State RPS Policies: Experiences and Lessons Learned

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Oregon Renewable Energy Working Group
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Presentation Overview

1. Overview of State RPS
2. RPS Impact on Project Development
3. RPS Design Pitfalls, Best Practices
4. Treatment of Specific Design Issues
5. Conclusions
What Is a Renewables Portfolio Standard?

Renewables Portfolio Standard (RPS):
• A requirement on retail electric suppliers…
• to supply a minimum percentage or amount of their retail load…
• with eligible sources of renewable energy.

*Typically* backed with penalties of some form

*Sometimes* accompanied by a tradable renewable energy credit (REC) program, to facilitate compliance

*Never* designed the same in any two states
## Advantages and Disadvantages of the Renewables Portfolio Standard

<table>
<thead>
<tr>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Can ensure known quantity of renewable energy</td>
<td>- Due to complexity, can be difficult to design well</td>
</tr>
<tr>
<td>- Can lower cost of achieving target by giving private market flexibility</td>
<td>- Less flexible in offering targeted support to <em>specific</em> RE sources, or ensuring resource diversity</td>
</tr>
<tr>
<td>- Competitively neutral if applied to all load-serving entities</td>
<td>- Cost impacts not known with precision in advance</td>
</tr>
<tr>
<td>- Relatively low administrative costs and burdens</td>
<td>- Questions over whether RPS policies will necessarily lead to long-term contracts</td>
</tr>
<tr>
<td>- Can be applied in restructured and regulated markets</td>
<td>- Operating experience is limited</td>
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</tbody>
</table>
State RPS Activity Gathering Steam

Recently Adopted RPS: CO, HI, MD, NY, RI (2004); DC, DE, MT (2005)
Recently Revised RPS: CA, NJ, NM, PA (2004); CT, NV, TX (2005); WI, NJ (2006)
Environmental Energy Technologies Division  • Energy Analysis Department

State RPS Policies and Purchase Mandates: 20 States and D.C.

Renewable energy “goals” established in IL, MN, and VT

Nearly 40% of US load covered
State RPS Program Context

- **Load Covered**: Roughly 40% of U.S. load covered by a state RPS or a renewables purchase obligation

- **RPS Development**: Most policies emanated from state legislation, but some from regulatory action (e.g., NY, AZ) and one from a state ballot initiative (CO)

- **Regulated vs. Restructured**: Initially concentrated in restructured states, but now roughly half in monopoly markets

- **Operating Experience**: Experience with policy is growing, but few states have >5 years experience
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RPS Policies Are Relatively New, But RE Capacity Built in RPS States is Growing

Note that RE capacity built in RPS states may not all be “caused” by the RPS, and that RE capacity built in non-RPS states may supply nearby state RPS policies.

Source: Black & Veatch 2006
Looking Ahead, Existing RPS Policies Could be a Major Driver of New Capacity

EIA estimates ~9,000 MW of new RE capacity, assuming that all does not go well.

UCS estimates ~32,000 MW of new renewable energy capacity by 2017, if all goes well.

Source: UCS

EIA estimates ~9,000 MW of new RE capacity, assuming that all does not go well.
The Most Aggressive State RPS Policies Require an Annual Growth of ~1%

Source: UCS
Development in RPS States Predominantly, But Not Entirely, Wind So Far

**Total Renewable Energy Additions in RPS States**
4,450 MW (nameplate); 1,320 MW (average)

Source: Black & Veatch 2006
Nearly Half of All Wind Project Development From 2001-2005 Was RPS-Related

The EIA loosely attributes 1,998 MW out of 3,275 MW (61%) of installed wind in 2004-05 to states with RPS policies.
Recent Examples of the Impact of RPS Policies on Wind Power Development

