CESA Webinar

# Recent RPS Studies: Maine and Maryland

Hosted by
Warren Leon, Executive Director, CESA

April 15, 2020

Clean Energy States Alliance

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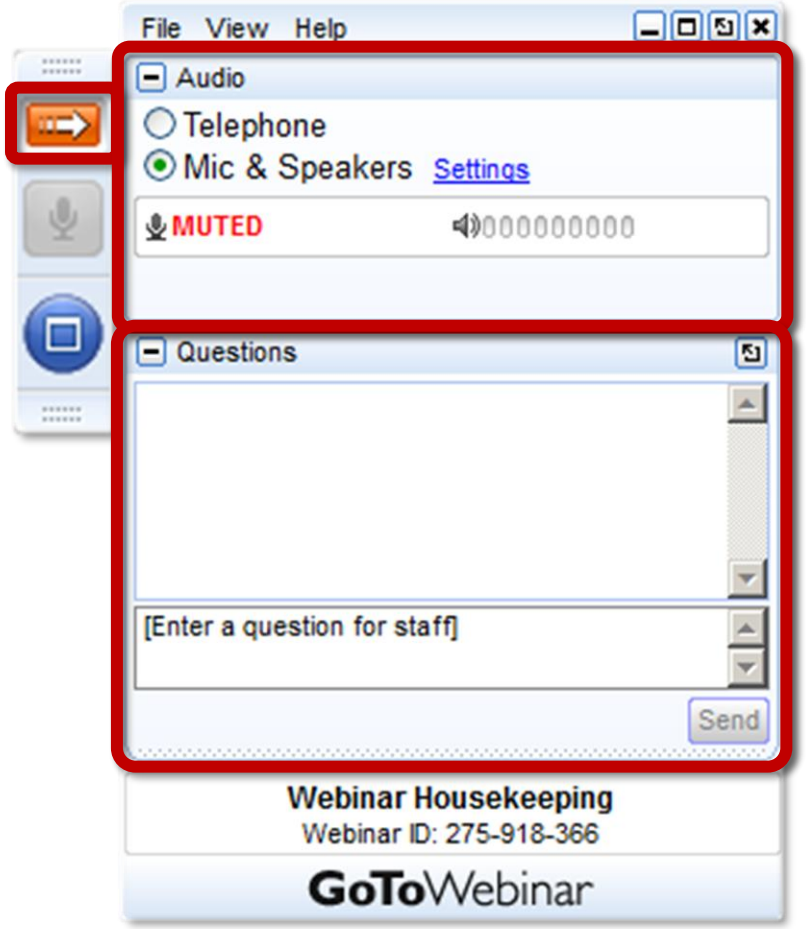


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# Webinar Speakers

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Sustainable Energy Advantage, LLC

Synapse Energy Economics, Inc.

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# Final Report Concerning the Maryland RPS

Presenters: Matt Hoyt & Rebecca Widiss

EXETER ASSOCIATES, INC.

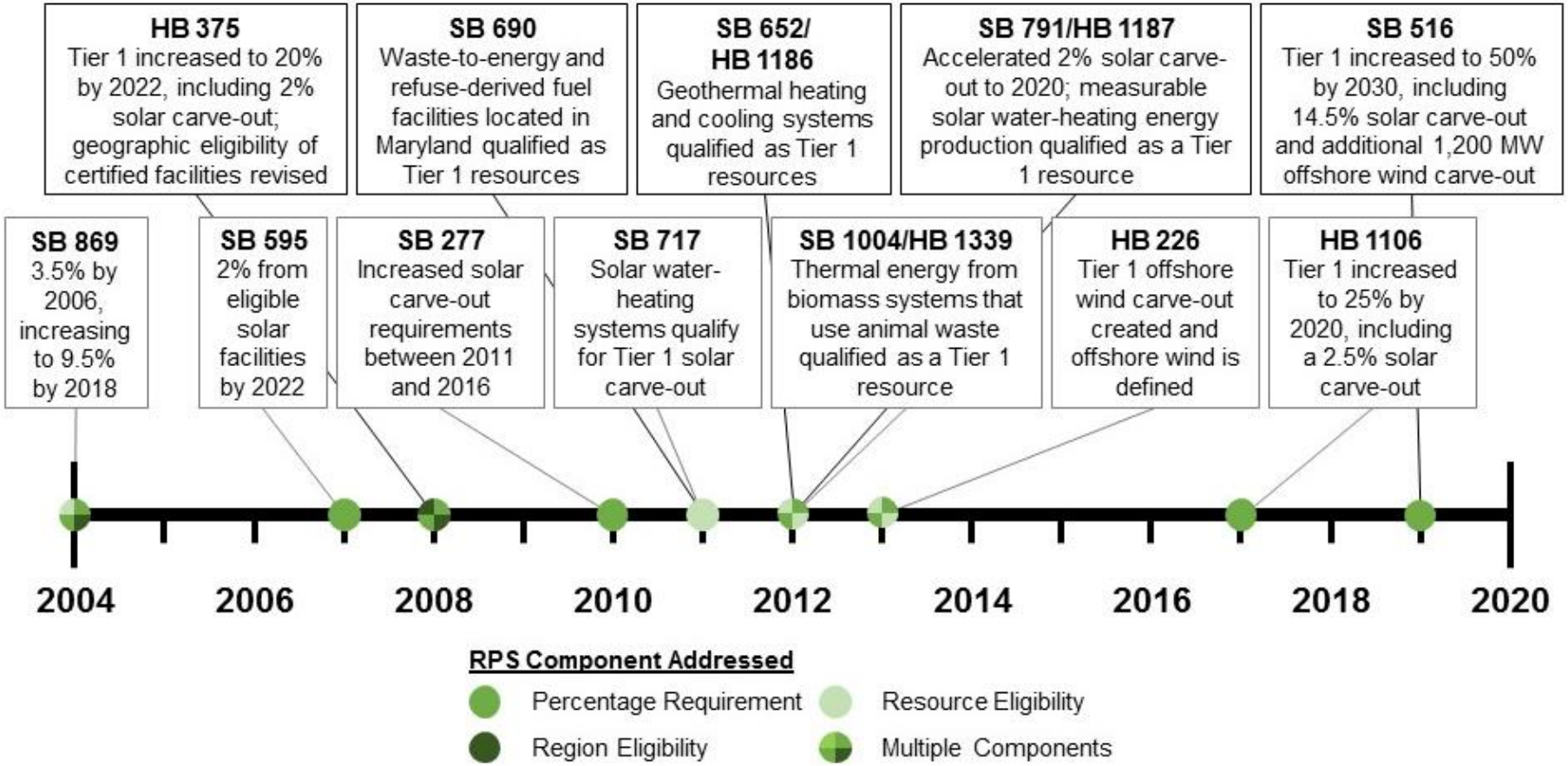
April 15, 2020

# AGENDA

- Background
  - Maryland RPS
  - Study Origins and Approach
- Findings
  - REC Sources
  - Rate Impacts
  - Emissions Impacts
  - Job Creation
  - Environmental Justice
- Parting Thoughts

