

Coffey, Danyele (CONTR)

From: Greg Rosenquist <gjrosenquist@lbl.gov>
Sent: Thursday, October 01, 2015 1:38 PM
To: Cymbalsky, John
Subject: Proposed Responses to AGA/APGA NODA Questions for Residential Furnaces (PART A)
Attachments: AGAAPGAQuestionsforNODA_2015-09-29.docx; Furnace_LCCinput_2015-09-29.xlsm; NODA Table Changes_2015-09-29.docx

Attached are documents which address AGA/APGA's and AHRI's questions on the Furnace NODA.

The first attached document (AGAAPGAQuestionsforNODA_2015-09-29.docx) has proposed responses to the AGA/APGA questions and related AHRI questions. The questions can be found at:

* **AGA/APGA - NODA Data Request:** <http://www.regulations.gov/#!documentDetail;D=EERE-2014-BT-STD-0031-0168>

* **AHRI - Questions on NODA:** Questions on NODA:
<http://www.regulations.gov/#!documentDetail;D=EERE-2014-BT-STD-0031-0167>

The first attached document also includes the results for input capacity limits up to 90 kBtu/h. (b) (5)

(b) (5)

The second attachment is an Excel spreadsheet that contains the Analytical Inputs to the LCC requested by AGA/APGA.

The third attachment is essentially an errata for Tables III.2 and III.3 in the NODA for consumers experiencing Net Cost. (b) (5)

(b) (5)

(b) (5)

Greg

Proposed Responses to AGA/APGA & AHRI Questions Regarding DOE NODA

The following lists to the proposed responses to questions in stakeholder comments:

- 1) AGA/APGA - NODA Data Request:
<http://www.regulations.gov/#!documentDetail;D=EERE-2014-BT-STD-0031-0168>
- 2) AHRI - Questions on NODA: Questions on NODA:
<http://www.regulations.gov/#!documentDetail;D=EERE-2014-BT-STD-0031-0167>

QUESTION 1: An updated version of input spreadsheet "rf_nopr_analysis_inputs_2014-02-06.xlsm" that was released with the NOPR LCC spreadsheet. The input spreadsheet contains key information on the LCC calculations and methodology for: contractor markups; implementation of the new AHRI shipment data; implementation of the new AEO forecast; implementation of the new EIA pricing data; implementation of updated NWGF input capacity percentiles

(b) (5)

QUESTION 2: Supporting data and detailed descriptions of changes in building shell efficiency calculations in the NODA LCC spreadsheet as mentioned on page 16 of "Res Furnace_NODA_2015-09-04.pdf." This is currently referenced in general terms as "described in the LCC spreadsheet."

(b) (5)

QUESTION 3: Supporting data and detailed descriptions of changes in climate indices used to adjust energy use as mentioned on page 16 of "Res Furnace_NODA_2015-09-04.pdf." This is currently referenced in general terms as "described in the LCC spreadsheet."

(b) (5)

QUESTION 4: Supporting data and detailed descriptions of the "updated engineering analysis" that is referenced in the "NODA Analysis Update" sheet under the "Prod Price" changes.

(b) (5)

QUESTION 5: Clarification as to whether or not changes have been made to the “NWGF Switching” sheet that was omitted from the descriptions of changes in the “NODA Analysis Updates” Sheet of the NODA LCC spreadsheet.

(b) (5)

A large black rectangular redaction box covering the response to Question 5.

QUESTION 6: Describe the “bug” in the “AFUE Existing” assignment and what was done to correct the bug, with references to specific locations in the NODA LCC spreadsheet. (Related question from AHRI: Can you provide additional explanation on the “bug” that has been fixed in the “AFUE (Existing)” worksheet?)

(b) (5)

A large black rectangular redaction box covering the response to Question 6.

QUESTION 7: Describe the methodology and rationale for choosing 1.3 vs. 1.7 oversizing factors in the “Furnace & AC Sizing” Sheet of the NODA LCC spreadsheet.

(b) (5)

A large black rectangular redaction box covering the response to Question 7.

QUESTION 8: Describe the methodology used to arrive at the Net Cost percentages included in Tables III.2 and III.3 of “Res Furnace NODA 2015-09-04.pdf.”

(b) (5)

A large black rectangular redaction box covering the response to Question 8.

QUESTION 9: Describe methodology/logic of implementing dual standard scenario, and downsizing options.

(b) (5)

A large black rectangular redaction box covering the response to Question 9.

(b) (5)



QUESTION 10: The NODA LCC spreadsheet provides a dropdown box (see cell D23 in the Summary tab of the LCC spreadsheet) that provides options for various Standard Scenarios. The options in the dropdown box include Dual Standard selections for input capacities for small furnaces with thresholds of less than or equal to 70, 75, 80, 85 and 90 kBtus/hr. However, the tables included in the NODA do not include the LCC or the NIA spreadsheet results for these scenarios. Please provide the LCC and NIA spreadsheet results for each of these scenarios in a similar fashion that the other scenario results were presented in the NODA. *(Related question from AHRI: The recently issued Residential Furnace NODA analysis only looked at small furnace definitions for input limits up to 65kBtu/h. Yet the spreadsheet has options to define small furnace up to 90kBtu/h. As such the NODA only provides partial information on the concept of two classes of furnaces based on input rate. We request that DOE complete the analysis for at least the remaining optional definitions provided in the drop-down menu in the LCC spreadsheet. We ask that DOE also expand this analysis to include 95kBtu/h and 100 kBtu/h as possible defining limits.)*

(b) (5)



Table 1: Share of Sample Households by Furnace Size (percent)

Furnace Size	Small Furnace Definition (kBtu/hour)										
	≤ 40	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65	≤ 70	≤ 75	≤ 80	≤ 85	≤ 90
Large	94	92	86	85	68	62	57	47	35	35	28
Small	6	8	14	15	32	38	43	53	66	66	72
Total	100	100	100	100	100	100	100	100	100	100	100

Table 2: Average LCC Savings for Alternative Furnace Standard Level Combinations (2014\$)*

Minimum AFUE (%)		Average LCC Savings (2014\$)*											
		Small Furnace Definition (kBtu/hour)											
Large	Small	≤ 40	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65	≤ 70	≤ 75	≤ 80	≤ 85	≤ 90	
90	80	\$382	\$383	\$400	\$400	\$492	\$484	\$484	\$489	\$475	\$475	\$432	
92	80	\$461	\$463	\$478	\$479	\$553	\$525	\$536	\$534	\$507	\$507	\$479	
95	80	\$438	\$439	\$447	\$449	\$479	\$437	\$457	\$453	\$411	\$411	\$390	
98	80	\$361	\$365	\$372	\$374	\$388	\$347	\$362	\$363	\$316	\$316	\$304	

* The average LCC savings only include those consumers who would be affected at a given standard level.

