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Perspectives on use of social cost of carbon for assessing distributed energy resources cost-effectiveness

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Agenda

- What has changed since E3's 2013 SCT presentation?
- New perspectives on social cost of carbon
- Q&A and discussion

Recap of 2013 Societal Cost Test workshop presentation by E3

- An initial discussion of the societal cost test presented in 2013 by Brian Horii and Jim Williams
- Study assessed what an SCT would look like
- Defines the components that would need to be done to compute an SCT consistent with the SPM
  - Key elements; social discount rate, non-energy benefits
- Social discount rate
  - Cites reasonable ranges (broadly) and literature
- Non-energy benefits focused on air emissions
  - Value of GHG emissions reductions
  - Value of criteria emissions reductions

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What has changed since?

- Significantly increased focus on GHG emissions reductions in the long term through 2050
  - SB32 sets 2030 target of 40% below 1990
- ARB mandate to consider societal costs in GHG regulations (AB 197, 2016)
- Significantly more pressure to increase distributed energy resource (DER) achievements
  - SB350 calls for doubling of energy efficiency, 50% RPS, and an integrated planning framework for least cost reductions
- Significantly lower energy prices
  - Led by low natural gas prices from increased supply
  - Low gasoline and fossil fuel prices from increased supply

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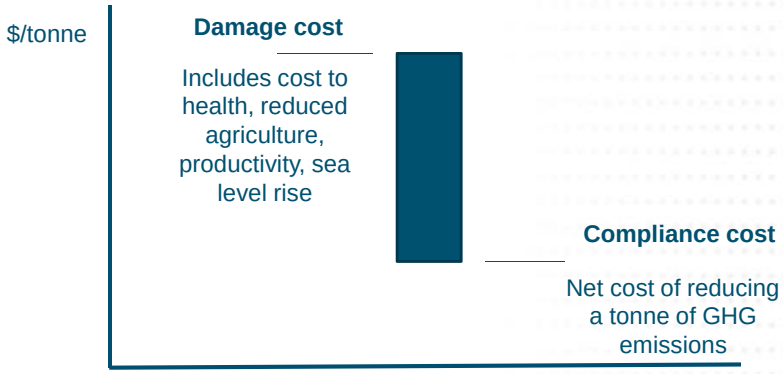
How to value reduced emissions?

- Two main approaches, damage cost and compliance cost which provide a range



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Damage function vs. marginal cost of GHG abatement approaches

- From our perspective, the damage function is appropriate for assessing the overall level of GHG reductions. Appropriately the ARB mandate.
  - Higher value, sets the overall level of stringency
- GHG abatement cost is appropriate in an IRP planning framework to evaluate the least net cost portfolio

Straw proposal

  - e.g., is energy efficiency a lower cost way to reduce GHG emissions than my alternative approach?
- Which cost test?
  - Seems appropriate to include avoided GHG measure net costs as a benefit of EE in a modified TRC and/or an SCT
  - In other cost tests, appropriate to include avoided net costs to utility ratepayers (PAC, RIM)

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How might this be implemented?

California's Scoping Plan Update

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CPUC IRP for Electricity Sector

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Cost-effectiveness of DER measures

Sets overall GHG reduction plan with electricity and pipeline gas sector targets, along with fuel switching (electrification and pipeline gas)

Refines electricity sector plan to hit comparable goals consistent with 40% reduction at least cost, identifies marginal abatement opportunities

Includes marginal abatement cost of alternative GHG reductions in cost-effectiveness assessment. In the near term, use a proxy analysis of marginal abatement cost if IRP is not yet completed

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Challenges with marginal GHG abatement approach (1A)

- Problem 1: How to estimate the avoided cost of the alternative GHG reduction opportunity?
- Sub-problem 1A: What scope of GHG reduction opportunities to consider?
  - Electricity Sector Only Scope
    - Pros: More certain cost, single regulated LSE for trade-offs
    - Cons: Not necessary least cost
  - CPUC jurisdictional Scope
    - Pros: More certain cost, one coordinated analysis across CPUC
    - Cons: Not necessarily least cost for society
  - Economy-wide Scope
    - Pros: Theoretically least cost approach
    - Cons: Multi-agency, cost uncertainty, difficult analysis

Straw proposal →

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Challenges with marginal GHG abatement approach (1B)

- Problem 1: How to estimate the avoided cost of the alternative GHG reduction opportunity?
- Sub-problem 1B: How to calculate the cost of the avoided GHG mitigation measure?
  - Two approaches are available, nearer and longer term
  - Best approach (longer term)
    - Use information from the CPUC IRP (and natural gas planning for CPUC jurisdictional scope) to calculate the net cost of the best other alternative in a marginal abatement cost calculation
  - Easier approach (shorter term)
    - Pick a proxy measure and compute the net marginal abatement cost of that measure
    - e.g., utility scale solar, electric vehicle, other measure

Challenges with approach (2)

- Problem 2: How to calculate the marginal abatement cost of alternative compliance measure?
  - This is not as easy as it might seem and requires many assumptions that can change the answer significantly

Marginal abatement cost of alternative compliance measure = $\frac{\Delta \text{ Cost relative to a reference case}}{\Delta \text{ Emissions relative to a reference case}}$

Requires
Reference case definition
Long term marginal emissions rates of reference case
Vintage, lifetime, and annualization assumptions
Forecast assumptions (energy, fuel, technology cost and performance)

Discussion and Q&A

- Are we right to think of the DER cost-effectiveness framework in coordination with the IRP process?
- Is the proposed mitigation cost as avoided alternative GHG compliance cost appropriate as opposed to damage estimates of GHG emissions?
- What are the strengths and weaknesses of the suggested CPUC-jurisdictional scope of the marginal GHG abatement approach ?
- Other discussion topics

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