Benefit-Cost Analysis for Distributed Energy Resources In New York

A Framework for Accounting for All Relevant Costs and Benefits

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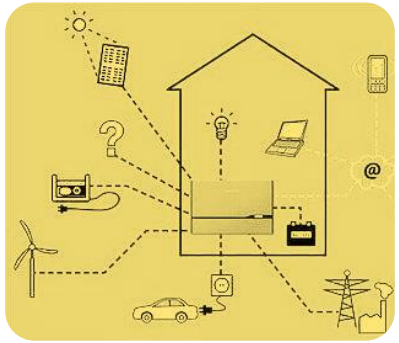
New York Reforming the Energy Vision

- The REV docket sets out a comprehensive, ambitious, and forward-thinking vision for the New York electric system.
- Relies on investments in Distributed Energy Resources (DER):
  - Energy efficiency
  - Demand response
  - Distributed generation
  - Distributed storage



- The benefit-cost analysis is the backbone of the initiative that will enable New York to achieve its vision and goals.
- Same principles of BCA should be applied to energy efficiency as well as other distributed energy resources

Benefit-Cost Analysis Framework Development

- BCA study prepared for the Advanced Energy Economy Institute

- Intended to serve as a foundation for forthcoming BCA discussions.
- Full report:

  Tim Woolf et al., *Benefit-Cost Analysis for Distributed Energy Resources: A Framework for Accounting for All Relevant Costs and Benefits* (Synapse Energy Economics, prepared for the Advanced Energy Economy Institute, September 22, 2014).

  http://info.aee.net/benefit-cost-analysis-for-der-synapse or
  http://synapse-energy.com/project/benefit-cost-analysis-distributed-energy-resources

1. Consistency with Policy Goals

- New York Commission's policy goals are clearly articulated:
  - Provide low-cost electricity services
  - Empower customers
  - Animate the markets for distributed energy resources
  - Improve system efficiency and resource diversity
  - Ensure reliability and resiliency
  - Reduce greenhouse gas emissions
- Staff proposed that the Societal Cost Test be the primary test used.
- Societal Cost Test is appropriate because it is most consistent with the Commission's policy goals.

2. Symmetry in Accounting for DER Impacts

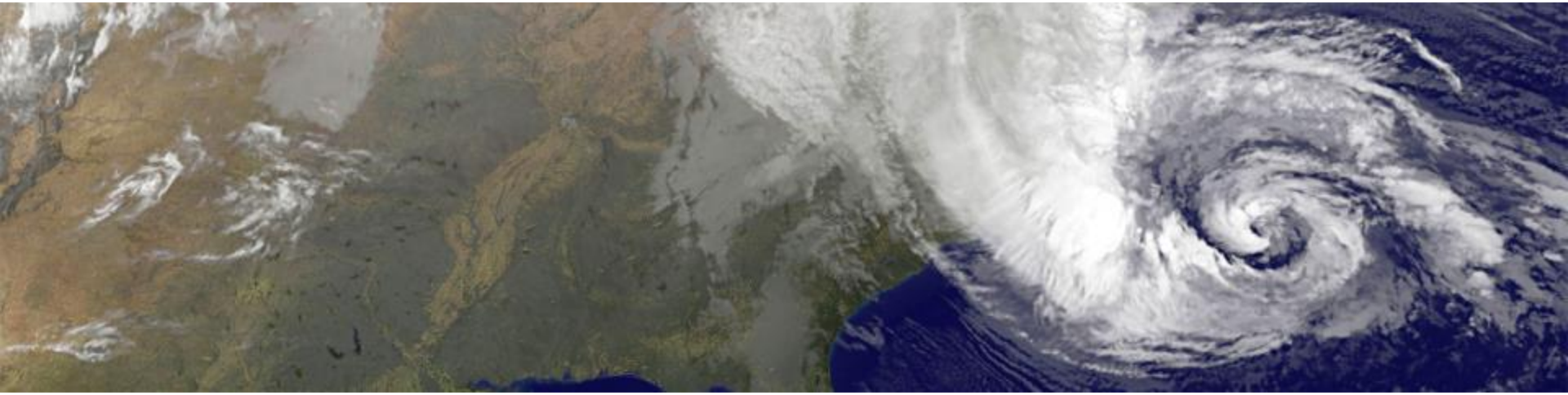
	BENEFITS			COSTS	
		Category	Examples	Category	Examples
Impacts on All Customers	1	**Load Reduction & Avoided Energy Costs**	Avoided energy generation and line losses, price suppression	1 **Program Administration Costs**	Program marketing, administration, evaluation; incentives to customers
	2	**Demand Reduction & Avoided Capacity Costs**	Avoided transmission, distribution, and generation capacity, price suppression	2 **Utility System Costs**	Integration capital costs, increased ancillary services costs
	3	**Avoided Compliance Costs**	Avoided renewable energy compliance costs, avoided power plant retrofits	3 **DSP Costs**	Transactional platform costs
	4	**Avoided Ancillary Services**	Regulation, reserves, energy imbalance		
	5	**Utility Operations**	Reduced financial and accounting costs, lower customer service costs		
	6	**Market Efficiency**	Reduction in market power, market animation, customer empowerment		
	7	**Risk**	Project risk, portfolio risk, and resliency		
Participant Impacts	1	**Participant Non-Energy Benefits**	Health and safety, comfort, tax credits	1 **Participant Direct Costs**	Contribution to measure cost, transaction costs, O&M costs
	2	**Participant Resource Benefits**	Water, sewer, and other fuels savings	2 **Other Participant Impacts**	Increased heating or cooling costs, value of lost service, decreased comfort
Societal Impacts	1	**Public Benefits**	Economic development, reduced tax burden	1 **Public Costs**	Tax credits
	2	**Environmental Benefits**	Avoided air emissions and reduced impacts on other natural resources	2 **Environmental Costs**	Emissions and other environmental impacts