# MARYLAND RPS OVERVIEW

- First enacted in 2004, amended 11 times, most recently in May 2019

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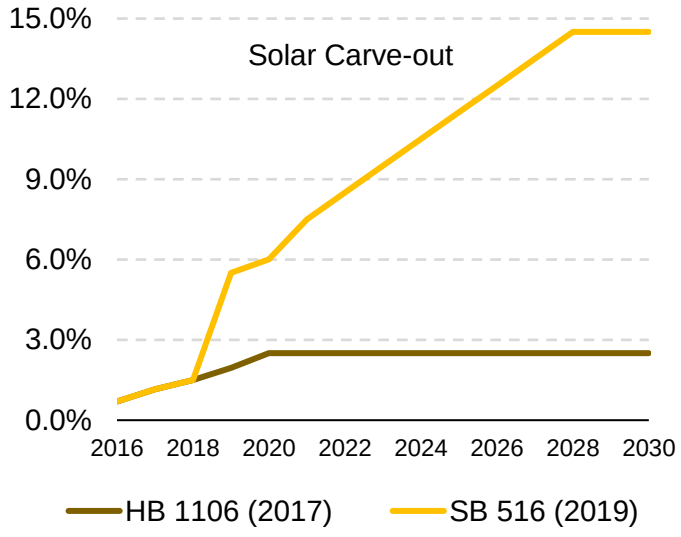
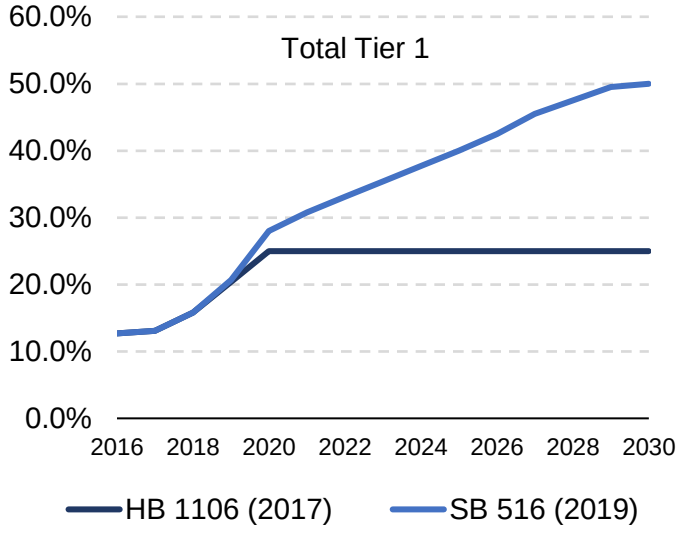
# MARYLAND RPS OVERVIEW (cont.)

- Requires that 50% of retail energy sales come from renewable energy resources by 2030
  - 14.5% from in-state solar by 2028
  - 2.5% from Tier 2 resources (i.e., hydropower) through 2020
  - 386 MW of approved offshore wind
  - 1,200 MW of additional offshore wind (to be added in 2026, 2028, and 2030)
- Represents a compromise between <u>many</u> stakeholders
  - Allows MSW and black liquor as Tier 1 resources
  - Has relatively broad geographic eligibility (within PJM, and eligible resources outside of PJM that are transmitted into PJM)
  - Is pseudo-split between encouraging new resources (solar and offshore wind) and maintaining existing resources (MSW, black liquor, hydro), lowering costs, and promoting in-state development, reducing emissions and supporting jobs, etc.

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# Study Origins and Approach

- HB 1414, enacted in 2017
  - Directed PPRP to study the Maryland RPS with 17 General and Specific requirements, including:
    - Effectiveness of the RPS along several economic and environmental dimensions
    - Availability and cost of renewable energy resources
    - Impact of alterations to the Maryland RPS
    - Potential to meet future Maryland RPS standards
- SB 516, enacted in 2019
  - Increased the MD RPS to 50% (among other changes)
  - Amended RPS study to expand one existing requirement and added one new requirement

**Overarching Focus**

- **How policy design affects performance**

Methods

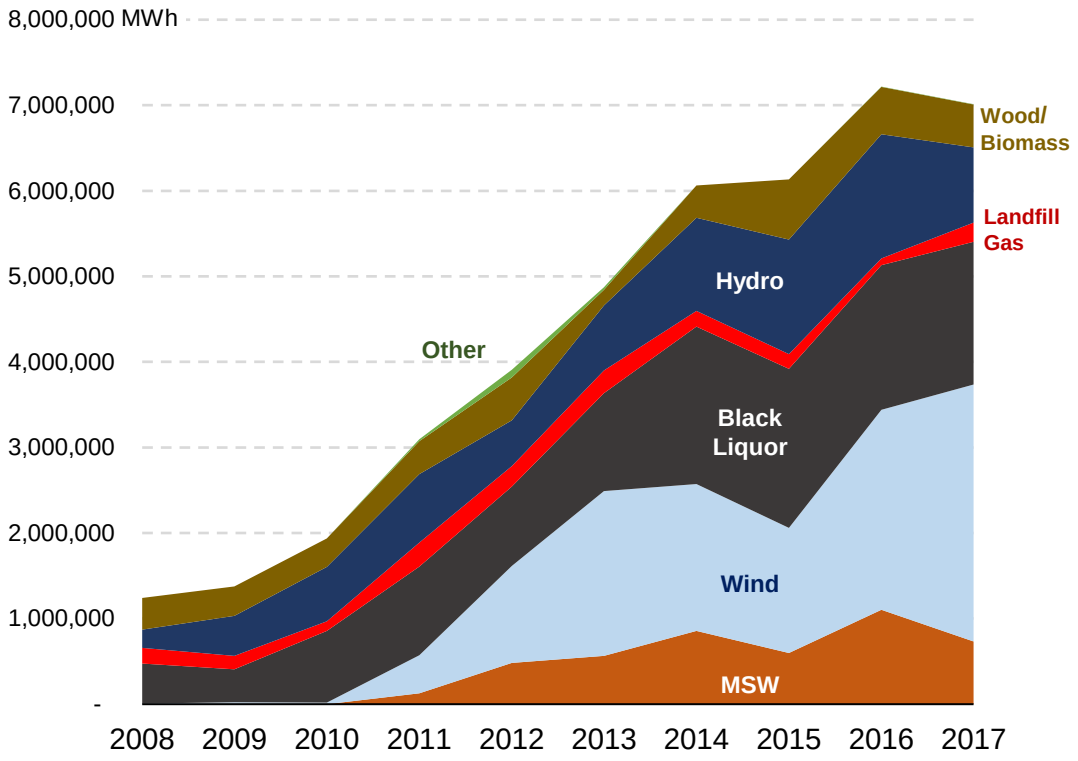
- Stakeholder engagement (e.g., NREL, LBNL, PJM, MD agencies)
- Assessment of existing research (e.g., production cost modeling)
- New research (e.g., IMPLAN modeling, Descriptive Analysis)

Timeline

- October 2017: PPRP RFP
- May 2018: Exeter approved
- December 2019: Final Report

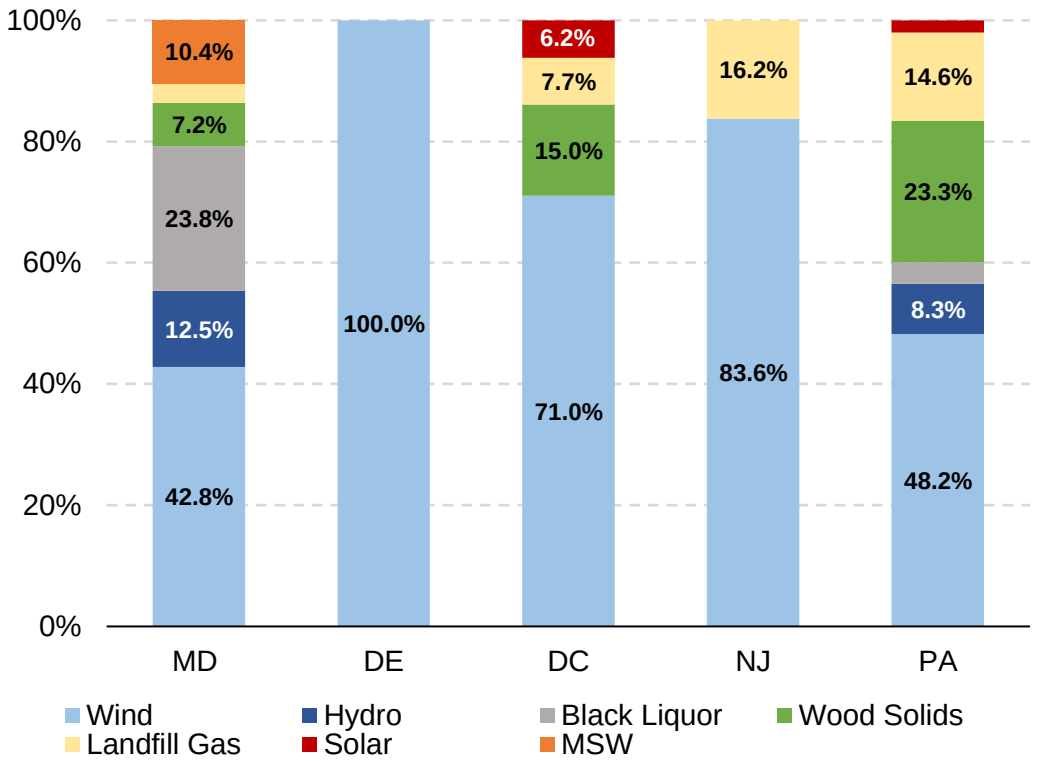
# FINDINGS: REC SOURCES

- RECs retired for Maryland RPS compliance are diverse in fuel type




**RECs Retired for Tier 1 Non-Carve-out RPS Compliance, by Fuel Source**

- This resource mix is on a par with PA's and more diverse than three other states in PJM




