DOCKETED	
Docket Number:	18-AAER-06
Project Title:	Hearth Products
TN #:	228673
Document Title:	Presentation - Proposed Energy Efficiency Standards for Gas Hearth Products
Description:	Staff presentation by Jessica Lopez, for the June 6, 2019 Staff Workshop on Gas Hearth Products.
Filer:	Jessica Lopez
Organization:	California Energy Commission
Submitter Role:	Commission Staff
Submission Date:	6/5/2019 4:41:17 PM
Docketed Date:	6/5/2019

Proposed Energy Efficiency Standards for Gas Hearth Products

Staff Workshop

June 6, 2019

David Nichols
Supervisor - Standards & Outreach Unit
Appliances Office – Efficiency Division

Housekeeping Items

- Note: This workshop is being recorded with a court reporter and WebEx.
- Restrooms are located outside this room and to the left and on the right beyond the stairs in back of the elevators.
- Refreshments
  - Water fountains located near the restrooms
  - There is a newly redecorated lounge on the second floor that includes vending machines for your convenience.
- Emergencies
  - Lastly, if there is an emergency and the building is evacuated, please follow our staff to the appropriate exits. We will convene at Roosevelt Park, located diagonally across the street from this building.

Workshop Agenda

Time	Topic	Presenter
10:00 a.m.	**Welcome**	David Nichols
10:10 a.m.	**Staff's Gas Hearth Products Presentation**	Jessica Lopez
11:10 a.m.	**Break** *(5 minutes)*	
11:15 a.m.	**Stakeholder Presentations** *(10 minutes each)*	
	California Investor Owned Utilities (IOUs)	Cassidee Kido
11:25 a.m.	**Open Discussion and Public Comment**	
12:05 p.m.	**Next Steps**	Jessica Lopez
12:15 p.m.	**Adjourn**	

Participation Guidelines

- For those participating online:
  - Please mute your phone.
  - Please use the raise hand feature to make comments.
    - We will unmute you.
  - Or use the chat feature to make comments.
    - We will read those comments into the record and respond accordingly.
  - State your name and organization.
- We recommend you log-in into the WebEx event and use the audio pin or have WebEx call you.

Participation Guidelines

- For those participating in the room:
  - Take a seat where a microphone is available. Or, you may stand at the small podium.
  - When you see a green light – the microphone is on. A red light indicates the microphone is off.
  - Speak directly into the mic.
  - State your name and organization.
  - When done, please turn off microphone (change to a red light).
  - Provide business card to court reporter.

Document Availability

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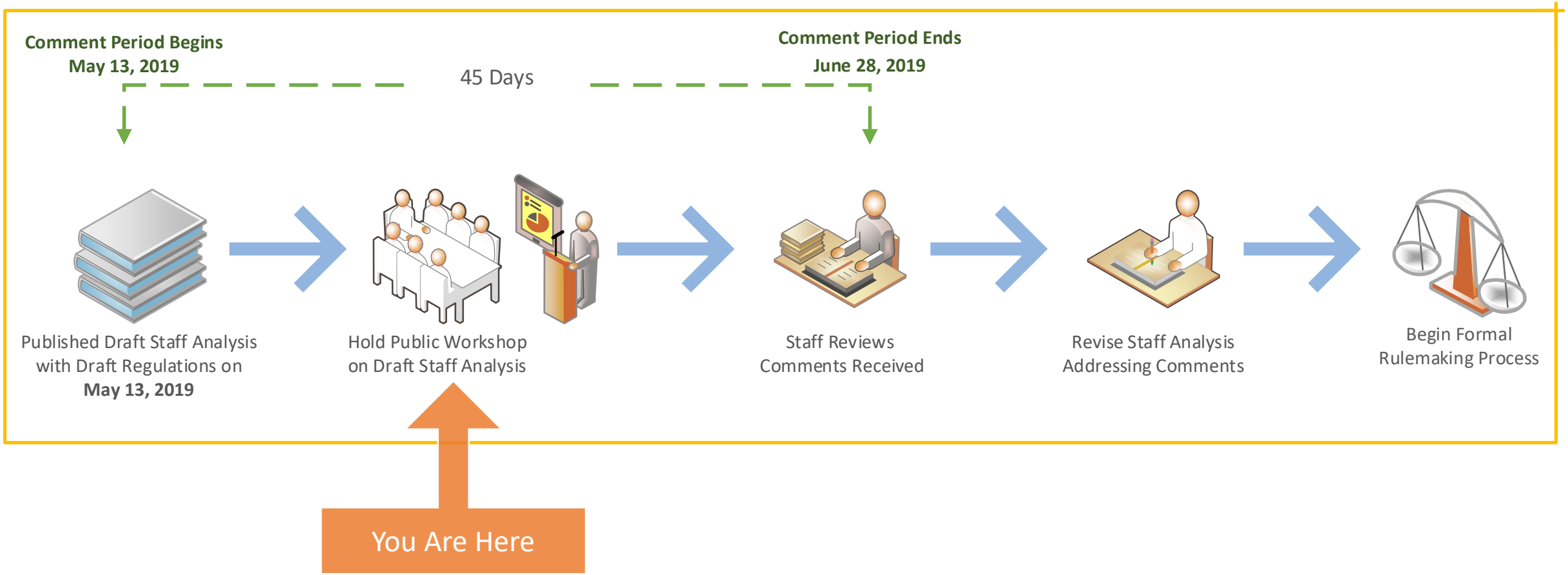
Documents Available Now DOCKET # 18-AAER-06
Draft Staff Report (Includes Proposal Details)
Staff Workshop Presentation
Stakeholder Presentations

Pre-Rulemaking Status



Comments

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Proposed Energy Efficiency Standards for Gas Hearth Products

Staff Workshop

June 6, 2019

Presented by Jessica Lopez
Associate Energy Specialist
Appliances Office – Efficiency Division

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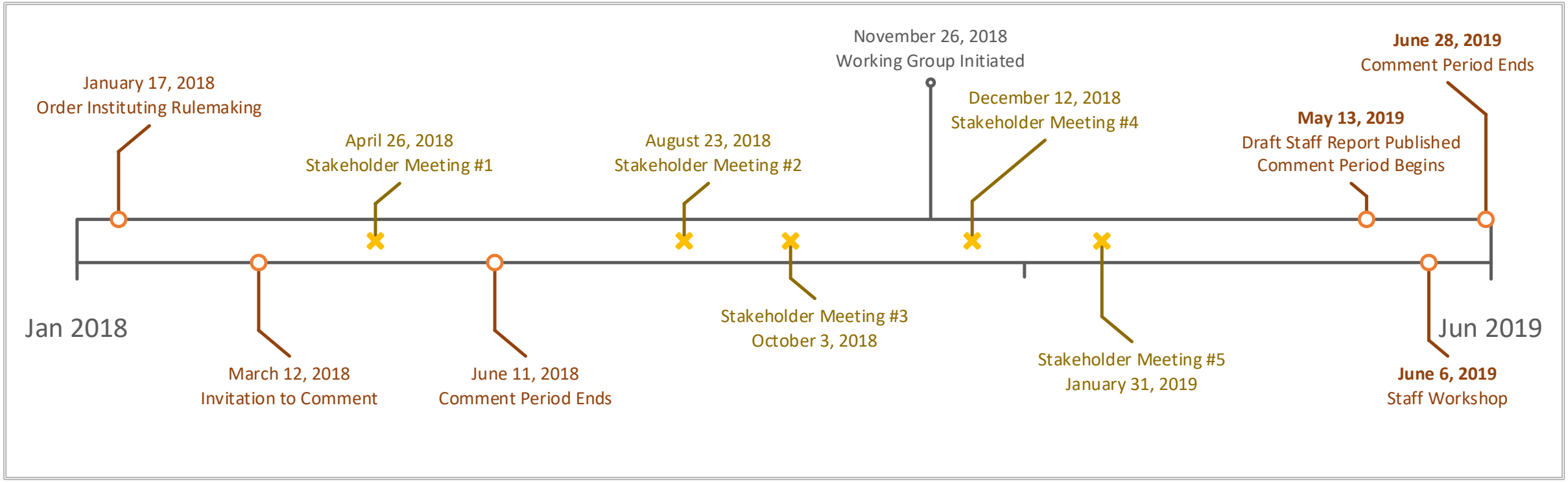
Presentation Agenda

