

From: [Hunt, Marshall](#)
To: [Anderson, Mary](#); [Eilert, Patrick](#)
Subject: FW: Furnace Comment Letter
Date: Sunday, January 08, 2017 9:37:15 PM
Attachments: [image001.png](#)
[DOE Residential Furnace SNOPR - SoCalGas Comments 20160106.pdf](#)

Mary and Pat

This is a very clear statement of SCG's position. Do we want a back ground retort for restricted circulation? Should Craig or others receive the report? I did not find it on the docket.

The retort gets "into the weeds" and would take some time so maybe for now it is enough to know it can be done. But I am concerned that if it goes unchallenged we may be seen as in tacit agreement.

The last and most critical aspect of the issue is that the November election guarantees that there will be furnace standard. The best tactic is keep from getting a "no" with the delay allowing for a reconsideration in 5 to 9 years. So we must go on the other issues where we can have an impact.

Marshall B. Hunt
Professional Mechanical Engineer
Codes & Standards
Pacific Gas & Electric Company
415-260-7624
mbh9@pge.com

From: Bryan Boyce [<mailto:bboyce@energy-solution.com>]
Sent: Friday, January 06, 2017 3:28 PM
To: Anderson, Mary; Hunt, Marshall; Bijit Kundu
Cc: Alex Chase; Erin Linney
Subject: FW: Furnace Comment Letter

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Hi All,

Please see the attached comments from SoCal Gas for the DOE Residential Furnace Standards SNOPR. Their main arguments are that the standard would be bad for Southern California residents due to the limited heating hours relative to the rest of the country, low-income residents will bear extra costs because they live in smaller homes that will see less energy savings benefit and landlords will raise rents due to installing high efficiency furnaces, fuel switching will occur due to greater upfront retrofit costs of condensing furnaces, and other complaints with DOE's analysis and data inputs.

Thanks,

Bryan Boyce | (510) 482-4420 x294

From: Sim, Michelle M [<mailto:MSim@semprautilities.com>]
Sent: Friday, January 06, 2017 2:52 PM
To: Bryan Boyce <bboyce@energy-solution.com>
Cc: Bo White <bo@negawattconsult.com>; Marc Esser <marc@negawattconsult.com>
Subject: RE: Furnace Comment Letter

Bryan,

Per your request, please find attached SoCalGas comment letter filed with the DOE.

Michelle Sim, CEM, CEA, CDSM, LEED AP

Codes and Standards & ZNE Project Manager

SoCalGas

T: 213.244.4034

C: 562.774.5608

Fax: 213.244.3448

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Please consider the environment before printing this e-mail

From: Bryan Boyce [<mailto:bboyce@energy-solution.com>]
Sent: Tuesday, November 22, 2016 8:19 AM
To: Sim, Michelle M
Cc: Bo White; Marc Esser
Subject: [EXTERNAL] RE: Furnace Comment Letter

Thank you, we would greatly appreciate that.

Bryan Boyce | (510) 482-4420 x294

From: Sim, Michelle M [<mailto:MSim@semprautilities.com>]
Sent: Monday, November 21, 2016 3:25 PM
To: Bryan Boyce <bboyce@energy-solution.com>
Cc: Bo White <bo@negawattconsult.com>; Marc Esser <marc@negawattconsult.com>
Subject: RE: Furnace Comment Letter

Bryan,

We are still finalizing the letter. And can provide final copy to you when complete.

Michelle Sim, CEM, CEA, CDSM, LEED AP

Codes and Standards & ZNE Project Manager

SoCalGas

T: 213.244.4034

C: 562.774.5608

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From: Bryan Boyce [<mailto:bboyce@energy-solution.com>]
Sent: Monday, November 21, 2016 1:09 PM
To: Sim, Michelle M
Cc: Bo White; Marc Esser
Subject: [EXTERNAL] RE: Furnace Comment Letter

Hi Michelle,

Energy Solutions would like to have a copy of the SoCal Gas comment letter for our records. Would you be able to forward me the final version that will be uploaded to the docket?

Thanks,

Bryan Boyce | (510) 482-4420 x294

From: Marc Esser [<mailto:marc@negawattconsult.com>]
Sent: Monday, November 21, 2016 1:07 PM
To: Bryan Boyce <bboyce@energy-solution.com>
Cc: Bo White <bo@negawattconsult.com>; Michelle Sim <MSim@semprautilities.com>
Subject: Re: Furnace Comment Letter

Please reach out to Michelle Sim for anything pertaining to Socalgas furnace rulemaking comments.

Thank you

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Marc Esser
NegaWatt Consulting, Inc.
(619) 309-4191
www.negawattconsult.com

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On Nov 21, 2016 12:58 PM, "Bryan Boyce" <bboyce@energy-solution.com> wrote:

|

Hi Marc and Bo,

Would it be possible to forward me the final Furnace comment letter when you are ready to docket it? We would like to have a copy for our records.