Table 3: Share of All Consumers Experiencing a Net Cost for Alternative Furnace Standard Level Combinations

Minimum AFUE (%)		% of Consumers Experiencing a Net Cost											
		Small Furnace Definition (kBtu/hour)											
Large	Small	≤ 40	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65	≤ 70	≤ 75	≤ 80	≤ 85	≤ 90	
90	80	17%	16%	13%	13%	8%	6%	6%	4%	2%	2%	2%	
92	80	15%	14%	12%	12%	7%	5%	5%	4%	2%	2%	2%	
95	80	19%	18%	16%	15%	10%	8%	8%	6%	4%	4%	3%	
98	80	38%	37%	33%	33%	25%	23%	20%	16%	12%	12%	10%	

Table 4: Share of All Consumers in the South Experiencing a Net Cost for Alternative Furnace Standard Level Combinations

Minimum AFUE (%)		% of Consumers Experiencing a Net Cost											
		Small Furnace Definition (kBtu/hour)											
Large	Small	≤ 40	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65	≤ 70	≤ 75	≤ 80	≤ 85	≤ 90	
90	80	25%	23%	19%	19%	9%	6%	6%	4%	2%	2%	1%	
92	80	22%	21%	17%	17%	8%	5%	5%	3%	1%	1%	1%	
95	80	27%	25%	21%	21%	12%	8%	8%	5%	3%	3%	2%	
98	80	38%	35%	30%	29%	18%	14%	12%	8%	5%	5%	4%	

Table 5: National Energy Savings for Alternative Furnace Standard Level Combinations (quads)

Min AFUE (%)		Small Furnace Definition (kBtu/hour)											
		≤ 40	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65	≤ 70	≤ 75	≤ 80	≤ 85	≤ 90	
Large	Small	2.9	2.9	2.9	2.9	2.3	1.8	1.7	1.3	0.8	0.8	0.7	
92	80	4.2	4.2	4.2	4.1	3.4	2.8	2.7	2.1	1.4	1.4	1.2	
95	80	5.8	5.8	5.7	5.7	4.9	4.2	3.9	3.2	2.2	2.2	1.8	

Table 6: National Net Present Value of Benefits for Alternative Furnace Standard Level Combinations at 7-percent Discount Rate (billion 2014\$)

Min AFUE (%)		Small Furnace Definition (kBtu/hour)											
		≤ 40	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65	≤ 70	≤ 75	≤ 80	≤ 85	≤ 90	
Large	Small	3.0	3.1	3.5	3.5	3.0	2.4	2.3	1.8	1.0	1.0	0.8	
92	80	4.1	4.2	4.6	4.6	4.2	3.6	3.4	2.8	1.8	1.8	1.4	
95	80	3.7	3.8	4.4	4.4	4.6	4.0	3.8	3.1	2.1	2.1	1.7	

Table 7: National Net Present Value of Benefits for Alternative Furnace Standard Level Combinations at 3-percent Discount Rate (billion 2014\$)

Min AFUE (%)		Small Furnace Definition (kBtu/hour)											
		≤ 40	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65	≤ 70	≤ 75	≤ 80	≤ 85	≤ 90	
Large	Small	14.7	14.7	14.8	14.8	11.8	9.1	9.0	7.1	4.1	4.1	3.3	
92	80	20.2	20.2	20.1	20.0	16.9	13.9	13.4	10.8	6.9	6.9	5.6	
95	80	23.9	23.9	24.0	23.9	21.3	18.4	17.2	14.2	9.5	9.5	7.8	

Note that the values in tables in the NODA notice published on September 14, 2015 that list the share of all consumers experiencing a net cost for alternative furnace standard level combinations were incorrectly reported for the small furnace standard scenarios (tables III.2 and III.3). The updated tables are below:

Table III.2. Share of All Consumers Experiencing a Net Cost for Alternative Furnace Standard Level Combinations

Minimum AFUE (%)		% of Consumers Experiencing a Net Cost				
		Small Furnace Definition (kBtu/hour)				
Large	Small	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65
90	80	16%	13%	13%	8%	6%
92	80	14%	12%	12%	7%	5%
95	80	18%	16%	15%	10%	8%
98	80	37%	33%	33%	25%	23%

Table III.3. Share of Consumers in the South Experiencing a Net Cost for Alternative Furnace Standard Level Combinations

Minimum AFUE (%)		% of Consumers in the South Experiencing a Net Cost				
		Small Furnace Definition (kBtu/hour)				
Large	Small	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65
90	80	23%	19%	19%	9%	6%
92	80	21%	17%	17%	8%	5%
95	80	25%	21%	21%	12%	8%
98	80	35%	30%	29%	18%	14%

Markups

Markups and Sales Taxes by RECS Region						
Location		Mech. Contractor Markup (Repl)		Mech. Contractor Markup (New)		General Cont
ID	States	Baseline	Incremental	Baseline	Incremental	Baseline
1	CT, ME, NH, RI, VT	1.572	1.270	1.484	1.198	1.354
2	Massachusetts	1.550	1.210	1.463	1.142	1.265
3	New York	1.635	1.314	1.543	1.240	1.334
4	New Jersey	1.644	1.306	1.551	1.232	1.434
5	Pennsylvania	1.544	1.211	1.457	1.143	1.413
6	Illinois	1.603	1.217	1.513	1.149	1.322
7	Indiana, Ohio	1.585	1.258	1.496	1.187	1.322
8	Michigan	1.656	1.308	1.563	1.235	1.526
9	Wisconsin	1.513	1.174	1.428	1.108	1.263
10	IA, MN, ND, SD	1.464	1.185	1.381	1.118	1.272
11	Kansas, Nebraska	1.471	1.199	1.389	1.132	1.303
12	Missouri	1.472	1.170	1.390	1.104	1.319
13	Virginia	1.592	1.299	1.502	1.226	1.428
14	DE, DC, MD	1.526	1.167	1.441	1.102	1.568
15	Georgia	1.552	1.260	1.464	1.189	1.363
16	NC, SC	1.542	1.259	1.456	1.188	1.274
17	Florida	1.568	1.260	1.480	1.189	1.418
18	AL, KY, MS	1.477	1.206	1.394	1.138	1.348
19	Tennessee	1.517	1.223	1.432	1.155	1.383
20	AR, LA, OK	1.563	1.297	1.475	1.224	1.320
21	Texas	1.528	1.239	1.442	1.169	1.358
22	Colorado	1.543	1.256	1.456	1.186	1.280
23	ID, MT, UT, WY	1.468	1.221	1.385	1.152	1.312
24	Arizona	1.492	1.183	1.408	1.116	1.388
25	NV, NM	1.540	1.226	1.453	1.157	1.476
26	California	1.629	1.307	1.538	1.234	1.400
27	OR, WA	1.521	1.179	1.436	1.112	1.372
28	Alaska	1.507	1.226	1.422	1.157	1.302
29	Hawaii	1.698	1.376	1.603	1.298	1.227
30	West Virginia	1.599	1.293	1.509	1.220	1.384
United States		1.556	1.244	1.469	1.174	1.361