**RECs Retired for Tier 1 Non-Carve-out RPS Compliance in Select States, by Fuel Source (2017)**

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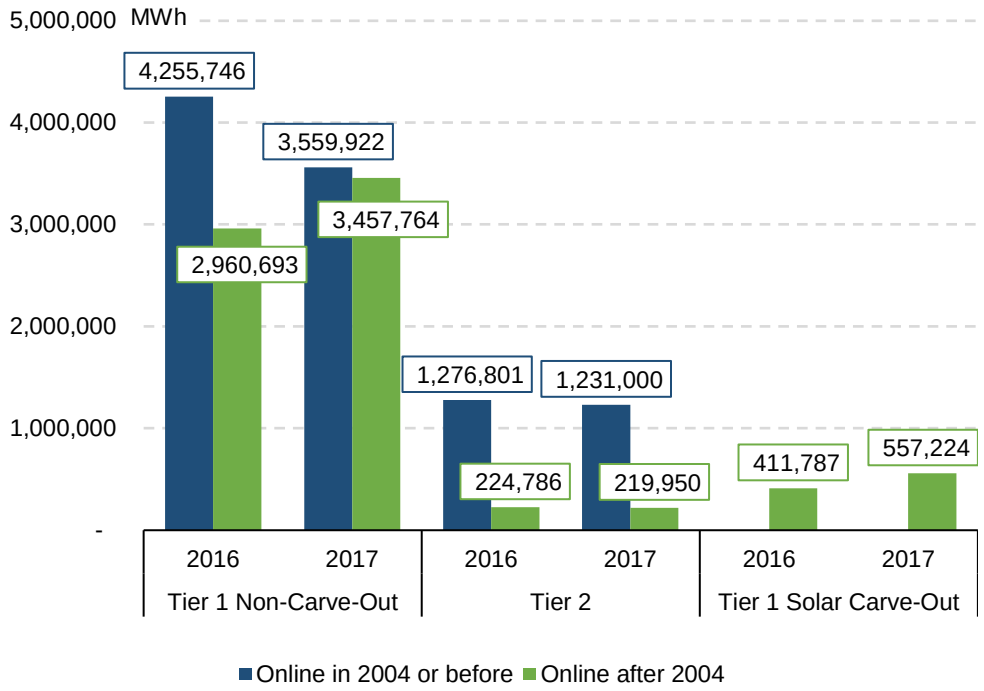
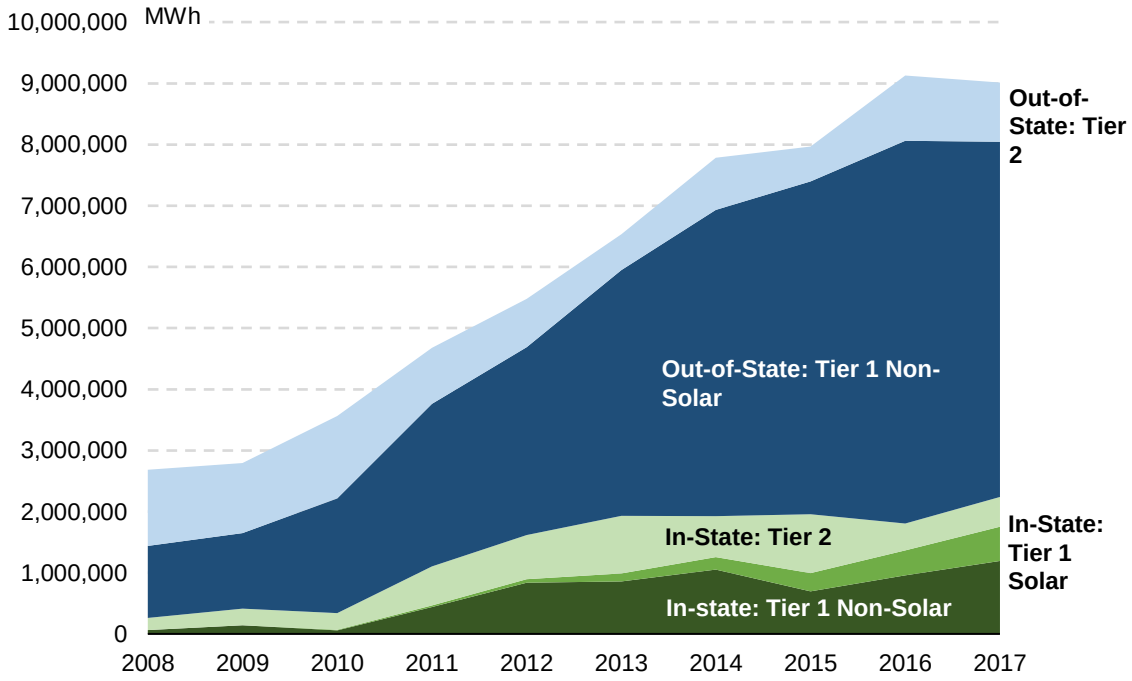
# FINDINGS: REC SOURCES (cont.)

- Half of RECs are from facilities that were in operation before 2004




**RECs Retired for Maryland RPS Compliance, by Plant Age and RPS Category**

- Most RECs retired for RPS compliance are from out-of-state sources




**Maryland REC Retirement, by Location and RPS Category**

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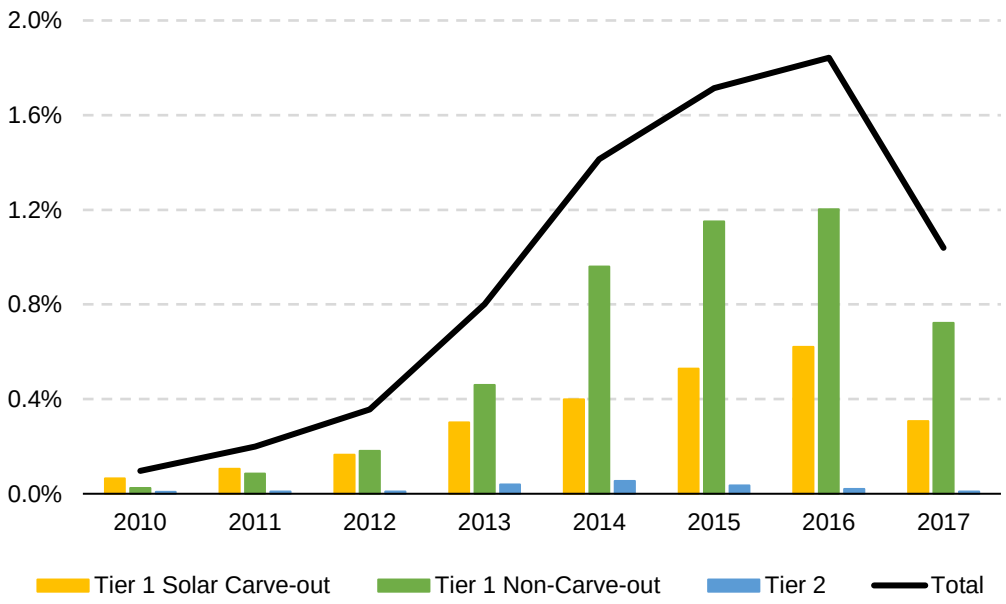
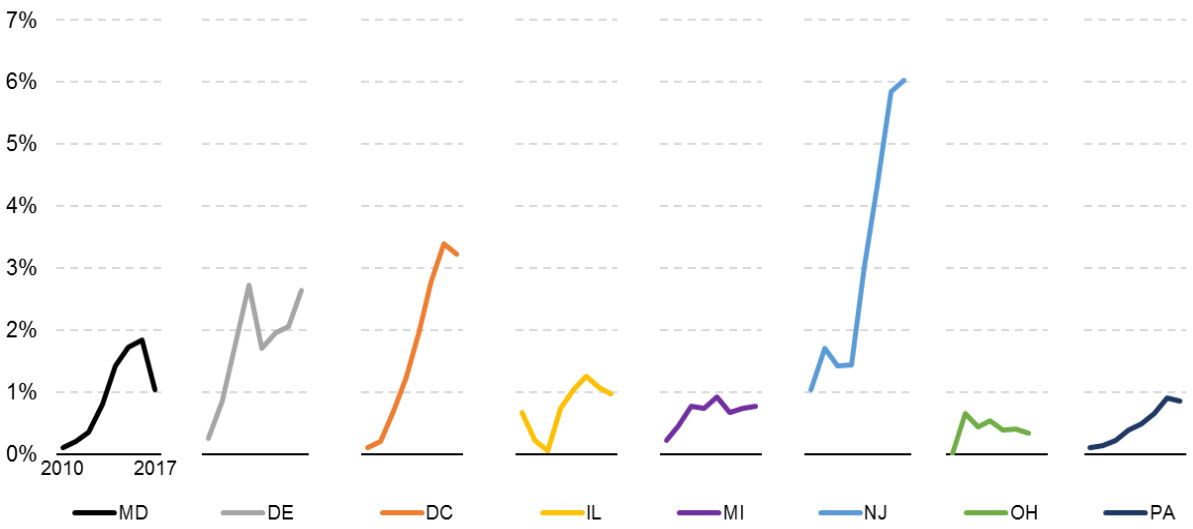
# FINDINGS: RATE IMPACTS

