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SoCalGas Comments on IEPR Building Decarbonization (Equipment)

Additional submitted attachment is included below.

Kevin Barker
Senior Manager
Energy and Environmental Policy
555 West 5th Street
Los Angeles, CA 90013
Tel: (916) 492-4252
KBarker@socalgas.com

July 7, 2021

The Honorable J. Andrew McAllister
California Energy Commission
Docket Unit, MS-4
Docket No. 21-IEPR-06
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Comments on Building Decarbonization (Equipment)

Dear Commissioner McAllister:

Southern California Gas Company (SoCalGas) appreciates the opportunity to provide public comments on the California Energy Commission (CEC) Integrated Energy Policy Report (IEPR) Commissioner Workshop on Building Decarbonization (Equipment) held June 22, 2021. Our comments focus on recommendations to facilitate development of successful building decarbonization policies grounded in the realities of home energy consumption, household energy burdens, and existing emissions profiles.

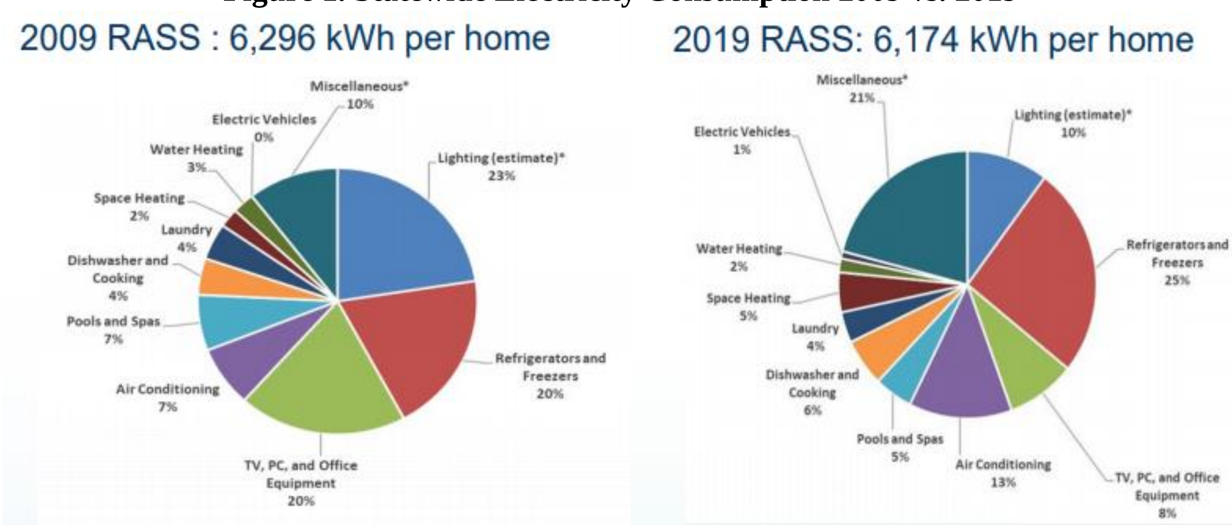
Home Energy Consumption

Based on the findings of the 2019 Residential Appliance Saturation Study (RASS), the "Lighting," and "TV, PC, and Office Equipment" categories decreased by about 60 percent of total statewide electricity consumption. The CEC deserves much of the credit for these electricity consumption reductions because of its effective work on TV and battery charger codes as well as its long-term commitment to lighting research and development at the University of California (UC) Davis lighting center. The CEC has also preserved its regulatory authority over lighting codes.[1] Clearly, all the CEC's hard work has paid off greatly in these areas.

[1] The National Electrical Manufacturing Association and American Lighting Association challenged the CEC's expanded rules for light bulbs, but later dismissed the lawsuit. *See* "California Energy Commission Statement on Lawsuit Dismissal Challenging Lighting Rules," January 15, 2020. Available at: https://www.energy.ca.gov/news/2020-01/california-energy-commission-statement-lawsuit-dismissal-challenging-lighting.

Conversely, the data expresses that electricity consumption for "Refrigerators and Freezers" increased by more than 20 percent over the total average consumption in 2009. (See Figure 1). This suggests that, due to affordability considerations, new energy efficient refrigerators and freezers may not be ready for mass market penetration. A significant percentage of consumers may buy refurbished/used refrigerators and freezers instead of new. At the same time, we suspect that higher-income households, who can afford new appliances, may also be increasing the number of units in a household. We also note that the "Miscellaneous" category's electricity consumption doubled; however, both the cause and emissions solutions are not discernable from the 2019 RASS and will require further fact finding and analysis. Finally, for all the attention that heat pumps have gained in the Title 24 Energy Code context, one would expect for their electricity consumption to have significantly grown over the past decade. However, electricity consumption for space and water heating is still very low. In 2009, space and water heating made up 5 percent of the total electricity consumption, while in 2019 these categories made up 7 percent.

Figure 1. Statewide Electricity Consumption 2009 vs. 2019[2]



Household Energy Burdens

As the State pursues the achievement of its climate goals, one boundary condition that must be considered is the extent to which energy efficient smart technology-based equipment requires a stable broadband internet connection. Home internet is necessary for and a catalyst to expand participation in building decarbonization programs. Currently, only about 25 percent of California's households have access to broadband internet.[3] Researchers found that income is a key determinant in whether a household has broadband internet access. In fact, low-income

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[2] Le-Huy Nguyen, *Presentation – 2019 Residential Appliance Saturation Study (RASS)*, California Energy Commission, 21 June 2021, at slide 6, Available at https://efiling.energy.ca.gov/getdocument.aspx?tn=238346.

