

Cost-Effectiveness of Demand Response

MADRI Working Group Meeting #34

June 17, 2014

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Framework for Cost-Effectiveness of DR - Outline

- Sponsors: US DOE and FERC.
 - National Action Plan for Demand Response.
- Authors: Synapse and Regulatory Assistance Project.
- Stakeholder input from Working Group.
- Scope of report: recommendations for regulators reviewing retail DR offered by utilities and funded by all retail electric customers.
- Proposed cost-effectiveness framework for demand response.
- Outlined the costs of demand response.
- Outlined the benefits of demand response.
- Identified issues for further research.

Cost-Effectiveness Framework

- For regulators considering retail DR offered by utilities, it makes sense to use the same framework that is used for energy efficiency offered by utilities.
- Standard efficiency screening tests:
 - Rate Impact Measure test
 - Participant test
 - Utility Cost test
 - Total Resource Cost (TRC) test
 - Societal Cost test
- While the tests should be the same for DR and EE, the components of the tests – i.e., the costs and benefits – might differ significantly.

Cost-Effectiveness Framework for Energy Efficiency

	Participant Test	RIM Test	Utility Test	TRC Test	Societal Test
Energy Efficiency Program Benefits:					
Customer Bill Savings	Yes	---	---	---	---
Avoided Energy Costs	---	Yes	Yes	Yes	Yes
Avoided Capacity Costs	---	Yes	Yes	Yes	Yes
Avoided Transmission and Distribution Costs	---	Yes	Yes	Yes	Yes
Wholesale Market Price Suppression Effects	---	Yes	Yes	Yes	Yes
Avoided Cost of Environmental Compliance	---	Yes	Yes	Yes	Yes
Non-Energy Benefits (utility perspective)	---	Yes	Yes	Yes	Yes
Non-Energy Benefits (participant perspective)	Yes	---	---	Yes	Yes
Non-Energy Benefits (societal perspective)	---	---	---	---	Yes
Energy Efficiency Program Costs:					
Program Administrator Costs	---	Yes	Yes	Yes	Yes
EE Measure Cost: Program Financial Incentive	---	Yes	Yes	Yes	Yes
EE Measure Cost: Participant Contribution	Yes	---	---	Yes	Yes
Lost Revenues to the Utility	---	Yes	---	---	---

Demand Response Program Costs

Cost	Participant	RIM	Utility	TRC	Societal
Program Administrator Expenses	--	Yes	Yes	Yes	Yes
Program Administrator Capital Costs	--	Yes	Yes	Yes	Yes
Financial Incentive to Participant	--	Yes	Yes	Yes	Yes
DR Measure Cost: PA Contribution	--	Yes	Yes	Yes	Yes
DR Measure Cost: Participant Contribution	Yes	--	--	Yes	Yes
Participant Transaction Costs	Yes	--	--	Yes	Yes
Participant Value of Lost Service	Yes	--	--	Yes	Yes
Increased Energy Consumption	Yes	Yes	Yes	Yes	Yes
Lost Revenues to the Utility	--	Yes	--	--	--
Environmental Compliance Costs	Yes	--	--	Yes	Yes
Environmental Externalities	--	--	--	--	Yes

Demand Response Program Benefits

Benefit	Participant	RIM	Utility	TRC	Societal
Avoided Capacity Costs	--	Yes	Yes	Yes	Yes
Avoided Energy Costs	--	Yes	Yes	Yes	Yes
Avoided T&D Costs	--	Yes	Yes	Yes	Yes
Avoided Ancillary Service Costs	--	Yes	Yes	Yes	Yes
Market Price Suppression Effects	--	Yes	Yes	Yes	Yes
Avoided Env't'l Compliance Costs	--	Yes	Yes	Yes	Yes
Avoided Environmental Externalities	--	--	--	--	Yes
Revenues from Wholesale Markets	--	Yes	--	--	--
Participant Bill Savings	Yes	--	--	--	--
Financial Incentive to Participant	Yes	--	--	--	--
Tax Credits	Yes	--	--	--	--
Other Benefits (e.g., market competitiveness, reduced price volatility, improved reliability)	depends	depends	depends	depends	depends

Other Benefits of Demand Response

- Enhanced market competitiveness.
- Reduced price volatility.
- Balancing intermittent resources.
- Insurance against extreme events.
- Modularity.
- Customer control over their bills.
- Better utilization of power plants.
- Innovation in retail markets.
- Non-energy benefits?

