Challenges of Meeting the 33% by 2020 RPS Goal

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California Public Utilities Commission

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California’s RPS Policy

• The RPS Program requires all retail energy sellers to procure 20% renewable energy by 2010
  • Original legislation (SB 1078, 2002) was 20% by 2017. Accelerated target to 2010, effective January, 2007 (SB 107, 2006).
  • All RPS-obligated retail sellers must procure an incremental 1% of retail sales per year until 2010
  • 20% obligation continues post-2010

• RPS procurement compliance is measured in terms of electricity deliveries, not signed contracts

• California has set itself a further goal of 33% renewable energy by 2020
20% by 2010 Current Status

- CPUC has approved 101 contracts for more than 6,100 MW of new and existing RPS capacity
  - Of these, 65 are contracts with new projects, totaling 4,660 MW
  - Were all this capacity to come online by 2010, we would more than achieve our RPS target.
- Response to RPS solicitations has been robust and increasing, one indication that the market is maturing
- Procurement process appears to be working
RPS progress has been slow

- Only 14 contracts for ~400 MW have come online; need about 3,000 more new MW in next 2 years for IOUs to meet 20% in 2010
- RPS generation has not kept pace with overall load growth
- If we successfully remove development barriers, may hit 20% by 2013, overlapping with AB 32 compliance period and giving LSEs only 7 years to achieve the 60% increase in RPS generation needed to reach 33%

<table>
<thead>
<tr>
<th></th>
<th>2003</th>
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<th>2005</th>
<th>2006</th>
<th>2007</th>
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</thead>
<tbody>
<tr>
<td>PG&amp;E</td>
<td>RPS Eligible GWh</td>
<td>8,828</td>
<td>8,575</td>
<td>8,543</td>
<td>9,114</td>
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<tr>
<td></td>
<td>RPS GWh as % of bundled sales</td>
<td>12.4%</td>
<td>11.6%</td>
<td>11.7%</td>
<td>11.9%</td>
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<tr>
<td>SCE</td>
<td>RPS Eligible GWh</td>
<td>12,613</td>
<td>13,248</td>
<td>12,930</td>
<td>12,706</td>
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<tr>
<td></td>
<td>RPS GWh as % of bundled sales</td>
<td>17.9%</td>
<td>18.2%</td>
<td>17.2%</td>
<td>16.1%</td>
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<tr>
<td>SDG&amp;E</td>
<td>RPS Eligible GWh</td>
<td>550</td>
<td>678</td>
<td>825</td>
<td>900</td>
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<tr>
<td></td>
<td>RPS GWh as % of bundled sales</td>
<td>3.7%</td>
<td>4.3%</td>
<td>5.2%</td>
<td>5.3%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>RPS Eligible GWh</td>
<td>21,991</td>
<td>22,500</td>
<td>22,298</td>
<td>22,719</td>
</tr>
<tr>
<td></td>
<td>RPS GWh as % of bundled sales</td>
<td>14.0%</td>
<td>13.9%</td>
<td>13.6%</td>
<td>13.2%</td>
</tr>
</tbody>
</table>

Numbers in red represent year-on-year decreases in GWh or % terms.
IOU Expected RPS Generation and Risk

Target: 20% of Expected IOU Retail Sales
Note: California has little control over this barrier.
CPUC working to create multi-agency solutions to known 20% RPS barriers

• Transmission
  – Streamlined permitting process
  – Initiated Renewable Energy Transmission Initiative (RETI)
  – Working closely with California ISO on queue reform

• Site control
  – Beginning to work with BLM, other relevant agencies

• Permitting
  – California Energy Commission (thermal facilities)
  – County agencies (wind, thermal <50 MW)

Key Question: Will the state address project development barriers on the scale and timeline needed for a 33% RPS?
Magnitude of a 33% RPS for all California LSEs must be acknowledged

Preliminary 20% in 2020 scenario with mainly in-state resources:

- **Energy**
  - 29,000 GWh of new renewables, in addition to existing 31,000 GWh
- **Transmission**
  - 2 New Major Transmission Lines (6,700 MW) at cost of $3.5 Billion

Preliminary 33% in 2020 scenario with mainly in-state resources:

- **Energy**
  - 70,000 GWh of new renewables, in addition to existing 31,000 GWh
- **Transmission**
  - 7 New Major Transmission Lines (15,900 MW) at cost of $6.4 Billion

Source: Energy and Environmental Economics, Inc.
Achieving 33% RPS will require careful transmission and resource planning

• Current challenges for 20% are significant:
  – Transmission
  – Site control
  – Permitting
  – Developer inexperience, etc.