[3] *See* CEC IEPR Commissioner Workshop on Building Decarbonization (Equipment), 21 June 2021, at 00:14:41. Available at https://energy.zoom.us/rec/share/FH-AVI9d86DGmPFFwM-YGcYsS3AqXaRSyRxgZNsdHYSv5vV-OzaqFfzTxwbYBwUX.Jq7xNmo_vvd0NrAn.

households often forgo broadband internet services for extensive periods to save money.[4] The implication is that for low-income households to participate in and derive benefits from increasing building electrification, affordable broadband internet is a prerequisite, with corresponding implications to cost burdens for low-income households. Effective building decarbonization solutions that serve and advance the public interest must be carefully designed to avoid the imposition of such asymmetrical and inequitable affordability effects.

Careful, integrated planning and sequencing of decarbonization policies and programs is also vital to avoid unintended consequences. Researchers found that aggressive electrification of residential end-use appliances has the potential to exacerbate daily peak electricity demand and increase total household expenditures on energy.[5] Currently, as a percentage of their income, low-income households spend 3.5 times more on home energy bills than non-low-income households.[6] (See Appendix A). As such, recognizing and integrating trends in gas and electric rates, with consequent implications for policy decisions and incentives, are also material to decarbonization policy choices. In many instances, the interactions between rate design and building decarbonization strategies will ultimately determine whether all-electric customers see net bill savings or increases. (See Appendix B). More pointedly, interdependencies among and between retail electricity rate reform (*i.e.*, eliminating time-of-use or peak pricing) and appropriate incentives for customers to actuate all-electric building standards may further burden low- and middle-income households, including renters. (See Appendix C). This potentially highlights the need to fully and transparently evaluate the many inter-related factors in building decarbonization policies and programs to adequately advance the public interest *across all segments of society*.

Existing Emissions Profiles

Transparent, fact-based policymaking also requires honest presentation and assessment of data - for which CEC workshops are an important stakeholder forum. This includes recognizing when panelist presentations may fall short of applicable standards of candor. During the workshop, a panelist presented a slide purporting to illustrate that building emissions are the primary source of smog-forming NOx emissions.[7] When the panelist falsely purported to attribute causation, the misinformation creates obstacles rather than facilitate sound policymaking. Figure 2 below utilizes the same data source as did the panelist, California Air Resources Board's (ARB's) 2020 sectoral NOx emissions projections including each of the three sectors that were presented in the Building

[4] Ron Mackovich, *California surpasses 90% internet connectivity, but low-income households still lack access,* USC News, 30 March 2021. Available at https://news.usc.edu/183952/california-internet-access-usc-survey-broadband-connectivity/.

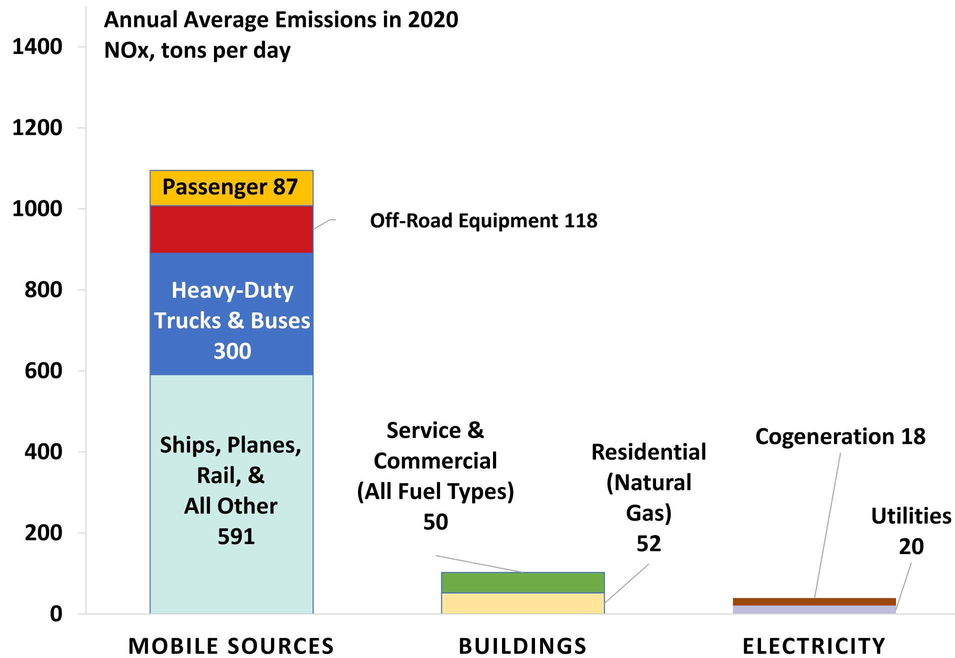
[5] Eric Daniel Fournier, et al. "Implications of the timing of residential natural gas use for appliance electrification efforts." Environmental Research Letters 15, no. 12 (2020): 124008. Available at https://iopscience.iop.org/article/10.1088/1748-9326/aba1c0/pdf.

[6] Fiona Burlig, *Energy Efficiency Can Deliver – Here's How,* Forbes, 24 May 2021. Available at https://www.forbes.com/sites/ucenergy/2021/05/24/energy-efficiency-can-deliver-heres-how/?sh=138742e87ca0.

[7] Panama Bartholomy, Presentation on Building Decarbonization Barrier Busting, 22 June 2021, at Slide on Outdoor Air Quality. Available at https://efiling.energy.ca.gov/getdocument.aspx?tn=238440.

Decarbonization Coalition's slide: transportation, buildings, and electric generation.[8] As is evident, the transportation sector is responsible for greater than ten times the NOx emissions as all 12 million buildings in California and almost 30 times more than electricity generation (cogeneration is included as these are industrial sized power plants that produce steam and electricity).

Figure 2. NOx emissions by Mobile, Building and Electricity Sector[9,10]



California is seeking to achieve carbon neutrality goals by 2045, for which there is no blueprint and not yet consensus on the path to get there. Collaborative and fact-based engagement among all stakeholders is essential to achieve these goals.