Issues for Further Research

- Avoided capacity costs.
- Participant value of lost service.
- Participant transaction costs.
- Ancillary service benefits.
- Avoided T&D costs.
- Wholesale market benefits.
- Reliability benefits.
- The role of demand response in integrated resource planning.
- The interaction between DR and EE programs.

The National Efficiency Screening Project (NESP)

- Organizers:
 - Home Performance Coalition, with funding from the Energy Foundation and several EE companies.
- Steering Committee:
 - Home Performance Coalition, Conservation Services Group, Tim Woolf
- Project Advisors:
 - Philippe Dunsky, Dunsky Energy Consulting; Tom Eckman, Northwest Power and Conservation Council; Sami Khawaja, Cadmus; Marty Kushler, American Council for an Energy Efficient Economy; Julie Michals, Northeast Energy Efficiency Partnerships; Peter Miller, Natural Resources Defense Council; Steve Schiller, Lawrence Berkeley National Laboratory; Rodney Sobin, Alliance to Save Energy.
- Members:
 - National Home Performance Council / Home Performance Coalition; Alliance to Save Energy; American Council for an Energy Efficient Economy; Clinton Foundation: Home Energy Affordability Program; Conservation Services Group; Energy Federation Inc.; National Resources Defense Council; Northeast Energy Efficiency Council; Performance Systems Development; Retrofit Software; Sierra Club; Truveon Corporation; Wisconsin Energy Center