Markups and Sales Taxes by CBECS Region						
Division		Mech. Contractor Markup (Repl)		Mech. Contractor Markup (New)		General Cont
ID	Division Name	Baseline	Incremental	Baseline	Incremental	Baseline
1	New England	1.561	1.240	1.474	1.170	1.318
2	Middle Atlantic	1.599	1.270	1.509	1.198	1.304
3	East North Central	1.595	1.247	1.506	1.177	1.215
4	West North Central	1.468	1.184	1.386	1.117	1.242
5	South Atlantic	1.552	1.246	1.464	1.176	1.233
6	East South Central	1.491	1.212	1.407	1.144	1.271
7	West South Central	1.541	1.260	1.454	1.189	1.222
8	Mountain	1.509	1.226	1.424	1.157	1.265
9	Pacific	1.602	1.275	1.512	1.203	1.285
United States		1.556	1.244	1.469	1.174	1.361

Manufactured Home Markup Data (New Construction Only)

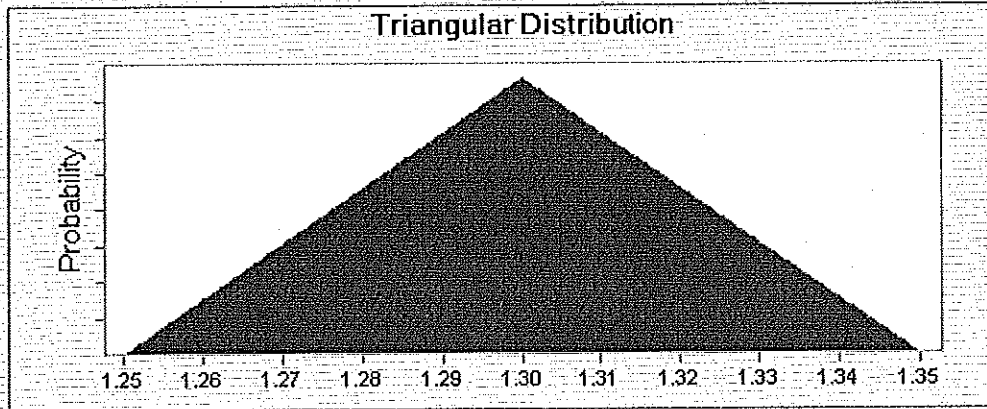
	Baseline	Incr.
Dealer/Retailer (New Const. Only)	1.28	1.17
Average values	1.30	1.17
Other Contrator/Reseller Markup (for incremental markup calc.)	1.66	1.37
Manufacturer (New Const. Only)	1.41	1.28

MHGF Dealer/Retailer (New Const. Only) Distribution Cell G 49

Name: MHGF Dealer/Retailer (New Const. Only)



Triangular Distribution



Minimum 1.25

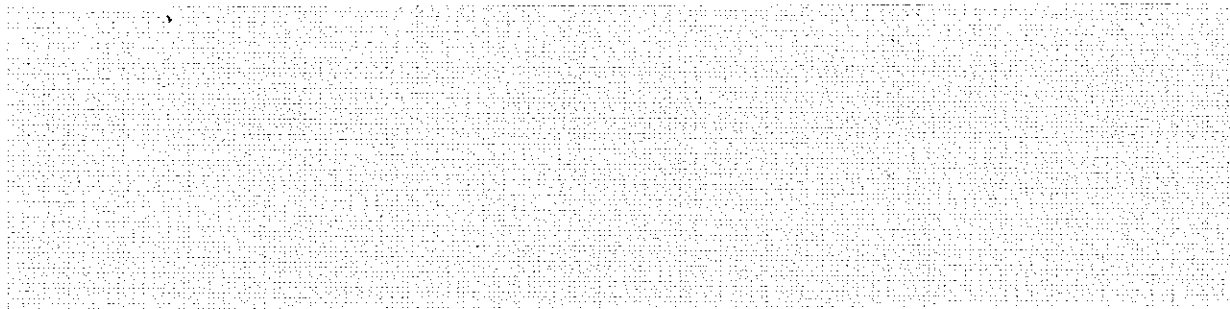


Likeliest 1.30



Maximum 1.35





Factor Markup Incremental	Wholesaler/Distributor Markup Baseline	Wholesaler/Distributor Markup Incremental	State and Local Sales Tax
1.118	1.366	1.072	3.80%
1.044	1.366	1.072	6.25%
1.101	1.366	1.072	8.45%
1.183	1.355	1.092	6.95%
1.166	1.354	1.095	6.35%
1.091	1.364	1.115	8.00%
1.091	1.353	1.097	7.09%
1.259	1.353	1.097	6.00%
1.042	1.364	1.115	5.45%
1.050	1.364	1.115	6.89%
1.075	1.364	1.115	6.90%
1.089	1.364	1.115	7.45%
1.178	1.355	1.092	5.60%
1.294	1.355	1.092	5.63%
1.125	1.330	1.097	7.00%
1.051	1.330	1.097	6.98%
1.170	1.330	1.097	6.65%
1.113	1.339	1.097	7.28%
1.141	1.330	1.097	9.45%
1.089	1.348	1.112	8.76%
1.120	1.348	1.112	7.95%
1.056	1.364	1.115	6.10%
1.082	1.403	1.110	5.85%
1.145	1.404	1.110	7.20%
1.218	1.387	1.110	7.57%
1.155	1.404	1.110	8.45%
1.132	1.404	1.110	3.58%
1.074	1.404	1.110	1.30%
1.013	1.404	1.110	4.35%
1.142	1.353	1.097	6.05%
1.123	1.362	1.104	7.14%

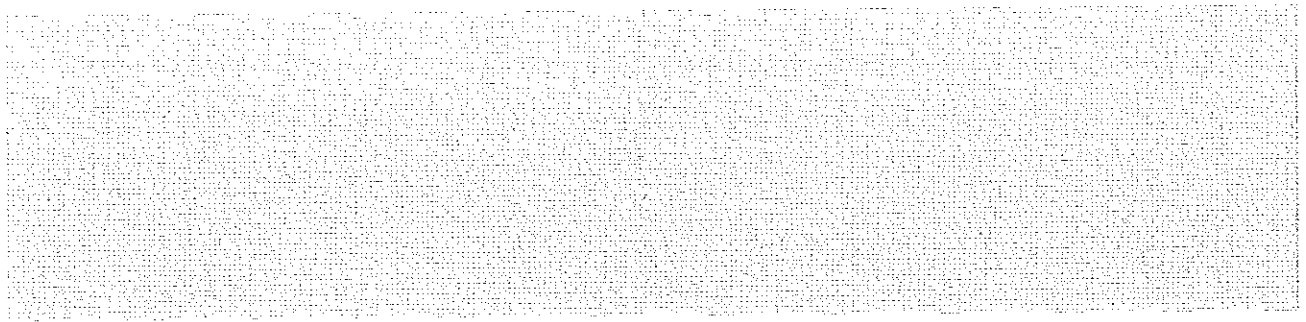
Factor Markup Incremental	Wholesaler/Distributor Markup Baseline	Wholesaler/Distributor Markup Incremental	State and Local Sales Tax
1.187	1.366	1.072	5.02%
1.169	1.359	1.086	7.24%
1.107	1.358	1.104	6.88%
1.128	1.364	1.115	7.07%
1.124	1.339	1.095	6.47%
1.166	1.336	1.097	8.06%
1.125	1.348	1.112	8.24%
1.148	1.389	1.111	6.50%
1.160	1.404	1.110	7.20%
1.123	1.362	1.104	7.14%