In closing, the thermal needs of buildings, as the primary impetus for emissions, are largely clear and straightforward but reducing building emissions is complicated, particularly in consideration of consumer impacts and regulatory constructs. A sizable portion of building emissions, and the majority of emissions from natural gas combustion, result from market participant choices by non-

[8] California Air Resources Board, 2016 SIP Emission Projection Data, 2020 Estimated Annual Average Emissions (Statewide). Available at https://www.arb.ca.gov/app/emsinv/2017/emssumcat_query.php?F_YR=2020&F_DIV=0&F_SEASON=A&SP=SIP105ADJ&F_AREA=CA#0.
[9] California Air Resources Board, 2020 SIP Projection Data – Almanac Emission Projection Data. Available at https://www.arb.ca.gov/app/emsinv/2017/emssumcat.php.
[10] California Air Resources Board, Greenhouse Gas Emission Inventory – Query Tool for years 2000 to 2018 (13th Edition). Available at https://www.arb.ca.gov/app/ghg/2000_2018/ghg_sector.php?_ga=2.109097357.96389475.1624471734-1364729385.1588700669.

core and/or larger core customers for whom there is limited (if any) legally valid means for compelling some of the decarbonization tools being explored in this proceeding.

As a common carrier, SoCalGas' primary business is to provide non-discriminatory fuel transportation services to those who request it. Larger customers, who can also include core customers, are free to procure their own fuel and have it delivered by the States' gas utilities. This foundational market design element has significant regulatory jurisdictional implications to building decarbonization strategies. As one starting point, we recommend that the CEC establish statewide energy efficiency targets with regulatory and incentive structures that are cost-effective, feasible in practice, and will not adversely impact public health and safety,[11] and which can and should advance building electrification.

SoCalGas outlined our goals to achieve net-zero emissions, including Scope 3 emissions, in ASPIRE 2045.[12] Scope 3 emissions result from the energy use decisions made by SoCalGas customers and over which, in most instances, we have limited means to influence. SoCalGas is thus aligned with facilitating, advancing, and actuating State policies for reducing our customers' emissions, including building electrification. We respectfully assert that establishing meaningful and aggressive energy efficiency targets for buildings is a beneficial starting point that, if done thoughtfully and carefully, will advance building electrification while minimizing affordability burdens. SoCalGas will take the actions to implement energy efficiency programs and decarbonized fuel strategies - as a comprehensive and supportive framework is vital to meet our shared decarbonization objective.

Respectfully,

/s/ Kevin Barker

Kevin Barker
Senior Manager
Energy and Environmental Policy

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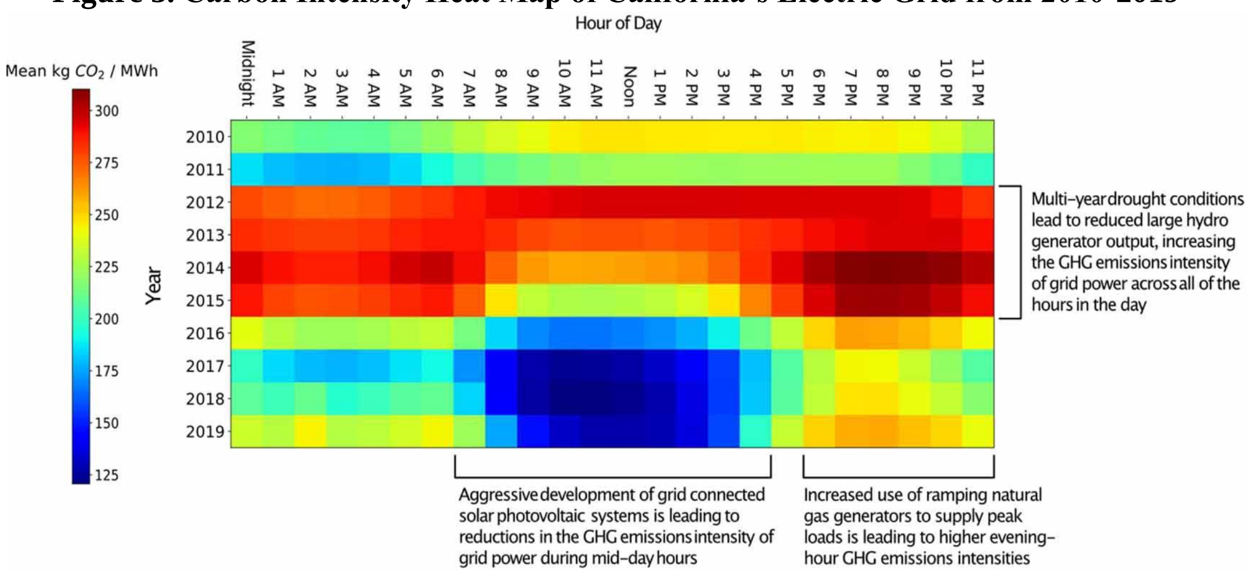
[11] *See* Warren-Alquist Act, 2021 Edition, Section 25310 (c)(1). Available at https://www.energy.ca.gov/sites/default/files/2021-05/CEC-140-2021-001.pdf.

[12] SoCalGas Company, *ASPIRE 2045: Sustainability and Climate Commitment to Net Zero*, March 2021. Available at https://www.socalgas.com/sites/default/files/2021-03/SoCalGas_Climate_Commitment.pdf.

Appendix A. Impacts on Affordable Housing

A recent study published by the University of California, Los Angeles (UCLA study) evaluated the hourly variations in the intensity of residential household's natural gas use within a low-income portion of SoCalGas' service territory.[13] Researchers found that the aggressive electrification of residential end-use appliances has the potential to exacerbate daily peak electricity demand, increase total household expenditures on energy, and, in the absence of a fully decarbonized electrical grid, will likely result in limited GHG emissions abatement benefits. Using templates based on temporal usage data for specific communities can help to distinguish low-income households from wealthier households within the same climate zone. This will also ensure GHG emissions reductions are occurring given the time dependent nature of the carbon intensity of the electric grid. (See Figure 3 below).

