



American Council for an Energy-Efficient Economy

Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved through Utility-Sector Energy Efficiency Programs

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ACEEE

Outline

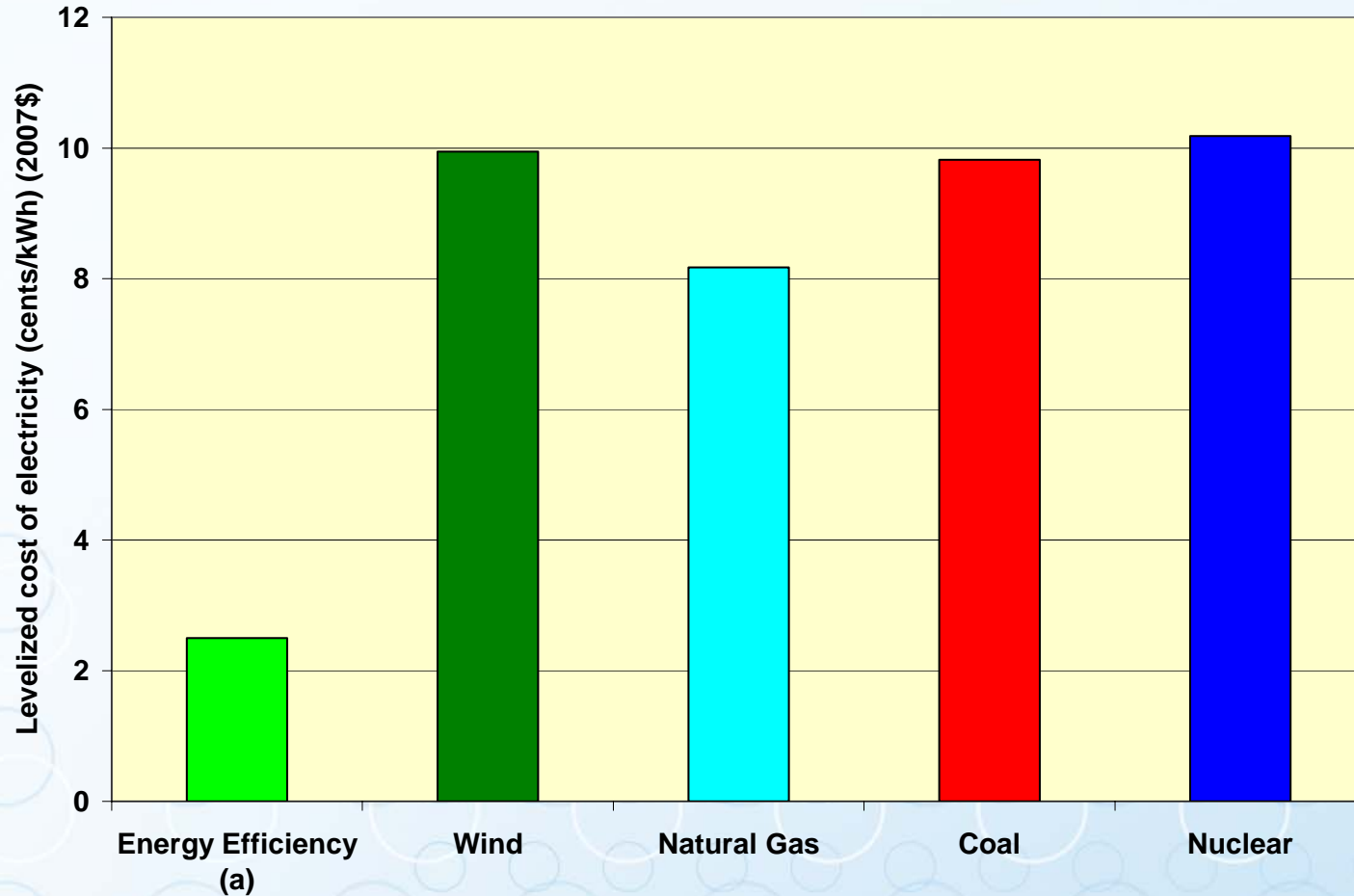
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Why Cost Evaluation Is Crucial