Thanks,

Bryan Boyce, PE | Engineer II | bboyce@energy-solution.com | (510) 482-4420 x294 | [449 15th Street, Oakland CA 94612](#)



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Lisa Larroque Alexander
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**BEFORE THE
OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY
UNITED STATES DEPARTMENT OF ENERGY
WASHINGTON, DC**

Energy Conservation Program)
for Consumer Products:) **Docket No. EERE-2014-BT-STD-0031**
Energy Conservation Standards) **RIN 1904-AD20**
For Residential Furnaces)

SOUTHERN CALIFORNIA GAS (SoCalGas®) COMMENTS:

In response to the United States Department of Energy’s (DOE) Supplemental Notice of Proposed Rulemaking (SNOPR) regarding non-weatherized gas furnaces (NWGF) and mobile home gas furnaces (MHGF), as well as the introduction of a separate product class for non-condensing furnaces with a designated input rating threshold, SoCalGas respectfully submits our comments and analyses on the impact to our customers should this standard advance. We commend DOE for revisiting energy conservation standards for residential furnaces and appreciate this opportunity to provide the following comments about this SNOPR.

SoCalGas has been delivering clean, safe and reliable natural gas to its customers for more than 140 years. We are the nation’s largest natural gas distribution utility, serving 20.9 million consumers through 5.8 million meters in more than 500 communities. The company’s service territory encompasses approximately 20,000 square miles in diverse terrain throughout Central and Southern California, from Visalia to the Mexican border.

California leads the nation in energy policy. The state’s Investor Owned Utilities are advancing energy efficiency not only to protect the environment but also to serve our residential, commercial and industrial customers. For decades, SoCalGas has been actively pursuing strategies to promote the efficient use of natural gas and energy efficiency. We have driven advancements in natural gas equipment and low emissions technologies and invested significantly in the advancement towards renewable natural gas and distributed generation.

We appreciate the DOE’s efforts to find a resolution by recommending a split standard. However, the analysis shows that even with the split standard, it continues to be an economic hardship on Southern California customers. SoCalGas submitted two sets of analyses to the original NOPR that provided a comprehensive evaluation of the underlying inputs, assumptions and methods of DOE’s life cycle cost (LCC) analysis and data filtered by region (California and Southern California). We have now conducted a

second analysis based on the updated LCC calculations and associated technical support document (TSD) released with the SNO PR.

Notwithstanding our proven commitment to advancing energy efficiency and our long-standing support of DOE’s efficiency actions, SoCalGas respectfully requests the DOE review the summary of findings below and address all concerns with the TSD and LCC prior to issuing a final rulemaking. We have provided the supporting documents again for your review as well as a recalculation of the impacts to our customers conducted based on the SNO PR.

SUMMARY OF FINDINGS:

- 1) Economic infeasibility for Southern California customers. The California climate and market is drastically different than the states representing the “Rest of the Country,” however, the DOE has regionally categorized California with this group. For this reason, we have conducted a non-weatherized gas furnace (NWGF) LCC analysis using the DOE’s applied model with updated Annual Energy Outlook (AEO) 2016 forecast pricing in the table below. To summarize:
 - a) The average savings for Southern California is over 99 percent less than the “Rest of the Country” region California is identified under for the proposed split standard, putting our customers at a severe disadvantage and making this economically infeasible;
 - b) The simple payback for Southern California is more than three times the “Rest of the Country” region California is identified under for the proposed split standard, making this not cost-effective;
 - c) The average payback for impacted customers in Southern California is more than double the “Rest of the Country” region, again, making this not cost-effective.

Table 1.1 – Lifecycle Cost Analysis for NWGFs¹

Metric	Location	Split Standard Threshold [kBtu/hr]				
		55	60	65	70	75
Average Savings [\$]	National	\$629	\$662	\$621	\$637	\$637
	North	\$607	\$669	\$607	\$621	\$610
	Rest of Country	\$644	\$654	\$638	\$656	\$677
	California	\$383	\$715	\$260	\$281	-\$37
	Southern California	\$3	\$229	\$169	\$187	-\$5
Simple Payback Period [yrs]	National	6.7	6.6	6.8	6.7	6.6
	North	7.3	7.2	7.3	7.2	7.0
	Rest of Country	5.3	4.9	5.0	4.8	5.0
	California	10.4	7.7	11.6	11.0	11.8
	Southern California	19.0	11.0	13.8	11.4	12.5
Average Payback Period [yrs]	National	11.7	10.7	10.0	10.1	10.0
	North	10.6	10.1	10.4	10.5	10.6
	Rest of Country	12.5	11.3	9.6	9.7	9.2
	California	21.3	17.2	19.4	20.5	24.4
	Southern California	26.1	21.7	16.3	17.3	21.0

Assumptions: AEO 2016; 92% AFUE for large furnace category; residential buildings only for California due to sample size; results omitted when there are < 10 samples above the threshold per DOE.