Figure 3. Carbon Intensity Heat Map of California's Electric Grid from 2010-2019[14]



SoCalGas shares California's goals of eliminating the State's GHG emissions; however, the cost should not disproportionately impact our most vulnerable and disadvantaged households. According to the Greenlining Institute, California "communities continue to experience high energy costs and energy insecurity, as well as high rates of disconnection when households [cannot] afford their bills."[15] In fact, a 2020 American Council for an Energy-Efficient Economy (ACEEE) report[16] found that 26 million low-income households experience a national median

[13] Eric Daniel Fournier, et al. "Implications of the timing of residential natural gas use for appliance electrification efforts." Environmental Research Letters 15, no. 12 (2020): 124008. Available at https://iopscience.iop.org/article/10.1088/1748-9326/aba1c0/pdf.
[14] Fournier, "Implications of the timing of residential natural gas use for appliance electrification efforts," at 5.
[15] See Greenlining Institute, Affordable Clean Energy webpage. Available at https://greenlining.org/our-work/energy/affordable-clean-energy/.
[16] Ariel Drehol, Lauren Ross, and Roxana Ayala, *How High Are Household Energy Burdens? An Assessment of National and Metropolitan Energy Burden across the United* States, American Council for an Energy-Efficient Economy, September 2020. Available at https://www.aceee.org/sites/default/files/pdfs/u2006.pdf.

energy burden of 8.1 percent as compared to 5 million non-low-income households that experience an energy burden of only 2.3 percent.[17] Therefore, low-income households spend more than 3.5 times as much of their income on home energy bills as non-low-income households. To combat energy burdens in low-income households, the 2020 ACEEE recommends expanding low-income energy efficiency programs, by ramping up investments in housing retrofits, energy efficiency, and weatherization. In fact, based on prior evidence of how weatherization reduces average customer bills, ACEEE estimated that weatherization can reduce low-income household energy burden by 25 percent.[18]

Additionally, researchers found that targeting funds based on past program and household-specific energy use data could increase the cost-effectiveness of energy efficiency investments by 21 percent.[19] There are opportunities to reconsider the performance and effectiveness of actual appliances in buildings in order to improve energy efficiency programs without increasing energy bills. However, there are barriers in the older housing stock that increases the cost and complexity of encouraging appliance and building upgrades to increase efficiency. For instance, the presence of asbestos is a barrier to energy efficiency building upgrades because of the cost of removal and/or abatement. Currently, it is the building owner's financial responsibility to eradicate the asbestos as doing so is outside the scope of energy efficiency programs. This preclusion in the utilization of funds thereby becomes a barrier for much needed energy efficiency upgrades.

The California Public Utilities Commission's (CPUC's) recently approved changes to the Energy Savings Assistance (ESA) program that streamline furnace replacement and repairs are a step in the right direction.[20] These changes will make it easier to access funds for customer specific needs. For example, we have anecdotal evidence of reluctance to replacing furnaces due to a requirement for city inspectors to enter homes to identify code violations. This hesitancy presents a real barrier to widespread weatherization and energy efficiency upgrades for some residences.

These higher energy burdens are not only because of lower incomes, but also because of energy inefficiencies in the home and the time-of-use of energy. For most households, there is very little flexibility in the time-of-use of their energy consumption. Most households use their appliances in the early morning hours when preparing to depart from home and in the evening hours when returning home. Under the existing electricity rate structures, switching from a low energy cost appliance (gas appliance) to a higher energy cost appliance (electric heat pump) will increase a household's expenditure on energy. This is because a household's time-of-use coincides with periods of peak-electricity demand when electricity rates are up to four times or more than gas rates on an energy equivalent basis. In fact, Figure 4[21] (below) from the UCLA study shows that

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[17] Energy burden is defined as utility bills as a percentage of income. Per Ariel Drehol, et al., at 10.
[18] Ariel Drehol, et al., at vi.
[19] Fiona Burlig, *Energy Efficiency Can Deliver – Here's How,* Forbes, 24 May 2021. Available at https://www.forbes.com/sites/ucenergy/2021/05/24/energy-efficiency-can-deliver-heres-how/?sh=138742e87ca0.
[20] *See* California Public Utility Commission Final Decision (D.) 21-06-015.
[21] Fournier, "Implications of the timing of residential natural gas use for appliance electrification efforts," at 6.

"the price premium for electrical energy can grow to a factor of 12 times during peak hours (4PM-9PM)."[22]

Figure 4. Comparison of the Normalized Cost of Energy Between Electricity and Natural Gas for Standard Residential Rate Tiers[23]