<table>
<thead>
<tr>
<th>State</th>
<th>Development Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Texas</td>
<td>700 MW installed in 2005</td>
</tr>
<tr>
<td>California</td>
<td>60 MW installed in 2005; new wind under contract: 727-988 MW (IOUs), 530 MW (POUs)</td>
</tr>
<tr>
<td>New York</td>
<td>Four contracts for 317 MW in NY, MD, PA, NJ</td>
</tr>
<tr>
<td>Colorado</td>
<td>775 MW in negotiations; 60 MW under contract</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>200 MW to be built in 2006 (due to We Energies goal)</td>
</tr>
<tr>
<td>Minnesota</td>
<td>145 MW installed in 2005</td>
</tr>
<tr>
<td>New Mexico</td>
<td>140 MW installed in 2005</td>
</tr>
<tr>
<td>New England and PJM</td>
<td>Development activity in New England and PJM in part as result of state RPS policies</td>
</tr>
</tbody>
</table>
Other Technologies Will Also Be Supported Over Time

EIA estimates that 93% of RPS-driven RE capacity will be wind on a going-forward basis. RPS cost studies predict – in aggregate – that ~60% of RE deliveries are likely to be wind, while Global Energy (a consulting firm) predicts ~75%.

Some RPS policies yielding diversity of resources, even without technology bands: California, Nevada, New England

California’s RPS procurements are governed by “Least Cost, Best Fit” criteria

...and...

Wind may not always provide the “Best Fit” (even if “Least Cost”)
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The Most Important (and obvious) Lesson Learned to Date

An RPS Can Be A...

Cost effective, elegant, flexible policy to meet RE targets

Costly, poorly designed, ineffective way to meet RE targets

The legislative and regulatory design details matter!!!
RPS Design Varies Substantially From One State to the Next

<table>
<thead>
<tr>
<th>Structure, Size and Application</th>
<th>Administration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basis (energy vs. capacity obligation)</td>
<td>Regulatory oversight body(ies)</td>
</tr>
<tr>
<td><strong>Structure (e.g., single tier or multiple tiers)</strong></td>
<td>Compliance verification (TRCs or contract-path)</td>
</tr>
<tr>
<td>Percentage purchase obligation targets</td>
<td>Certification of eligible generators</td>
</tr>
<tr>
<td>Start date</td>
<td>Compliance filing requirements</td>
</tr>
<tr>
<td>Duration of purchase obligation</td>
<td>Enforcement mechanisms</td>
</tr>
<tr>
<td>Resource diversity requirements or incentives</td>
<td>Cost caps</td>
</tr>
<tr>
<td><strong>Application to LSEs - Who must meet targets?</strong></td>
<td>Flexibility mechanisms (banking, borrowing, etc.)</td>
</tr>
<tr>
<td>Product- or company-based application</td>
<td>Implementing future changes to the RPS</td>
</tr>
<tr>
<td><strong>Eligibility</strong></td>
<td><strong>Contracting standards for regulated LSEs</strong></td>
</tr>
<tr>
<td>Geographic eligibility</td>
<td>Cost recovery for regulated LSEs</td>
</tr>
<tr>
<td>Resource type eligibility</td>
<td>Interactions with other renewable energy and environmental policies</td>
</tr>
<tr>
<td>Eligibility of existing renewable generation</td>
<td></td>
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<tr>
<td>Definition of new/incremental generation</td>
<td></td>
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<tr>
<td>Treatment of multi-fuel facilities</td>
<td></td>
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<tr>
<td>Treatment of off-grid and customer-sited facilities</td>
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</table>
Variations Driven By Different Goals, Market Circumstances, Political Influences

• There is no single optimal design, but the unfortunate result of present design variations are uneven historical and expected market impacts of state RPS policies

• Some RPS policies seemingly working well…
  – Texas, Minnesota, New Mexico, others

• Other policies are under-performing so far…
  – Chronic under-compliance in Arizona, Nevada, Massachusetts, and California so far
  – Other policies have largely supported or will support existing (not new) renewable generation (ME, MD, etc.)