Markup and Sales Tax Values by State

RECS Code	S Code	State Name	Mechanical Contractor (Replacement) Baseline	Incremental
18	6	Alabama	1.48	1.20
28	9	Alaska	1.51	1.23
24	8	Arizona	1.49	1.18
20	7	Arkansas	1.57	1.32
26	9	California	1.63	1.31
22	8	Colorado	1.54	1.26
1	1	Connecticut	1.52	1.22
14	5	Delaware	1.66	1.30
14	5	District of Co	1.53	1.24
17	5	Florida	1.57	1.26
15	5	Georgia	1.55	1.26
29	9	Hawaii	1.70	1.38
23	8	Idaho	1.55	1.25
6	3	Illinois	1.60	1.22
7	3	Indiana	1.58	1.27
10	4	Iowa	1.45	1.18
11	4	Kansas	1.45	1.17
18	6	Kentucky	1.50	1.21
20	7	Louisiana	1.59	1.32
1	1	Maine	1.54	1.27
14	5	Maryland	1.52	1.16
2	1	Massachusetts	1.55	1.21
8	3	Michigan	1.66	1.31
10	4	Minnesota	1.45	1.16
18	6	Mississippi	1.44	1.21
12	4	Missouri	1.47	1.17
23	8	Montana	1.61	1.23
11	4	Nebraska	1.49	1.22
25	8	Nevada	1.57	1.23
1	1	New Hampshire	1.56	1.24
4	2	New Jersey	1.64	1.31
25	8	New Mexico	1.48	1.21
3	2	New York	1.63	1.31
16	5	North Carolina	1.52	1.23
10	4	North Dakota	1.59	1.35
7	3	Ohio	1.59	1.25
20	7	Oklahoma	1.53	1.24
27	9	Oregon	1.52	1.18
5	2	Pennsylvania	1.54	1.21
1	1	Rhode Island	1.77	1.50
16	5	South Carolina	1.61	1.35
10	4	South Dakota	1.55	1.28
19	6	Tennessee	1.52	1.22
21	7	Texas	1.53	1.24
23	8	Utah	1.41	1.21
1	1	Vermont	1.48	1.23
13	5	Virginia	1.59	1.30
27	9	Washington	1.52	1.18
30	5	West Virginia	1.60	1.29
9	3	Wisconsin	1.51	1.17
23	8	Wyoming	1.61	1.32
31	10	United States	1.56	1.24

Markup

Mechanical Contractor
General Contractor
Distributor/Wholesaler
Sales Taxes



Mechanical Contractor (New Construction)		General Contractor (Residential)		General Contractor (Commercial)		Distributor Markup		State and Local Sales Tax (%)	Fraction of Shipments by State
Baseline	Incremental	Baseline	Incremental	Baseline	Incremental	Baseline	Incremental		
1.39	1.13	1.27	1.05	1.32	1.21	1.33	1.10	8.60%	1.4%
1.42	1.16	1.30	1.07	1.53	1.30	1.40	1.11	1.30%	0.1%
1.41	1.12	1.39	1.15	1.21	1.10	1.40	1.11	7.20%	1.2%
1.49	1.25	1.25	1.03	1.29	1.21	1.35	1.11	8.95%	2.6%
1.54	1.23	1.40	1.16	1.32	1.18	1.40	1.11	8.45%	10.5%
1.46	1.19	1.28	1.06	1.16	1.01	1.36	1.11	6.10%	2.2%
1.44	1.15	1.41	1.16	1.39	1.26	1.37	1.07	6.35%	0.2%
1.57	1.23	1.89	1.56	1.21	1.09	1.36	1.09	0.00%	0.2%
1.45	1.17	1.23	1.02	1.31	1.17	1.36	1.09	5.75%	0.1%
1.48	1.19	1.42	1.17	1.26	1.13	1.33	1.10	6.65%	0.7%
1.46	1.19	1.36	1.12	1.15	1.05	1.33	1.10	7.00%	4.5%
1.60	1.30	1.23	1.01	1.51	1.34	1.40	1.11	4.35%	0.0%
1.46	1.18	1.26	1.04	1.24	1.13	1.40	1.11	6.00%	0.5%
1.51	1.15	1.32	1.09	1.19	1.09	1.36	1.11	8.00%	6.2%
1.49	1.20	1.24	1.02	1.20	1.07	1.35	1.10	7.00%	3.5%
1.37	1.11	1.30	1.07	1.22	1.11	1.36	1.11	6.80%	1.4%
1.37	1.10	1.29	1.06	1.26	1.16	1.36	1.11	7.90%	1.2%
1.41	1.14	1.37	1.13	1.24	1.13	1.35	1.10	6.00%	1.3%
1.50	1.24	1.31	1.08	1.25	1.15	1.35	1.11	8.85%	1.4%
1.45	1.20	1.25	1.03	1.13	1.02	1.37	1.07	5.50%	0.0%
1.43	1.09	1.56	1.29	1.29	1.18	1.36	1.09	6.00%	2.6%
1.46	1.14	1.26	1.04	1.31	1.17	1.37	1.07	6.25%	0.7%
1.56	1.23	1.53	1.26	1.19	1.10	1.35	1.10	6.00%	5.1%
1.37	1.10	1.25	1.03	1.24	1.13	1.36	1.11	7.20%	2.6%
1.36	1.14	1.47	1.21	1.32	1.20	1.33	1.10	7.05%	0.7%
1.39	1.10	1.32	1.09	1.23	1.10	1.36	1.11	7.45%	3.4%
1.52	1.16	1.24	1.03	1.28	1.16	1.40	1.11	0.00%	0.2%
1.40	1.16	1.31	1.08	1.29	1.17	1.36	1.11	6.05%	1.4%
1.48	1.16	1.55	1.28	1.59	1.47	1.40	1.11	7.95%	1.1%
1.47	1.17	1.32	1.09	1.21	1.09	1.37	1.07	0.00%	0.3%
1.55	1.23	1.43	1.18	1.38	1.22	1.36	1.09	6.95%	1.9%
1.40	1.14	1.30	1.07	1.21	1.10	1.35	1.11	6.70%	0.5%
1.54	1.24	1.33	1.10	1.30	1.17	1.37	1.07	8.45%	3.0%
1.43	1.16	1.29	1.07	1.21	1.09	1.33	1.10	6.90%	2.4%
1.50	1.27	1.30	1.07	1.26	1.17	1.36	1.11	6.10%	0.2%
1.50	1.18	1.37	1.13	1.27	1.16	1.35	1.10	7.15%	5.9%
1.44	1.17	1.44	1.19	1.19	1.11	1.35	1.11	8.40%	1.6%
1.44	1.11	1.42	1.17	1.14	1.06	1.40	1.11	0.00%	2.1%
1.46	1.14	1.41	1.17	1.26	1.14	1.35	1.09	6.35%	3.4%
1.68	1.41	1.37	1.13	1.53	1.42	1.37	1.07	7.00%	0.1%
1.52	1.27	1.22	1.01	1.30	1.18	1.33	1.10	7.20%	0.9%
1.46	1.21	1.26	1.04	1.21	1.13	1.36	1.11	5.45%	0.4%
1.43	1.15	1.38	1.14	1.23	1.14	1.33	1.10	9.45%	1.9%
1.44	1.17	1.36	1.12	1.21	1.10	1.35	1.11	7.95%	9.9%
1.33	1.14	1.34	1.10	1.25	1.17	1.40	1.11	6.70%	1.6%
1.40	1.16	1.31	1.08	1.35	1.20	1.37	1.07	6.10%	0.0%
1.50	1.23	1.43	1.18	1.35	1.23	1.36	1.09	5.60%	1.8%
1.44	1.11	1.31	1.08	1.25	1.12	1.40	1.11	8.90%	1.4%
1.51	1.22	1.38	1.14	1.28	1.15	1.35	1.10	6.05%	0.4%
1.43	1.11	1.26	1.04	1.23	1.10	1.36	1.11	5.45%	3.2%
1.52	1.25	1.36	1.12	1.31	1.20	1.36	1.11	5.45%	0.1%
1.47	1.17	1.36	1.12	1.25	1.13	1.36	1.10	7.14%	100.0%