- Compliance costs peaked at 1.8% of retail electric utility bills in 2016, fell to 1.0% in 2017




**Maryland RPS Ratepayer Impact as a Percent of Total Retail Bills**

- Maryland's RPS compliance costs, as a share of retail bills, place it in the middle of PJM states




**RPS Ratepayer Impact as a Percent of Total Retail Bills Across PJM (2010-2017)**

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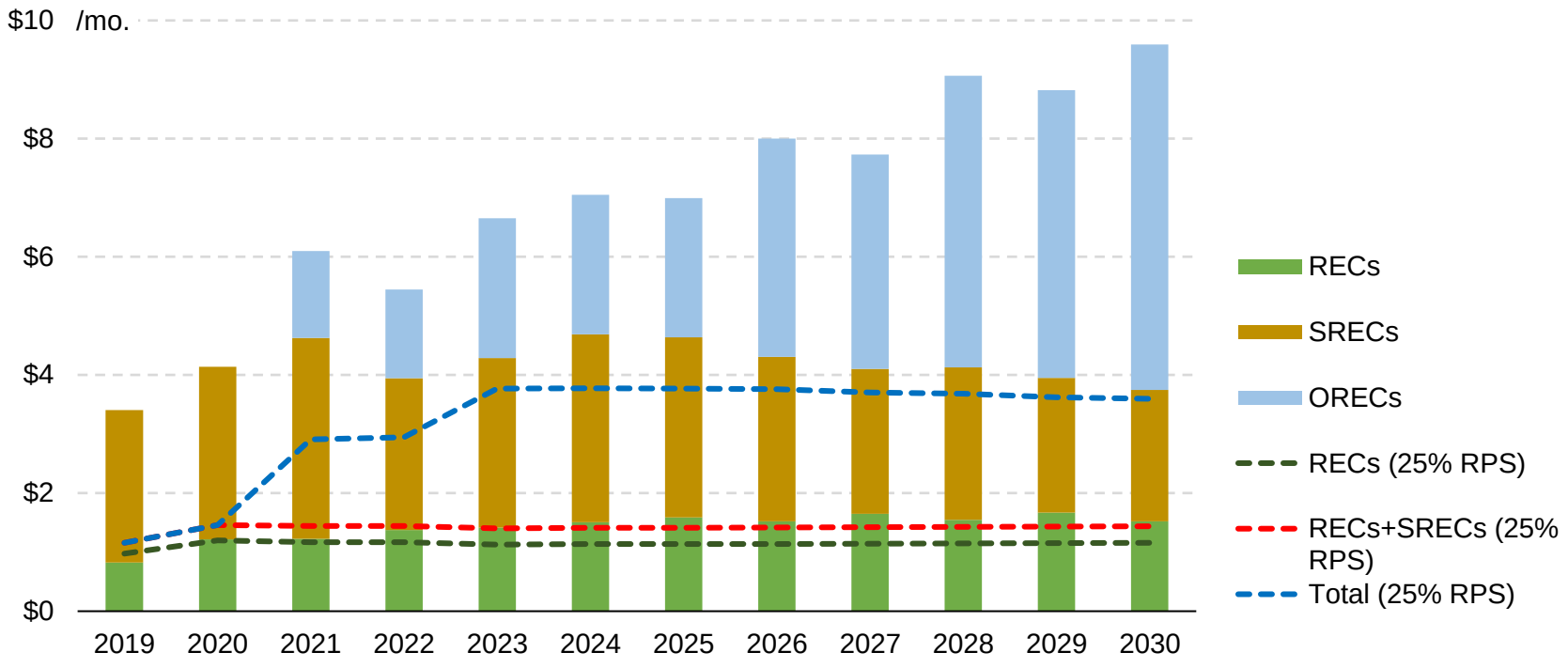
# FINDINGS: RATE IMPACTS (cont.)

- Maryland's carve-out requirements, especially for offshore wind, will likely raise future RPS compliance costs




**Estimated Average Monthly RPS Compliance Costs for Maryland Residential Customers, 25% RPS and 50% RPS**

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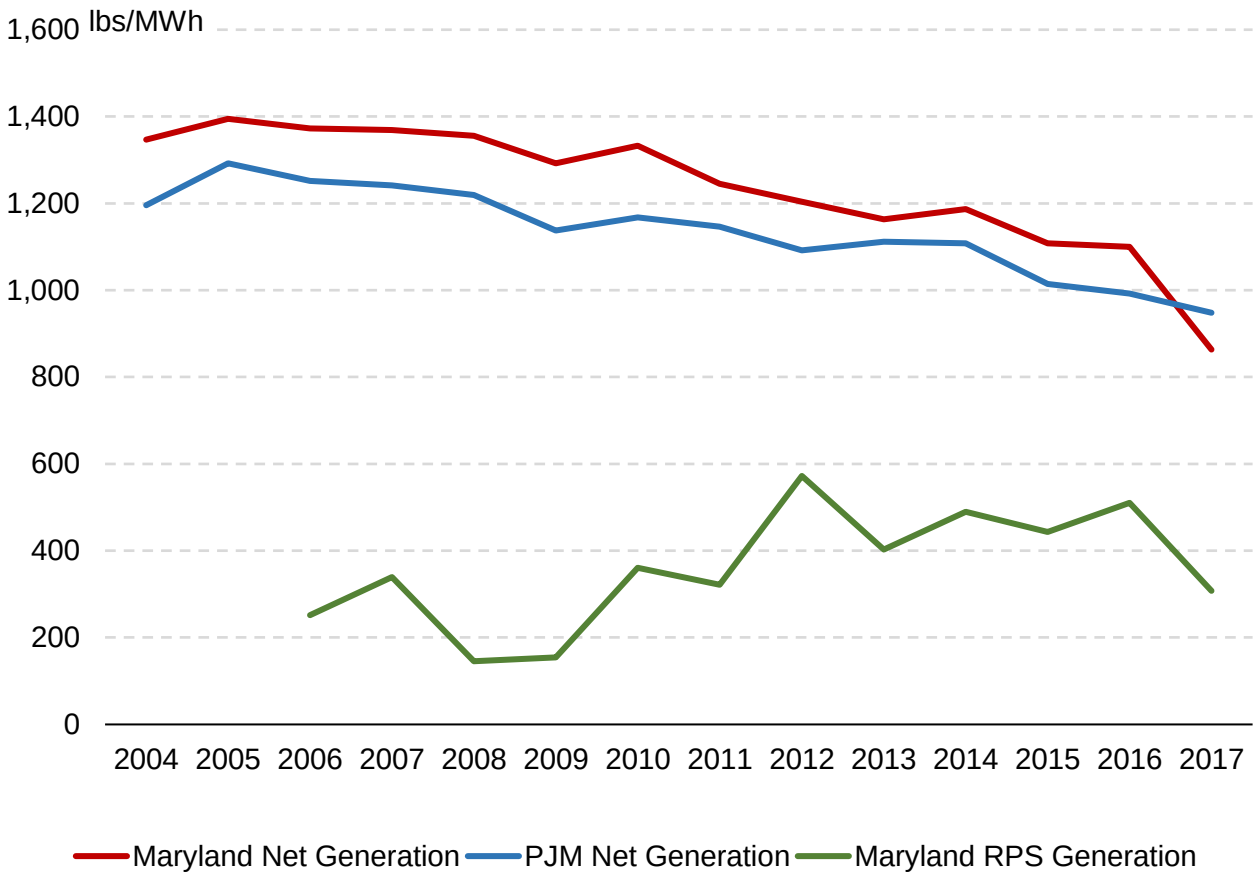
# FINDINGS: EMISSIONS

