Cal TF eTRM Charrette
GHG Calculation Approach

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TECHNICAL FORUM

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Greenhouse Gas Impact

- Current approach to calculating greenhouse gas impacts of EE measures is complex
  - Starts with CPUC-adopted Avoided Cost Calculator
    - Determines annual average GHG per MWh of energy
    - Parses annual value to hourly value per MWh based on supply mix
      - Assumes all avoidable supply comes from natural gas turbine
      - Uses market price as proxy for supply mix
      - Assumes higher market price reflects less efficient gas turbines
      - Lower market price would reflect increasing amount of renewables in mix
    - These were most recently updated in August 2019

Greenhouse Gas Impact

- ACC output is then “rolled up” for inclusion in Cost-Effectiveness Tool (CET)
  - Performed using Excel tool (e.g., SCE_PreProc mm-dd-yyyy.xlsm)
  - Uses hourly emissions outputs from ACC
  - Uses hourly end-use profiles from DEER 2011
  - Uses Time-of-Use mapping by utility
    - Addresses on-peak, partial peak, off-peak
    - Summer and Winter seasonal periods
  - Aggregates values to quarterly and annual values
  - Output from pre-processor tool is used to populate CET tables in SQL Server database

Greenhouse Gas Impact - POU

- CMUA guidance provides several options
  - Use CEC-forecasted emission rates
    - Need CEC buy-in
  - Use GHG methodology and emission rates developed by CARB
    - Viewed as over-simplistic, not very robust
    - May not be acceptable to CEC
  - Develop POU-specific emission rates
    - Would be most accurate
    - Also most expensive option, perhaps cost-prohibitive for smaller POUs
  - Adopt emission rates based on E3 analyses for IOUs
    - Can be seen as most viable near-term
    - Data already exists, is considered robust by regulators

Recent Rulings

- Avoided Cost Calculator updated to reflect changes in supply mix
  - More renewables
- Fuel Substitution Decision may affect how emissions rates are determined and monetized
  - Currently, ACS uses average emissions rates
  - Load-building activities like gas-to-electric fuel substitution would be better served by using long-term marginal emission rates
  - No change adopted yet, due to complexities involved in modifying existing tools
- These (and other, unforeseen future decisions) may affect the hourly emission rate values

- **However, the methodology proposed for eTRM should be flexible enough to incorporate any changes that may occur in future.**

Greenhouse Gas Impact

- Proposed eTRM methodology will use hourly profiles for energy savings and CO_2 emissions
- This approach will satisfy POU near-term desire for hourly emission impact data at measure level
- It also provides maximum flexibility to address emergent needs
  - Changes in DEER peak methodology
  - Allows rapid incorporation of new measures
    - Once a savings load shape is derived, the emissions profile and impacts can be readily determined in eTRM
  - In the future, it may allow tools like ACC and CET to be streamlined by offloading emissions calculations to eTRM
    - ACC may still monetize GHG at unitary rate and feed that value to CET
    - ACC would still generate avoided cost components, but would feed directly to CET
    - Emissions profile (and savings load shape) can be transmitted to CET from eTRM as part of measure packet
    - CET can then monetize estimated savings using unitary rate provided by ACC
    - This could eliminate the pre-processing step between ACC and CET

Proposed GHG Treatment in eTRM

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Greenhouse Gas Impact

- For each measure, an hourly savings profile is assigned
  - 8,760 hour profile
- A greenhouse gas hourly profile is selected
  - May be utility specific, or may be CAISO profile (from Clean Net Short calculator)
  - One table used for each year

Measure Savings: 45 kWh

Hourly Profile Table

M	D	H	ES
1	1	1	0.02%
1	1	2	0.02%
1	1	3	0.04%
1	1	4	0.05%
…	…	…	…
12	31	24	0.01%

X

CO2 Table

M	D	H	CO2
1	1	1	0.030
1	1	2	0.025
1	1	3	0.025
1	1	4	0.025
…	…	…	…
12	31	24	0.040

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Hourly Reduction

M	D	H	CO2
1	1	1	0.00027
1	1	2	0.00023
1	1	3	0.00039
1	1	4	0.00056
…	…	…	…
12	31	24	0.00018
Sum:			2.45

M = Month of year
D = Day of month
H = Hour of day
ES = Energy Saving fraction for Hour
CO2 = CO2 Rate for Hour

Questions

- What source should be used for GHG emissions rates?
  - Ideally, should be source that IOUs and POUs can use interchangeably
  - What approach/source for GHG savings calculation should be used? Examples:
    - CPUC electrification proceeding (decarbonization)
    - POU cost-effectiveness calculator
    - IOU CET
    - Climate Action Registry
    - CARB approach
    - IERP process – Clean Net Short calculator
    - Other?
- How often should values be updated?
  - May depend on approach selected

Questions

- How should GHG impacts for natural gas be addressed?
  - Single rate per therm
    - May not reflect effect of bio-methane and H_2 injection into pipeline
  - Are there load-shape dependent attributes to natural gas CO_2?
    - Seasonality
    - Geographic
- As GHG rates are updated, how should they be deployed to measures?
  - We could update measures, triggering a new version whenever rates change
  - We could store emissions values as separate process in eTRM
    - Decouple emissions rate versions from measure versions
- Do updates need to be applied retrospectively?
  - Example – should 2021 CO_2 update be applied to 2020 measure version