Conservation Cost-Effectiveness Methodology

CRAC Meeting

September 2, 2015

What We Know

- We need a way to determine if a measure is cost-effective
- We need to recognize:
  - Capacity is important
  - Future is uncertain (loads, market prices)
  - Carbon policy can impact resource costs
  - RPM buys above market price
  - RPM did not find significant differences between above-market purchases for lost opp vs. retrofit measures

How to Define Cost-Effective?

- Benefit-to-cost ratio is greater than 1, using the total resource cost test
- We did not use B/C in RPM, we used TRC levelized cost
  - Includes first cost, O&M, admin, non-energy impacts, other fuel, periodic replacement, deferred T&D
  - Does not include energy savings benefits
- How to estimate the benefits?
  - B = NPV(energy + capacity + other fuel + NEI + avoided periodic replacement)

Capacity Benefits

- Capacity value is winter peak savings (kW_p) multiplied by:
  - Deferred transmission credit – T
  - Deferred distribution credit – D
  - Deferred generator credit – G
  - Regional Act conservation credit – 10%
- Capacity = $kW_p*(T+D+G)*(1+10\%)$

Transmission & Distribution

- Deferred T&D investment based on analysis completed for 6P
  - T = $26/kW-yr
  - D = $31/kW-yr

Deferred Generation

- The region is capacity short
  - RPM is building resources for system adequacy
- Conservation defers purchase of alternate capacity resource
  - Simple-cycle combustion turbine frequently marginal resource for capacity
  - Size of SCCT similar to annual conservation build out of RPM

Deferred Generation, cont

- Simple-cycle combustion turbine (Aeroderivative)
  - Levelized capacity cost: $190/kW-yr in 2015
  - Conservation is deferring this investment every year over planning horizon
  - Deferred capacity cost: $117/kW-yr
- Deferred generation value was *not* included in:
  - Levelized cost of conservation inputs
  - 6P formulation

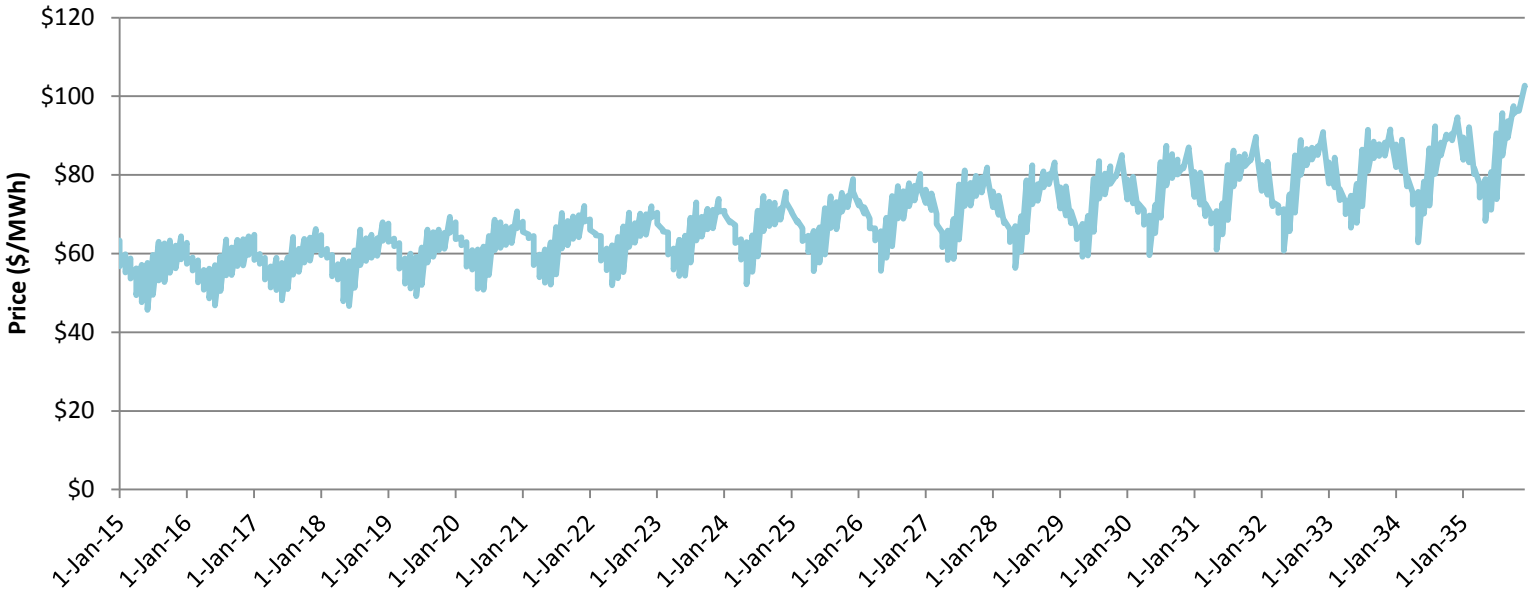
Energy Benefits

- Energy value is energy savings (kWh) multiplied by:
  - Market price - M
  - Carbon price - C
  - Risk mitigation credit - RMC
  - Regional Act conservation credit – 10%
- Energy = kWh * (M+C+RMC)*(1+10%)

Market Price + Carbon

- Use RPM equilibrium market price
  - Is based on the resource deployment in RPM
  - Represents cost of dispatching the marginal in-region resource or changing the net regional position in an external market
  - This is slightly lower than Mid-C Aurora™ estimate
- Scenario 2B includes:
  - Carbon prices at Social Cost of Carbon 3% discount rate: $40/Ton up to $60/Ton
    - This is the federal price for carbon damage
  - Varying heat rates

Market Price + Carbon, cont



- Levelized cost ~$57/MWh
- Without Carbon ~$32/MWh

Risk Mitigation Credit

- Represents conservations value in reducing volatility of future system costs:
  - Fluctuating market prices
  - Fuel price uncertainty
  - Uncertainty in loads
  - Renewable portfolio standard builds
- Is *not* the same as RPM's market adder
- We solve for this to match the target

Risk Mitigation, cont

- With parameters chosen, risk premium is **zero** for 7P
  - Deferred generation resource intrinsically includes some risk mitigation
  - Region has less dependency on risk than before
  - We are not differentiating between lost opp and retrofit

Summary

- Formulation will provide more value to measures that reduce capacity
- 6P formulation focused on energy benefit with less emphasis on measures' capacity contribution
- Measure with marginal B/C under 6P formulation:
  - with zero capacity contribution will likely *not* be cost effective in 7P
  - with lots of capacity contribution will likely be cost effective in 7P

Next Steps

- Develop action item to recommend this formulation for conservation cost effectiveness
  - Details will be in Appendix
- Present methodology to RTF
- Final RTF adoption won't occur until after 7P is final (~Feb 2017)