• Many others are just getting underway

• Experiences suggest lessons learned and pitfalls
Common Design Pitfalls

**Overly Broad Definitions of Eligible Resources**

- Existing biomass in Maine, Connecticut

**Lenient Geographic Boundaries**

- Can enlarge the market for RECs, but may also moderate need for new renewables and reduce local benefits (e.g., PA, MD, NJ, DE, DC, NY)

**Overly Stringent Requirements**

- Requirements that ramp up so fast as to not be achievable may not be politically sustainable (MA, NV, CA)

**Force Majeure Clauses and Cost Caps**

- Compliance flexibility should be encouraged, but new RPS policies increasingly including a lot of “wiggle room” to possibly allow escape from full compliance, or establishing low cost caps (e.g., MT, HI, MN, PA, NV)

**Inadequate Enforcement**

- Enforcement motivates action; where full compliance is apparently not being achieved (NV, CA, AZ)...will penalties be used to enforce compliance?
Common Design Pitfalls (cont.)

Narrow Applicability
- RPS applied unequally will limit impact of policy, create “unfair” competition (CT and PA original RPS policies)

Lack of Long-Term Contracts
- Major problem in Northeast, where retail competition exists and where renewable energy sources are more expensive

Policy Instability
- Uncertainty in RPS duration, target, or eligible technologies can impede development (e.g., CT, MA, AZ etc.)

Transmission Bottlenecks
- TX, MN and CA trying to be more proactive with transmission planning and construction, but transmission remains a key barrier in many states

Design Complexity
- Is the complexity inherent in the California RPS worth it?
What Makes a Strong RPS?  
Policy Design Requirements

- Broad applicability (*limited exemptions ok*)
- Carefully balanced supply-demand (*ensures new supply, but not overly aggressive*)
- Sufficient duration and stability of targets (*provides market confidence*)
- Well-defined/stable resource eligibility rules (*ambiguity erodes confidence*)
- Well-defined/stable out-of-state resource eligibility (*ambiguity erodes confidence*)
- Credible & effective enforcement (*to ensure compliance*)
- Flexible verification (*simplifies oversight, contracting; may lower compliance costs*)
- Adequate compliance flexibility (*to ensure that targets can be achieved at low cost*)
- Contracting standards/cost recovery for regulated utilities and providers of last resort (*to ensure reasonable compliance effort, and long-term contracts*)
- Product-based (not company-based) compliance (*supports voluntary sales*)
What Makes a Strong RPS?
Market Context Requirements

- Creditworthy long-term power purchasers (*to ensure new supply*)
- Stable political and regulatory support (*ambiguity erodes confidence, makes financing difficult*)
- Adequate and accessible developable RE resource (*to ensure that full compliance is possible*)
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Specific Design Issues

- RPS Structure and Vintage Eligibility
- Applicability to Load Serving Entities
- Geographic Eligibility/Deliverability
- Support for More Expensive RE Applications
- Contracting Requirements
State RPS Structure and Vintage Eligibility

**STRUCTURE**

- **One Tier with Only New Eligible**
  - Arizona (proposed)
  - Iowa
  - Massachusetts
  - Montana
  - Earlier Xcel (MN)

- **One Tier with New and Existing Eligible**
  - California (partial)
  - Colorado
  - Hawaii
  - Maine
  - Minnesota
  - New Mexico
  - New York (partial)
  - Nevada
  - Pennsylvania (for RE)
  - Texas (partial)
  - Wisconsin

- **Two Tiered by Vintage**
  - Delaware (partial)
  - Rhode Island

- **Two Tiered by Technology**
  - Connecticut
  - Maryland
  - New Jersey
  - Texas (partial)
  - Washington, DC

- **Technology Bands/ Set Asides**
  - Arizona
  - Colorado
  - Minnesota
  - Montana
  - Nevada
  - New Jersey
  - New York
  - Pennsylvania
  - Washington, D.C.
Tradeoffs in RPS Structure

• Focusing just on new/incremental provides greatest assurance of new renewables development, and mitigates against “overpaying” for existing resources, but…
  – Fails to support the continued operation of existing plans
  – Requires a clear definition of new/incremental (e.g., retrofits/repowering; project location or fuel changes)

• Single new/existing requirement supports continued operation of existing plants, and rewards early renewable energy procurement, but...
  – May erode impact of policy on new resource development (e.g., state may soak up existing renewable assets from neighboring states)
  – May result in overpayment of existing projects

• Two tiered by vintage helps to solve “overpayment” problem, but still requires a clear definition of new/incremental and may do little to support the continued operations of existing plans in a broader regional market

• Two tiered by technology typically does little to support the lower tiers given potential to supply those tiers from out-of-state existing facilities
Applicability to Load Serving Entities

RPS typically applies to IOUs and to competitive ESPs. Treatment of publicly owned utilities (POUs) varies.

