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Monetizing Health Benefits from Efficiency and Renewables

Briefing for the Massachusetts Legislature

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Key Power Sector Trends

• Changing Desires of Consumers
• Falling Costs of Clean Energy
• Environmental and Health Drivers
• Electrification
• DERs and Their Impacts
• Changes in Bulk Power Markets
• Evolving Approaches to Utility Regulation
The Evolving Utility

YESTERDAY
- SAFE
- RELIABLE
- AFFORDABLE

TODAY
- SAFE & SECURE
- RELIABLE & RESILIENT
- AFFORDABLE
- CUSTOMER-FOCUSED
- INCREASINGLY CLEAN

TOMORROW
- SAFE & SECURE
- RELIABLE & RESILIENT
- AFFORDABLE & EQUITABLE
- CUSTOMER-FOCUSED & INTERACTIVE
- CARBON FREE
- SERVICE PLATFORM
- PLATFORM FOR OTHER INFRASTRUCTURE
Key Power Sector Trends

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Energy Efficiency + Renewable Energy = Health Benefits
RAP’s “Layer Cake” Approach

Source: https://www.raponline.org/knowledge-center/recognizing-the-full-value-of-energy-efficiency/
EPA Report: Benefits per Kilowatt Hour
BPK values show greater variation by region than technology, based on existing fuel mix and population density.

2017 BPK Values
(3% Discount Rate, Low Estimate)

<table>
<thead>
<tr>
<th>AVERT Region</th>
<th>Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>0.0</td>
</tr>
<tr>
<td>Great Lakes/Mid Atlantic</td>
<td>0.5</td>
</tr>
<tr>
<td>Lower Midwest</td>
<td>1.0</td>
</tr>
<tr>
<td>Northeast</td>
<td>1.5</td>
</tr>
<tr>
<td>Pacific Northwest</td>
<td>2.0</td>
</tr>
<tr>
<td>Rocky Mountains</td>
<td>2.5</td>
</tr>
<tr>
<td>Southeast</td>
<td>3.0</td>
</tr>
<tr>
<td>Southwest</td>
<td>3.5</td>
</tr>
<tr>
<td>Texas</td>
<td>4.0</td>
</tr>
<tr>
<td>Upper Midwest</td>
<td>4.5</td>
</tr>
</tbody>
</table>

¢/kWh (2017)

Technology:
- Uniform EE
- EE at Peak
- Solar
- Wind
- Average
What’s 100 MW worth in health benefits?

Annualized capital cost
$20.2 million
(37% capacity factor)

Annualized capital cost
$12.2 million (27% capacity factor)

<table>
<thead>
<tr>
<th>Health Benefits</th>
<th>Low values, 3% discount ($ millions)</th>
<th>High value, 3% discount ($ millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northeast (Wind)</td>
<td>5.0</td>
<td>11.2</td>
</tr>
<tr>
<td>Northeast (Solar)</td>
<td>4.6</td>
<td>10.4</td>
</tr>
</tbody>
</table>
Impact in Massachusetts - EE

- Efficiency spending ≈ $650 million/year
- For every million MWh saved from efficiency: BPK health benefits ≈ $16.5 – 37.3 million
- Average 10 year measure life - benefits × 10
- Average MA household electricity use/month – 600 kwh (US average ≈ 900)

We’re #1!
Conclusions

- Significant health benefits from efficiency and renewables available to Massachusetts
- EPA’s tool can illustrate and guide further investments
Resources from RAP

- Recognizing the Full Value of Energy Efficiency
- Value Added – Measuring the Benefits of the Layer Cake
- Webinar: Value Added: Measuring the Health Benefits of Energy Efficiency and Renewables
- Presentation: Power Sector Trends and Opportunities
About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org