- Background
- Staff Proposal
  - Scope
  - Test Procedure
  - Efficiency Standard
  - Design Standard
  - Other Supporting Requirements
    - Marking Requirements
    - Certification Requirements
- Technical Feasibility
- Savings and Cost Analysis
  - Cost and Benefits
  - Energy Savings
  - Avoided Emissions
- Conclusion
  - Q&A
- Discussion Topics

Background

Pre-Rulemaking History



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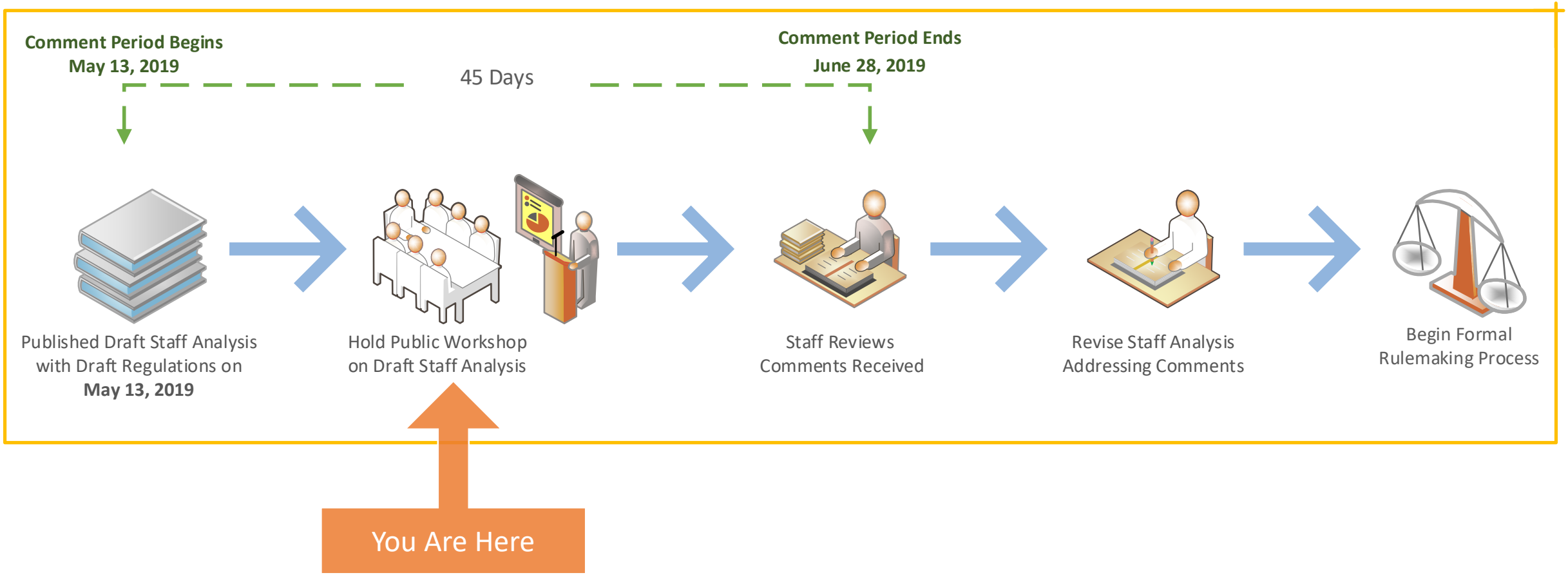


Other Regulatory Approaches

United States

Currently No Federal Standards

Rebate programs in Washington, Oregon, Minnesota, Utah, Wyoming, and Idaho

California Building Energy Efficiency Standards (BEES)

2016 BEES: Prohibits Continuous Pilots on Gas Fireplaces, Decorative Gas Appliances, & Gas Logs

2019 BEES: Prohibits Continuous Pilots on Gas-Fueled Indoor and Outdoor Fireplaces

Other Regulatory Approaches

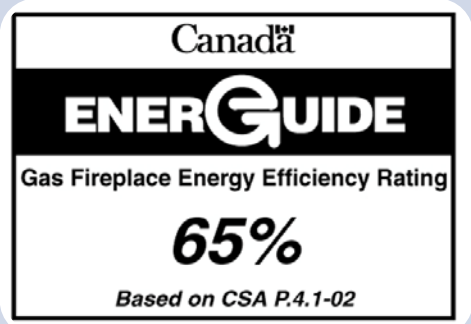
British Columbia (BC)

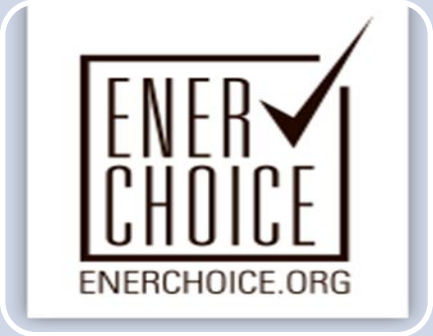
- Vented Heating and Decorative Gas Fireplaces
- Minimum **FE of 50%** for Heating Gas Fireplaces
- Test Decorative Gas Fireplaces for FE
- Test Method: CSA P.4.1 -2015
- Prohibits Continuous Pilots
- Labeling Requirements
- Effective Date: January 1, 2019

Natural Resources Canada (NRCan)

- Same as British Columbia
- On-demand Time Limit
- Minimize Main Burner Operation for Decorative Gas Fireplaces
- Continuation of Certifying to NRCan
- Proposed Effective Date: January 1, 2020

Canadian Voluntary Labeling Programs





Acknowledgements

Natural Resources Canada (NRCan)