- PJM-wide $CO_2$ emissions were approximately 0.8% lower in 2017 than they would have been absent the Maryland RPS
  - Assumes all retired RECs supported resources that would not have operated otherwise
  - Given Maryland's small contribution to PJM energy sales (8%), this impact is notable
- By contrast, the $SO_2$ and NOx emissions profiles of Maryland RPS resources, on average, are equal to or slightly higher than net PJM generation since 2010




**Weighted Average of Carbon Emissions in Maryland and PJM, by Electric Generation Category**

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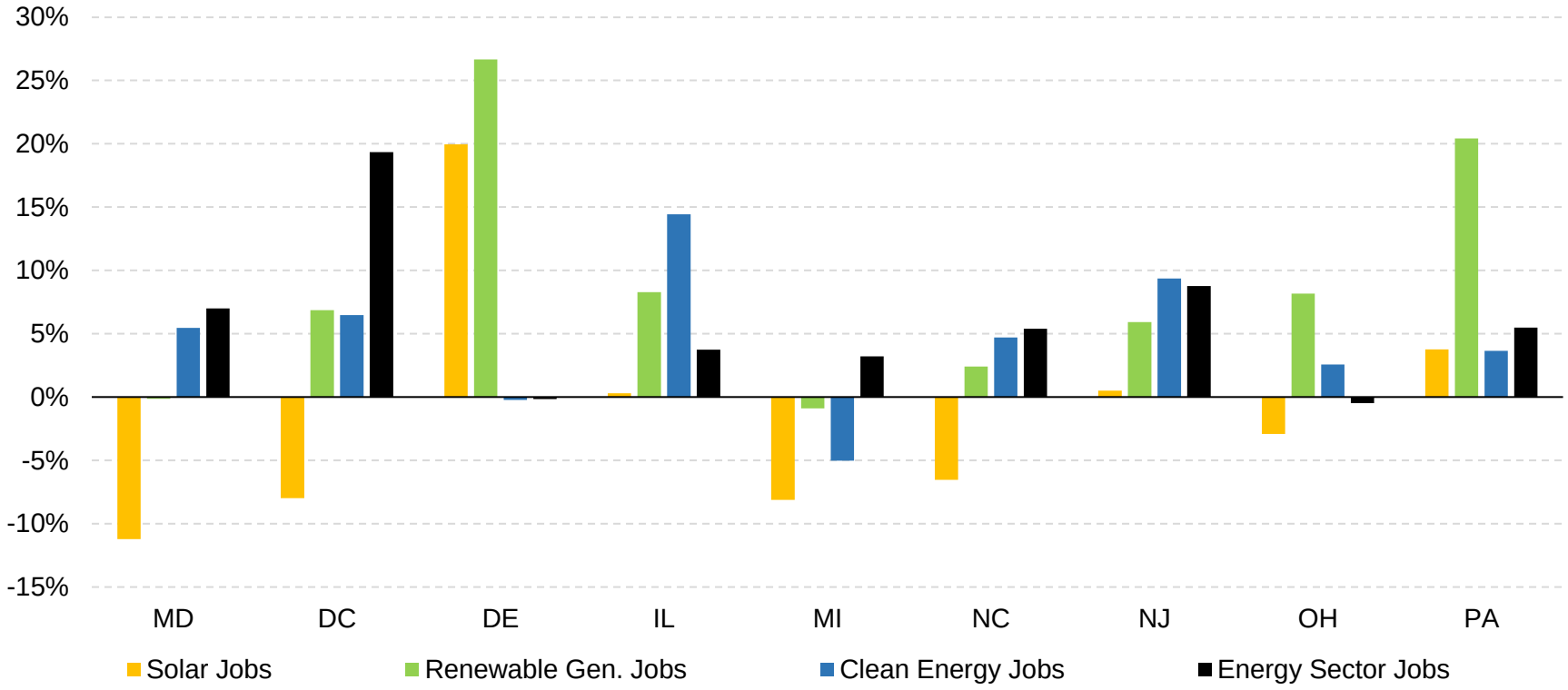
# FINDINGS: JOBS

- The Maryland RPS has resulted in modest in-state economic development, including jobs with higher-than-average salaries




**Change in Energy Sector Job Categories in Select States in PJM, from 2016 to 2018**

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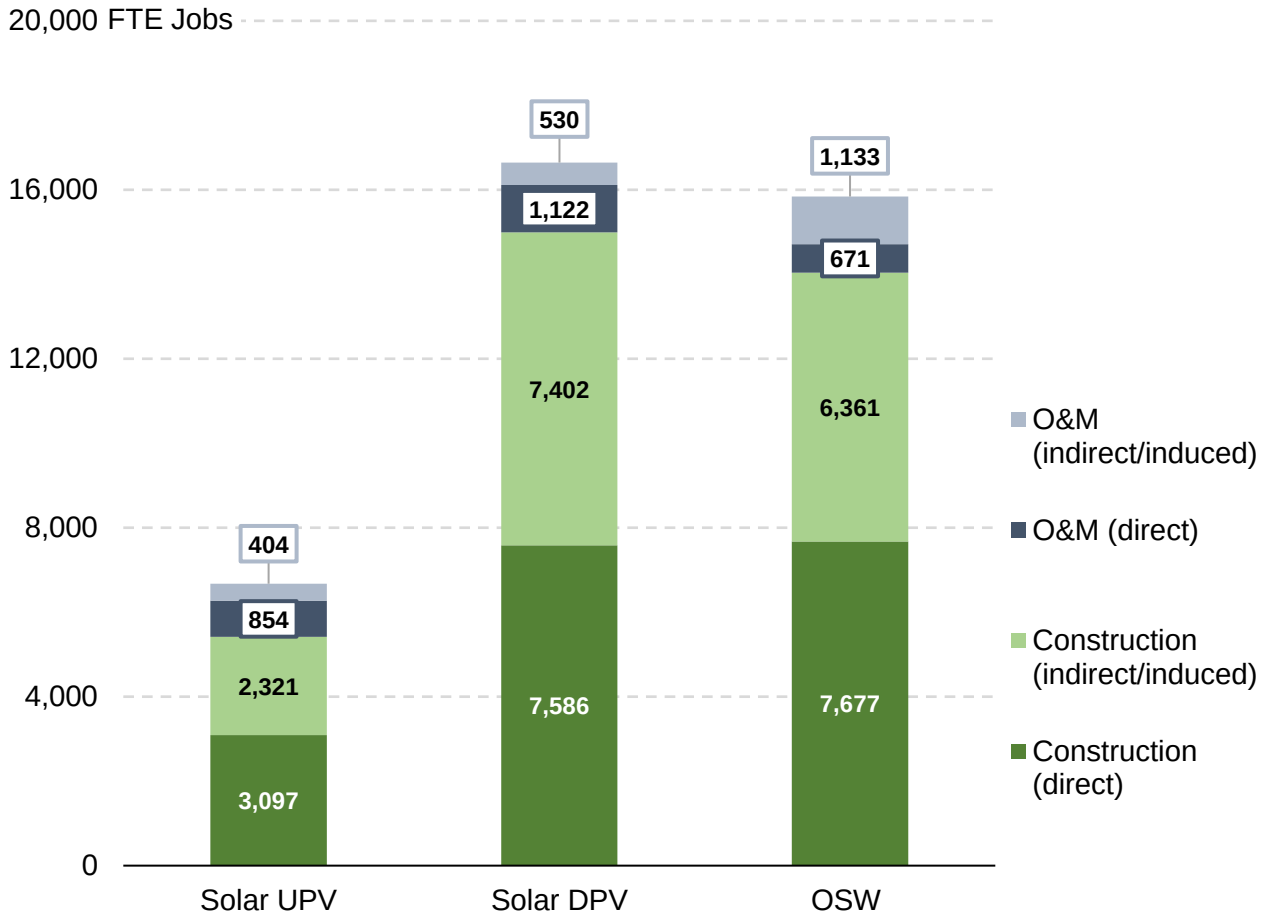
# FINDINGS: JOBS (cont.)




