retired 75,532 SRECs (at average price of $544.85) = $41 million
      - Paid 54,738 SACPs at the RY09 level of $711 per MWh = $38.9 million
    - Estimated Total Cost of Compliance = $80 million
    - On November 10, 2009, the Board approved the transfer of the SACP funds into the New Jersey Clean Energy Program consistent with the RPS rules at N.J.A.C. 14:8-2.10 (e).

Source: NJ RPS 2009 Annual Report

The Evolving Costs of Compliance (2)

- **Solar RPS – Costs of Compliance**
  - 2010:
    - The RPS percentage requirement for solar electricity in RY10 was 0.22% of retail sales, a RY10 obligation to provide 171,095 SRECs or their equivalent in SACPs.
    - Regulated entities
      - Retired 123,717 SRECs (at average price of $615.50) = $76 million
      - Paid 47,373 SACPs at the RY10 level of $693 per MWh = $32.8 million
    - Estimated Total Cost of Compliance = $108 million
    - The Solar Advancement Act of 2010 requires that SACP funds be refunded to ratepayers. On March 30, 2011, the Board promulgated amendments to the RPS rules providing a methodology for refunding to ratepayers. (Comment period ends July 1, 2011).

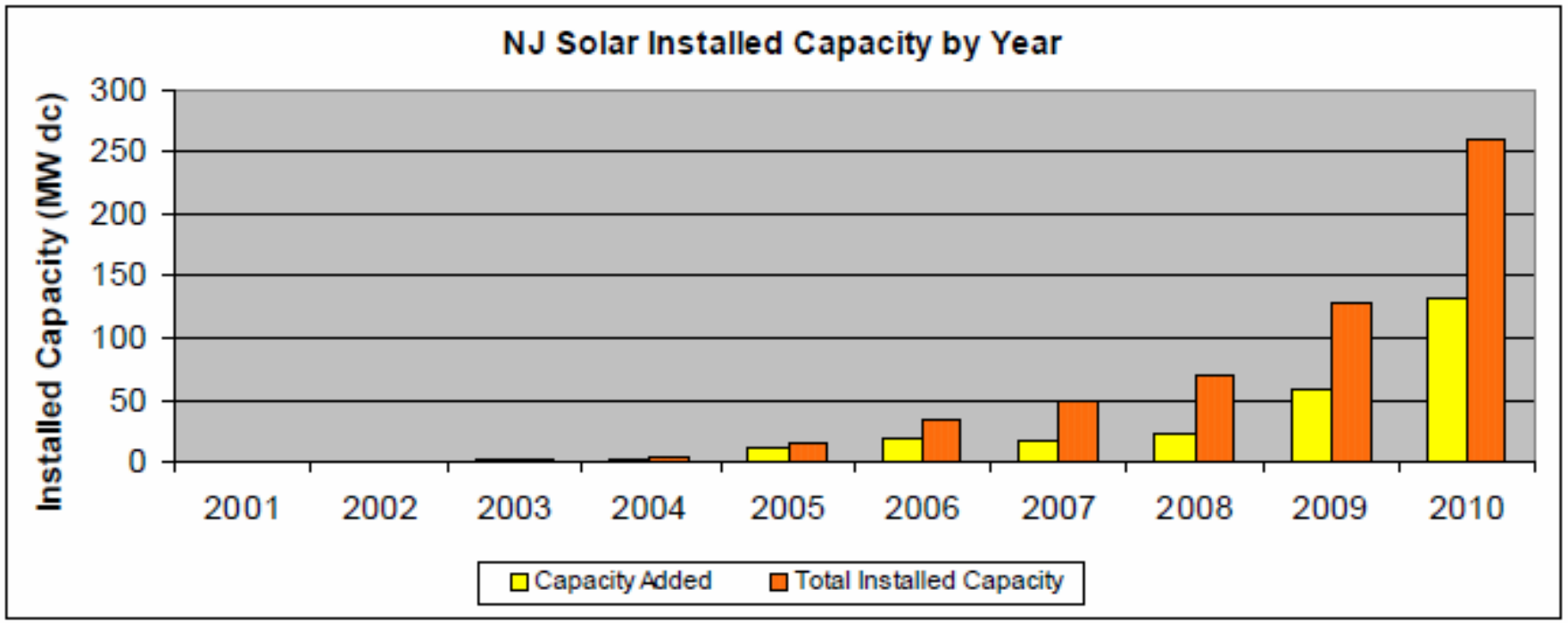
Source: NJ RPS 2010 Draft Annual Report

INCENTIVES:
Rebates v. SREC Market Support

- **REBATES:**
  - Between May 2001 and August 2007, forty (40) MW of solar generating capacity was installed in New Jersey.
  - This build-out was assisted by more than $170 million in rebates, or about $4,250 per kilowatt.
  - At that rate, the NJBPU recognized that achieving the 2.12% solar RPS requirement by 2021 would require an estimated $10.9 billion in rebates (an additional 7.5% to electricity rates).

Source: NJ RPS 2009 Annual Report

Historical Pace of Solar Installation



Source: NJ RPS 2010 Draft Annual Report

Status of Installed Capacity

- **SREC MARKET SUPPORT**
  - As of December 31, 2010, nearly 259 MWdc of solar renewable energy capacity from over 8,000 projects installed in New Jersey as a result of the incentives available through the NJCEP, the net metering and interconnection regulations and the Renewable Portfolio Standard regulations.