¹ NegaWatt, “Evaluation of DOE Supplemental Proposed Rulemaking on Residential Furnace Standards Life Cycle Cost Analysis: Inputs and Results with Emphasis on Southern California,” pages 9-10, December 20, 2016.

In keeping with SoCalGas' commitment to energy efficiency, we would have welcomed this rulemaking had it proven to be economically feasible to our customers.

- 2) Burden on low-income communities. DOE's own analysis shows that low-income consumers in the "Rest of Country" region may bear a larger burden than other consumers with this rulemaking, despite the split standard.² This burden is compounded by the fact that low- and fixed-income homeowners typically live in smaller spaces, which require less energy to heat and therefore will achieve less annual savings. Additionally, low- and fixed-income renters will likely be forced to deal with higher rents when landlords are required to install high-efficiency furnaces, passing the cost to the renters, contrary to DOE assertions.

DOE maintains that these increased costs are necessary and worthwhile given the energy needs of the nation. The US Census Bureau estimates that nearly a quarter of California residents live in poverty. With a total state population of 38.7 million people,³ that percentage amounts to approximately 9.7 million residents statewide and over 5.2 million within SoCalGas' service territory. This rule may create an undue burden on a significant number of vulnerable residents who do not have the economic flexibility to absorb what might seem to some to be an incidental cost.

- 3) Increases energy consumption. The increased costs of moving to a 92% AFUE minimum efficiency gas furnace from the current industry standard of 80% AFUE, particularly in the retrofit market where the switch from non-condensing to condensing furnaces require changing the flue and providing a condensate drain, make fuel-switching (using split-system or mini-split heat pumps) an attractive alternative to consumers on a cost, rather than performance, basis. A switch from gas to electricity space heating will, however, *increase* source energy consumption due to the inefficiencies of losses in generation, transmission and distribution of electricity.⁴ This is particularly true if the heat pumps with lower performance are selected for cost reasons and when, on very cold weather days, heat pumps don't function well, built-in backup resistance heaters are triggered. The resulting increased source energy use is contrary to the stated goals of the legislation that provides the basis for efficiency standards. The introduction of a 55,000 Btu/h split standard does not change the potential for fuel switching and therefore does not reduce the potential for the increase in source energy consumption, negating the intent of the rulemaking.
- 4) Data requires additional clarification and transparency. The TSD requires clarification on the probability distribution, labor rate, and teardown analysis inputs into the LCC calculation. DOE's LCC calculation is complex and additional documentation and justification for some critical input data is necessary for stakeholders to accurately assess the methodology of the calculations. We have several concerns with this approach:
 - a) Appendix 8B of the TSD⁵ includes some rudimentary statistics background about probability distributions and a table showing the distributions. However, stakeholders are not provided sufficient details and/or information to review and determine the reasonableness and equitability of the inputs on more than one hundred probability distributions.

² Table 11.3.10 and Table 8.6.10 of the TSD, <https://www.regulations.gov/document?D=EERE-2014-BT-STD-0031-0217>

³ January 2015 population, California Department of Finance

⁴ NegaWatt, "Evaluation of DOE Supplemental Proposed Rulemaking on Residential Furnace Standards Life Cycle Cost Analysis: Inputs and Results with Emphasis on Southern California," page 6, section "General Observations, Three," December 20, 2016.

⁵ <https://www.regulations.gov/document?D=EERE-2014-BT-STD-0031-0217>

- b) RS Means, a reference cited by DOE, includes city-level labor rates but DOE up-sampled that data to statewide or multi-state averages before using it.⁶ We recommend that the city level data be used instead to improve the regional accuracy of the LCC results.
- c) The DOE used teardown analysis to create the furnace first cost input for the LCC model. Per Chapter 5 of the TSD, the DOE did physical teardowns of 31 models, virtual teardowns of 46 models, and obtained some real-world manufacturer selling prices. However, DOE does not provide detailed selection criteria, nor make, model, and specifications of the equipment that were studied. Stakeholders are unable to confirm the representativeness of the selection and the conclusions drawn.

With additional clarification on these important items, stakeholders will be able to better understand and review the LCC calculations that are believed to be yielding overstated LCC savings.