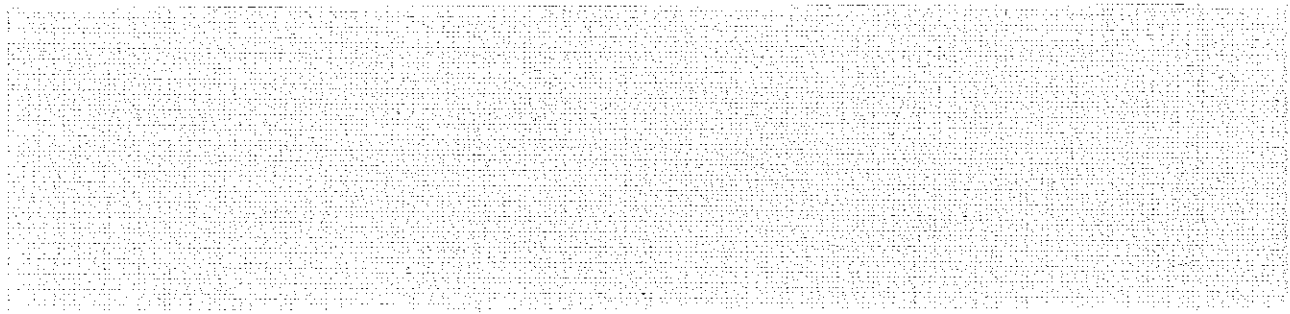
Reference (s)

2012 Economic Census of the United States AND 2005 ACCA

2012 Economic Census of the United States

2013 HARDI Data

Sales Tax Clearinghouse: <https://lhestc.com/STRates.slm> (Last Accessed: 04/27/2015)



1

Coffey, Danyele (CONTR)

From: Cohen, Daniel
Sent: Tuesday, October 13, 2015 4:50 PM
To: Cymbalsky, John; Jochum, Johanna; Stas, Eric
Subject: RE: Proposed Responses to AGA/APGA NODA Questions for Residential Furnaces (PART A)
Attachments: AGAAPGAQuestionsforNODA_2015-09-29 JH Comments.docx

John, attached are a few comments / questions.

Dan

From: Cymbalsky, John
Sent: Monday, October 05, 2015 9:36 AM
To: Cohen, Daniel <Daniel.Cohen@hq.doe.gov>; Hariharan, Johanna <Johanna.Hariharan@Hq.Doe.Gov>; Stas, Eric <Eric.Stas@hq.doe.gov>
Subject: FW: Proposed Responses to AGA/APGA NODA Questions for Residential Furnaces (PART A)

Here is our response to the APGA and AHRI letters. (b) (5)

(b) (5)

We can draft a blast to alert stakeholders that new material was added.

Here is the detail from Greg:

Attached are documents which address AGA/APGA's and AHRI's questions on the Furnace NODA.

The first attached document (AGAAPGAQuestionsforNODA_2015-09-29.docx) has proposed responses to the AGA/APGA questions and related AHRI questions. The questions can be found at:

* **AGA/APGA - NODA Data Request:** <http://www.regulations.gov/#!documentDetail;D=EERE-2014-BT-STD-0031-0168>

* **AHRI - Questions on NODA:** Questions on NODA:
<http://www.regulations.gov/#!documentDetail;D=EERE-2014-BT-STD-0031-0167>

The first attached document also includes the results for input capacity limits up to 90 kBtu/h.

The second attachment is an Excel spreadsheet that contains the Analytical Inputs to the LCC requested by AGA/APGA.

The third attachment is essentially an errata for Tables III.2 and III.3 in the NODA for consumers experiencing Net Cost. (b) (5)

(b) (5)

(b) (5)



Proposed Responses to AGA/APGA & AHRI Questions Regarding DOE NODA

The following lists to the proposed responses to questions in stakeholder comments:

1) AGA/APGA - NODA Data Request:

<http://www.regulations.gov/#!documentDetail;D=EERE-2014-BT-STD-0031-0168>

2) AHRI - Questions on NODA: Questions on NODA:

<http://www.regulations.gov/#!documentDetail;D=EERE-2014-BT-STD-0031-0167>

Data Request: Addition information is needed from DOE to permit an understanding and evaluation of the updated or revised input parameters, values, and methodologies contained in the NODA LCC spreadsheet.

QUESTION 1: An updated version of input spreadsheet "rf_nopr_analysis_inputs_2014-02-06.xlsm" that was released with the NOPR LCC spreadsheet. The input spreadsheet contains key information on the LCC calculations and methodology for: contractor markups; implementation of the new AHRI shipment data; implementation of the new AEO forecast; implementation of the new EIA pricing data; implementation of updated NWGF input capacity percentiles.