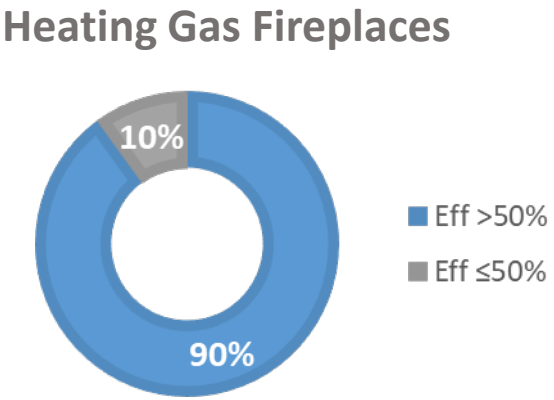
British Columbia

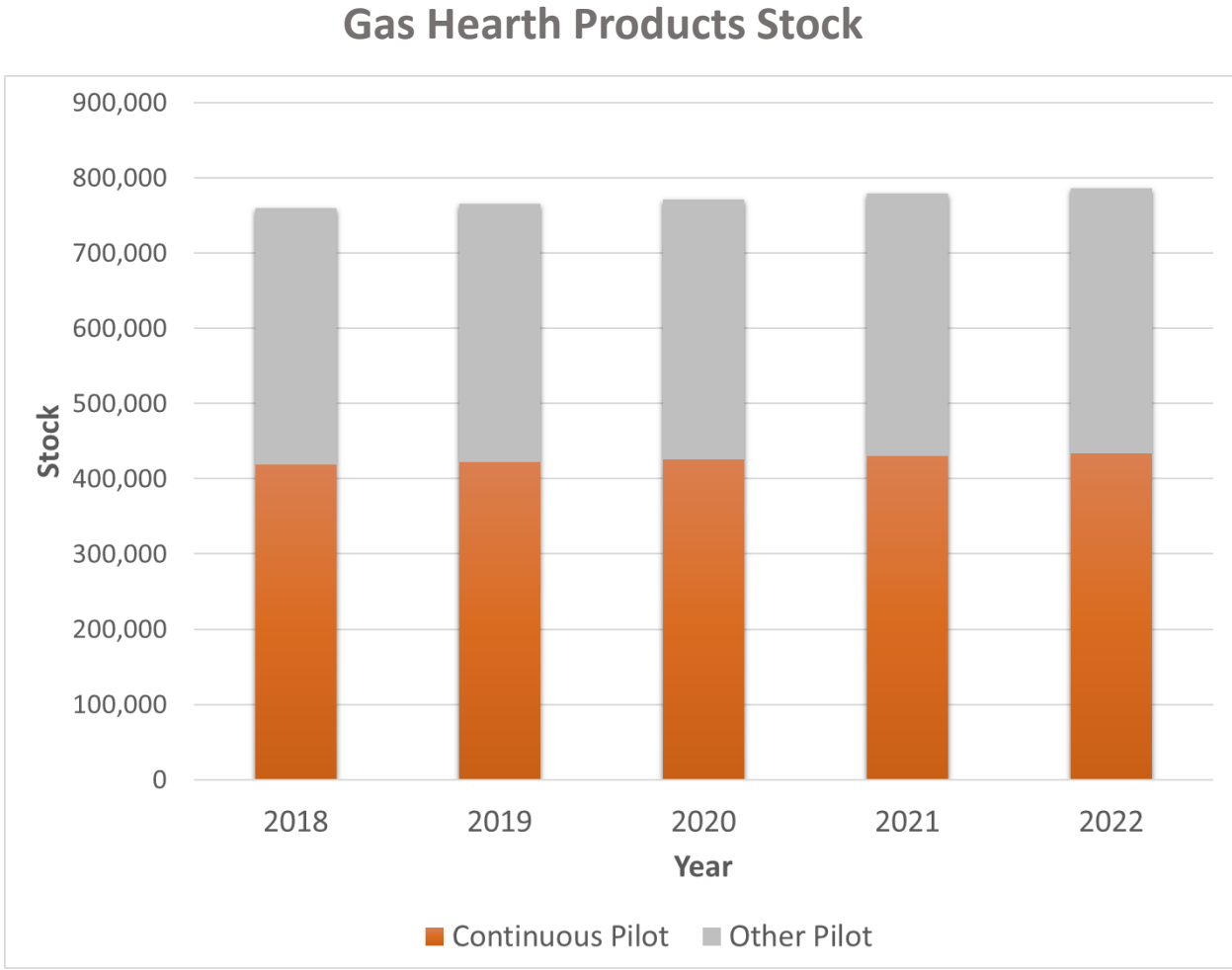
Office of Ministry of Energy, Mines and Petroleum Resources
Energy Efficiency Branch

Staff Proposal

Why Propose Standards?

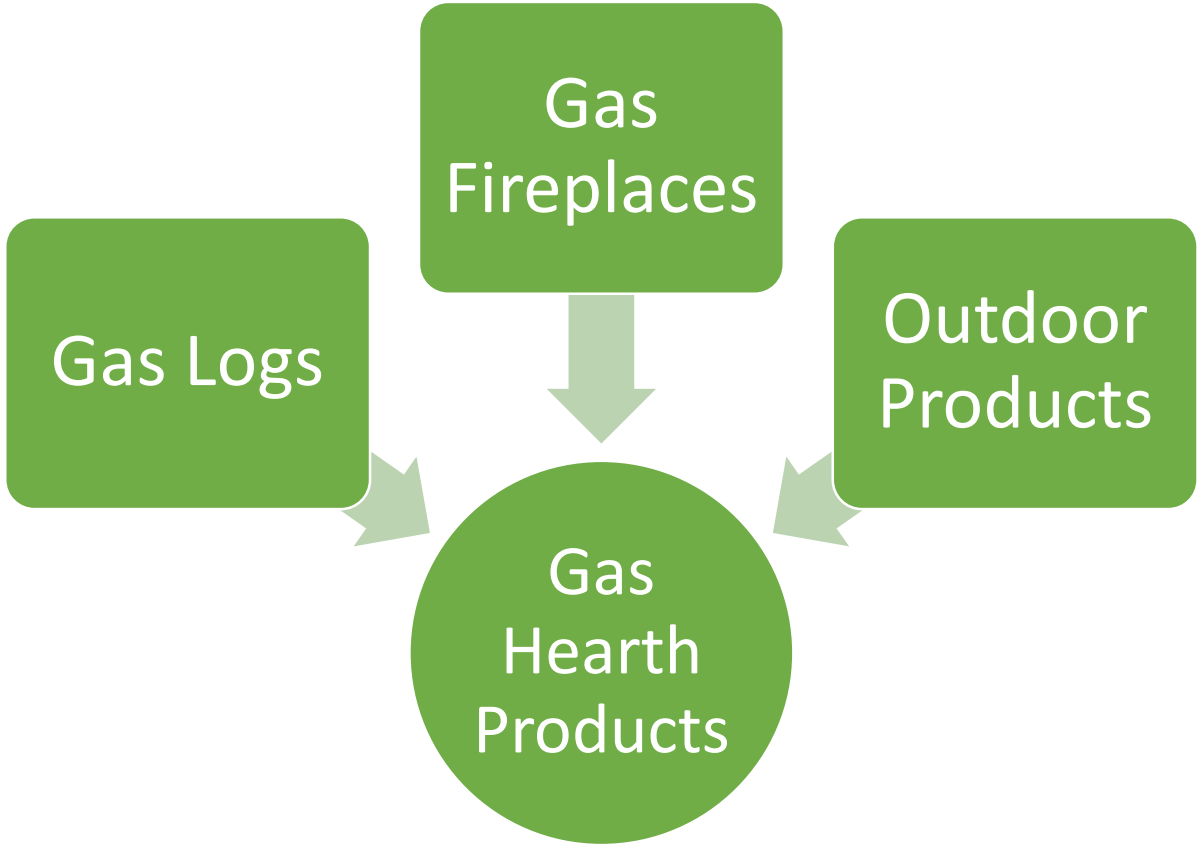
- More than 50% of gas hearth products have a continuous pilot
  - Wasteful gas consumption
  - Excess emissions
- Additional saving opportunities through product efficiency





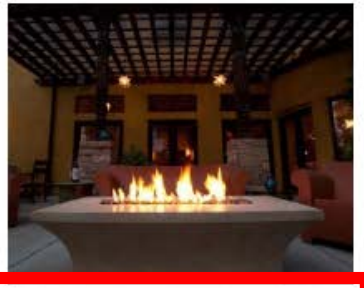
Scope

Gas Hearth Products* - means a gas-fueled appliance that simulates a solid-fueled fireplace or presents a flame pattern (for aesthetics or other purpose) and that may provide space heating directly to the space in which it is installed.