**Applicability to POUs**

- **Intermediate Treatment**
  - Arizona
  - California
  - Colorado
  - Delaware
  - Maryland
  - Minnesota
  - Montana
  - Texas
  - Washington (proposal)

- **Fully Obligated**
  - Hawaii
  - Wisconsin

- **Fully Exempt**
  - Connecticut
  - Iowa
  - Massachusetts
  - Maine
  - New Jersey
  - New Mexico
  - Nevada
  - New York
  - Pennsylvania
  - Rhode Island
Options for Intermediate Treatment

- Generally subject to RPS, with exemptions based on...
  - formal filing (DE, AZ)
  - utility size (CO, WA proposal)
  - customer vote (CO)
  - pre-existing contracts (MD)
  - renewable energy fund (DE)
  - good faith efforts (MN upstream POUs)

- Subject to “substantially similar” RPS
  - CA, MT, CO option

- Green pricing requirements
  - NM, DE, CO

- Only subject to RPS if allow retail competition
  - TX
Other Exemptions

- **Some Large Industrial Loads**: Maryland, Delaware, Maine
- **Self Generation**: All RPS policies
- **Poor Utility Credit**: California
- **Small Utilities**: Colorado, Washington (proposed)
- **Customer Vote**: Colorado
- **Fully Contracted**: New Mexico, New Jersey, WA (proposed)
- **During Rate Freeze**: Pennsylvania, Maryland
- **Good Faith Efforts Sufficient**: Minnesota (not Xcel)
- **Force Majeure**: Many states, with varying definitions
Exemption Best Practices

• Limit exemptions to cases where benefits clearly outweigh the cost
  – benefits = lower regulatory complexity, greater political viability
  – costs = loss of “fairness” and more limited policy impact

• Above conditions likely hold for self-generation and small publicly-owned utilities, at a minimum

• Make exemptions clear and unambiguous, and not subject to ongoing revision/filings, if possible
  – force majeure exemptions should be avoided/limited if possible, as discretion creates complexity and uncertainty
Different Approaches Are Used for Geographic Eligibility/Deliverability

- **In-state requirement:** IA, MN (original Xcel mandate), HI
- **In-state delivery requirements of varying stringency:**
  - In-state transmission interconnection requirement: NV, TX
  - In-state delivery requirements: AZ, CA, WI, MN, NM, NY
    - Delivery can be required on a real time, monthly, or yearly basis
- **Broader regional delivery requirements of various types:**
  - Unbundled REC trade within larger region with delivery to region: CA (multi-jurisdictional utilities), CT (after 2010), CO(?), DE, MA, ME, NJ, PA, RI (WA proposal a special case because delivery required to state)
  - Unbundled REC trade within larger region with delivery to that region, and possibility of REC trade from nearby states without delivery if certain conditions are met: CT, DC, MD
- **In-state encouragement:** CO (multiplier), DE (multiplier), AZ (in-state solar multiplier before 2005); NM (in-state preference)
- **DG must often – not always – be located in-state (exceptions: CT, PA)**
Assessing the Tradeoffs in Determining Geographic Eligibility

- Potential cost reduction from expanded geographic scope
  - The wider the net, the lower the costs
- Supply-demand balance that drives new investment
  - Risk of absorbing existing/non-additional RE as geography expands
- Relationship between benefits and location/delivery of RE
  - Economic development: in-state
  - Fuel diversity: delivered to state
  - Environmental
    - Local: delivered to state
    - Regional: delivered to region
    - Global climate change: anywhere where fossil is displaced
- Interstate commerce clause
  - In-state requirements very problematic
  - In-state multipliers worrisome
  - Stringent in-state delivery, and anything more lenient, should be ok
Emerging Technologies, Market Development, and the RPS