• New issues anticipated for 33%:
  – Transmission grid reliability and integration
  – Increasing renewable generation costs
  – Paradigm shift in procurement and transmission planning
Transmission grid reliability and integration

- Flexible fossil, dispatchable demand response and/or storage will be needed to provide ramp and regulation for intermittent resources, including solar.

- California ISO has not yet studied the operating needs – and thus the costs – of integrating 33% renewable energy, but has stated the costs cannot be assumed to be linear.

- State needs to consider the feasibility of such a build-out, given once-through cooling restrictions, local air permitting requirements and other restrictions.

Key Question: How will we ensure that we can maintain system reliability and accommodate a 33% RPS level?
Increasing Renewable Generation Costs: RPS bid prices have increased 2002-2008

- Construction costs increasing for both renewable and conventional generation
- Resource mix is shifting
  - Little geothermal and biomass in response to recent RFOs
  - Increase in share of solar thermal and PV – relatively high installation costs and significant permitting challenges
- Many prime resource sites have already been developed
- Concern that constrained supply and policy-driven demand drive up costs

Key Question: Would a mandate to meet 33% by 2020 accelerate the increasing costs of large scale renewable procurement?
Costs of Increasing Renewables

**Note:** Any discussion of cost is very speculative given uncertainty regarding generation, transmission and integration costs

- **Key assumptions:**
  - Existing technology, existing cost levels (*conservative given recent cost increases in renewable solicitations*)

- **Key drivers:**
  - Natural gas prices, level of energy efficiency, development of new renewable technology

### Total Investment Costs - Millions of Dollars ($2008)

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<tr>
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<th>Existing to 20% RPS</th>
<th>Existing to 33% RPS</th>
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<tbody>
<tr>
<td>Renewable Generation Cost $M</td>
<td>$21,126</td>
<td>$54,517</td>
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<tr>
<td>Transmission Cost $M</td>
<td>$3,550</td>
<td>$6,372</td>
</tr>
<tr>
<td>Total Investment Costs $M</td>
<td>$24,676</td>
<td>$60,889</td>
</tr>
</tbody>
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Source: Energy and Environmental Economics, Inc.
33% will require procurement of more expensive renewables

Source: Energy and Environmental Economics, Inc.
Paradigm shift needed in procurement and transmission planning

- With 33% RPS, energy from non-renewable generation reduced 11% by 2020
- Renewable procurement drives fossil procurement

Key Question: Will we be able to adapt system planning and operations for a no new fossil paradigm shift?
Given associated challenges and costs, the overall goal of a 33% RPS must be clear

• Is the goal to promote broad environmental and economic development benefits of renewables, to “move the renewables market”, or to reduce greenhouse gases?

• If main driver is reduction of greenhouse gases, then:
  – State must consider the GHG impact of the generation and transmission development needed for 33%
  – Renewables should be compared to other GHG reduction measures – DR, EE, fossil repowers (or fuel switching)
  – State should choose the least cost, best fit resources, indifferent to whether they are in or out-of-state
  – An *integrated approach to planning* is most appropriate
Conclusions

• We need real progress – a 33% RPS will achieve little if the state does not effectively address the barriers already facing the 20% RPS

• The magnitude of the 33% RPS implies costs, GHG emissions and new operating and planning challenges that we do not yet understand

• A pragmatic, multi-agency assessment of implementation specifics is needed before the state sets a mark and a timeline for moving beyond 20% renewables
More Information

CPUC RPS Website:

Questions:
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