*Natural gas and propane fueled products

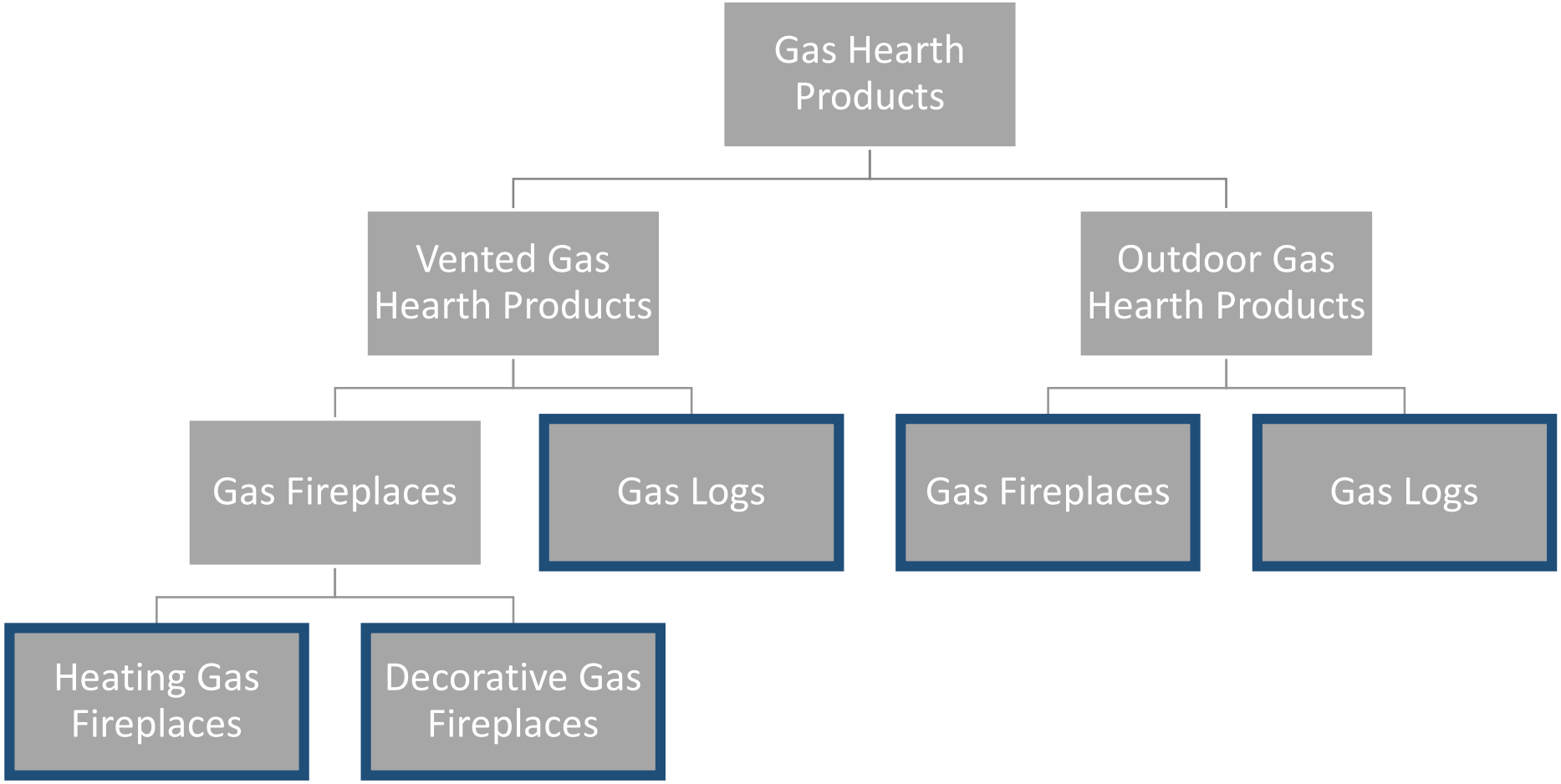
Gas Hearth Products

Configuration Type ↓	Vented Gas Fireplaces	Unvented Gas Fireplaces	Vented Gas Logs	Unvented Gas Logs	Outdoor Products
Zero-Clearance Fireplace					 Other Outdoor Products (e.g., fire pits, fire tables)
Insert					 Outdoor Gas Logs
Stove					 Outdoor Gas Fireplaces

Proposed Scope

Source: U.S. Department of Energy, Modified by CEC staff

Proposed Scope



Proposed Definitions

- **“Heating gas fireplace”** means a gas fireplace that presents a flame pattern for aesthetic effects and is designed to provide space heating directly towards the space in which it is installed. Functions as a primary or supplementary heat source.

- **“Decorative gas fireplace”** means a gas fireplace that is not equipped with a thermostat, and presents a flame pattern primarily for aesthetic effects. Does not function as a primary or supplementary heat source.

Proposed Appliance Standards

Efficiency Standards

- Vented *Heating* Gas Fireplaces
  - Must have a minimum Fireplace Efficiency (FE) of 70%
- Vented *Decorative* Gas Fireplaces
  - No minimum FE standard
    - Manufacturers will report FE

Design Standards

- For all products in scope:
  - Shall not be equipped with a continuous pilot (includes dual pilot capabilities)
  - On-demand pilots shall be timed for a maximum of 7 days.
- Vented *Decorative* Gas Fireplaces
  - Shall be equipped with an automatic shut-off device with a time limit no greater than 24 hours.

Proposed Test Procedure

- Canadian Standards Association (CSA) P.4.1 – 2015: Testing method for measuring annual fireplace efficiency
  - Fireplace Efficiency (FE) – measure of fireplace's energy efficiency over the heating season and is expressed as a percentage.
- With modifications:
  - Adding clarifications
    - Pilot Energy Input
    - Equation Nomenclature
  - Adding test lab report requirements

Other Proposed Supporting Requirements

Marking Requirements

- Vented *Decorative* Gas Fireplaces
  - Shall be marked permanently on the unit, packaging, and cover page of instructions:

  "Vented decorative gas appliance: not a source of heat."

Certification Requirements

- Basic information to determine compliance and to monitor the market.

Proposal

- Details of proposal is located in the draft staff report:
  - Chapter 5, Alternative 5 – Proposal
  - Chapter 6 – Discusses proposal
  - **Chapter 10 – Proposed regulatory language**
- Proposed effective date is January 1, 2021.