- RPS can be effective in supporting the least-cost renewable energy projects
- Standard RPS will not provide adequate support for emerging technologies, smaller projects, or broader market development activities (e.g., solar, community wind, small-scale biomass, etc.)
  - Cost barriers
  - Solicitation barriers
- Options to provide that support include:
  - RPS set-asides
  - RPS credit multipliers
  - SBC programs
## Diversity Incentives: Set Asides in 10 States, Credit Multipliers in 7 States

### Set Asides

<table>
<thead>
<tr>
<th>State</th>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>TX</td>
<td>500 MW target for sources other than wind energy</td>
</tr>
<tr>
<td>AZ</td>
<td>Proposed rule: 4.5% from DG renewables by 2025, with $\frac{1}{2}$ from residential applications</td>
</tr>
<tr>
<td>NV</td>
<td>1% from solar by 2015</td>
</tr>
<tr>
<td>CO</td>
<td>0.4% from solar by 2015, with $\frac{1}{2}$ from customer-sited solar</td>
</tr>
<tr>
<td>NJ</td>
<td>2.12% from solar by 2021</td>
</tr>
<tr>
<td>PA</td>
<td>0.5% from solar by 2020</td>
</tr>
<tr>
<td>MT</td>
<td>75 MW from community renewable projects by 2015</td>
</tr>
<tr>
<td>NY</td>
<td>0.152% from customer-sited PV, fuel cells and wind by 2013</td>
</tr>
<tr>
<td>DC</td>
<td>0.386% from solar by 2022</td>
</tr>
<tr>
<td>MN</td>
<td>0.5% from biomass by 2010; wind and community wind requirements for Xcel</td>
</tr>
</tbody>
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### Credit Multipliers

<table>
<thead>
<tr>
<th>State</th>
<th>Multiplier Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AZ</td>
<td>1.5 for in-state solar generation installed pre-2005; 1.3 for renewables installed in 2001, 1.2 for 2002, 1.1 for 2003; in-state manufacturing and DG multipliers; proposed rule would eliminate multipliers for projects installed after 2005</td>
</tr>
<tr>
<td>DE</td>
<td>3 for solar or fuel cells before 2014; 1.5 for wind sited in DE before end of 2012</td>
</tr>
<tr>
<td>CO</td>
<td>1.25 for in-state renewable resources</td>
</tr>
<tr>
<td>NV</td>
<td>1.15 for distributed renewable generation; 2.4 for PV (2.55 for DG PV); 0.7 for customer-sited reverse polymerization waste tire facilities</td>
</tr>
<tr>
<td>NM</td>
<td>2 for biomass, geothermal, LFG, or fuel cell; 3 for solar</td>
</tr>
<tr>
<td>DC</td>
<td>1.2 for wind and solar through 2006 and 1.1 from 2007 to 2009; 1.1 for methane gas through 2009</td>
</tr>
<tr>
<td>MD</td>
<td>1.2 for wind through 2005 and 1.1 for wind from 2006 to 2008; 1.1 for landfill methane through 2008; 2.0 for solar</td>
</tr>
</tbody>
</table>
Set Asides and Credit Multipliers: Lessons Learned

Credit multipliers not yet set at level to matter in most cases

Solar and DG set-asides are beginning to function, but…

– Overall effectiveness not entirely clear because experience is still limited
– Success to date typically a result of large up-front rebates
– Cost of set-asides can be significant
– Complexity of policy increases
– May not always encourage a diversity of technologies and projects, and may not adequately support market development activities
– Opening the door to set-asides can create a political morass of each technology wanting its share

• Develop accounting/metering rules to allow DG to earn RPS RECs
• Carefully consider merits and drawbacks of RPS set-asides
• Use existing SBC funds along with PURPA implementation to support smaller projects, and the “next” technologies and market applications
Many states have RE (public benefits) funds (system-benefits charge, or SBC) and RPS requirements

Possible linkages between funds and RPS:

• Directly fund above-market cost of RPS (AZ, CA, NY)
• Support financing of RPS-eligible projects (MA)
• Fund projects that could otherwise compete well under RPS
• Fund projects/activities that RPS will not adequately support
Use of Renewable Energy Funds to Support RPS Compliance

