Cashing in on Clean Energy:
A National Renewable Electricity Standard will Benefit the Environment and the Economy

Renewable Energy & Economic Development Session

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Union of Concerned Scientists
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Renewable electricity standards: a primary driver of new renewables

- The #1 driver of renewable energy development. **Goldman Sachs**
- “... the most important driver for new renewables in the U.S. and Canada over the next 10 years.” **Navigant Consulting**
- “the most powerful tool that a state can use to promote wind energy.” **Natl Renewable Energy Lab**
Renewable electricity standards

25 States + D.C.

- PA: 8% by 2020
- 25 States + D.C.

- Standard
- Goal
- Voluntary Goal

- 14 states have requirements of 20% or higher
Renewable Energy Required by State Standards*

New renewable energy supported:
- 55,700 MW by 2020
- Additional 16,500 MW possible from voluntary goals

*Projected development assuming states achieve annual renewable energy targets.
Renewable Energy Generation*

- **Historic**
- **EIA - State RPS Side Case**
- + existing state RPS (UCS)
- + 1/2 of new state RPS potential (UCS)
- 20 percent by 2020 National RES

*In addition to hydro and MSW.

**Assumes non-compliance with some state programs, does not include new or higher standards adopted since September 2006.

Sources: EIA (AEO 2007); UCS.
UCS National RES Analysis

- Used EIA’s National Energy Modeling System
- Analyzed impacts of a 20% by 2020 national RPS proposed in House using EIA assumptions and UCS assumptions

For UCS Case:
- Used Black & Veatch cost and performance assumptions for wind, coal, gas, and nuclear
- Used costs for solar, geothermal and biomass more in line with DOE/NREL projections
- Included recent capital cost increases from actual renewable and conventional projects
Renewable Energy Mix, 2030

**EIA Case**
- Biomass: 63%
- Wind: 23%
- Solar: 6%
- Geothermal: 5%
- Landfill Gas: 3%

**UCS Case**
- Biomass: 16%
- Wind: 58%
- Solar: 11%
- Geothermal: 12%
- Landfill Gas: 3%
Renewable energy reduces natural gas price risk

Source: Lawrence Berkeley Lab, 2005.
Other recent national RPS studies show modest savings or costs

<table>
<thead>
<tr>
<th>Study</th>
<th>Energy Bill Savings ($)</th>
<th>Energy Bill Savings (%)</th>
<th>NPV?</th>
</tr>
</thead>
<tbody>
<tr>
<td>EIA 25%</td>
<td>$2 b</td>
<td>&lt;0.1%</td>
<td>Y</td>
</tr>
<tr>
<td>UCS 20% (EIA assumptions)</td>
<td>$10.8 b</td>
<td>0.2%</td>
<td>Y</td>
</tr>
<tr>
<td>UCS 20% (UCS assumptions)</td>
<td>$31.8 b</td>
<td>0.6%</td>
<td>Y</td>
</tr>
<tr>
<td>UCS (House-passed 15%) Higher RE case</td>
<td>$28 b</td>
<td>0.5%</td>
<td>Y</td>
</tr>
<tr>
<td>EIA (House-passed 15%) Case B (more RE)</td>
<td>$3.3 b</td>
<td>0.1%</td>
<td>Y</td>
</tr>
<tr>
<td>ACEEE 15%</td>
<td>$35 b</td>
<td>0.7%</td>
<td>Y</td>
</tr>
<tr>
<td>EEI (15%)</td>
<td>-$175 b</td>
<td>-0.7%</td>
<td>N, Nominal $</td>
</tr>
<tr>
<td>Wood MacKenzie</td>
<td>$240 b</td>
<td>3%</td>
<td>Y</td>
</tr>
</tbody>
</table>
Consumers save money in all regions
UCS 20% by 2020 scenario

Cumulative Natural Gas and Electricity Bill Savings* by U.S. Census Region, 2007-2030

- NORTHWEST: $1.5 billion
- CALIFORNIA: $3.8 billion
- MOUNTAIN: $3.7 billion
- WEST NORTH CENTRAL: $0.8 billion
- EAST NORTH CENTRAL: $2.3 billion
- EAST SOUTH CENTRAL: $0.8 billion
- WEST SOUTH CENTRAL: $8.6 billion
- MID-ATLANTIC: $5.7 billion
- SOUTH ATLANTIC: $2.4 billion
- NEW ENGLAND: $2.2 billion

* Under a 20% by 2020 national renewable electricity standard. Results are in 2005$ using a 7 percent real discount rate. Excludes transportation.
Helping to keep energy dollars at home

Annual Coal Import Expenditures, 2005 (million $)

$7.3 billion

Source: Map created by UCS using EIA and FERC data.
A downpayment on reducing global warming emissions

Power Plant CO₂ Emissions

In 2020, equivalent to taking 36.4 million cars off the road
Jobs and other benefits to local economies

- Net benefit of 120,000 jobs
- $66.7 billion in new capital investment for renewable energy technologies*
- $25.6 billion in new income for farmers, ranchers, and rural landowners
- $2 billion in new property tax revenues

*Results are presented in 2005 dollars using a 7 percent real discount rate.
Renewables reduce the cost of carbon cap (EIA 2001)

Total Consumer Energy Bills (not including transportation)

$95 billion total savings
## “Low-carbon electricity” standard?

<table>
<thead>
<tr>
<th>Renewables</th>
<th>Coal/CCS and Nuclear</th>
</tr>
</thead>
<tbody>
<tr>
<td>More land; impacts more visible</td>
<td>Less land; impacts less visible</td>
</tr>
<tr>
<td>Renewable- conserve resources for future generations</td>
<td>Resources large but depletable</td>
</tr>
<tr>
<td>Diversify existing resource supply</td>
<td>Expand dominant resources</td>
</tr>
<tr>
<td>Use little to no water</td>
<td>Use increasingly scarce water</td>
</tr>
<tr>
<td>Little or no mining or wastes</td>
<td>Mining impacts, long-lived wastes</td>
</tr>
<tr>
<td>No terrorist targets</td>
<td>Nuclear – targets; proliferation risk</td>
</tr>
<tr>
<td>Little or no accident risk</td>
<td>Need liability insurance exemption</td>
</tr>
<tr>
<td>Commercially available today, short construction lead times</td>
<td>Commercially available 10-25 years, very long lead times</td>
</tr>
<tr>
<td>Track record – manufacturing economies/price declines</td>
<td>Track record – construction cost overruns</td>
</tr>
<tr>
<td>Technology people prefer (at least if somewhere else)</td>
<td>Technology people dislike/oppose</td>
</tr>
</tbody>
</table>
Thank you. Any questions?

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Additional slides
Public favors renewables >3:1
Even if much more expensive

“With information:”
• Avg. elec. bill = $1,200/yr.
• Nuclear = $2,400/yr.
• CCS = $2,400/yr.
• Renewables = $4,000/yr.
Source: Lawrence Berkeley National Lab