  - Most of this capacity was installed in RY2010 when more than 132 MWdc of solar was connected to the electric distribution system serving New Jersey – an amount exceeding the cumulative capacity installed since the inception of the clean energy incentive programs in 2001.
  - RESULTS:
    - Since 2009 - SREC Registration Program (and predecessor SREC-only Pilot Program) = 145 MWdc.
    - Since 2001 - NJCEP rebate programs; CORE and REIP combined = 114 MWdc.

Source: NJ RPS 2010 Draft Annual Report

Comparative Impact of Rebates and Market Support Mechanisms

New Jersey Solar Installation Projects by Program

Installed Projects 2001 to 3/31/2011

Program	# Projects	Total kW	Total Rebate $
CORE Rebate	4,268	87,131.0	$311,406,225.45
REIP Program	3,019	30,895.3	$40,696,064.03
SREC Registration	1,613	183,222.5	-
Total*	**8,900**	**301,248.7**	**$352,102,289**

Source: NJ OCE Web Site: http://www.njcleanenergy.com/

Enhancing and Supporting the SREC Market

- **SREC Market Support Mechanisms**
  - Phase out of Rebates by May 2012
  - Increased Trading Life for (RECs and) SRECs - Now 3 years.
  - Utility Programs:
    - SREC Financing
      - JCP&L = 42MW (6-09 - 5-12)
      - ACE = 19MW
      - RECO = 3.769MW
    - PSE&G Solar Loan & Solar 4 All Programs
      - Through 2010 approximately 45.6 MW installed so far of approximately 160MW target

SREC-Financing Program Results Summary

Solicitation	BPU Approval	Total Awarded	Projects	Average Price/SREC	Lowest Price
#1 - August 25, 2009	Sept. 23, 2009	1,585.37 kW	7	$409.71	$369.00
#2 - December 11, 2009	January 21,2010	6,521.798 kW	39	$405.15	$272.44
#3 - March 5, 2010	April 28, 2010	9,332.978 kW	57	$424.18	$349.74
#4 – June 11, 2010	August 12, 2010	3,931.945 kW	20	$466.21	$413.69
#5 – October 14, 2010	January 3, 2011	9,512, 190 kW	55	$459.34	$419.69
#6 – February 17, 2011	March 30, 2011	16,565.932 kW	106	$432.66	$342.75
Totals[2] 6 Solicitations		**47,450.213 kW**	**284**	**$432.87**	**$361.21**

Note 1: For a 10 yr. Contract.

Note 2: There are 20,102.742 kW remaining to be solicited during the remainder of 2011 in 2 (or, if necessary 3) rounds for Reporting Year 2010.

Source: NJ RPS 2010 Draft Annual Report and SREC-Based Financing Program Update 5-12-11 (NERA Economic Consulting (Solicitation Manager))

Are Declining Prices a Success?