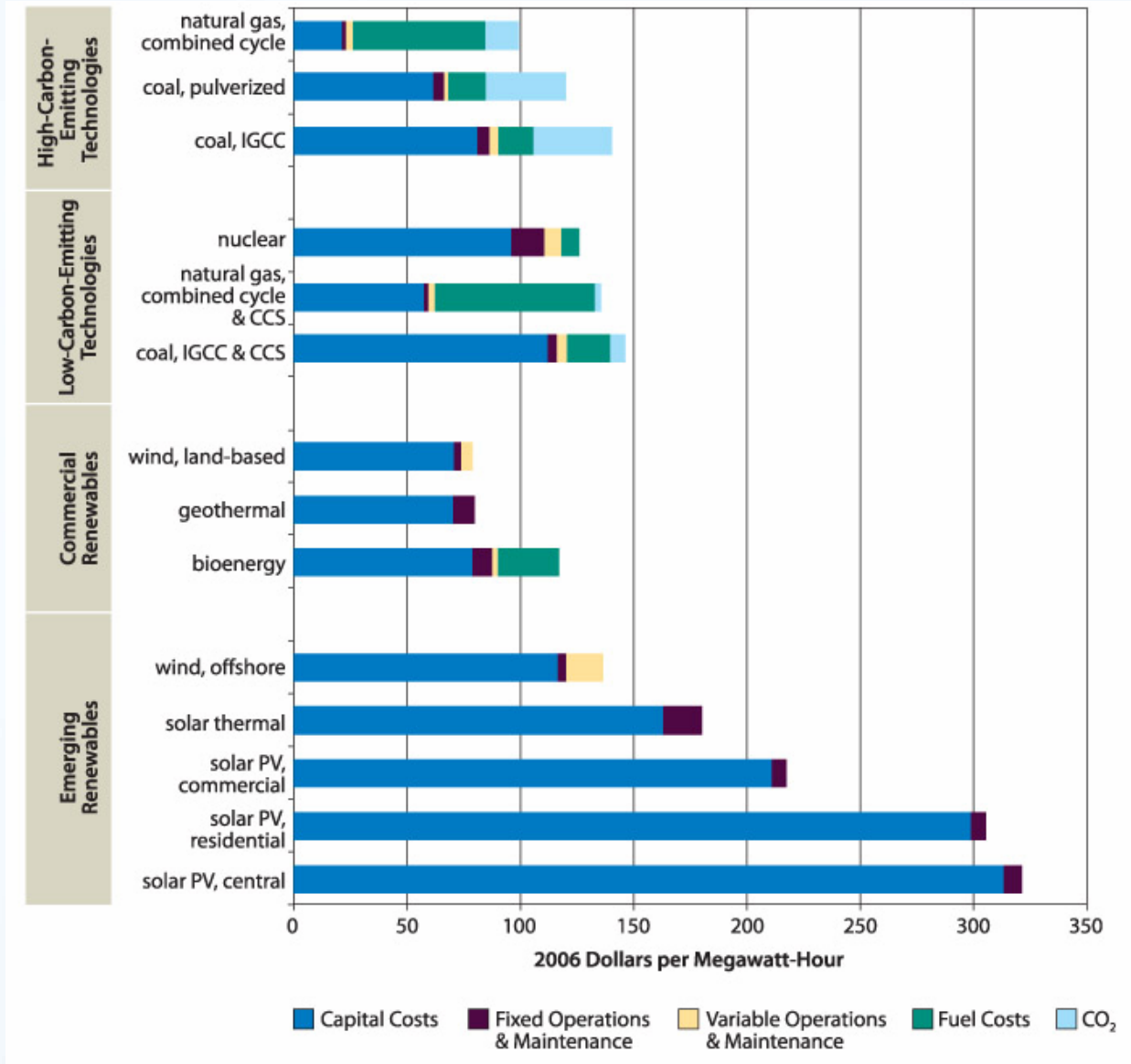
- Energy efficiency remains an under-tapped resource in the United States.
- Energy efficiency can cut costs, reduce greenhouse gas emissions, and generate jobs.
- There has been a resurgence of interest in efficiency.
- States are creating and/or expanding programs.
- Evidence of cost-effectiveness supports increased funding.
- This year is a pivotal time to study cost-effectiveness.