**Cumulative Full-Time Equivalent Job Creation in Maryland, by Technology, 50% RPS**

- The Maryland RPS will generate an estimated 39,300 full-time equivalent (FTE) jobs and $7.6 billion in in-state sales revenue from 2019-2030

**Mid-Atlantic Companies with the Potential to Supply OSW Components**

| Industry | MD | DE | NJ | VA | PA |
|---|---|---|---|---|---|
| Electronics | **1** | 0 | 3 | 2 | 15 |
| Manufacturing & assembly | **17** | 0 | 1 | 6 | 17 |
| Installation, construction, materials | **13** | 2 | 1 | 5 | 28 |
| Maintenance, logistics, transportation | **16** | 0 | 4 | 34 | 6 |
| Services | **6** | 2 | 6 | 34 | 4 |
| **TOTAL** | **53** | **4** | **15** | **81** | **70** |

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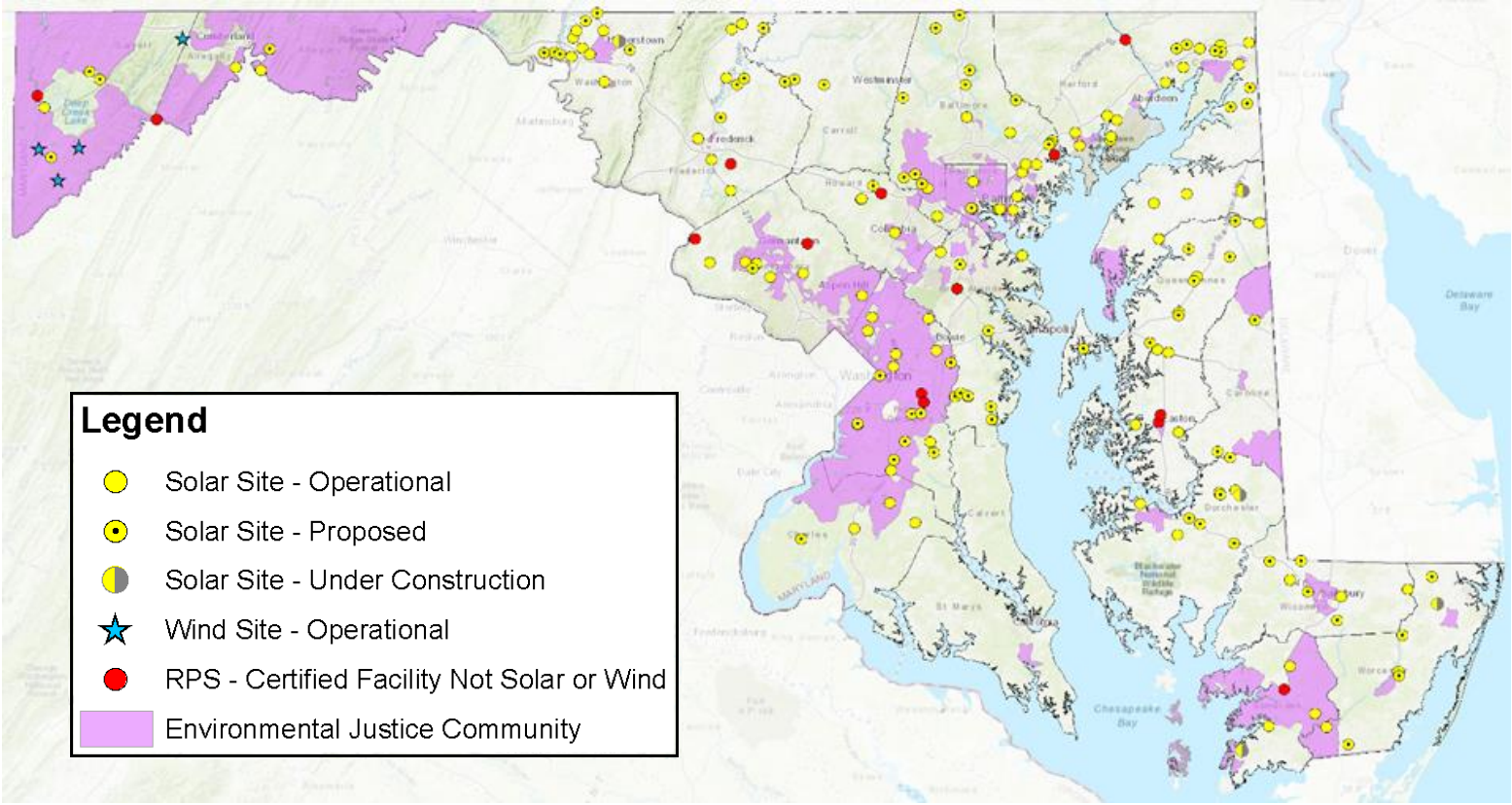
# FINDINGS: ENVIRONMENTAL JUSTICE

- Environmental justice (EJ) communities have received a disproportionately low share of the benefits associated with renewable energy projects in Maryland
  - EJ communities represent 43% of the state's population, but receive 25% of the overall benefits associated with utility-scale renewable energy
  - Distributed solar projects in Maryland are also less likely in EJ communities




**Maryland Environmental Justice Communities and RPS-Certified Projects**

# Parting Thoughts

- Maryland RPS
  - Sparked new wind and solar capacity and will spur offshore wind
  - Modestly increased jobs while lowering $CO_2$ emissions
  - Is unusual in allowing MSW and BLQ
  - Met goals to date, at a reasonably low cost
- The future of the Maryland RPS depends on what goals are most important to policymakers
  - Some goals necessarily involve trade-offs
  - Past goals of RPS may not match desired goals going forward
- Additional resources in the report
  - Primers on non-RPS policies
  - Quantification of technical and economic potential for all types of renewable energy (RE) throughout PJM
  - Detailed discussion of REC markets
  - Review of the impacts of policy changes to the Maryland RPS
  - Evaluation of potential strengths and weaknesses of a variety of potential policy changes that apply to other states as well

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# Expanding Maine's Renewable Portfolio Standard: Creating Economic and Environmental Benefits

Synapse Energy Economics, Inc.