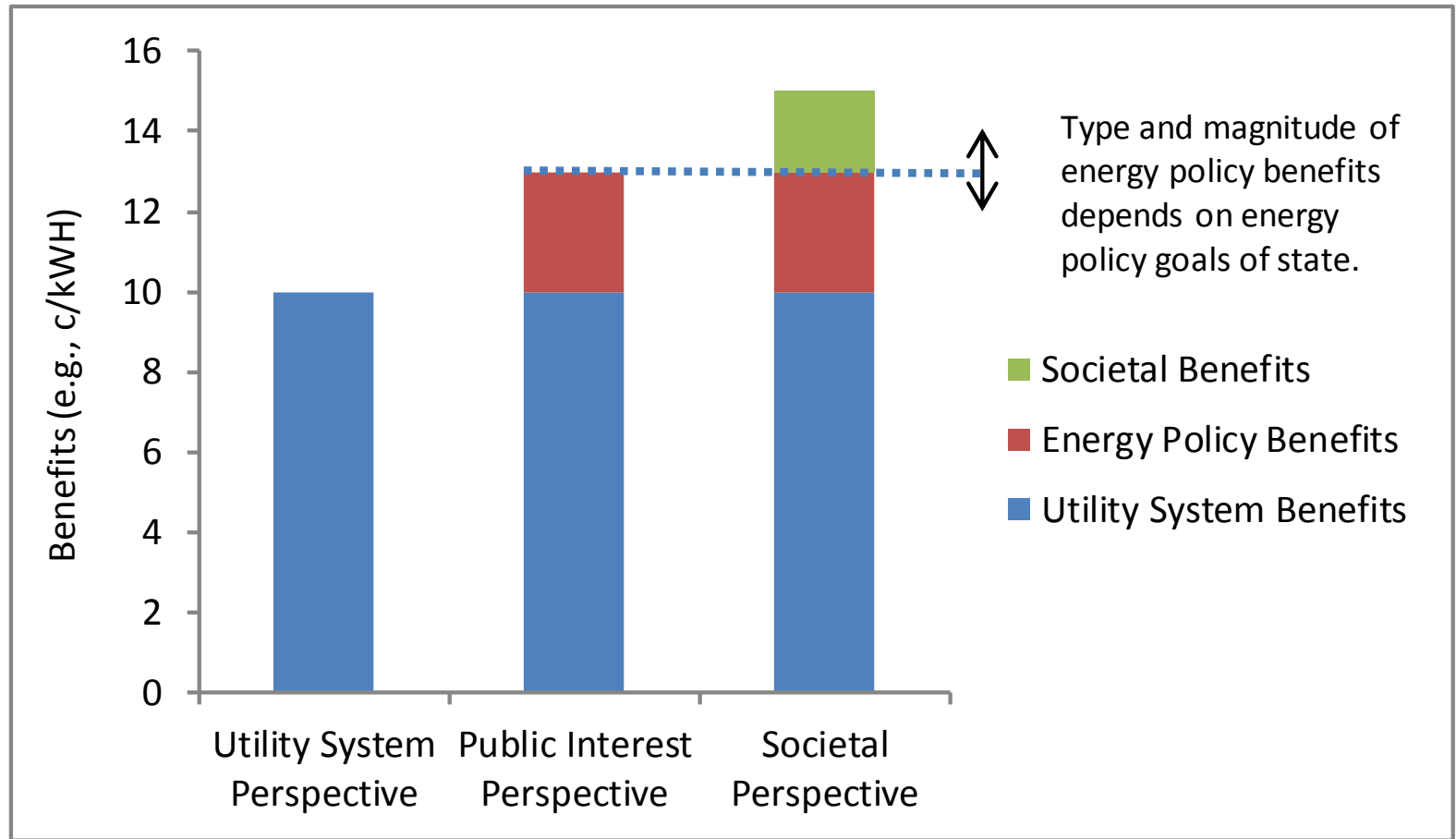
The California Standard Practice Manual

- The CA Standard Practice Manual is used in almost every state.
- However, the Manual is woefully inadequate for today's needs.
- Approach to energy policy goals is not well addressed.
- Non-energy benefits are barely addressed.
- The difference between the TRC and Societal tests is not well defined.
- The RIM test should not be used for screening.
 - Other approaches should be used to assess rate impacts.
- States should not be confined to the CA tests.

The Resource Value Framework

- Developed through the NESP.
- A framework of principles and recommendations that allows each state to identify a test that meets its own needs.
 - Clarifies that the goal of energy efficiency screening is to identify those resources that are in the public interest.
 - Accounts for the energy policy goals of each state.
 - Requires that costs and benefits be applied symmetrically.
 - Requires consideration of relevant hard-to-quantify benefits.
 - Provides an explicit, transparent process to identify the appropriate screening test and methodologies for each state.
- Still a work-in-progress.
 - See www.nhpci.org/campaigns.html for more information.

The Public Interest Perspective



Demand Response Costs: Aggregator & Market

Cost	Participant	Utility	Aggregator	Market
Program Administrator Expenses	--	Yes	Yes	--
Program Administrator Capital Costs	--	Yes	Yes	--
Financial Incentive to Participant	--	Yes	Yes	Yes
DR Measure Cost: PA Contribution	--	Yes	Yes	--
DR Measure Cost: Participant Contribution	Yes	--	--	--
Participant Transaction Costs	Yes	--	--	--
Participant Value of Lost Service	Yes	--	--	--
Increased Energy Consumption	Yes	Yes	Yes	--
Lost Revenues to the Utility	--	--	--	--
Environmental Compliance Costs	Yes	--	--	--
Environmental Externalities	--	--	--	--

Demand Response Benefits: Aggregator and Market

Benefit	Participant	Utility	Aggregator	Market
Avoided Capacity Costs	--	Yes	--	Yes
Avoided Energy Costs	--	Yes	--	Yes
Avoided T&D Costs	--	Yes	--	Yes
Avoided Ancillary Service Costs	--	Yes	--	Yes
Market Price Suppression Effects	--	Yes	--	Yes
Avoided Env't'l Compliance Costs	--	Yes	--	Yes
Avoided Environmental Externalities	--	--	--	--
Revenues from Wholesale Markets	--	--	Yes	--
Participant Bill Savings	Yes	--	--	--
Financial Incentive to Participant	Yes	--	--	--
Tax Credits	Yes	--	--	--
Other Benefits (e.g., market competitiveness, reduced price volatility, improved reliability)	depends	depends	depends	depends

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Synapse Energy Economics

- Founded in 1996.
- Leader in providing rigorous technical and economic analyses of the electric power sector.
- Staff of 30 includes experts in energy and environmental economics.
- Serve a variety of public interest and government clients throughout North America, including consumer advocates, environmental advocates, regulatory commissions, state energy offices, US DOE, US EPA, and more.

Appendix – Rates, Bills and Participants

- Concerns about rate impacts are primarily concerns about customer equity and cross-subsidization.
- The RIM test does not provide any meaningful information about equity.
- Eliminating cross-subsidization can lead to perverse outcomes:
 - For example, zero cross-subsidization → higher costs for all.
- Rate impact concerns should be addressed as follows:
 - Estimate long term average rate impacts.
 - Estimate the extent to which average bills will be reduced.
 - Estimate the extent to which customers will participate.
 - Take steps to help increase participation.
- Primary goal is to balance reduced costs and increased rates.