The Good News

The Cost of New Electric Resources



Projected Cost of Various New Electricity Resources in 2015



Source: Union of Concerned Scientists. 2009. *Climate Blueprint 2030*.

Costs of Saved Energy (CSE)

Reported or Calculated; Based on Annual Reports

	Mean	Median	Range
Electricity Programs (per kWh)	\$0.025	\$0.027	\$0.016 - \$0.033
Natural Gas Programs (per therm)	\$0.37	\$0.33	\$0.27 - \$0.55

Means are calculated from the averages for each state.

Benefit/Cost Ratios

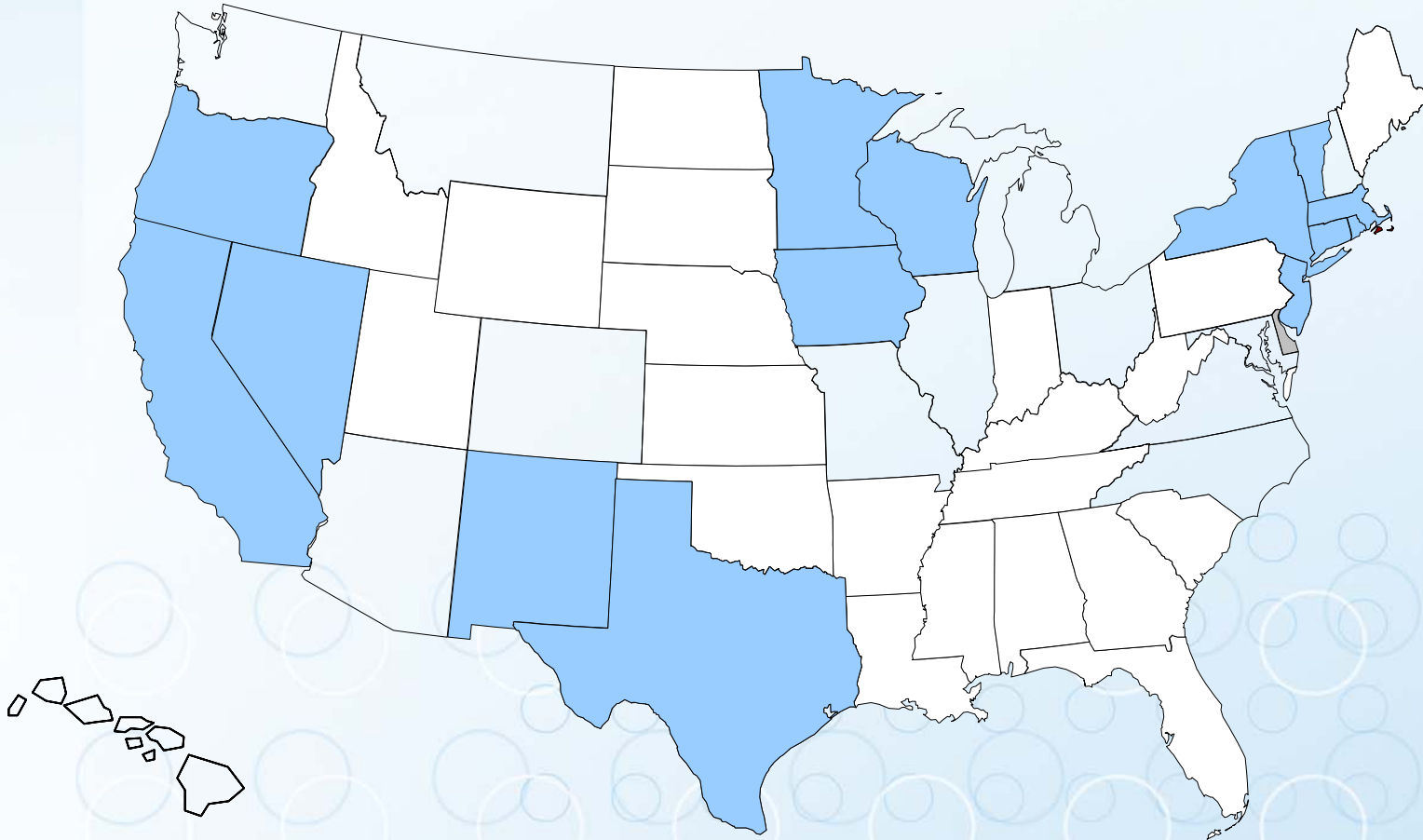
High benefit-to-cost ratios (greater than 1) show the advantages of investing in energy efficiency. States differ in their criteria for the minimum ratio.