3. Accounting for Hard-to-Quantify Impacts

1. Direct monetization
   - Preferred approach wherever possible
2. Proxies
   - E.g., multiplier on avoided costs, $/MWh, percent adder
3. Alternative screening benchmarks
   - Benefit-cost ratio benchmark less than 1.0, to reflect benefits that are not accounted for otherwise
4. Regulatory judgment
   - Should use the greatest amount of monetized and quantified information available
5. Multi-attribute decision analysis
   - A systematic process for weighting and scoring both monetized and non-monetized criteria in order to rank several options across all criteria

Example: Risk

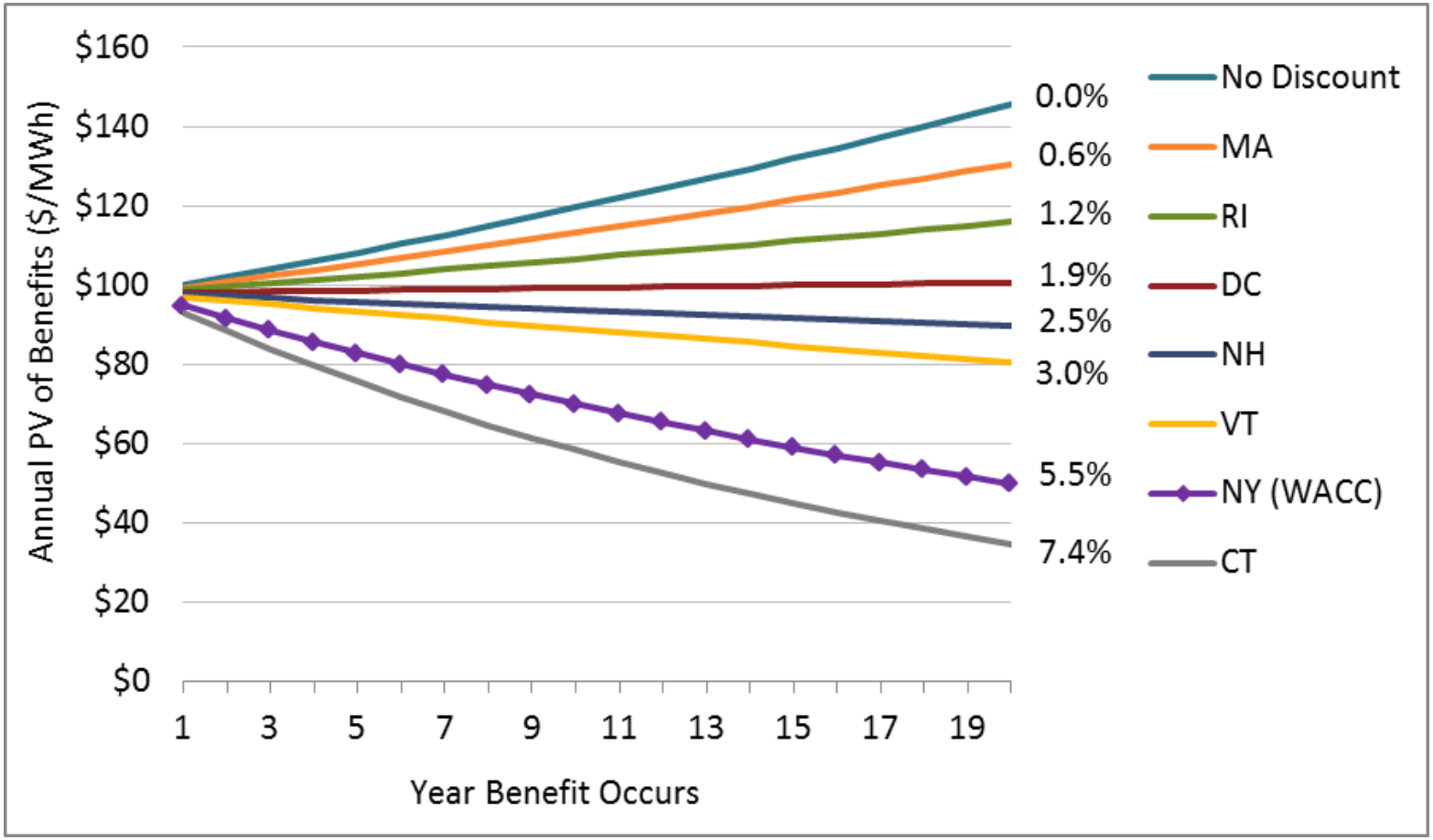
- Distributed energy resources offer several risk benefits:
  - Fuel price hedge and resource diversity
  - Optionality in investment timing (fast, small increments, flexible)
  - Resiliency
- Can be accounted for through a proxy **or** in the discount rate