(b) (5)

QUESTION 2: Supporting data and detailed descriptions of changes in building shell efficiency calculations in the NODA LCC spreadsheet as mentioned on page 16 of "Res Furnace_NODA_2015-09-04.pdf." This is currently referenced in general terms as "described in the LCC spreadsheet."

(b) (5)

(b) (5)

QUESTION 3: Supporting data and detailed descriptions of changes in climate indices used to adjust energy use as mentioned on page 16 of "Res Furnace_NODA_2015-09-04.pdf." This is currently referenced in general terms as "described in the LCC spreadsheet."

(b) (5)

QUESTION 4: Supporting data and detailed descriptions of the "updated engineering analysis" that is referenced in the "NODA Analysis Update" sheet under the "Prod Price" changes.

(b) (5)



QUESTION 5: Clarification as to whether or not changes have been made to the "NWGF Switching" sheet that was omitted from the descriptions of changes in the "NODA Analysis Updates" Sheet of the NODA LCC spreadsheet.

(b) (5)



QUESTION 6: Describe the "bug" in the "AFUE Existing" assignment and what was done to correct the bug, with references to specific locations in the NODA LCC spreadsheet. (Related question from AHRI: Can you provide additional explanation on the "bug" that has been fixed in the "AFUE (Existing)" worksheet?)

(b) (5)



QUESTION 7: Describe the methodology and rationale for choosing 1.3 vs. 1.7 oversizing factors in the "Furnace & AC Sizing" Sheet of the NODA LCC spreadsheet.

(b) (5)



(b) (5)



QUESTION 8: Describe the methodology used to arrive at the Net Cost percentages included in Tables III.2 and III.3 of "Res Furnace_NODA_2015-09-04.pdf."

(b) (5)



QUESTION 9: Describe methodology/logic of implementing dual standard scenario, and downsizing options.

(b) (5)



QUESTION 10: The NODA LCC spreadsheet provides a dropdown box (see cell D23 in the Summary tab of the LCC spreadsheet) that provides options for various Standard Scenarios. The options in the dropdown box include Dual Standard selections for input capacities for small furnaces with thresholds of less than or equal to 70, 75, 80, 85 and 90 kBtus/hr. However, the tables included in the NODA do not include the LCC or the NIA spreadsheet results for these scenarios. Please provide the LCC and NIA spreadsheet results for each of these scenarios in a similar fashion that the other scenario results were presented in the NODA. *(Related question from AHRI: The recently issued Residential Furnace NODA analysis only looked at small furnace definitions for input limits up to 65kBtu/h. Yet the spreadsheet has options to define small furnace up to 90kBtu/h. As such the NODA only provides partial information on the concept of two classes of furnaces based on input rate. We request that DOE complete the analysis for at least the remaining optional definitions provided in the drop-down menu in the LCC spreadsheet. We ask that DOE also expand this analysis to include 95kBtu/h and 100 kBtu/h as possible defining limits.)*

(b) (5)



Table 1: Share of Sample Households by Furnace Size (percent)

Furnace Size	Small Furnace Definition (kBtu/hour)										
	≤ 40	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65	≤ 70	≤ 75	≤ 80	≤ 85	≤ 90
Large	94	92	86	85	68	62	57	47	35	35	28
Small	6	8	14	15	32	38	43	53	66	66	72
Total	100	100	100	100	100	100	100	100	100	100	100

Table 2: Average LCC Savings for Alternative Furnace Standard Level Combinations (2014\$)

Minimum AFUE (%)		Average LCC Savings (2014\$)*											
		Small Furnace Definition (kBtu/hour)											
Large	Small	≤ 40	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65	≤ 70	≤ 75	≤ 80	≤ 85	≤ 90	
90	80	\$382	\$383	\$400	\$400	\$492	\$484	\$484	\$489	\$475	\$475	\$432	
92	80	\$461	\$463	\$478	\$479	\$553	\$525	\$536	\$534	\$507	\$507	\$479	
95	80	\$438	\$439	\$447	\$449	\$479	\$437	\$457	\$453	\$411	\$411	\$390	
98	80	\$361	\$365	\$372	\$374	\$388	\$347	\$362	\$363	\$316	\$316	\$304	

* The average LCC savings only include those consumers who would be affected at a given standard level.

Table 3: Share of All Consumers Experiencing a Net Cost for Alternative Furnace Standard Level Combinations

Minimum AFUE (%)		% of Consumers Experiencing a Net Cost										
		Small Furnace Definition (kBtu/hour)										
Large	Small	≤ 40	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65	≤ 70	≤ 75	≤ 80	≤ 85	≤ 90
90	80	17%	16%	13%	13%	8%	6%	6%	4%	2%	2%	2%
92	80	15%	14%	12%	12%	7%	5%	5%	4%	2%	2%	2%
95	80	19%	18%	16%	15%	10%	8%	8%	6%	4%	4%	3%
98	80	38%	37%	33%	33%	25%	23%	20%	16%	12%	12%	10%

Table 4: Share of All Consumers in the South Experiencing a Net Cost for Alternative Furnace Standard Level Combinations

Minimum AFUE (%)		% of Consumers Experiencing a Net Cost											
		Small Furnace Definition (kBtu/hour)											
Large	Small	≤ 40	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65	≤ 70	≤ 75	≤ 80	≤ 85	≤ 90	
90	80	25%	23%	19%	19%	9%	6%	6%	4%	2%	2%	1%	
92	80	22%	21%	17%	17%	8%	5%	5%	3%	1%	1%	1%	
95	80	27%	25%	21%	21%	12%	8%	8%	5%	3%	3%	2%	
98	80	38%	35%	30%	29%	18%	14%	12%	8%	5%	5%	4%	

Table 5: National Energy Savings for Alternative Furnace Standard Level Combinations (quads)

Min AFUE (%)		Small Furnace Definition (kBtu/hour)											
		≤ 40	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65	≤ 70	≤ 75	≤ 80	≤ 85	≤ 90	
92	80	2.9	2.9	2.9	2.9	2.3	1.8	1.7	1.3	0.8	0.8	0.7	
95	80	4.2	4.2	4.2	4.1	3.4	2.8	2.7	2.1	1.4	1.4	1.2	
98	80	5.8	5.8	5.7	5.7	4.9	4.2	3.9	3.2	2.2	2.2	1.8	

Table 6: National Net Present Value of Benefits for Alternative Furnace Standard Level Combinations at 7-percent Discount Rate (billion 2014\$)

Min AFUE (%)		Small Furnace Definition (kBtu/hour)											
		≤ 40	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65	≤ 70	≤ 75	≤ 80	≤ 85	≤ 90	
92	80	3.0	3.1	3.5	3.5	3.0	2.4	2.3	1.8	1.0	1.0	0.8	
95	80	4.1	4.2	4.6	4.6	4.2	3.6	3.4	2.8	1.8	1.8	1.4	
98	80	3.7	3.8	4.4	4.4	4.6	4.0	3.8	3.1	2.1	2.1	1.7	