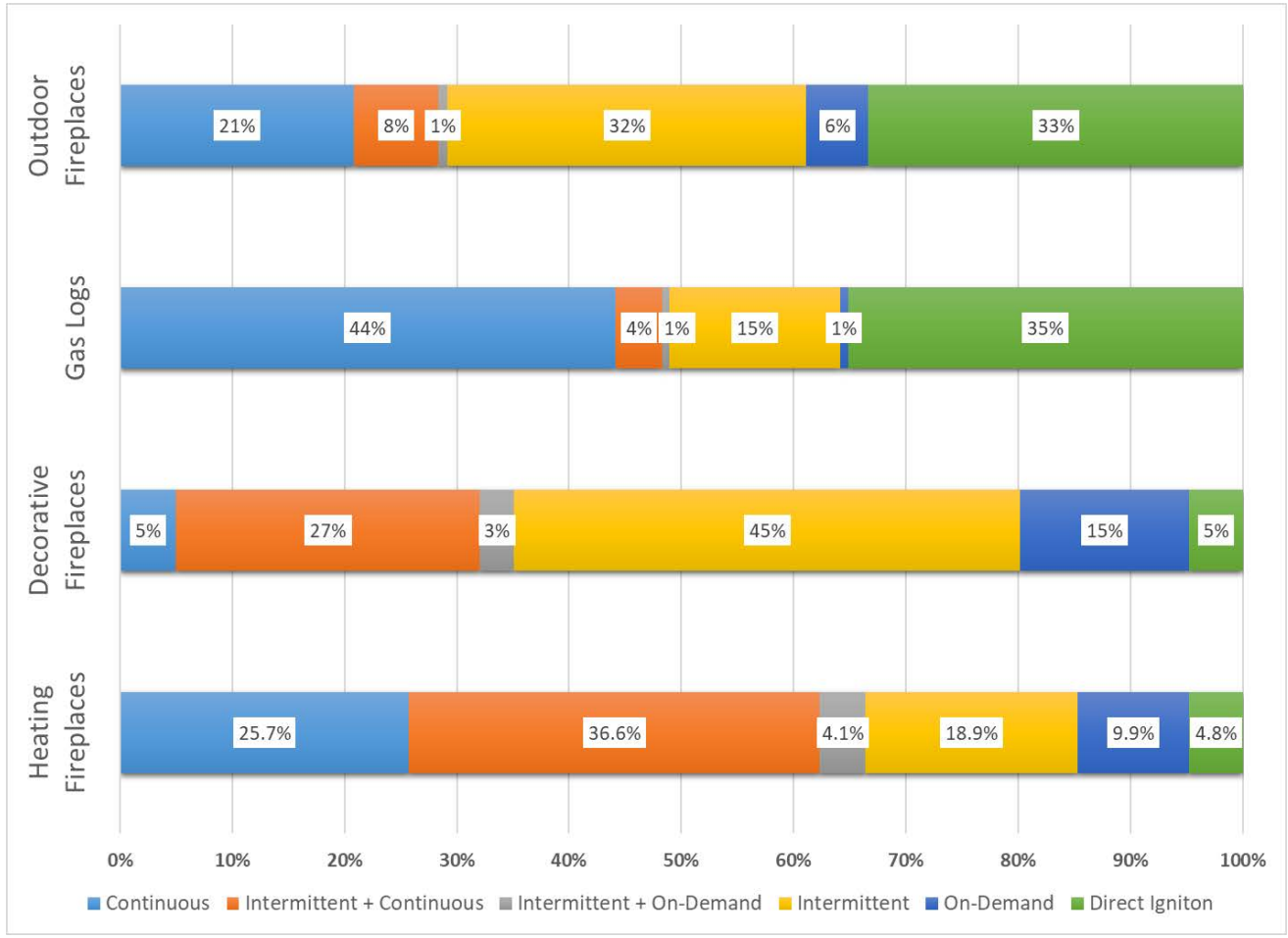
Technical Feasibility

Technical Feasibility – Design Standard

Table 1: Pilot Compliance Rates

Compliancy	Heating Fireplaces	Decorative Fireplaces	Gas Logs	Outdoor Fireplaces
Non-Compliant	63%	32%	48%	29%
Compliant	33%	63%	17%	39%
Direct Ignition	5%	5%	35%	33%

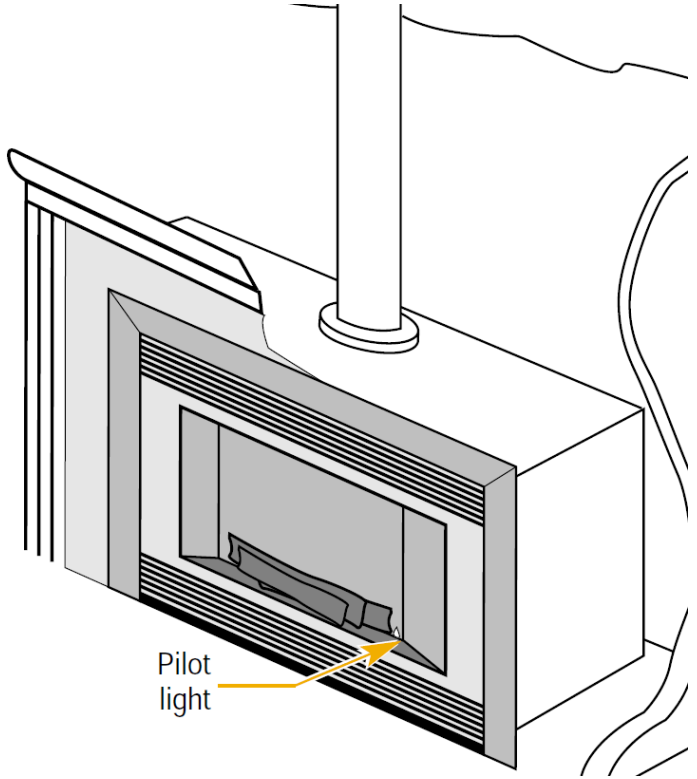
Figure 1: Illustration of Compliance Rates



Technical Feasibility – Technology Options

Design Standard

- Intermittent pilot
- On-demand pilot
- Interrupted pilot
- Dual pilot capability
  - Intermittent + On-demand
- Direct ignition (no pilot)