- **Current Perspectives:**
  - As of March 31, 2011 – New Jersey has nearly 8,900 solar PV installations totaling over 301 MWdc of installed capacity.
  - SREC Supply and SREC Requirements are converging.
    - SREC Prices Decline
      - SREC Prices for Energy Year 2012 experienced a sharp decline. [Source: Flett Exchange]
      - At end of April, 2011 - NJ Solar REC Market fell 25% (Hi:$622.50; Low:$437.50; Avg: $525.59). [Source: Bloomberg Finance L.P.]
      - In past NJ Energy Years SREC demand has outstripped supply, creating a tight market and allowing the SRECs to trade between 92%-97% of the SACP. However, this should not be the case for Energy Year 2012 [where] … estimates [suggest] an oversupply situation of 59,000-122,000 SRECs for Energy Year 2012. [Source: Flett Exchange]
    - Utility Programs Under Review.

Pipeline Projects

New Jersey Solar Pipeline Plus Installed Projects as of 3/31/2011			
Description	# Projects	Total kW dc	Report
Pipeline Projects	3,820	304,485.7	Solar Projects Pipeline
Installed Projects	8,900	301,248.7	Solar Installation Summary
Total*	**12,720**	**605,734.4**	

Source: NJ OCE Web Site: http://www.njcleanenergy.com/

California's RPS performance

The RPS has served as a strong driver of renewable energy development in California.

- IOUs procured 17.9% of their electricity from RPS-eligible generation in 2010.
- 300 MW of new renewable capacity online in Q1 2011.
- An additional 589 MW expected to come online by the end of 2011.

Source: CPUC Renewables Portfolio Standard Quarterly Report, 1st Quarter 2011

Background: CPUC's RPS vs. CARB's RES

CPUC

- 20% by 2010
- IOUs, ESPs and CCAs
- TRECs: limits through 2013
  - Up to 25% of RPS requirement
  - $50/TREC price cap

CARB

- 33% by 2020
- IOUs, ESPs, CCAs and POUs
- TRECs: unilimited usage

SBX1-2

Covered Entities: IOUs, ESPs, CCAs and POUs

Benchmarks

- Utilities must obtain the following percentage of their retail sales from renewable energy by the following dates:
  - 20% by December 31, 2013
  - 25% by December 31, 2016
  - 33% by December 31, 2020

SBX1-2, (contd.)

Compliance Options

- **Bundled transactions** (interconnected or delivered to California balancing authority):
  - At least 50% for 2011-2013 period
  - At least 65% for 2014-2016 period
  - At least 75% for 2016 and after
- **Firmed and shaped transactions**
  - De facto limit set due to the minimum set for bundled transactions
- **TRECs**
  - 25% for 2011-2013
  - 15% for 2014-2016
  - 10% 2017 and beyond

SBX1-2, **(contd.)**

Cost limits

- Previously, MPR was used to determine the above-market costs of RPS contracts.
  - CPUC would use the MPR to provide above-market funds for expenses above the MPR.
- SBX1-2 mandates that a cost limit be established by the CPUC for each IOU.
  - IOUs are relieved from obtaining renewable energy that exceeds this limit.

TREC Eligibility

- In order to sell TRECs for California compliance, sellers must:
  - Obtain CEC eligibility (http://www.energy.ca.gov/renewables/documents/index.html#rps)
    - Submit application
    - Notice of eligibility sent by CEC approximately 30 days after receipt, but may take more than 60 days for out-of-state facilities
  - Register with WREGIS (http://www.wregis.org/join-wregis.php)
    - Generators must register themselves and the applicable units with WREGIS
    - Generation information is reported to WREGIS and certificate is generated

TREC Implications

Increase in Out-of-State Investment:

- Because TRECs may be generated outside of California, investment in out-of-state renewable energy projects should increase in the near term.
- More options for development (in-state vs. out-of-state) while still selling RECs in California.

New Market Participants:

- Small generators may now participate in REC market while still selling power to non-utility off-takers.

Increased Liquidity:

- RECs generated in WREGIS participant states will have increased liquidity due to ability for use in California.
- Example: PG&E TREC deal with Greengate.

TREC Implications, **(contd.)**

New compliance options:

Retail sellers of electricity can now purchase TRECs in a number of ways, including:

- Spot market REC purchases
- Out-of-state PPAs, while applying associated TRECs to California RPS
- REC only transactions with small generators or out-of-state utility scale generators

Increased Competition:

- Other WECC states have RPS targets
- Unbundling leaves underlying power less attractive to local utilities since power without the accompanying renewable attributes does not count towards the RPS

Other Implications and Considerations

- **Transmission**:
  For bundled transactions, transmission availability is still an issue when trying to comply with the California RPS.