Table 7: National Net Present Value of Benefits for Alternative Furnace Standard Level Combinations at 3-percent Discount Rate (billion 2014\$)

Min AFUE (%)		Small Furnace Definition (kBtu/hour)											
		≤ 40	≤ 45	≤ 50	≤ 55	≤ 60	≤ 65	≤ 70	≤ 75	≤ 80	≤ 85	≤ 90	
92	80	14.7	14.7	14.8	14.8	11.8	9.1	9.0	7.1	4.1	4.1	3.3	
95	80	20.2	20.2	20.1	20.0	16.9	13.9	13.4	10.8	6.9	6.9	5.6	
98	80	23.9	23.9	24.0	23.9	21.3	18.4	17.2	14.2	9.5	9.5	7.8	

Coffey, Danyele (CONTR)

From: Jochum, Johanna
Sent: Wednesday, October 14, 2015 11:35 AM
To: Cymbalsky, John; Stas, Eric; Dean, Diana
Subject: RE: Furnaces Reopening
Attachments: RF Comment Reopening 10142015 - JH edits.docx

Two small edits.

Johanna Hariharan
Office of the General Counsel
Phone: 202-287-6307

-----Original Message-----

From: Cymbalsky, John
Sent: Wednesday, October 14, 2015 11:30 AM
To: Hariharan, Johanna <Johanna.Hariharan@Hq.Doe.Gov>; Stas, Eric <Eric.Stas@hq.doe.gov>; Dean, Diana <Diana.Dean@hq.doe.gov>
Subject: Furnaces Reopening

Please see the attached notice for reopening of the furnace comment period.

Thanks,
John

MEMORANDUM FOR

KATHLEEN B. HOGAN
DEPUTY ASSISTANT SECRETARY FOR ENERGY EFFICIENCY
ENERGY EFFICIENCY AND RENEWABLE ENERGY

FROM:

ROLAND J. RISSE
DIRECTOR
BUILDING TECHNOLOGIES OFFICE
ENERGY EFFICIENCY AND RENEWABLE ENERGY

SUBJECT:

ACTION: Publication in the Federal Register of a Notice
Reopening the Comment Period regarding the Notice of
Data Availability for Residential Furnaces (RIN: 1904-
AD20)

ISSUE: Approval to publish in the Federal Register the attached notice reopening the comment period regarding the notice of data availability for residential furnaces energy conservation standards.

BACKGROUND:

- DOE published a notice of data availability (NODA) on September 14, 2015 making available data regarding capacity ranges for energy conservation standards for residential furnaces. 80 FR 55038.
- After receiving a request for additional time to comment from AGA and APGA, DOE has decided to reopen the comment period for submitting comments and data in response to the NODA for 14 days.

OPTIONS: None

RECOMMENDATION: Recommend the attached notice of reopening of the comment period be approved for publication in the Federal Register.

APPROVE: _____ DISAPPROVE: _____ DATE: _____

[6450-01-P]

DEPARTMENT OF ENERGY

10 CFR 430

[Docket No. EERE-2014-BT-STD-0031]

RIN: 1904-AD20

**Energy Conservation Program: Energy Conservation Standards for Residential
Furnaces**

AGENCY: Office of Energy Efficiency and Renewable Energy, Department of Energy.

ACTION: Reopening of public comment period.

SUMMARY: On September 14, 2015, the U.S. Department of Energy (DOE) published a notice of data availability (NODA) in the Federal Register regarding energy conservation standards for residential furnaces (RF ECS NODA). The comment period was scheduled to end October 14, 2015. After receiving a request for additional time to prepare and submit comments, DOE has decided to reopen the comment period for submitting comments regarding the RF ECS NODA. The comment period is reopened through **[INSERT DATE 14 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

DATES: DOE will accept comments, data, and information in response to the NODA received no later than **[INSERT DATE 14 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**.

ADDRESSES: Any comments submitted must identify the NODA for Energy Conservation Standards for Residential Furnaces, and provide docket number EERE-2014-BT-STD-0031 and/or regulatory information number (RIN) number 1904-AD20. Comments may be submitted using any of the following methods:

1. Federal eRulemaking Portal: www.regulations.gov. Follow the instructions for submitting comments.
2. E-mail: ResFurnaces2014STD0031@ee.doe.gov Include the docket number EERE-2014-BT-STD-0031 and/or RIN 1904-AD20 in the subject line of the message.
3. Mail: Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, Mailstop EE-2J, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. If possible, please submit all items on a CD. It is not necessary to include printed copies.
4. Hand Delivery/Courier: Ms. Brenda Edwards, U.S. Department of Energy, Building Technologies Program, 950 L'Enfant Plaza, SW., Suite 600, Washington, DC, 20024. Telephone: (202) 586-2945. If possible, please submit all items on a CD. It is not necessary to include printed copies.

Docket: The docket, which includes Federal Register notices, public meeting attendee lists and transcripts, comments, and other supporting documents/materials, is available for review at regulations.gov. All documents in the docket are listed in the regulations.gov index. However, some documents listed in the index, such as those containing information that is exempt from public disclosure, may not be publicly available.

A link to the docket web page can be found at:
[\[www.regulations.gov/#!docketDetail;D=EERE-2014-BT-STD-0031\]](http://www.regulations.gov/#!docketDetail;D=EERE-2014-BT-STD-0031). This web page contains a link to the docket for this notice on the regulations.gov site. The regulations.gov web page contains instructions on how to access all documents, including public comments, in the docket.

For further information on how to submit a comment or review other public comments and the docket, contact Ms. Brenda Edwards at (202) 586-2945 or by email: Brenda.Edwards@ee.doe.gov.

FOR FURTHER INFORMATION CONTACT:

John Cymbalsky, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Building Technologies Program, EE-5B, 1000 Independence Avenue, SW., Washington, DC, 20585-0121. Telephone: (202) 287-1692. Email John.Cymbalsky@ee.doe.gov.

For legal issues, please contact Ms. Johanna Hariharan, U.S. Department of Energy, Office of General Counsel, GC-33, 1000 Independence Avenue, SW., Washington, DC 20585-0121. Telephone: (202) ~~287586-6307~~1777. Email: Johanna.Hariharan@hq.doe.gov.

SUPPLEMENTARY INFORMATION:

On September 14, 2015, DOE published a notice of data availability (NODA) in the Federal Register regarding energy conservation standards for residential furnaces (RF ECS NODA). 80 FR 55038. The notice ~~provided for requested~~ that interested parties ~~the~~ submission of submit written comments by October 14, 2015.