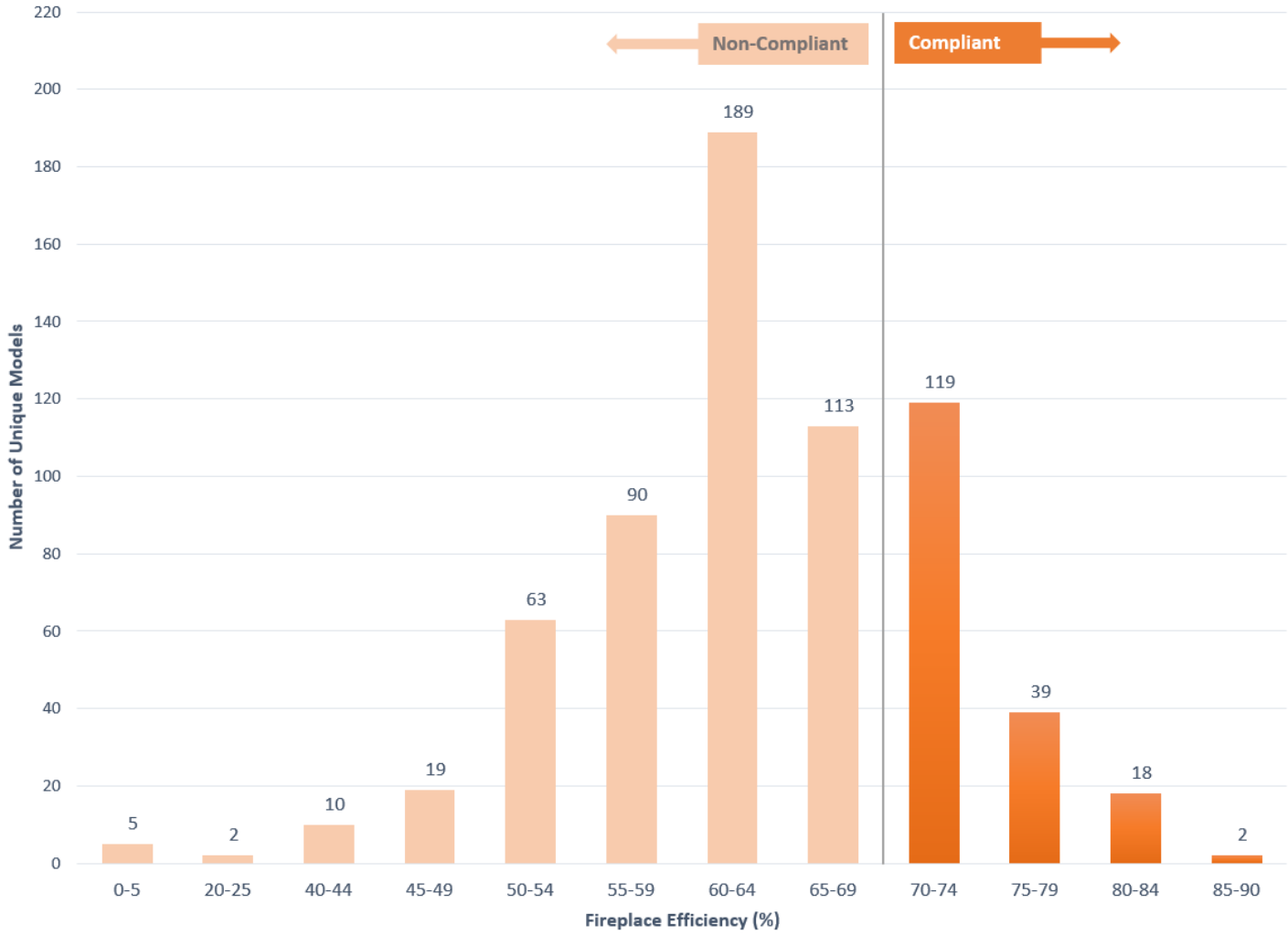
Source: NRCan

Technical Feasibility – Efficiency Standard

Table 2: FE Compliance Rates

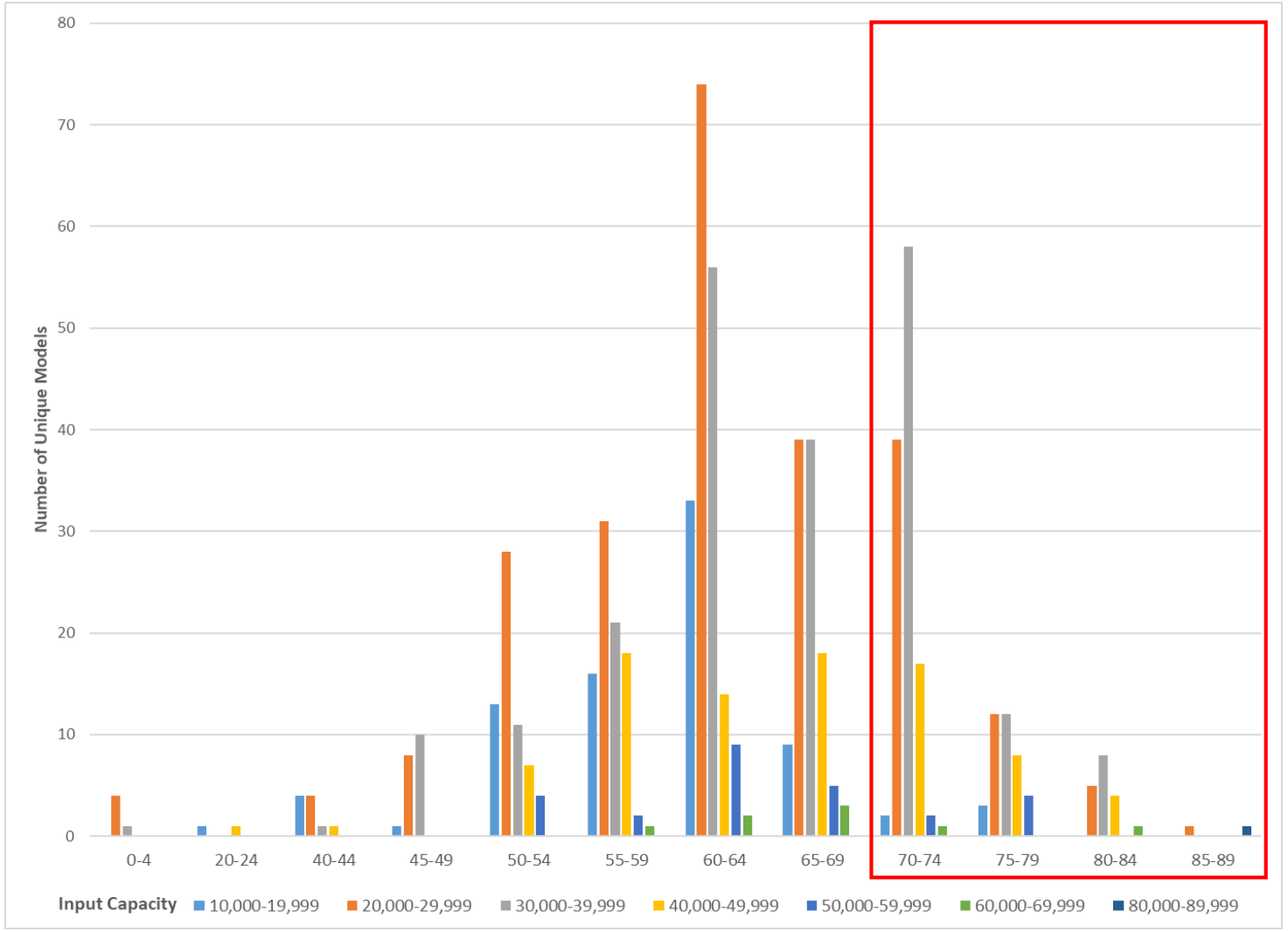
	Natural Gas Models	Propane Models
Non-Compliant	73.4%	71.2%
Compliant	26.6%	28.8%

Figure 2: Fireplace Efficiency Compliance (Natural Gas)



Technical Feasibility – Cont.

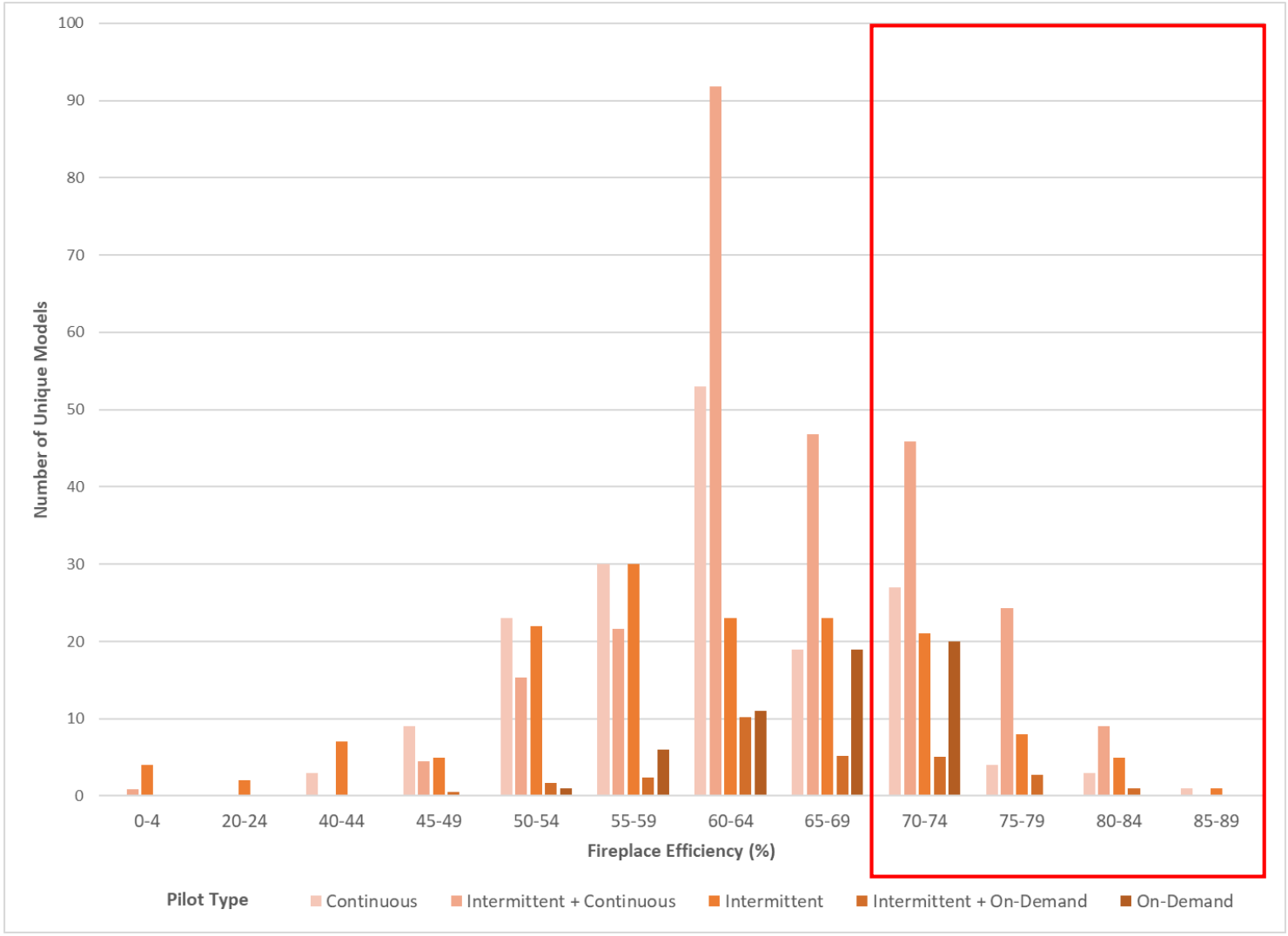
Figure 3: Fireplace Efficiency vs. Input Capacity [Btu/hr] (Natural Gas)



Compliant FE

Technical Feasibility – Cont.