- 5) No-New-Standards Case Furnace Assignment Methodology: SoCalGas, along with various stakeholders were concerned with the no-new-standards case furnace assignment methodology during the NOPR phase. In the SNOPR, the DOE discussed this comment but did not implement any improvements. Furthermore, the addition of the split standard makes the accuracy of this methodology even more critical. National energy savings are calculated against the no-new-standards case. It therefore makes a significant difference whether a building sample is placed in the small furnace category, and is thus certainly not impacted, or placed in the large category and potentially impacted.

The DOE's no-new-standards-case furnace efficiencies are based on shipment data and an AHRI directory of furnace products. The shipment data is at best, categorized by state and by condensing versus noncondensing and the directory does not include sales data. This is very coarse data to apply to the specific buildings in the RECS database. DOE states that they have requested sales data but have not received it. We recommend that DOE and the manufacturers further pursue the sharing of non-proprietary data given its importance in improving the accuracy of the selection model. We also recommend that the DOE use building specific data (e.g. heating load) when assigning a furnace efficiency during each trial to improve accuracy.

The DOE's furnace capacity section model is currently based on building square footage, outdoor design temperature, and the aforementioned shipment and directory data. It does not include building specific data such as building age or heating load. The DOE responded to a comment during the October 17, 2016 public meeting stating that home vintage was not an input into their furnace capacity assignment algorithm. Given the importance of building envelope tightness when evaluating HVAC sizes and energy/thermal efficiency, the absence of this information in the no-new-standard furnace selection model makes the DOE's offer of a new split standard inadequate.

The DOE also assumes that furnaces are typically oversized and therefore consumers that would otherwise choose a furnace that has a capacity slightly above the threshold in a given split standard would downsize in order to purchase a cheaper furnace.⁷ DOE cites two sources to support their choice of a 35 percent oversizing factor. The possibility that existing oversizing factors may vary by retrofit versus new construction, region, capacity range, home vintage, air conditioning requirements, and home size is not addressed.

- 6) LCC Savings Overstated: DOE's predictive LCC model results combine general assumptions and a limited consumer model that overstate LCC savings compared to a more robust Consumer Economic

⁶ TSD, page 8D-37, <https://www.regulations.gov/document?D=EERE-2014-BT-STD-0031-0217>

⁷ Appendix 8M of the TSD provides a brief explanation of the downsizing methodology.

Decision-making (CED) framework methodology,⁸ offered by GTI. In response, DOE discussed this comment in the SNOPR but did not change the consumer model. DOE did not further utilize the American Home Comfort Study as GTI and others recommended. They also did not address the significant deviation the GTI model shows from what DOE claims to be the LCC results.

We recommend that prolonging furnace replacement by way of deep maintenance repairs should be accounted for as a consumer choice in the fuel switching model. This may be the most economical option for some retrofit consumers who need equipment with capacity above the threshold but for which switching to electric equipment would be too expensive. If this option were added, it will increase the accuracy of the fuel switching model and reduce nationwide savings. Additionally, a consumer's choice to prolong aged equipment may delay the commercialization of higher efficient equipment, invariably, adversely affecting the consumers with overstated LCC savings.

- 7) Aged Price Forecasts: DOE's use of AEO 2015 price forecasts for energy prices is outdated. We recommend that DOE implement AEO 2016 price forecasts into a revised LCC spreadsheet and SNOPR immediately rather than when the final rule is determined. This would give stakeholders a chance to review and understand the true impacts the price forecast changes would have on the LCC outputs.

Attached for your further review and consideration is (1) the GTI technical analysis originally provided at the time of our NOPR comment submission, and (2) an updated NegaWatt technical analysis of supplemental TSD.

CONCLUSION

SoCalGas has dedicated decades to advancing efficiencies in energy use and our results in that area are substantial. We will continue to work to drive higher efficiency standards wherever it is proven to be cost effective for our customers. Our efforts have realized savings equivalent to almost 152 million therms over the past five years and over 560 million therms since 1990. Currently, we run 82 energy-efficiency programs, have an annual savings goal of over 25 million therms, an annual budget of \$89.5 million and employ 186 people to deliver these programs. In addition, our low-income energy efficiency programs have treated over 569,000 low-income households with energy efficiency upgrades at no cost to those households. In 2014 alone, we avoided 170,000 tons of CO₂ emissions. Our energy efficiency programs alone have also helped to create over 8,000 jobs in California.

We would like to reiterate our support for the DOE for their tremendous effort in trying to update the energy conservation standards for residential furnaces. We thank the DOE for the opportunity to be involved in this process and encourage the DOE to carefully consider the recommendations outlined in this letter prior to the issuance of a final decision.

Sincerely,



Lisa Alexander
Vice President, Customer Solutions

⁸ GTI, "Technical Analysis of DOE Notice of Proposed Rulemaking on Residential Furnace Minimum Efficiencies and Its Impact in Southern California," pages 6-9, July 7, 2015.