Understanding California's New Fuel Substitution Test To Support Decarbonization

May 1, 2020

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Announcements

- AESP California Chapter Board Call for Nominations
  - 2 Positions: VP, Southern California & Membership Chair
  - Email bio & letter of intent to slipp@trccompanies.com by 5/18
- Upcoming Webinars:
  - Thursday, May 7, 2020: Normalized Metered Energy Consumption (NEMC) Explained
  - Wednesday, May 20, 2020: TRC versus PAC: How to Reform Cost-Effectiveness for Modern DSM
- Please hold your questions until the end of the presentations

Today's Presenters

- Alejandra Mejia Cunningham, Building Decarbonization Advocate for NRDC

- Jay Madden, Senior Engineer for Southern California Edison

Policy Context

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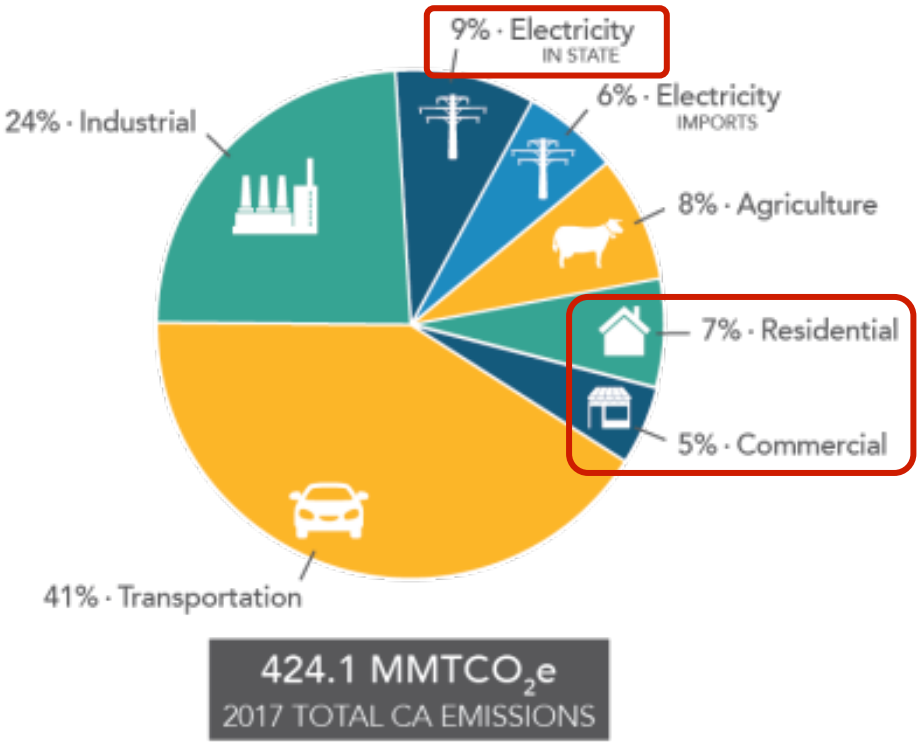
Policy Context: Why Buildings Matter

California Emissions by Economic Sector



- Gas combustion in buildings (12%) > all in-state power plants (9%)
- Not including building emissions from electricity and fugitive methane

Source: www.arb.ca.gov/cc/inventory/data/data.htm, 2019

Policy Context:
The Problem with the Three Prong Test

Established in Decision 92-02-075

- Baseline set by optimistic policy goals: “Most efficient available technology for already installed fuel”
- Prong one: Heat rate used to calculate source energy do not account for renewable penetration
- Prong two: High cost effectiveness threshold than all other measures (TRC=1 at measure level, not portfolio)
- Prong three: Assumes gas plant is marginal electric resource

Policy Context: Problem Fixed!

CPUC Decision 19-08-009 (August 5th, 2019)

- Revision driven by GHG emission reduction goals
- Reduced the test to two-prong “Fuel Substitution” tests

The New Fuel Substitution Test

- **Part 1 - Measure must NOT increase total source energy (BTU)**
- **Part 2 - Measure must NOT adversely impact the environment (CO2)**

- Baseline & cost effectiveness requirements equal to all other measures
- Does not allow for fuel switching from unregulated fuels

Fuel Substitution Test

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Fuel Substitution Test

Test Part 1 - Calculate Source Energy Savings (BTUs)
Test Part 2 - Calculate CO2 Emission Savings