What discount rate to use?

Discount Rate Implications

Discount rates (real) are applied to a hypothetical stream of future benefits. (Note: all effects of inflation removed.)



Discount Rate – Concepts

- A discount rate is applied when converting future costs and benefits to present values for comparison purposes.
- The discount rate reflects the fact that a benefit experienced in the future (e.g., in 20 years) is worth less than a benefit experienced today.
- The choice of discount rate is essentially a decision about time preference, i.e., the relative importance of short- versus long-term costs and benefits.

General Recommendations

- The purpose of the BCA is to make investment decisions that are in the public interest.
- Therefore the discount rate should be based on a "time preference" that reflects the public interest.
- The public interest is defined by the state's energy policy goals
  - In New York: Reduce costs, increase system efficiency, improve reliability and resiliency, lower risk, reduce CO_2, animate markets, empower customers
- The discount rate must be consistent with these regulatory goals.
  - Otherwise, the BCA will not lead to resources that meet these goals.

Whose time preference is most relevant for the public interest?

- The utility investors' time preference (WACC) is not the same as the public interest time preference.
  - The resource investment is made for the benefit of all customers, not utility investors
- The discount rate chosen must reflect a time preference that is relevant to all utility customers
- Any one customer's time preference is not the same as the public interest time preference
  - The public interest should consider all different types of customers
  - The public interest should consider both short-term and long-term customer interests

Specific Recommendations

- The discount rate that reflects the public interest should be used, regardless of whether the Societal Cost Test, TRC Test, or Utility Cost Test is used.*
- For each of these tests, the goal of the BCA is still the same: to identify those resources in the public interest
- In New York, a societal discount rate is most consistent with the public interest
  - The scope of New York's energy policy goals encompasses all societal benefits and costs
- Other jurisdictions may define the public interest differently
- Ultimately regulators should choose a discount rate based on consideration of the goals of the BCA and all the factors that affect the public interest

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About Synapse Energy Economics

- Synapse Energy Economics is a research and consulting firm specializing in energy, economic, and environmental topics. Since its inception in 1996, Synapse has grown to become a leader in providing rigorous analysis of the electric power sector for public interest and governmental clients.
- Staff of 30+ experts
- Located in Cambridge, Massachusetts

Appendix

- The convention of using a WACC is widely used for unregulated industries because the goals of the BCA for unregulated industries is often to maximize profit. The goal of the BCA for a regulated utility is fundamentally different.
- There are many ways in which regulators require utilities to make planning decisions that do not maximize shareholder value. Instead the regulators seek to maximize value to customers.
- Why discount revenue requirements using a WACC that has no relevance to the public interest? It is the customers that pay the revenue requirements, not shareholders.
- For example, energy efficiency avoided costs typically largely comprised of avoided fuel costs. Those costs carry a tremendous risk. Utilities do not bear much, if any, of this risk; customers do. Why use a discount rate that reflects shareholders' risks when these risks do not affect them?

Appendix, continued

- Customers have a wide array of discount rates.
- The only place that it is relevant to use an individual customer's discount rate is in the Participant Cost Test. That is where the participant's interests are being evaluated.