	Mean	Notes
Total Resource Cost (TRC) Test	2.6	The TRC test includes costs to both participants and utilities and may include some external societal costs.
Utility Cost Test	4.0	The Utility Cost test only includes costs to utilities.

Methodology

- Electricity program data from 14 states
- Natural gas data from six states
- Benefit/Cost reporting:
 - Total Resource Cost (TRC) test results from seven states
 - Utility Cost test results from four states
- Annual reports were from **2002 – 2007**.
(The exact years depended on the history of the program.)

States Examined in National Review



Levelized Costs

- For programs that did not report the cost of saved energy, we used a **levelized cost** equation for program administrator costs.
- For **electricity programs**, we used a **5% real discount rate** and an averaged measure **lifetime of 10-15 years**, depending on the reported measure lifetimes of each program.

Levelized Costs (cont'd.)

- **Natural gas program lifetimes were 15-20 years** and were calculated in the same way as described above.
- **For programs without an average lifetime, we used standard estimates of 13 years for electricity and 19 years for natural gas.**

Customer Costs

Customers' decision to invest in energy efficiency is key to the success of utility programs.

Average Customer Contribution (%)	Average Ratio (Cust. Cost to Program Cost)	Range (%)	Average TRC Levelized Cost of Saved Energy
45%	0.83:1	25% - 70%	4.6 cents

Methods of estimating customer costs vary by state.

Customer Incentives vs. Admin

Average Customer Incentives (% of Program Costs)	Average Administrative Costs (% of Program Costs)
76%	24%

Average of five states: CA, TX, VT, CT and MA.

Spending by Sector

Commercial/industrial programs tend to receive more funding than residential programs do. They also are a more cost-effective option for utilities, on average.

	Residential Spending	Non-Residential Spending
Mean	46%	54%
Median	44%	56%

From Kushler et al, 2009.

However...

Q: Could two states invest the same amount of money in energy efficiency and achieve different results?

A: Yes.

Factors Influencing the Cost of Saving Energy

- Regional differences in weather and climate
- Relative focus on different sectors and/or technologies
- Choices about evaluation metrics
- Community priorities (e.g., some low-income programs may be more expensive on a per kWh basis)

Choices about Evaluation Metrics

- Reporting methods differ significantly across states.
- Using consistent methods would make it easier to compare programs.
- Issues include:
 - Use of annual versus cumulative data
 - Occasional inclusion of renewable energy and/or load management
 - Use of estimated versus actual participant costs
 - Calculation of avoided costs

Recommendation: More Consistent Reporting

- Greater consistency in reporting both costs and energy savings is an essential tool for:
 - Regulators seeking to compare states
 - Program developers looking for transferable models
 - Developers of regional and/or federal standards
- We encourage energy efficiency programs to coordinate their reporting strategies to achieve this goal.