Sustainable Energy Advantage, LLC

## Clean Energy States Alliance webinar

April 15, 2020

Jason Gifford, Senior Director at Sustainable Energy Advantage

Pat Knight, Principal Associate at Synapse Energy Economics

# Who we are

## Sustainable Energy Advantage

- Founded in 1998
- SEA works to help private, public and non-profit organizations develop opportunities for clean, renewable sources of energy in competitive wholesale and retail electricity markets
- Publishes the New England Renewable Energy Market Outlook 3X per year

## Synapse Energy Economics

- Founded in 1996
- Leader for public interest and government clients in providing rigorous analysis of the electric power sector
- Staff of 30+ includes experts in energy and environmental economics and environmental compliance

- In addition to other projects in New England and throughout the United States, SEA and Synapse have partnered 8 times in the past 3 years to estimate the impact of clean energy deployment in New England
- Clients have included state agencies, utilities, developers, and advocates
- Our foundation is rigorous, industry-standard, analysis of the electricity sector and associated systems

# Purpose of analysis: 80 percent by 2030

- SEA and Synapse were hired by a coalition of renewable and environmental advocates in Maine to assess the impacts of increasing Maine's Class 1 renewable portfolio standard (RPS)
- Prior to 2019, Maine had two classes of RPS:
  - Class 1: Required RPS-obligated entities to procure 10 percent of their power from qualifying resources built, repowered, or returning to service on or after 9/1/2005
  - Class 2: Required RPS-obligated entities to procure 30 percent of their power from qualifying resources built before 9/1/2015
  - Together, the RPS required that suppliers procure 40 percent of their electricity from renewables
- Our clients sought to understand the impacts of increasing the Class 1 RPS from 10 percent to 50 percent. This would increase the total quantity of renewables from 40 percent to 80 percent

**We compared two scenarios:**

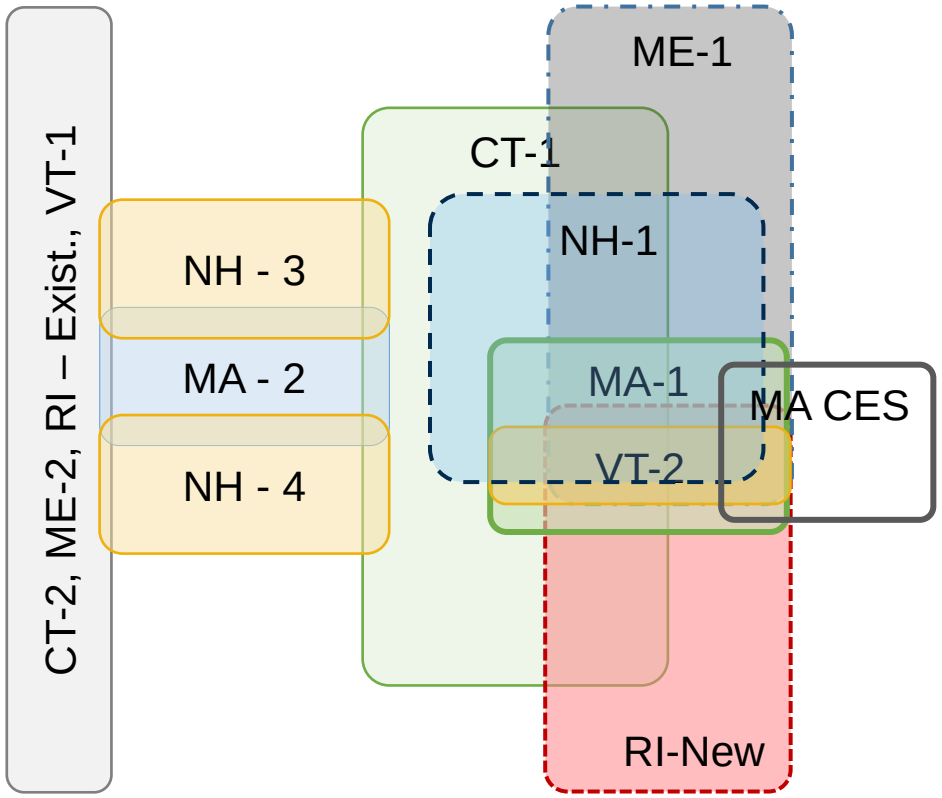
- A "Reference case" where Maine's RPS remains at 10% through 2030
- A "80% by 2030 case" where Maine's Class 1 RPS is increased to 50% by 2030 (Class 2 stays at 30%)

# RPS policies in New England

- New England renewable energy markets are complex
- Each of the six states has its own RPS
- Each state's RPS has multiple classes:
  - Some focus on spurring new renewable capacity
  - Some focus on maintaining existing renewables
- Each state has different RPS eligibility rules
  - Numerous overlaps between classes

***Regional market dynamics are central to understanding state-specific outcomes.***

**New England RPS Eligibility Map**



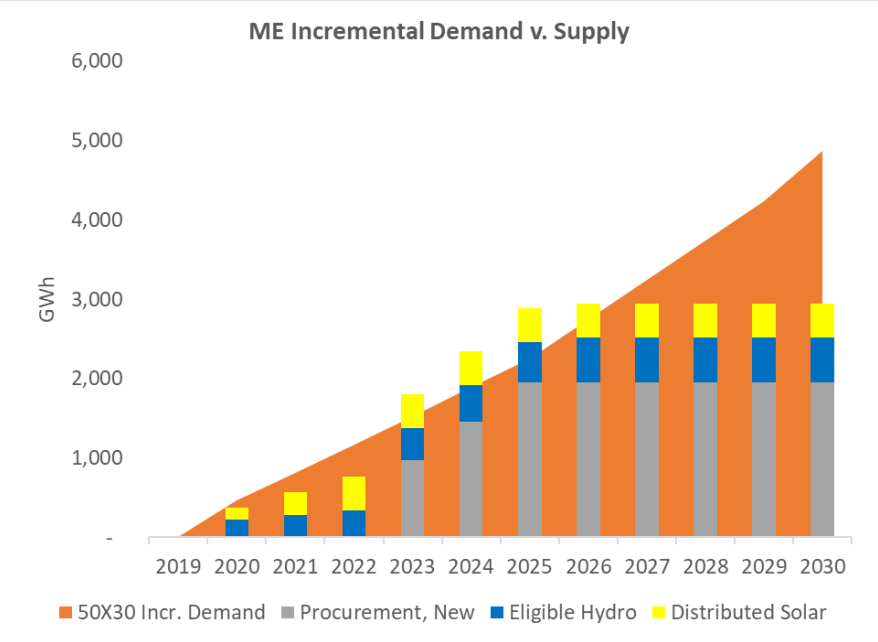
# Study findings: Increased Maine demand met by combination of new supply and expected regional surplus

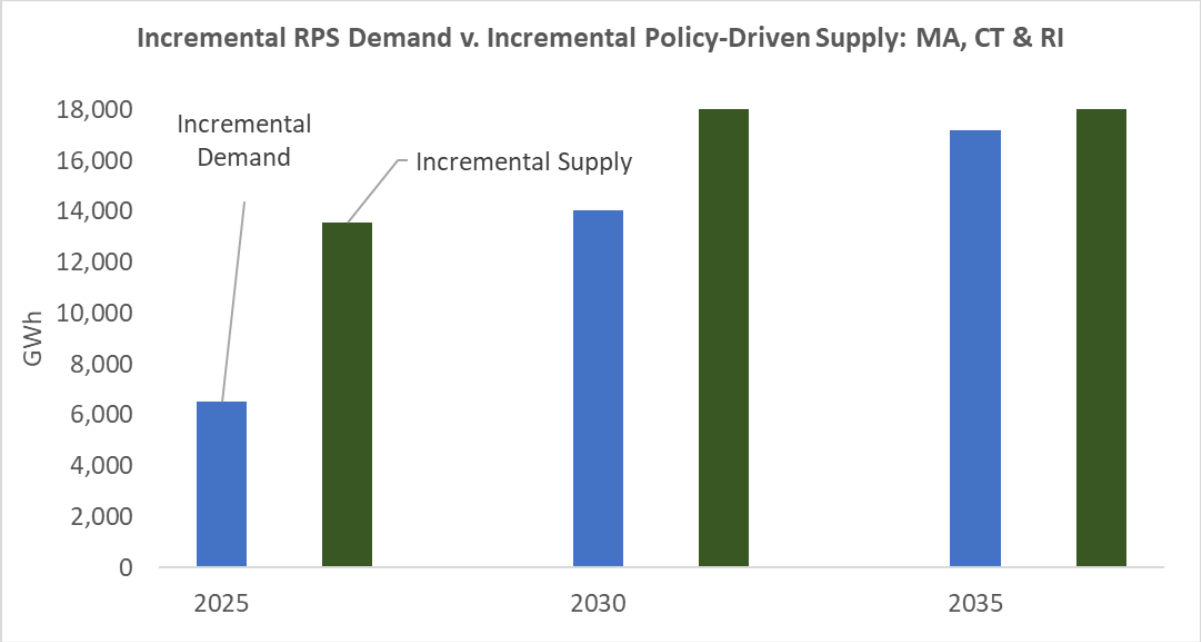

"Other" includes hydro, biomass, biogas, & other miscellaneous resource types

- "Wind, Solar, and Other" denote generation in operation as of 2018
- "New Wind, New Solar, and New Other" represent the expectation of additional renewable energy buildout to satisfy regional RPS obligations
- **The 80% by 2030 case produces an additional 1,200 MW by 2030;** 700 MW are expected to be in Maine
  - 500 MW solar, 200 MW wind
- **Remaining supply to meet 80% by 2030 will come from projected surplus of regional Class 1 supply** (see next slide).
- The State of Maine benefits from in-state renewable impacts resulting from:
  - Maine's own RPS
  - Other state's RPS