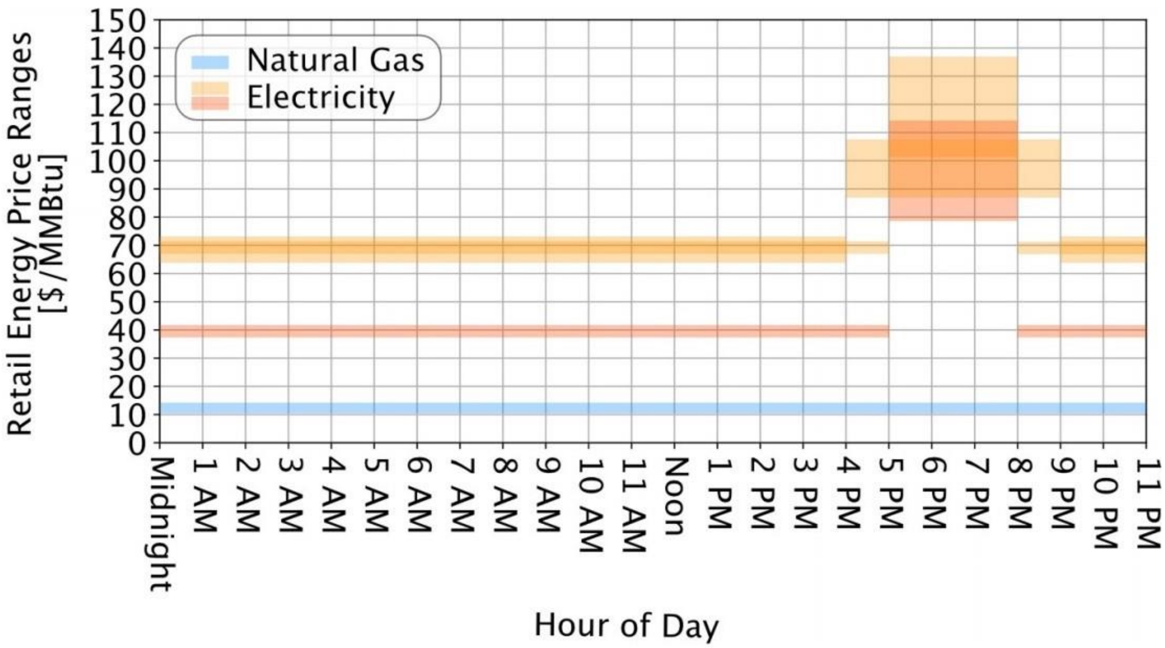

Figure 4. Comparison of local retail price ranges for electricity (red & orange) and natural gas (blue) using standardized energy units ($/*MMBtu*), by hour of day throughout the course of a year. These figures assume current residential rate tariff schedules and within-baseline-tier consumption levels. Note: the two different electricity rate tariffs depicted (red & orange) have different daily basic charges, minimum daily charges, and baseline credits. Thus, the range of values plotted only reflect the marginal cost of energy procurement.

A February 2021 CPUC Report[24] shows from 2019 to 2021, the residential rates for the three IOUs increased by 20 percent.[25] It is important to note that key investments during this period were wildfire mitigation and system modernization costs. The CPUC also examined recent trends and expected spending on major capital investment to develop a rate forecast from 2020 through 2030. The CPUC Report used a 10-year baseline forecast of steady growth in customer rates (nominal $/kWh) and projected electric rates as follows:

> "PG&E: $0.240 to $0.329, or about an annual average increase of 3.7 percent;
> SCE: $0.217 to $0.293, or about an annual average increase of 3.5 percent; and
> SDG&E: $0.302 to $0.443, or about an annual average increase of 4.7 percent."[26]

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[22] Ibid.
[23] Ibid.
[24] *See* CPUC Report on Utility Costs and Affordability of the Grid of the Future.
[25] Most increases in PG&E's rate occurred in 2020, while increases in SCE and SDG&E's rates occurred in 2021.
[26] *See* CPUC Report on Utility Costs and Affordability of the Grid of the Future, at 8.

The CPUC electric rate projections highlighted that, for energy price sensitive households, bills are expected to outpace inflation over the coming decade. The implication is that, if household incomes are expected to generally increase at the rate of inflation, bills will become less affordable over time. CPUC President Marybel Batjer found this discovery "very troubling" as affordability impacts communities across California differently. Continuing to say, "increases in energy bills by $1 or $2 can be absorbed by some households but can be detrimental to low-income households."[27] In fact, lower- and middle-income households bear a far greater cost for the State's power system.[28] Lower to middle-income households also tend to pay a higher percentage of their discretionary income for energy bills than wealthier households.[29]

[27] *See* CPUC En Banc on Energy Rates and Costs Recording, 24 February 2021, at . Available at http://www.adminmonitor.com/ca/cpuc/en_banc/20210224/.
[28] *See* Next 10 and Energy Institute at Haas Report on Designing Electricity Rates for An Equitable Energy Transition.
[29] *See* American Council for an Energy-Efficient Economy Report on How High Are Household Energy Burdens? An Assessment of National and Metropolitan Energy Burdens across the U.S., 2020 September 10. Available at https://www.aceee.org/research-report/u2006.

Appendix B. Impacts on California Residents' Household Energy Bills

According to researchers at the Energy Institute at Haas and the nonpartisan nonprofit organization Next 10, Californians pay some of the highest electricity rates in the country.[30] Energy rates are material to decarbonization policy choices as well as the rate of energy consumption. It has been a long and proud motto for California that although we may have some of the highest electricity rates in the country, we have among the lowest energy bills in the Nation. Table 1 from the U.S. Energy Information Administration (EIA) shows that despite a higher electricity price (19.15 cents/kWh), on average California's residential customers have relatively low electrical bills because customers consume less electricity (532 kWh).[31]

Table 1. U.S. EIA 2019 Average Monthly Bill – Residential

1 **2019 Average Monthly Bill- Residential**

2 (Data from forms EIA-861- schedules 4A-D, EIA-861S and EIA-861U)

	State	Number of Customers	Average Monthly Consumption (kWh)	Average Price (cents/kWh)	Average Monthly Bill (Dollar and cents)
4	Hawaii	438,352	525	32.06	168.21
5	**California**	**13,707,126**	**532**	**19.15**	**101.92**
6	Vermont	316,180	549	17.71	97.18
7	Alaska	289,290	555	22.92	127.29
8	Rhode Island	444,216	560	21.73	121.62
50	Texas	11,366,639	1,140	11.76	134.07
51	Alabama	2,249,425	1,201	12.53	150.45
52	Mississippi	1,293,419	1,206	11.27	135.87
53	Tennessee	2,914,916	1,217	10.87	132.33
54	Louisiana	2,095,466	1,232	9.80	120.70

The table shows the top five states (Hawaii, California, Vermont, Alaska, and Rhode Island) with the lowest average monthly consumption (kWh); and the bottom five states (Texas, Alabama, Mississippi, Tennessee, and Louisiana) with the highest average monthly consumption (kWh).