DOE received a joint request from the American Gas Association (AGA) and the American Public Gas Association (APGA) requesting additional time to prepare and submit comments (Docket No. EERE-2014-BT-STD-0031, AGA/APGA, No. 168 at p. 2). In response to this request, DOE is reopening the public comment period to allow interested parties to provide DOE with written comments and data in response to the RF ECS NODA. DOE will consider any comments in response to the RF ECS NODA received by midnight of **[INSERT DATE 14 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER]**, and deems any comments received by that time to be timely submitted.

Issued in Washington, DC, on

Kathleen B. Hogan

Deputy Assistant Secretary for Energy Efficiency

Energy Efficiency and Renewable Energy

Coffey, Danyele (CONTR)

From: Cohen, Daniel
Sent: Wednesday, October 14, 2015 12:13 PM
To: Cymbalsky, John; Dean, Diana; Jochum, Johanna; Stas, Eric
Cc: Barley, Clara (CONTR); DL-EERE-5B Appliance Standards Support Team
Subject: RE: Furnaces Reopening

I concur, if that's needed.

-----Original Message-----

From: Cymbalsky, John
Sent: Wednesday, October 14, 2015 11:46 AM
To: Dean, Diana <Diana.Dean@hq.doe.gov>; Hariharan, Johanna <Johanna.Hariharan@Hq.Doe.Gov>; Stas, Eric <Eric.Stas@hq.doe.gov>
Cc: Barley, Clara (CONTR) <Clara.Barley@Hq.Doe.Gov>; Cohen, Daniel <Daniel.Cohen@hq.doe.gov>; DL-EERE-5B Appliance Standards Support Team <DL-EE-5BApplianceStandardsSupportTeam@ee.doe.gov>
Subject: RE: Furnaces Reopening

(b) (5)

We will announce this reopening with the blast later today on placing the AGA answers in the docket.

Please prep for signature.

-----Original Message-----

From: Dean, Diana
Sent: Wednesday, October 14, 2015 11:42 AM
To: Cymbalsky, John <John.Cymbalsky@EE.Doe.Gov>; Hariharan, Johanna <Johanna.Hariharan@Hq.Doe.Gov>; Stas, Eric <Eric.Stas@hq.doe.gov>
Cc: Barley, Clara (CONTR) <Clara.Barley@Hq.Doe.Gov>
Subject: RE: Furnaces Reopening

This looks ok. Just be sure that the signature is not alone on the last page.

-----Original Message-----

From: Cymbalsky, John
Sent: Wednesday, October 14, 2015 11:30 AM
To: Hariharan, Johanna <Johanna.Hariharan@Hq.Doe.Gov>; Stas, Eric <Eric.Stas@hq.doe.gov>; Dean, Diana <Diana.Dean@hq.doe.gov>
Subject: Furnaces Reopening

Please see the attached notice for reopening of the furnace comment period.

Thanks,
 John

Coffey, Danyele (CONTR)

From: Steve Nadel <SNadel@aceee.org>
Sent: Wednesday, October 14, 2015 3:11 PM
To: Cymbalsky, John
Subject: Furnace NODA

John,

From the furnace rule website it looks like you are publishing additional info on the NODA today/shortly and the comment period is extended until 14 days after publication in the Federal Register. Do I have this right? If so, we'll hold off on filing our comments today in order to see what additional info you are making available.

S.

Coffey, Danyele (CONTR)

From: Steve Nadel <SNadel@aceee.org>
Sent: Thursday, October 15, 2015 11:27 AM
To: Cymbalsky, John
Subject: RE: Furnace NODA

John,

There's a cryptic indication on the furnace rulemaking website that there will be a 14-day reopening so we decided to wait before submitting our comments.

S.

From: Cymbalsky, John [mailto:John.Cymbalsky@EE.Doe.Gov]
Sent: Wednesday, October 14, 2015 4:46 PM
To: Steve Nadel
Subject: Re: Furnace NODA

We should be issuing that information shortly.

From: Steve Nadel [mailto:SNadel@aceee.org]
Sent: Wednesday, October 14, 2015 03:10 PM
To: Cymbalsky, John
Subject: Furnace NODA

John,

From the furnace rule website it looks like you are publishing additional info on the NODA today/shortly and the comment period is extended until 14 days after publication in the Federal Register. Do I have this right? If so, we'll hold off on filing our comments today in order to see what additional info you are making available.

S.

Coffey, Danyele (CONTR)

From: Steve Nadel <SNadel@aceee.org>
Sent: Thursday, October 15, 2015 12:56 PM
To: Cymbalsky, John
Subject: Re: DOE Issues a Notice Reopening the Comment Period Regarding the Notice of Data Availability Concerning Energy Conservation Standards for Residential Furnaces

This just mentions time and no new info. Will there be more info provided on your analysis or is this reopening just about more time?

Sent from my iPhone

On Oct 15, 2015, at 11:45 AM, Cymbalsky, John <John.Cymbalsky@EE.Doe.Gov> wrote:

Was this what you were referring to?

From: DOE Office of Energy Efficiency and Renewable Energy [<mailto:eere@service.govdelivery.com>]
Sent: Thursday, October 15, 2015 11:43 AM
To: Cymbalsky, John
Subject: DOE Issues a Notice Reopening the Comment Period Regarding the Notice of Data Availability Concerning Energy Conservation Standards for Residential Furnaces

ENERGY.GOV

Office of Energy Efficiency & Renewable Energy

Building Technologies Office

DOE Issues a Notice Reopening the Comment Period Regarding the Notice of Data Availability Concerning Energy Conservation Standards for Residential Furnaces

The Department of Energy has issued a pre-publication *Federal Register* notice reopening the comment period regarding the Notice of Data Availability (NODA) concerning residential furnaces. The comment period is

reopened for an additional 14 days after publication in the *Federal Register*. (October 15, 2015).

- Find more information on the rulemaking, including milestones, statutory authority, rulemaking documents, and any other related rulemakings.
- All notices, public comments, public meeting transcripts, and supporting documents associated with this rulemaking are included in Docket No. EERE-2014-BT-STD-0031.
- Find product information about current standards and test procedures; recent product updates; waivers, exceptions, and exemptions; the statutory authority; historical information; and contact information.

This email is part of an effort by the Department of Energy to notify all interested persons of recently issued *Federal Register* notices and other significant program developments under the Appliance and Equipment Standards Program. By following the link provided below, you may change your Subscriber Preferences to remove your email address from the product-specific lists being used by DOE under this program.

Update your subscriptions, modify your password or email address, or stop subscriptions at any time on your subscriber preferences page. You will need your email address to log in. If you have questions or problems with the subscription service, contact support@govdelivery.com.

This service is provided to you by the U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy (EERE).

This email was sent to john.cymbalsky@ee.doe.gov on behalf of the U.S. Department of Energy Office of Energy Efficiency and Renewable Energy · 1000 Independence Ave., SW · Washington DC 20585