

“Fuel Substitution Measures” Issue Statement

Fuel substitution is defined as the substitution of one “regulated” fuel for another, like natural gas to electric. (In contrast, fuel switching is defined as switching from a ‘non-regulated’ fuel, like propane or natural gas.) The CPUC adopted new fuel substitution rules in 2019 that must be applied clearly and consistently for the development of deemed fuel substitution measures. The new fuel substitution rules result in three sets of calculations/values that do not fit into the current measure and claims reporting process:

- Source energy comparison of base case and measure case technologies (fuel substitution requirement).
 - BTUs over life of measure (different than “normal” deemed measure)
- Unit energy consumption (UEC) for base case and measure cases (CPUC decision directing the reduction of EE goal for base case fuel).
 - Baseline and measure case UECs are documented in eTRM already
 - How values are reported to CPUC is more complex
- Site energy comparison between different fuels as done in typical measure savings calculation.
 - CO2 reduction over life of measure

It is unclear how to report the measure savings and how to apply UECs to the EE goals.

Target Audience

Who cares about this problem? Who are we trying to persuade? Who will be able to take action?

- PAs (IOUs and others) (BB)
- Program implementers (BB)
- Measure designers (BB)
 - Include product manufacturers? Nest for example put in work on t-stats; would the HPWH folks produce their own? Especially for the TECH program in the Decarb proceeding (MC)
- City and State officials who look to push for electrification measures through reach codes (AS)

Potential Research / Analysis Approach

What is the analysis approach to the research that needs to be done to devise one or more potential solution(s)?

- Look at Title 24 (MC)
- E3 looking at this (kWh conversion values) for CEC (AP)
- Seems essential to work with the CPUC staff and get the clarity from them on this issue. (BB)
- Look for lowest hanging fruits based on market sector, building type, vintage, and climate zone.

Potential Data Sources (Primary and Secondary)

What are the data sources that will be analyzed? Is the data accessible?

- Fuel substitution technical guidance, fuel substitution calculator
 - D.19-08-009, other CPUC decisions
 - NYSERDA (BB)
 - LBNL, NREL, E3 Potential Study
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Key Technical & Policy Considerations and Challenges

What are the barriers to address this problem? What are the barriers to completing this white paper? Any timeline considerations?

Cost effectiveness (AS)

Funding sources (AS)

Gas line bans and lawsuit in Berkeley (AS)

Scope of white paper

- Address how to deal with current state, how to incorporate additional values in reporting (no rule changes, no corrections/updates to methodology)
- Address how to improve current state with updates to rules and methodology/calculator
 - Updates to rules/methodology should be TPP (not white paper)

New Construction, Baseline

- Current guidance does not include new greenfield construction (not substituting anything)
- The baseline would be the building design spec. If switch from gas/elec to all-elec design, then baseline would change to all-elec
- Retrofits that trigger code would have issue (AP) A full-scale remodel of an existing area will trigger code but is eligible for fuel sub (JM)
- Commercial has mixed-fuel standard, residential also has all elec standard (AS)
 - There is work to address MF right now for standard update (AP)
 - Could compare all elec building to mixed-fuel standard, but then the project might not meet code. Is EUI the same? (AS) The intent is to keep EUI the same (AP)

Fuel Substitution Calculator Methodology / Technical Guidance

- How to calculate BTUs – is there a single value, value per utility? (AP)
- The CEC is looking at hourly values for source energy (separate from TDV but similar approach). The CPUC Decision discussed switching to hourly in the future.
- Need corresponding hourly load shapes
- D.19-08-009 heat values for avoided cost calc is appropriate for source energy conversion. But technical guidance adopted different set of heat rates. These should be examined/verified. (CP)
- A recent email from CPUC noted the CET was updated to address negative/positive fuel savings, so CET can calc fuel substitution. The CET calculator convert to kWh and will calculate C/E using elec avoided cost. (CP)
- In the past entered prelim into CET, got drastically different TRC for same measure using this approach, different than if kept fuel #s separate and treating one as negative and the

other as positive. (JM) (Chan similar experience, CPUC is looking into this)