For the most part, California's low monthly electric bills are attributable to the great success of energy efficiency measures as well as to the temperate climate benefiting most residential customers. The lower electric bills can also be attributed to the fact that most household's thermal energy supply comes from gas. In 2020, about half of a building's energy supply came from gas and half from electricity as shown in Figure 5 (below) from Energy and Environmental Economics' (E3's) Pathways Report.[32] This is not to suggest or urge adherence to the status quo.

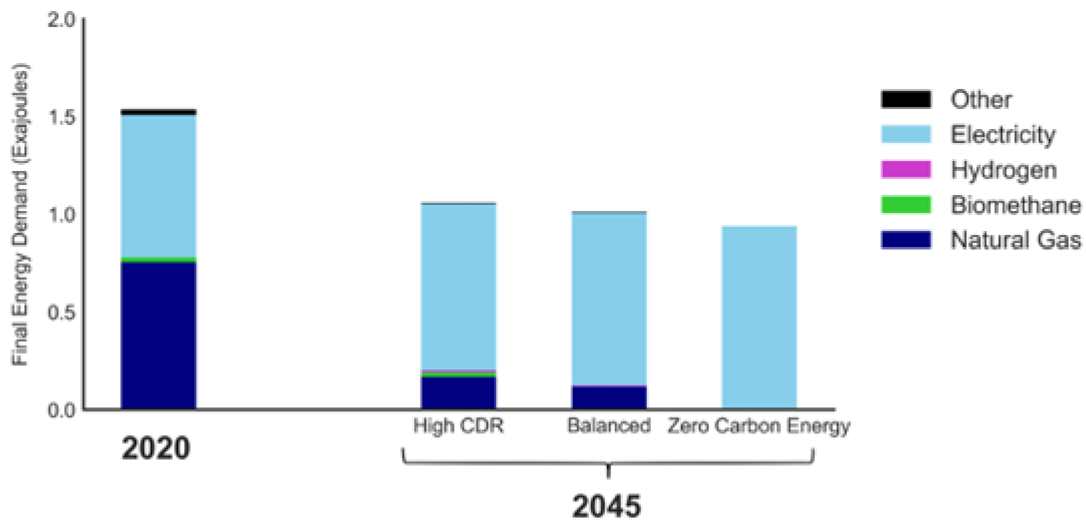
[30] Next 10 and Energy Institute at Haas, *UC Berkeley Report on Designing Electricity Rates for An Equitable Energy Transition*, 23 February 2021. Available at https://www.next10.org/sites/default/files/2021-02/Next10-electricity-rates-v2.pdf.

[31] *See* U.S. Energy Information Administration Data on Electricity: Sales (consumption), revenue, prices & customers: Average retail price of electricity to ultimate customers: Average monthly bill: Residential average monthly bill by Census Division, and State. Available at https://www.eia.gov/electricity/data.php#sales.

[32] Energy and Environmental Economics, DRAFT: Achieving Carbon Neutrality in California: PATHWAYS Scenarios Developed for the California Air Resources Board, August 2020, at 36. Available at https://ww2.arb.ca.gov/sites/default/files/2020-08/e3_cn_draft_report_aug2020.pdf.

But rather to express the need for thorough analysis and development of future decarbonization pathways based on diverse energy sources, and a realistic, publicly vetted cost and rate analysis.

Figure 5. Final Energy Demand in Buildings in 2020, and in 2045 Across the Three Scenarios[33]



As others stated in the Workshop, there are certain areas in the country with all-electric homes. Many of these locations are in Southern States, such as Texas, where climate temperatures generally do not drop below 40 degrees Fahrenheit and residential customers benefit from very-low electric rates. The E3 study figure also shows an all-electric building scenario by 2045, assuming residential customer's electricity consumption will reduce due to high building efficiency assumptions and fuel substitution appliances.[34] For illustrative purposes, if we replace gas consumption with electric consumption on a one for one basis, then California's residential customers will pay the highest average electricity bills in the country. (See Table 2).

[33] Ibid.
[34] Energy and Environmental Economics, DRAFT: Achieving Carbon Neutrality in California: PATHWAYS Scenarios Developed for the California Air Resources Board, August 2020, at 35. Available at https://ww2.arb.ca.gov/sites/default/files/2020-08/e3_cn_draft_report_aug2020.pdf.

Table 2. U.S. EIA 2019 Average Monthly Bill – Residential

1 **2019 Average Monthly Bill- Residential**

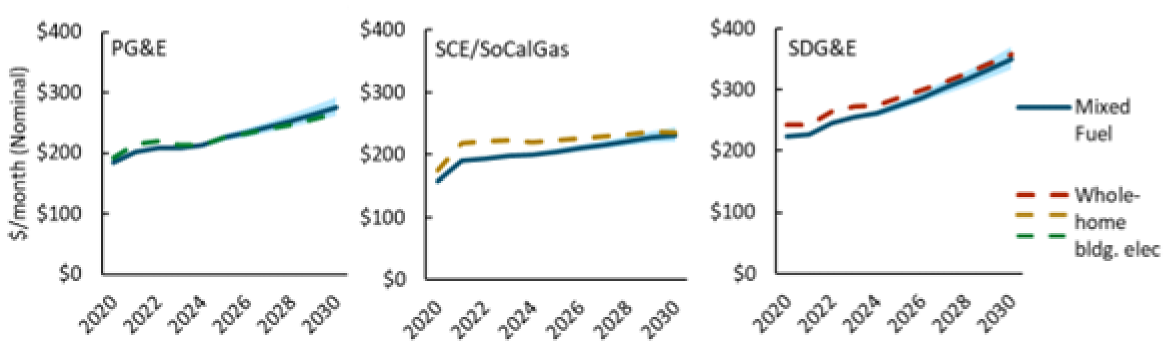
2 (Data from forms EIA-861- schedules 4A-D, EIA-861S and EIA-861U)

