RAC Policy Subcommittee Meeting

Northeast Update: TRC Test Applied to CHP in MA & NY

26 January 2011

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WHAT are the various cost-effectiveness tests

*The Participant Cost Test (PCT). Cost effectiveness from the Participant's perspective

*Program Administrator's Cost or Utility Cost Test (PAC/UCT), determines C/E from utility perspective

*Rate Impact Measure (RIM) test, assesses if utility rates increase/decrease

*Total Resource Cost test (TRC) assesses whether the analysis region (utility service area or state) is better off

* Societal Test (SRT) extends the TRC with certain non-monetized benefits to assess whether Society is better off

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WHAT are these test designed to Measure?

The TRC is designed to answer: : What is the impact on utility BILLS in the region studied over the period of analysis

IF a program passes the TRC, it implies that the total energy bill in the study region is LESS with the program as compared with the base case.

The Societal Resource Test includes certain non-monetized benefits, for example, reductions in criteria air pollutants and greenhouse gas emissions

The question that the SRT is designed to answer is whether or not the REGION studied will be better off (includes non-energy benefits)

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Details Can Significantly Affect the B/C Ratio Outcome -- State's Adjust to local circumstances						
COMPONENT	PCT	PAC	RIM	TRC	SCT	
Energy and capacity related avoided costs	-	benefit	benefit	benefit	benefit	
Additional resource savings	-			benefit	benefit	
Non-monetized benefits	-	-	-	-	benefit	
Incremental equipment and install costs	cost	-	-	cost	cost	
Program overhead costs	-	cost	cost	cost	cost	
Incentive payments	benefit	cost	cost	-	-	
Bill Savings	benefit	-	cost	-	-	
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*Adadpted from presentation on Total Resource Cost Test and Avoided Costs						
Public Utilities Commission of Ohio Workshop, August 5, 2009 Group,						
by Snuller Price and Richard Sedano representing Electricity Markets & Policy, LBNL						

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Energy & Capacity Related Avoided Cost

* Reductions in purchased energy ($/kWh)

* Reductions in capacity purchases ($/kW-year)

•Lower cost of meeting RPS obligations (reductions in REC cost)

•Avoided T&D costs defer/avoid T&D upgrades

----------(in restructured markets)----------

Lower energy cost and capacity costs due to lower cost generators being on the margin
Demand Reduction Induced Price Effect-DRIPE

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Additional Resource Savings (or Non-Energy Benefits)

- Savings in water usage, or other reductions in total resources consumed
- greater degree of power reliability, power quality
- reduced reliance on imported energy sources ($37.8 Bil energy $ outflow in 2008 -$2000 p.c.)
- supporting critical infrastructure, business continuity, emergency management recovery

---------- Non Energy Benefits tend to be hard to quantify and therefore not readily incorporated---

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Major Components of Avoided Electric Costs from 2009 NEPOOL AESC Study

*Avoided Electric Generation costs (energy and capacity -- 76.9%

*Transmission and Distribution avoided costs 15.4% note: does NOT include local distribution

*DRIPE (Capacity & Energy) 7.7%

**Source: Exhibit A-5, MA 2009 AESC

…note that there is a 10% wholesale price reduction after 15x15 modeled in NY State Energy Plan. $7.69/MWh ($1.233 Billion)

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Critical Issue Areas

What is the **discount rate** used for calculating future years benefits and costs?

Are **hourly marginal costs** used for ascertaining benefits and costs or annual averages?

How are regional cost differences captured in the analysis of benefits and costs?

In restructured markets are the wholesale energy and capacity market effects of changes in the marginal units serving loads captured? Demand Reduction Induced Price Effect – DRIPE

Critical Issue Areas(2)

Are federal incentives such as accelerated depreciation or Investment Tax Credits (ITC) subtracted from the installed cost basis?

Are cost reductions due to changes in REC purchases included in the avoided cost calculation?

Are marginal or average losses used in crediting avoided supply costs?

What if any non-energy benefits are included in the analysis (other resource savings, improved power reliability/quality, reduced reliance on imports, etc)

NY TRC Tests on Select CHP Projects

NYSERDA submitted several "prototype" CHP projects for TRC test review

Projects ranged from 250 kW to 19 MW's. Most projects were < 1 MW

Smaller projects were not passing the NY TRC with the avoided cost estimates for Con Ed steam and electric distribution capacity available at the time. It appeared the two largest projects would pass the TRC especially in certain areas if network specific distribution capacity credits could be established

MA experience with CHP & TRC Tests

2010 was the first year that CHP projects were eligible under the electric EE programs

There were approximately 15 projects (7 or 8 in National Grid, 7 or 8 NSTAR) that screened positive for TRC in 2010

There is an expectation of a similar number in 2011

Large AND small projects are passing the TRC in MA.

Sectors include Nursing homes, hospitals, multifamily, industrial

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MA experience

Projects with high proportion of utilization of thermal energy, even if small are likely to pass

Sites that are dumping significant amounts of thermal energy are not likely to pass – therefore, projects sized to displace peak electricity and demand charges, irrespective of coincident thermal demand, less likely to pass

By encouraging near full utilization of thermal energy, the MA test may encourage systems that are “right sized” from a societal perspective.