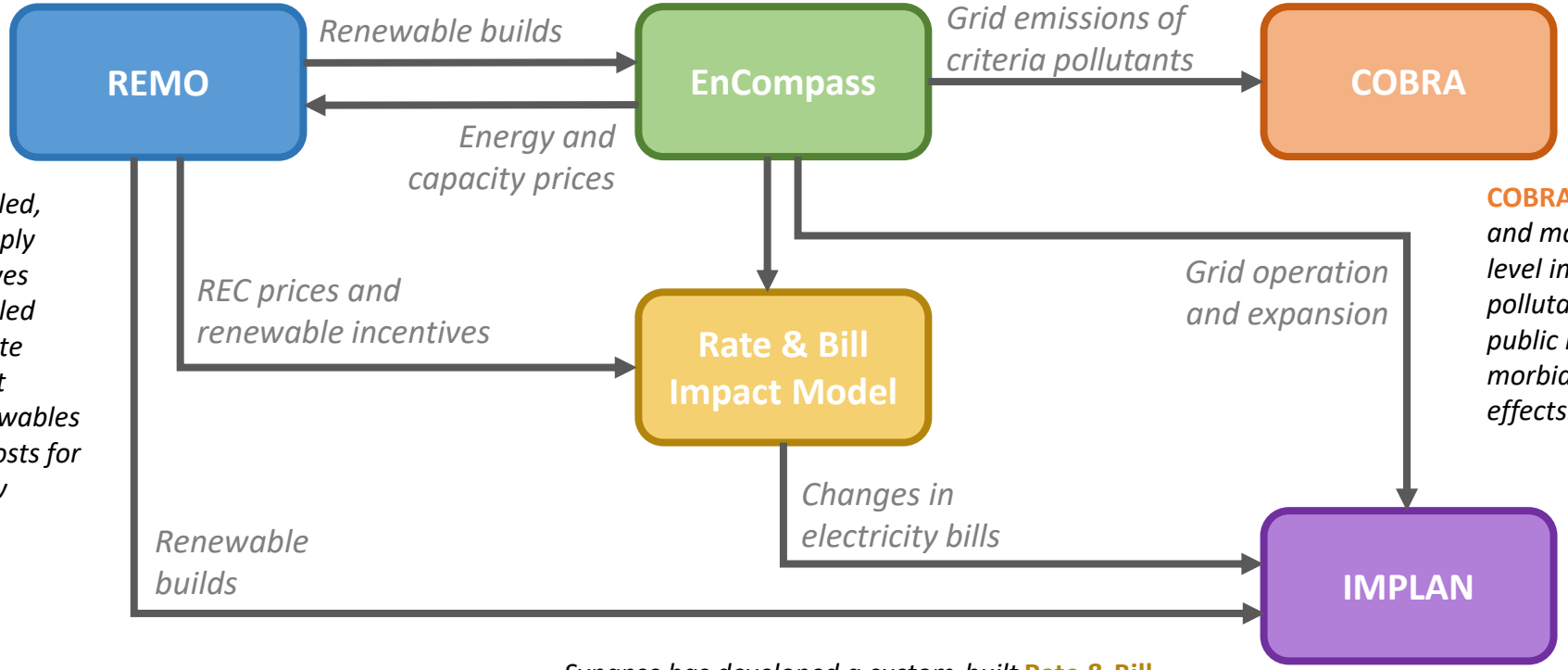
# Study findings: Policy-driven supply creates long-term regional surplus

- These charts compare incremental RPS demand to policy-driven supply in Maine (left) and MA,CT, and RI (right).
  - Maine: Incremental demand for RECs in the 80% by 2030 Case (orange area) is less than incremental policy-driven supply for 2020-2022 and 2027-2030. Remaining demand must be met with current and expected regional supply (see next bullet). Between 2023 and 2026, Maine's proposed policies (long-term contracting & distributed generation) create more incremental supply than incremental demand.
  - MA, CT, and RI: By 2025, incremental policy-driven supply exceeds incremental demand, creating regional surplus that easily fulfills the remainder of Maine's incremental demand after 2026.



# Benefit and impact modeling methodology




**REMO** *uses detailed, state-specific supply and demand curves paired with detailed knowledge of state policies to project buildouts of renewables and associated costs for each state in New England.*

**COBRA** *is a health impacts screening and mapping tool. COBRA uses county-level inputs on changes in criteria pollutants to estimate impacts on public health. Impacts include morbidity and monetized health effects.*

**EnCompass** *is a production-cost and capacity-expansion model of the electric sector. It uses inputs (including demand, resource costs, and regulatory requirements) to estimate hourly impacts on the electricity system, including changes in generation, emissions, and capacity.*

*Synapse has developed a custom-built* **Rate & Bill Impact Model** *to analyze rate and bill for residential, commercial, and industrial customers. This model takes into account changes in wholesale energy and capacity prices, as well as changes to renewable costs prices.*

**IMPLAN** *is an economic input-output model that assesses positive and negative job impacts (measured in jobs per year) associated with spending changes on various sectors, as well as changes to statewide GDP, tax revenue, and labor earnings.*

# Study findings: Jobs, emissions, and health impacts

**Increasing the Class 1 Maine RPS to 50 percent by 2030…**

1. Creates a net increase of 1,900 jobs between 2020 and 2030, equivalent to 170 Maine jobs per year

2. Reduces in-state $CO_2$ emissions by 10% in 2030, relative to a Reference case

   - Reduces regionwide 2030 electric-sector $CO_2$ emissions by 0.5 MMT

   - Were Maine to be credited for 2030 region-wide electric-sector $CO_2$ emissions, Maine's emissions would fall by 55 percent, relative to a Reference case

3. From 2020 to 2030, reduces criteria pollutants by the following amounts, relative to a Reference case:

   - 1.4 million pounds of $NO_X$

   - 1.2 million pounds of $SO_2$

   - This translates into avoided health benefits of $500,000 per year, relative to a Reference case

# Study findings: Market cost impacts and bill impacts

**Increasing the Class 1 Maine RPS to 50 percent by 2030…**

4. Projected net cost to Maine: $21 million per year
   - Increases RPS costs in Maine by $43 million per year, on average between 2020 and 2030
   - Decreases wholesale energy costs (energy and capacity market) by $22 million per year
   - Impacts are smaller in the early to mid 2020s because of current surplus in renewable supply
   - As a point of reference, Maine's 2018 electricity costs (including energy, capacity, and RPS) totaled about $700 million
5. Increases electric bills for Maine residential ratepayers by 1.1 percent, or about $1.16 per month
   - Average from 2020 to 2030, relative to Reference case
   - Takes into account changes to REC prices, capacity prices, and wholesale energy prices, and include the impact of price suppression from renewables
6. Increases electric bills for Maine small commercial and industrial (C&I) ratepayers by 1.1 percent, or about $1.76 per month
   - We did not specifically analyze bill impacts for medium and large C&I ratepayers—these customers frequently have complex or even unique electric rate structures, which may include kW charges or reactive demand charges.

# Contact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# Upcoming Webinars

**State Pollinator-Friendly Solar Initiatives**
Tuesday, May 5, 1-2:30pm ET

**100% Clean Energy States and the 100% Clean Energy Collaborative**
Monday, May 11, 3-4pm ET

**Decarbonizing Electricity: The Critical Role of Firm Low-Carbon Resources**
Friday, May 15, 2-3pm ET

Read more and register at: www.cesa.org/webinars