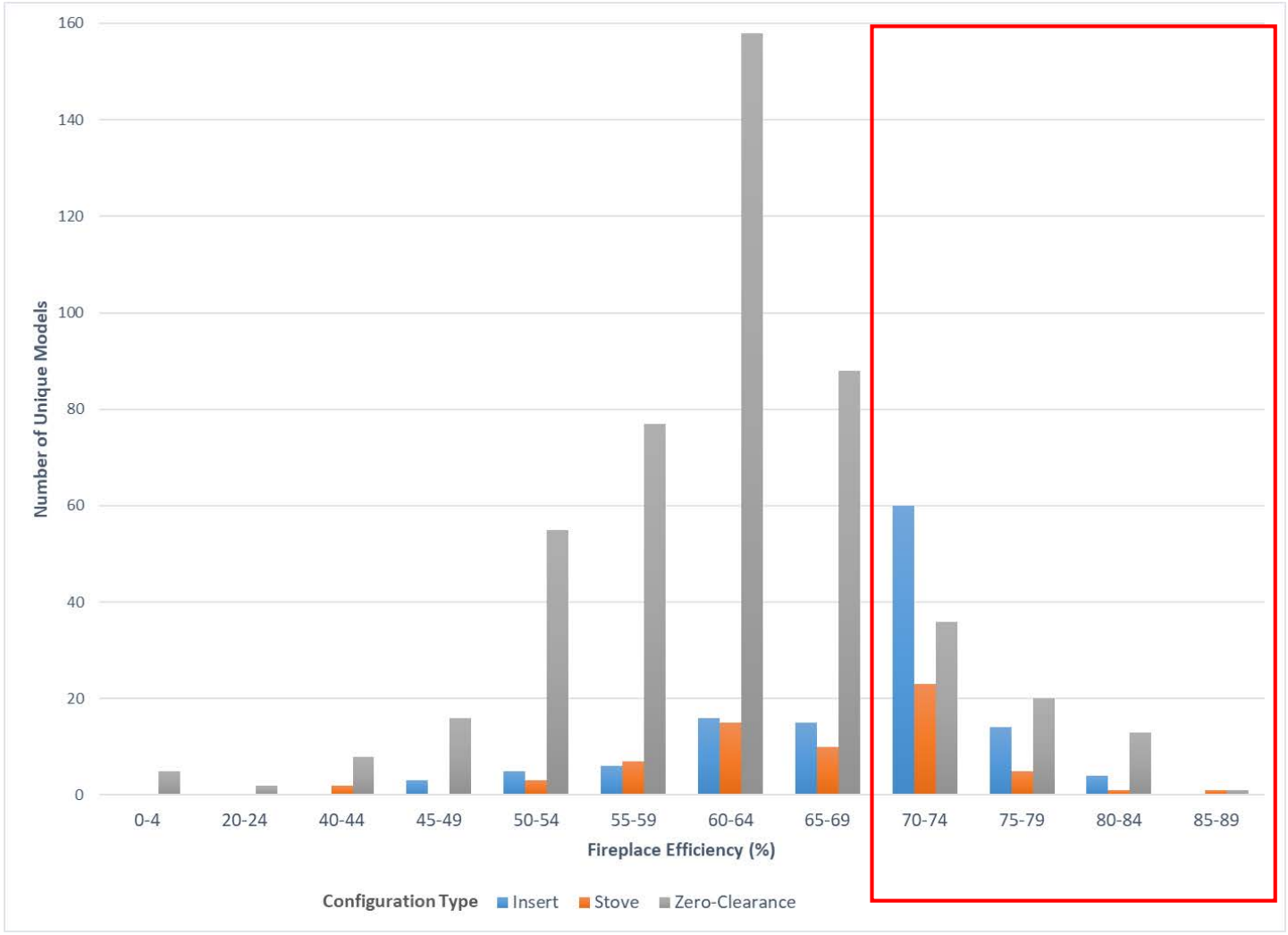
Figure 4: Fireplace Efficiency vs. Pilot Type (Natural Gas)



Compliant FE

Technical Feasibility – Cont.

Figure 5: Fireplace Efficiency vs. Configuration (Natural Gas)

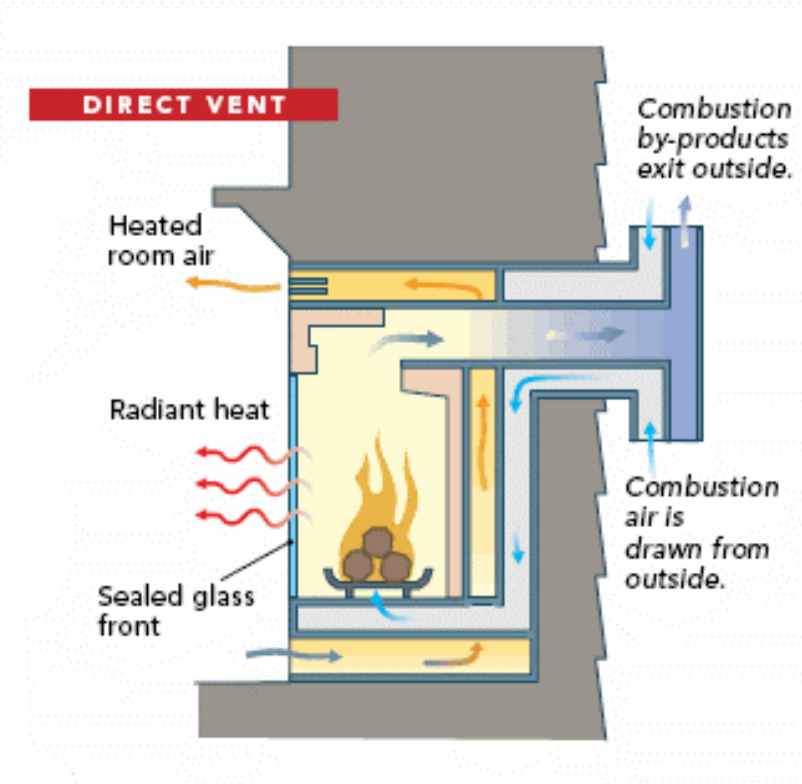


Compliant FE

Technical Feasibility – Technology Options

Efficiency Standard

- Direct vent technology
- Ceramic glass front
- Condensing heat exchanger
- Circulating fan
- Insulation



Source: FineHomeBuilding.com

Savings and Cost Analysis

Cost and Benefits

Table 3: Design Standard Unit Energy Savings and Lifecycle Costs/Benefits

Gas Hearth Product	Design Life	Energy Savings* (MMBtu/year)	Lifecycle Cost* ($/unit)	Net Present Value Lifecycle Benefit* ($/Unit)
Heating Gas Fireplaces	15	1.5 to 4.3	$30 to $37	$189 to $591
Decorative Gas Fireplaces	15	2.3 to 3.9	$30 to $37	$298 to $542
Gas Logs	15	1.2 to 2.5	$37 to $85	$92 to $329
Outdoor Gas Fireplaces	15	1.1 to 1.8	$59 to $74	$86 to $213

*Energy savings, lifecycle costs, and lifecycle benefits vary by pilot type

Cost and Benefits

Table 4: Efficiency Standard Unit Energy Savings and Lifecycle Costs/Benefits for Heating Gas Fireplaces

Scenario	Design Life	Energy Savings* (MMBtu/year)	Lifecycle Cost* ($/unit)	Net Present Value Lifecycle Benefit* ($/Unit)
Non-Compliant Pilot + Non-Compliant FE	15	2.8 to 5.6	$115 to $122	$189 to $591
Compliant Pilot + Non-Compliant FE	15	1.3	$85	$104

*Energy savings, lifecycle costs, and lifecycle benefits vary by pilot type

Energy Savings

Table 5: Total Statewide Annual Stock Savings

	First-Year Savings (2021)		Complete Stock Turnover Savings (2035)	
Gas Hearth Product	**Energy Use (MMBtu/year)**	**Savings ($ Million/year)**	**Energy Use (MMBtu/year)**	**Savings ($ Million/year)**
Heating Gas Fireplaces	68,251	$0.89	2,268,575	$29.31
Decorative Gas Fireplaces	17,058	$0.22	58,666	$0.76
Gas Logs	16,861	$0.22	57,213	$0.74
Outdoor Gas Fireplaces	2,986	$0.04	44,720	$0.58
Total	**105,157**	**$1.36**	**2,429,175**	**$31.39**

0.105 TBtu/year

2.4 TBtu/year

Avoided Emissions

Table 6: Avoided Emissions

	Avoided Greenhouse Gases (Metric tons CO_2)				
Year	**Heating Gas Fireplaces**	**Decorative Gas Fireplaces**	**Gas Logs**	**Outdoor Fireplaces**	**Total**
First-Year (2021)	3,646	911	901	152	**5,618**
After Complete Stock Turnover (2035)	121,142	3,134	3,057	2,389	**129,722**

Conclusion

Comments

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Clarifying Questions?