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Features of the MA Incentive Program

- CHP projects <= 150 kW & passing the BCR test will receive a $750/kW incentive
- CHP projects >150 kW & passing BCR Test will receive an incentive determined by the PA
- The incentive is capped at 50% of total installed costs of CHP system
- Incentive payment can be denied if a building or process is “materially lacking in implementation of cost effective efficiency”

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Contrasting MA and NY TRC Tests

*NY does not include the federal tax benefits of accelerated depreciation and ITC as a reduction to the participants costs whereas MA (and CA) does

*NY does not include the wholesale market price suppression effect (a.k.a. DRIPE) and MA does

*MA includes the reduction in costs due to reduced REC purchases

*NY used a value of $100/kW year avoided distribution costs in New York City. Avoided distribution costs for certain areas of Manhattan and other constrained networks are likely to be much higher.

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Contrasting MA and NY TRC Tests

*Distribution Utility Avoided Capacity Costs are incremental to the results reported in the NEPOOL AESC. They are calculated at the Distcos level by the utility

*By guidelines established in D.P.U. 08-50-A, EE costs and benefits for both utilities and customers are evaluated with low-risk discount rate, such as that represented by the yield on Treasury securities.

*MA estimates includes a wholesale risk premium on avoided capacity costs of 9% (11.1% in VT by order of the VT Public Service Board

Implications of MA vs. NY Differences

MA and CA count federal tax credits as a benefit, NY does not, this reduces the cost basis when calculating the total installed system costs for CHP

None of the states count their own state incentives as a benefit (in-state incentives are considered a transfer)

MA counts Energy & Capacity DRIPE, which accounts for about 7.7% of the calculated 2009 Avoided costs, NY does not count this in the TRC test for EE

Impacts of TRC Test Assumptions

- MA and CA count the avoided cost of REC purchases. In a CA example a 1%/year reduction in demand resulted in a $8.03/MWh higher avoided cost (Snuller Price and Richard Sedano)

- Using a low-risk ("social") discount rate has significant implications for projects with high initial cost and benefits over time.
- An annuity of $1/year for 20 years is worth $14.88 at a 3% discount rate, but just $8.51 at a 10% rate

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Time Specific Avoided Costs?

Are benefits calculated using annual average, or hourly avoided costs?

CA example demonstrates that using an hourly methodology results in a near doubling in avoided costs (from $.066/kWh to $.121/kWh) for peak savings Air conditioning programs.

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Statewide or localized estimates?

* In NYS there are presently avoided distribution capacity cost estimates: Upstate NY ($33.48/kW-year) and New York City ($100/kW-year).

*Con Edison has reported much higher distribution system avoided costs on constrained networks up to and beyond $609/kW-year

*NY DPS staff is open to use of higher distribution credits for projects on those networks

Con Ed has engaged NERA in a study to review the existing $100/kW-year value City average

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Effect on CHP of more Time & Location Specific Estimates

Time specific avoided cost estimates will benefit CHP that is operating more intensively on peak and will advantage it relative to EE measures with proportionally more impacts off-peak

Location specific estimates will alter the area benefit of CHP, favoring projects in high avoided cost areas of a state relative to projects in lower avoided cost areas

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Benefit? / Cost? / Transfer?

- Are lower wholesale energy costs in competitive energy markets due to EE a benefit cost or transfer payment?
- If CHP reduces the need to dispatch high priced generators in particular hours, does the resulting savings (incremental generator costs * kWh sold in the hour) count as a social benefit, or a “transfer payment” from generators to energy users
- Are federal incentives reducing the cost basis of a measure a transfer? A reduction in cost?

What's in the Details, Matters

DRIPE accounts for 7.7% of the avoided electric supply benefits in the April 30, 2009 EE Plan

Guidelines established in D.P.U. 08-50-A, EE costs and benefits for both utilities and customers are evaluated with low-risk discount rate, such as that represented by the yield on Treasury securities.

T&D accounts for over 15% of avoided electric supply

costs as estimated in the Electric EE Plan 2009 AESC Appendix A, pg. A-17 (NOT Counting local distribution system avoided costs)

Utility Incentives

Incentives for installing CHP systems recently increased to $750 / kw for eligible systems

Projects must pass Benefit Cost Ratio or Screening, which will be determined by the appropriate Mass Saves Utility (Program Administrator) with input from the vendor/contractor

This is one of the highest CHP incentives available

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CO_2 Reductions

NY has a placeholder value of $15/ton reduced.

The *BASIS* from which the reduction is calculate is is very important for CHP

- **is CHP displacing the fossil fuel average emissions rate for a region?**
- **is CHP displacing a "future resource", e.g. a high efficiency gas combined cycle unit?**

….. Or something in-between (hourly marginal unit emissions)

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Alternative Portfolio Standard

A utility purchase obligation for acquiring a stipulated amount of APS resources (CHP) starting at 1% growing to 4% by 2010

APS Example: 500 kW IC engine, 66% efficiency, 49% useful heat, 7,000 hours

AEC's/yr = 4375 MWH, Revenue Stream=$87,500/yr if payments are $20/MWH ACP

AECs = CHP elec/.33 + thermal/.80 – fuel to CHP

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