Recommendation: Leverage the Benefits of Efficiency

Energy efficiency programs:

- Can be implemented relatively quickly
- May decrease in cost as they scale up
- Reduce our contribution to climate change
- Create jobs
- Save money for customers and utilities.

As this study shows, **they can also be readily justified on a cost per kWh (or cost per therm) basis.**

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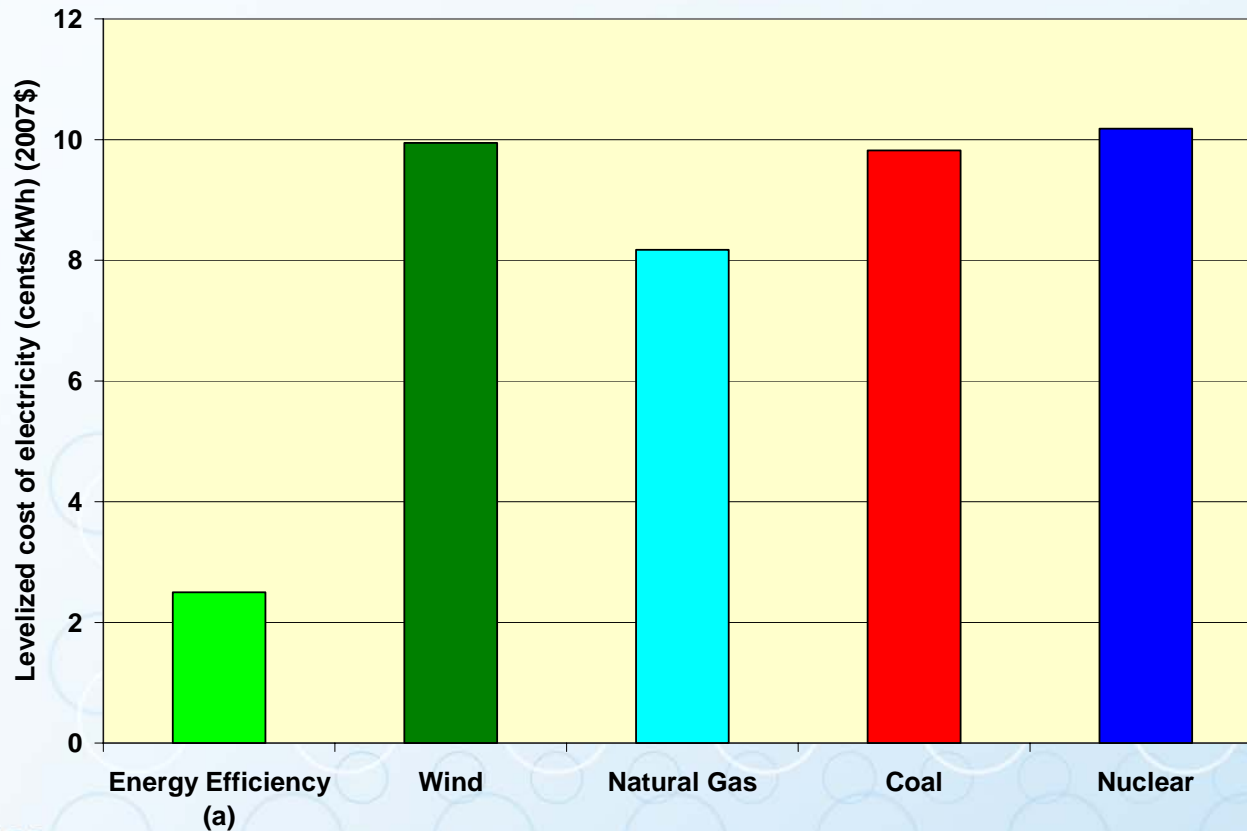
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Conclusion

Energy efficiency programs are impressively cost-effective and provide both economic and environmental benefits to states and utilities.



For More Information and a Copy of the Report ...

<http://www.aceee.org/pubs/u092.htm>

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