- There are issues with current methodology. Opportunity for this group to recommend appropriate methodology and present to CPUC. CP agrees if issues can be clearly identified. (AS) The calculator (Oct 2019) was the initial tool; the intent was to refine in the future. (JM) Acknowledges it is high-level methodology and gaps need to be filled in. (AS)
- Need to look into heat rate conversion factors (AS)
 - There are examples of utilities outside CA offering gas to elec measures to customers. Heat rate favorable for using gas instead of elect. Might be different for CA because cost/benefit calcs in CA (CP).
- In the goals and potential study, not taking customer into consideration for fuel substitution. This makes it more difficult to create program around fuel sub measures if customer decision is not reflected. (MC)
- Dynamic supply side issues, hourly impacts of avoided GHGs can radically differ from customer to customer, can't be prototyped. This is especially true for battery electric storage systems. (MC)
- Consider that there are geographic areas that are heating predominant vs cooling predominant. Swapping to an elec hp will add AC where didn't have it before in some CZs, whether the customer needed it or not. In such instances, the elec hp measure could add AC peak load. This is a factor with BayREN, coastal N.CA and So Cal areas. (JM)

Metrics

- Emphasis should be on GHGs saved instead of costs. Not ignoring costs, but not end goal. (GB)
 - Source energy is proxy for GHG. CEC is bound by what can include in C/E analysis. Not sure about CPUC side. (AP)
 - In CET, GHG and source energy values scale with each other
 - If looking at GHGs should look at offsets from refrigerant reduction, which might postpone other projects (GB)
 - Would it be worth connecting with CARB to see if their refrigerant management program could inform the refrigerant leakage issue that was discussed on the call? (BB)
 - Would it make sense to factor the CARB cap-and-trade program into how fuel substitution measures are evaluated for cost-effectiveness? (BB)
 - Problem today trying to use EE for GHG reduction, metrics do not match. Need \$/CO2 to change metric to GHG. (JM)
 - Include \$ cost to customer, what is the net impact of customer energy bill \$ (regardless of fuel type) (JM)
 - C/E test no longer considers cost to customer
 - The fact that we are not valuing carbon at a high enough rate is huge obstacle (GB)
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- Are we focused on individual measure level or whole building or whole program? Bundled measures might be more cost effective. Where does the customer experience land in this continuum? (AP)

Infrastructure Costs

- Consider both avoided infrastructure and added infrastructure. Is CET the right format for these costs? What do you assume for baseline? Assumptions will impact C/E. Is there a tie-in to the ACC or DDIF? (AP)
- Infrastructure costs are recorded separately from material and labor costs and vary a lot between measures. Currently, Pas are requiring customer reports to document infrastructure cost upgrades. Infrastructure costs can be \$0 for some measures. What's done with infrastructure costs hasn't been determined yet. (JM) Need data to "deemify" per unit cost. (AS)
- The white paper should identify parameters for estimating infrastructure costs. What's included/not included. (AP)
- In a few years, fuel sub measures will be covered by impact evaluation and recalibration. Some costs are variable, some will match estimates for deemed measure. How close are the ex ante infrastructure cost estimates to actual? Make prelim decisions now, then wait until impact evaluation results. (ER)
- The E3 study for SCE, LADWP can be starting point. (AS) Can benchmark/compare. Codes & standards/new construction standards might have values. (AP)

Availability of Resources to Complete Whitepaper

Are enough people able and willing to contribute to the development of this white paper? List subcommittee members here.

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Participants of subcommittee and interested parties include:

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Value/Potential Impact

Rate the impact on the CA EE/DSM industry (high, med, low) and describe. Is the impact commensurate with level of effort/costs required?

- Could influence later track of decarb. proceeding. (MC)
- Could standardize the implementation of Fuel Substitution Measures in Utility incentive programs
- Could influence citywide (reach) and statewide codes and standards
- Increase feasibility of implementing Fuel Substitution measures
- Could impact potential & goals study (MC)
- Could impact IRP (MC)
- Could impact market transformation PA decision making for MT Initiative investment decisions (MC)