These are calculated automatically using supporting Fuel Substitution Calculator

Section 2. Fuel Substitution Test Part 1 and Part 2

	Part 1: Lifecycle Savings of Primary Energy		Part 2: Lifecycle savings of CO2e emissions		Conclusion of Fuel Substitution Test
Index	Lifecycle Primary Energy Savings (MMBTU at generation source)	Test Pass/Fail	Lifecycle emissions savings Metric tCO2	Test Pass/Fail	
1	11.183	PASS	0.593	PASS	Eligible
2	72.078	PASS	3.825	PASS	Eligible
3	128.029	PASS	6.795	PASS	Eligible
4	3,218.793	PASS	170.823	PASS	Eligible

California Energy Efficiency Energy Contracts – Published 10/30/2019
https://pda.energydataweb.com/api/view/2304/Fuel%20Substitution%20Technical%20Guide%20v1.1.pdf

Test Part 1 – Calculate Source Energy Savings (BTU)

Life-cycle source energy consumption of the measure (over the Effective Useful Life – EUL) must be less than that of the baseline technology

No peak demand reduction or penalty towards peak demand goal achievement

$$\textit{Source Energy Savings (BTUs)} = \sum_{1}^{EUL} \textit{Site Energy Savings x Source Energy Factor}$$

Figure 3: Fuel Substitution Source Energy Factors

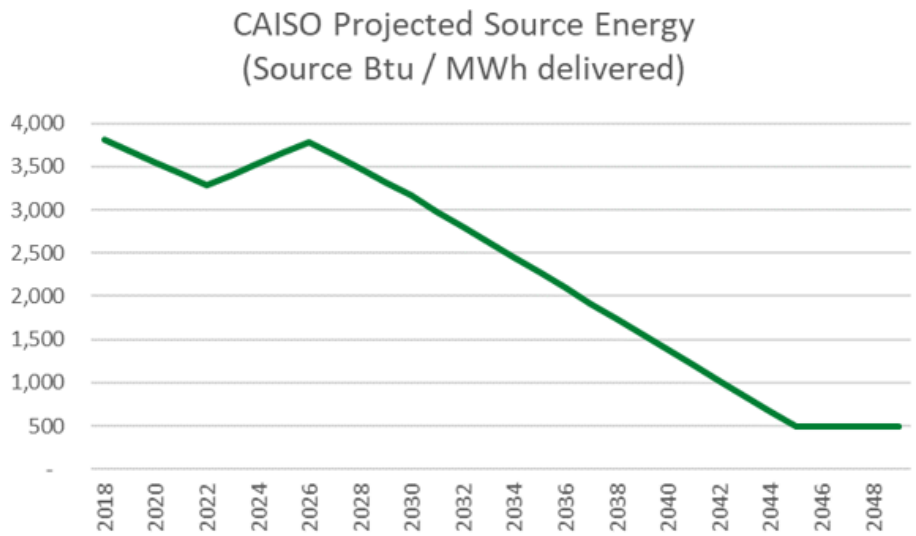


Table 3 Annual Source Energy and Emissions for Natural Gas used at the Site

Year	Emissions Intensity (metric tonnes CO_2/Therm)	Source Energy (Btu/Therm)
Constant over the years	0.00531	100,000

Note:

- How "clean" is the power in the grid?
- These are electric annual factors based on the intensity in the 2017-2018 Reference System Plan and incorporate the net effect of both increases from direct emissions and the corresponding supply portfolio response.

- These are driven by de-carbonization policies, e.g., AB100

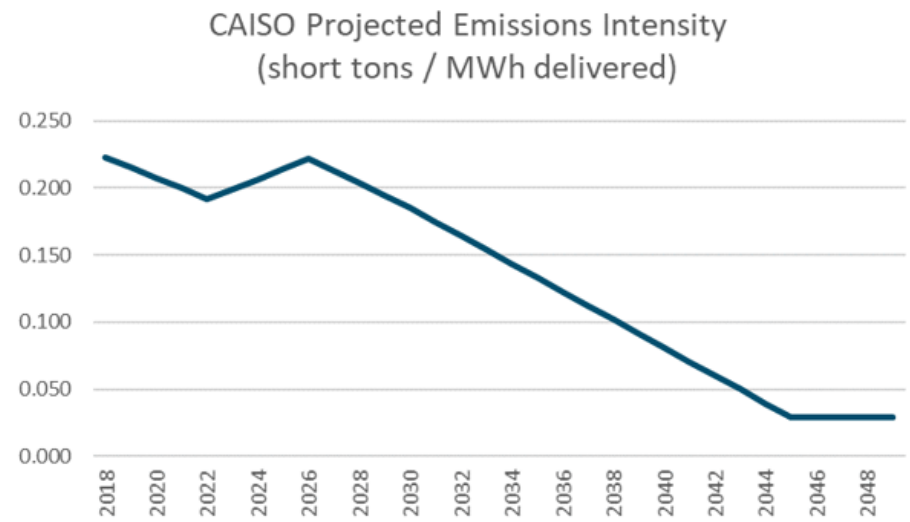
Units: Heat Rate - Source Btu / MWh delivered