3	State	Number of Customers	Average Monthly Consumption (kWh)	Average Price (cents/kWh)	Average Monthly Bill (Dollar and cents)
44	Florida	9,565,846	1,108	11.70	129.65
45	Georgia	4,411,521	1,121	11.76	131.84
46	Tennessee	2,914,916	1,217	10.87	132.33
47	Texas	11,366,639	1,140	11.76	134.07
48	Virginia	3,464,677	1,122	12.07	135.46
49	Mississippi	1,293,419	1,206	11.27	135.87
50	South Carolina	2,330,903	1,114	12.99	144.73
51	Alabama	2,249,425	1,201	12.53	150.45
52	Connecticut	1,510,966	689	21.87	150.71
53	Hawaii	438,352	525	32.06	168.21
54	**California**	**13,707,126**	**1,064**	**19.15**	**203.80**

The table projects the hypothetical assumption of replacing gas consumption with electric consumption on a one for one basis. The California Average Monthly Consumption (kWh) doubled from 532 kWh to 1,064 kWh. The Average Monthly Bill was derived by multiplying 1,064 kWh by 19.15 cents/kWh.[35]

Further, Figure 6 (below) from the CPUC's Report presented at the 2021 CPUC Energy Rate and Costs En Banc shows that the energy costs for mixed-fuel and all-electric homes are similar over the decade and in SoCalGas and SCE territory, mixed fuel homes pay less on average for their monthly utility bill.[36] However, trends in gas and electric rates, as well as policy decisions or incentives, can ultimately determine whether all-electric customers see net bill savings or costs. The customer cost-effectiveness of all-electric new homes represents an important policy consideration for achieving GHG emissions reductions in buildings.[37]

Figure 6. Monthly Energy Bills (Electricity Plus Natural Gas) for a New Mixed-Fuel Home and a New All-Electric Home in a Hot Climate Zone in Three IOU Service Territories

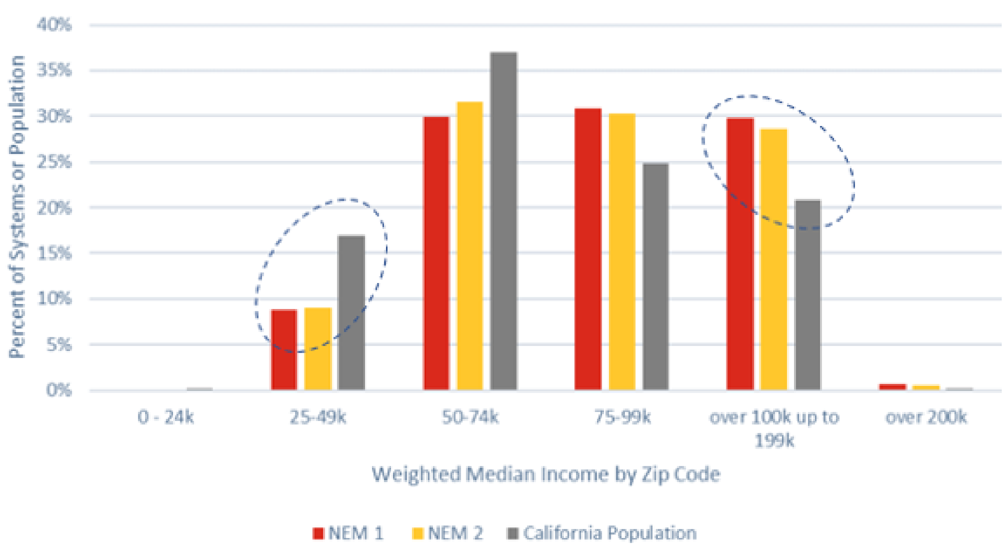


[35] *See* U.S. Energy Information Administration Data on Electricity: Sales (consumption), revenue, prices & customers: Average retail price of electricity to ultimate customers: Average monthly bill: Residential average monthly bill by Census Division, and State. Available at https://www.eia.gov/electricity/data.php#sales.
[36] *See* CPUC Report on Utility Costs and Affordability of the Grid of the Future, at 82.
[37] *See* CPUC Report on Utility Costs and Affordability of the Grid of the Future, at 83.

Appendix C. Impacts of Technology-Specific Tariffs on Non-participating Customers

Technology-specific tariffs, like the Net-Energy Metering (NEM) program have been demonstrated to have unintended cost-shifting impacts on non-participating customers. NEM is a program designed to incent customers to generate their own electricity by installing roof-top solar, wind, biogas, or fuel cells.[38] Behind-the-meter (BTM) customers who install roof-top solar, for example, receive a financial credit at the same electric retail rate (including generation, distribution, and transmission components) for every kilowatt-hour (kWh) of excess solar generated.[39] As such, BTM solar customers avoid paying the full cost for services rendered by the electric grid (*i.e.*, both the infrastructure and energy).[40] These avoided costs are shifted by way of higher electric rates to non-solar customers, who typically have lower incomes and thus less discretionary spending, are more likely to be renters, and/or have low credit ratings that impedes access to third-party owned solar systems.[41] In fact, Figure 7 shows the delineation between households making $75,000 or more per year having a greater percent of the population participating in the NEM programs than those making less than $75,000 per year, and the discrepancy becomes even greater for the population making less than $50,000 per year. [42]