• There are significant disadvantages to directly funding the above-market costs of the RPS through a renewable energy fund
  – Adds complexity and delay due to the definition of “above-market” cost and the need for careful oversight of project selection (see, e.g., CA)
  – Requires coordination between funding entity and RPS-obligated entities
  – Collection of needed funds may not be politically viable/durable

• Supporting the financing of least-cost RPS-eligible projects only needed if long-term contracts are not available (e.g., MA)

• Funding projects that could otherwise compete under RPS will skew competitive landscape, will not yield least-cost compliance, and may result in windfall gains to certain generators

• Funding projects/activities that the RPS will not adequately support is the best practice (WI, MN, NJ, etc.)!
  – Question: who keeps the RECs in these instances?
  – Answer: usually, but not always, the project owner
Renewable Energy Contracting Requirements

**Typically used if:**

1) There are concerns about the willingness of suppliers to enter into long-term contracts with renewable projects, and therefore seek least-cost compliance.

2) There are concerns about the transparency or reasonableness of the planning and procurement processes used by suppliers to comply with the RPS.

3) There is a need for regulatory oversight given the recovery of RPS compliance costs in retail rates.
Two General Types of RPS Compliance Markets, and Contracting Practices

**Regulated Markets**
- Dominated by long-term bundled contracts for electricity and RECs
- Utility RFP solicitations or bilateral negotiations, with PUC oversight

**Restructured Markets**
- More often dominated by short-term trade in RECs to multiple parties, without PUC oversight
- Developers often sell electricity and RECs separately

**NYSERDA’s** central procurement approach intended to some degree to replicate regulated market outcomes in a restructured context
Political / Regulatory Risk of Relying on Short-Term RECs

- **August 2, 2005:** Connecticut DPUC finds that existing Maine biomass plants, and new gas pipeline expansion (pressure reduction) turbines, qualify as Class I renewable resources.

- **August/September 2005:** Connecticut Class I REC prices plummet by $30/MWh on prospect of abundant, cheap supply.

REC price uncertainty, and lack of long-term contracts, can make financing more difficult, is slowing renewable energy development in the Northeast, and is increasing the cost of the RPS in some states.

Source: www.evomarkets.com
## Long-Term Contracting Requirements

### RPS Design Is Beginning to Respond to the Long-Term Contracting Challenge

<table>
<thead>
<tr>
<th>Contract Requirements</th>
<th>CA (10+ yrs); MT (10+ yrs); NV (10+ yrs); CO (20+ yrs); CT (100 MW); RI (portfolio)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Procurement</td>
<td>NY adopted “central procurement” model in which NYSERDA purchases RECs</td>
</tr>
<tr>
<td>Credit Protection</td>
<td>NV has created the “TRED” program to protect payments to RE generators from utility credit concerns; CA can exempt utilities from meeting RPS until they become creditworthy</td>
</tr>
<tr>
<td>RE Fund Support</td>
<td>MA RE fund created “green power partnership” that offers 10-year REC price insurance</td>
</tr>
</tbody>
</table>
Other Contracting Process Requirements

• **Public Procurement Plans**
  – To ensure adequate planning for RPS compliance

• **Transparent Bid Evaluation Criteria**
  – So that bidders know what is being looked for

• **Standardized Contract Terms**
  – PPAs may otherwise impose contractual requirements that some view as unduly severe, or cause negotiation delays

• **Procurement Review Group and/or Independent Evaluator**
  – To facilitate public and regulatory review of procurement activities

• **Contract Pre-Approval by PUC**
  – To provide assurance of cost recovery

• **Addressing Contract Failure**
  – Emerging concern that utilities are selecting low-priced contracts that may fail to yield operating projects; regulators can require over-contracting, or otherwise clarify application of penalties in event of contract failure
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Conclusions

• State RPS policies are currently a principal form of support for renewable energy projects, and are becoming increasingly popular.

• An RPS can effectively deliver renewable power at a low cost, and such policies are meeting expectations in some states.

• RPS is opening markets and improving the profitability of renewable projects, but not without corresponding risks.

• Designing an effective RPS requires careful attention – the devil is in the details!!!