Test Part 2 – Calculate CO_2 Emission Savings

Life-cycle CO_2 emissions of the measure (over the Effective Useful Life – EUL) must be less than that of the baseline

$$CO_2 \text{ Emission Savings (short tons)} = \sum_{1}^{EUL} \text{Site Energy Savings} \times \text{Emmission Intensity Factors}$$

Figure 2: Fuel Substitution GHG Factors



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General Notes:

- How "clean" is the power in the grid?
- These are electric annual factors based on the intensity in the 2017-2018 Reference System Plan and incorporate the net effect of both increases from direct emissions and the corresponding supply portfolio response.
- These are driven by de-carbonization policies, e.g., AB100

Units: Short Tons / MWh delivered

Other Things to Note:

- If the measure technology passes the fuel substitution test, it may be offered as a deemed measure or within a custom project
- Cost Effectiveness
  - Fuel substitution measures are not required to pass cost-effectiveness thresholds at the individual measure level
  - However, since fuel substitution measures are included in the cost effectiveness analysis of PA energy efficiency portfolios, program developers should calculate the cost effectiveness of fuel substitution measures
  - When performing the cost effectiveness calculations input a positive value for the original fuel net savings & a negative or positive value for the new fuel net savings

More Things to Note:

- Energy Savings Goal Reduction
  - The original fuel utility can reduce its kWh or Therm savings goals by the difference between the fuel substitution measure's energy use & the energy usage of the baseline measure
- NTG
  - As directed in the Decision 19-08-009, use a default NTG ratio 1.0 until impact evaluation results become available
- Sites with On-Site Generation
  - As per the Decision 19-08-009, for sites with on-site generation, fuel substitution measures will be treated as any other energy efficiency measure
  - Appendix B of the Technical Guidance has additional details

Resources


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Resources

- CPUC Fuel Substitution Decision 19-08-009
- Fuel Substitution Technical Guidance for Energy Efficiency. Version 1.1 10/31/2019
  - Provides guidance on the following:
    - Determining a fuel substitution measure baseline
    - Conducting the fuel substitution test
    - Calculating the cost effectiveness of a fuel substitution measure
    - Reporting energy savings & goal reductions
- Fuel Substitution Calculator v 1.1
  - Calculates the Source Energy & CO_2 Emissions Savings
  - Supplements the Technical Guidance document
- Technical Guidance & Calculator can be found at:
  - https://pda.energydataweb.com/#!/documents/2304/view

Program Opportunities

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Fuel Substitution Opportunities

- Approved Deemed Measures:
  - Heat Pump Water Heater, Residential
  - Ductless HVAC, Residential
  - Heat Pump HVAC, Residential
  - Heat Pump Clothes Dryer, Residential
  - Package A/C to Heat Pump, Commercial
- The Following Deemed Measures have been Submitted for Approval:
  - Fryers, Commercial
  - Cooking Equipment, Residential (Induction Cooktops)
  - Convection Ovens, Commercial
- The Fuel Substitution Test is also applicable to Custom Projects

Q&A

- We'll unmute the lines so you can ask your questions verbally
- You may also post your questions in the chat box

Thank you for joining us!

Don’t forget about our upcoming webinars:

Thursday, May 7, 2020: **Normalized Metered Energy Consumption (NEMC) Explained**

- Carmen Best (Director of Policy & Emerging Markets for Recurve) & David Jump (Director for kW Engineering)

Wednesday, May 20, 2020: **TRC versus PAC: How to Reform Cost-Effectiveness for Modern DSM**

- Adam Scheer (Director of Customer Solutions for Recurve) & Mohit Chhabra (Senior Scientist, Climate & Clean Energy Program for NRDC)