- **Cost constraints:**
  The new cost cap, as opposed to the MPR, will require utilities to fit new projects within their budget for implementing the RPS, while also allowing them to limit their renewable procurement after the cap is met.

Issues for 2011

- Continued pressure on REC prices from increased capacity and regulatory concern
- Uncertainty arising with increased shopping affecting long-term contracting
- Challenges to set-asides and geographic limitations

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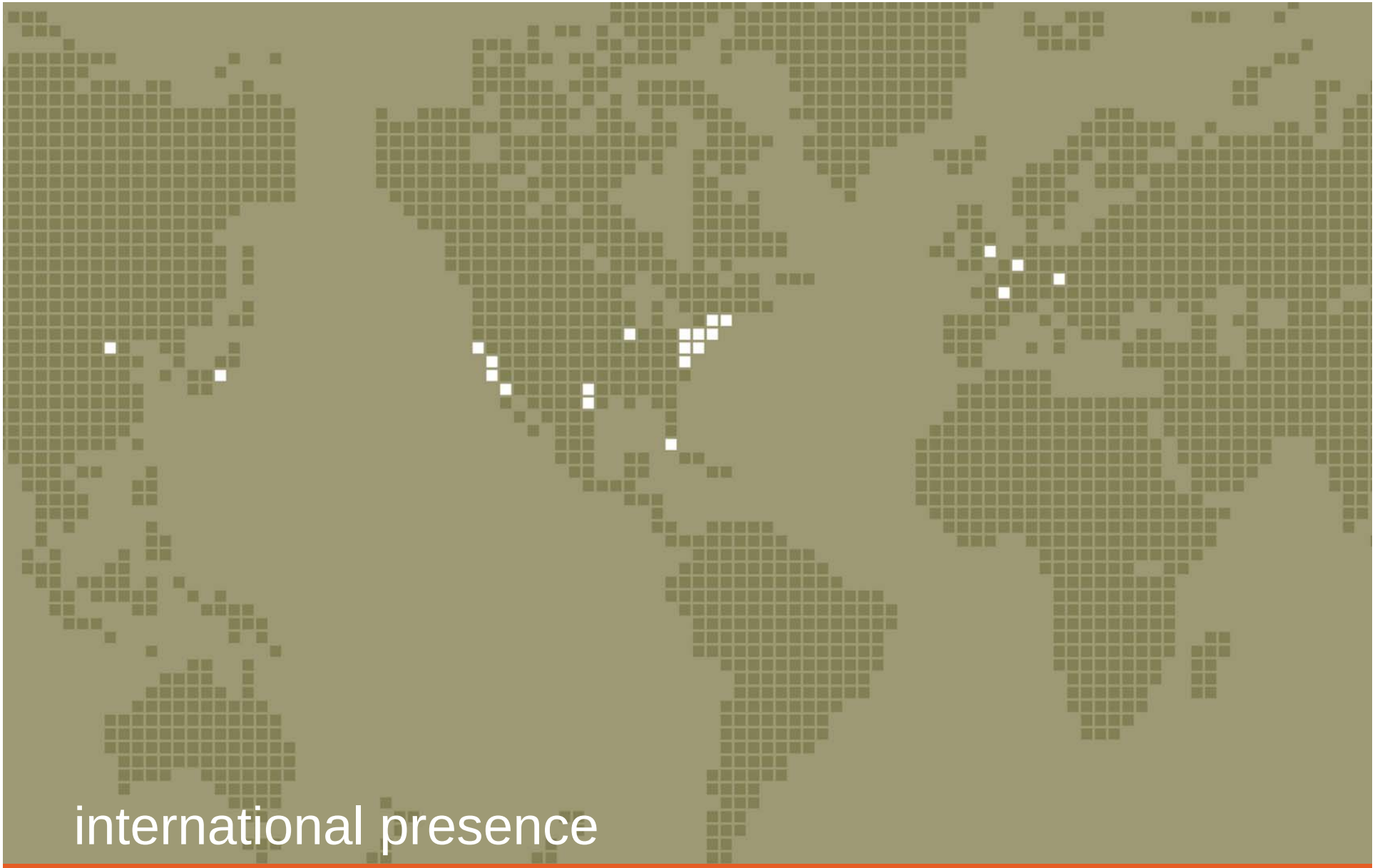

international presence

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