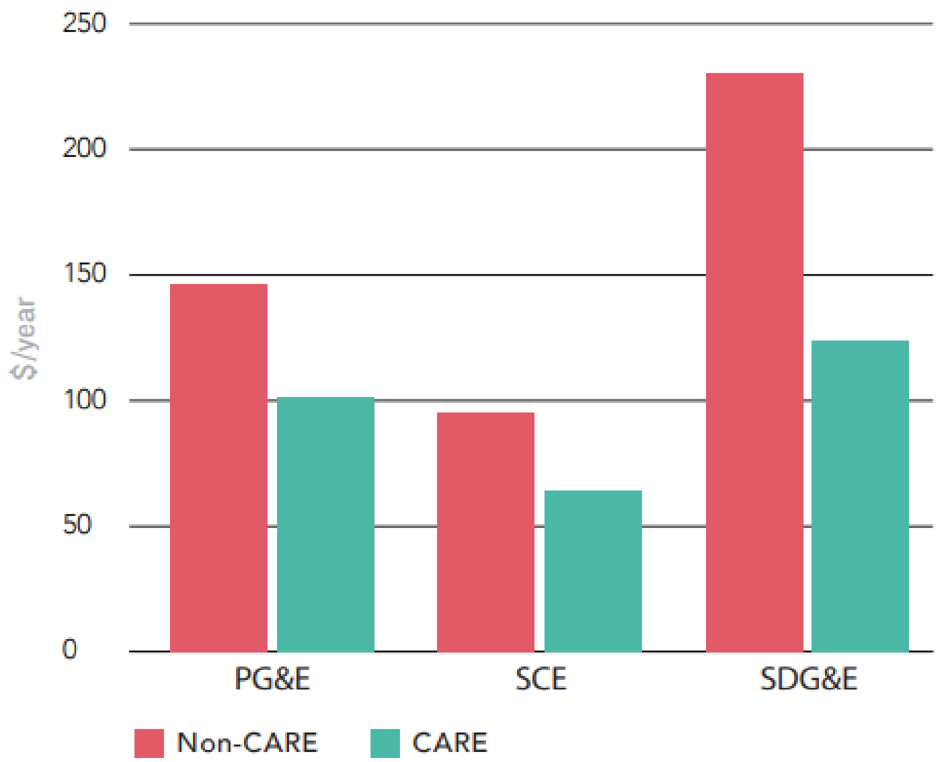
Figure 7. Distribution of NEM Systems and California Population by Median Income in Zip Code



[38] CPUC webpage on Net Energy Metering (NEM), 2021. Available at https://www.cpuc.ca.gov/nem/.
[39] Ibid.
[40] Energy Institute at UC Berkeley's Hass School of Business and NEXT 10, *Designing Electricity Rates for An Equitable Energy Transition*, February 2021. Available at https://www.next10.org/sites/default/files/2021-02/Next10-electricity-rates-v2.pdf.
[41] According to Solar Reviews, 'in general your credit score may need to be 700 or higher for a solar loan from a traditional financial institution like a bank.' *See* Solar Reviews blog post on "Is a Mosaic solar loan the best option to finance solar panels," 24 May 2021. Available at https://www.solarreviews.com/blog/is-a-mosaic-solar-loan-the-best-option-to-finance-solar-panels.
[42] Graphic colors have been changed, but the data comes from Verdant Associates, LLC's Report "Net-Energy Metering 2.0 Lookback Study," submitted to the California Public Utilities Commission on January 21, 2021. Available at https://www.cpuc.ca.gov/WorkArea/DownloadAsset.aspx?id=6442467448.

Additionally, a 2021 study by the Energy Institute at UC Berkeley's Haas School of Business and NEXT 10,[43] found that the NEM tariff "…shifts the burden of fixed cost recovery onto customers that have not adopted BTM [solar]."[44] Figure 8[45] further shows the annual household bill impacts of the NEM program on low-income California Alternate Rates for Energy (CARE) and non-CARE customer. Specifically depicting the incremental cost of annual electric bills split between low-income CARE customers, who pay an additional $60 to $120 annually for electricity, and non-CARE customers, who pay an additional $100 to $230 annually. As more affluent households install roof-top solar, low- and middle-income households will increasingly bear the burden of covering the high fixed costs of the electric grid.[46]

Figure 8. Household-Level Bill Impacts of BTM Solar Incentives ($/year)



We highlight the NEM program because there is growing demand for electric rate reform (*i.e.*, eliminating time-of-use or peak pricing) to incent customers to adopt all-electric building standards in the CEC and the CPUC building decarbonization proceedings. Customers that are likely to pay for the up-front costs for all-electric appliances may be more affluent homeowners with high

[43] Next 10 is an independent nonpartisan organization.
[44] Energy Institute at UC Berkeley's Hass School of Business and NEXT 10, *Designing Electricity Rates for An Equitable Energy Transition*, February 2021, at 27.
[45] Graphic from Energy Institute at UC Berkeley's Hass School of Business and NEXT 10, *Designing Electricity Rates for An Equitable Energy Transition*, February 2021, at 28.
[46] Energy Institute at UC Berkeley's Hass School of Business and NEXT 10, *Designing Electricity Rates for An Equitable Energy Transition*, February 2021, at 4.

disposal income and credit scores. As such, affluent homeowners may stand to benefit more from electric rate reform than low- and middle-income households because the latter households will likely pay for additional electric infrastructure required to meet increased peak demand. Technology-specific tariffs may further burden low-and middle-income customers, including renters, with increased bills to subsidize more affluent customers' adoption of all-electric building standards. To avoid regressive policies such as the NEM program, a rate structure in which all customers pay their share of electric grid costs and the volumetric price of energy is lowered to support all-electric building standards should be pursued. Fundamentally, the electric grid was built to ensure power is generated, transmitted, and distributed during peak hours to avoid interruptions. Thus, all customers should pay for this essential service. We respectfully suggest that the CEC consider the externalities of programs prior to recommending a rate restructure and/or policy reform to the CPUC.