Contact Information

Jessica Lopez

Appliances Office

Efficiency Division

Jessica.Lopez@energy.ca.gov

(916) 654 - 5125

Discussion

Discussion Topics

- Heating vs. Decorative
  - Are there physical characteristics that differentiate a heating gas fireplace from a decorative gas fireplace?
  - How do manufacturers define a heating gas fireplace and a decorative gas fireplace?
  - What does the FE rating mean for a decorative gas fireplace?
    - For example, what is the difference between a decorative gas fireplace with an FE rating of 50% and a heating gas fireplace with an FE rating of 50%?
- Efficiency
  - With different ways to increase efficiency, what is the most effective and/or cost effective?

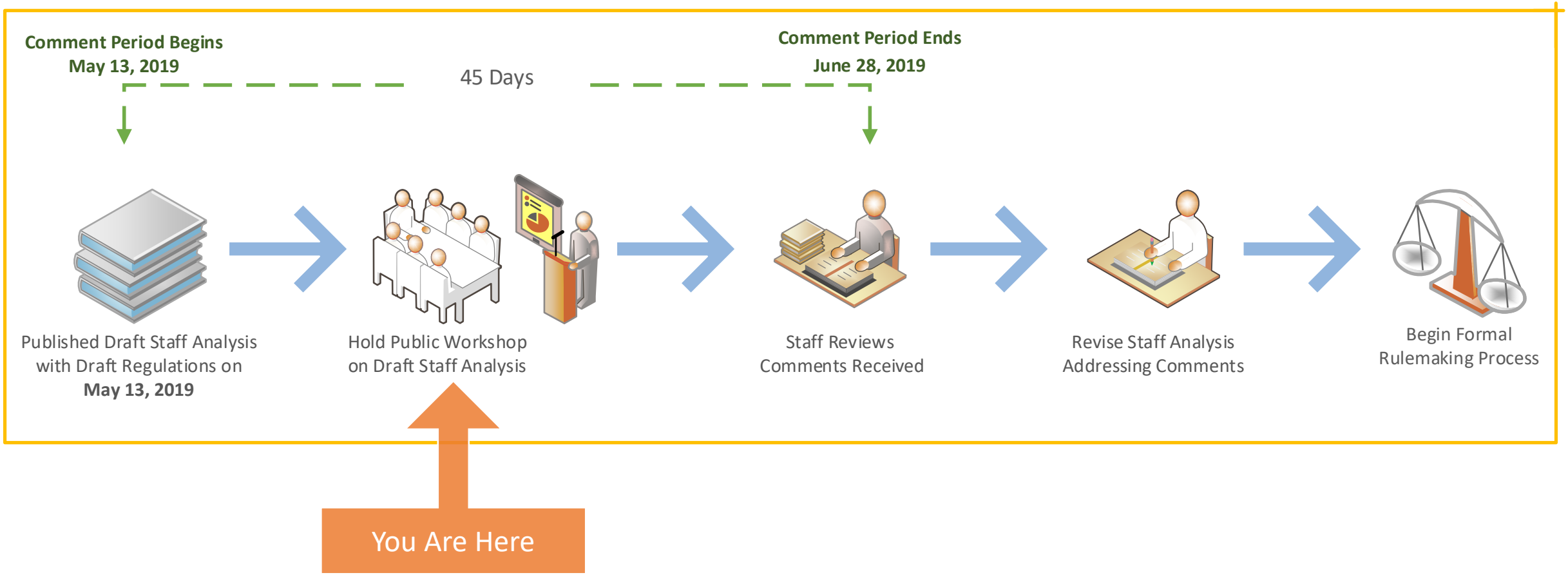
Discussion Topics

- Small Businesses
  - How are small business affected by staff's proposal?
- Pilot Types
  - Are there pilot types that have not been identified in this proposal?
  - How are on-demand pilots identified in market literature?
- Test Procedure
  - Are the proposed multiplication factors assigned to *interrupted pilots* and *intermittent and on-demand capability pilot* reasonable? What is practiced in industry?
  - Does the type of media selected impact the test procedure results?
  - Are there any limitations or improvements that can be made to the test procedure?

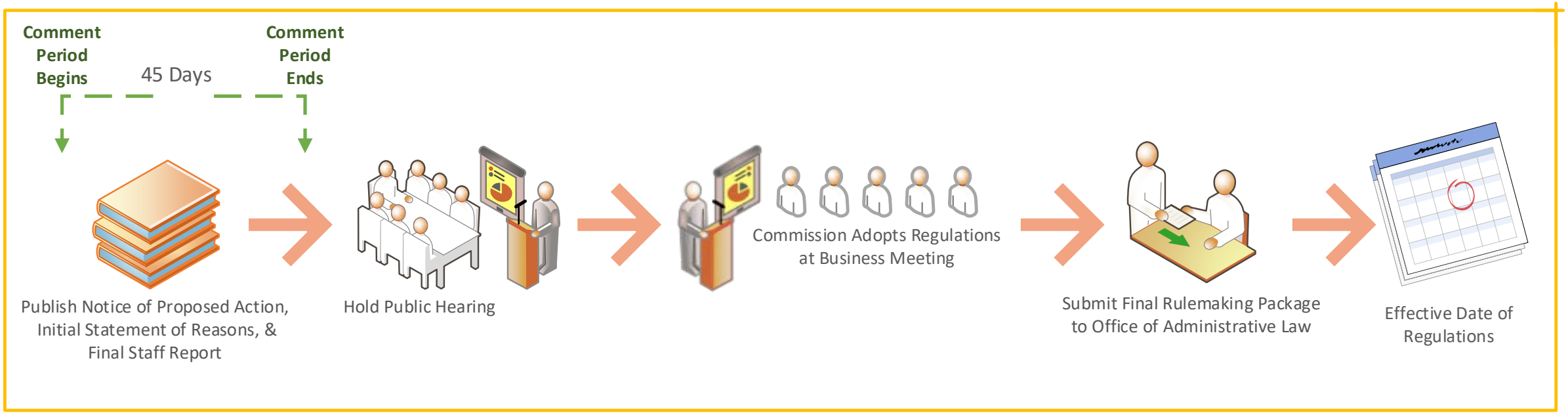
Next Steps

Presented by Jessica Lopez
Associate Energy Specialist
Appliances Office – Efficiency Division

Next Steps: Pre-Rulemaking



Next Steps: Formal Rulemaking



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Thank You!

Jessica Lopez

Appliances Office

Efficiency Division

Jessica.Lopez@energy.ca.gov

(916) 654 - 5125

Additional Information

Test Procedure Excerpt

5.7 Pilot light measurement

The energy input rate, Q_P, shall be measured to the pilot light on all fireplaces so equipped, except for fireplaces with controls that turn off the pilot when the main burner is shut down. The energy input rate shall be measured with an error not greater than 3%.

The energy input rate shall be determined as follows:

a) for fireplaces with a continuous pilot, Q_P = measured pilot input;
b) for fireplaces with a remotely operated pilot ignition system, Q_P = measured pilot input × 0.5;
c) for fireplaces with an intermittent ignition system that are capable of continuous pilot operation, Q_P = measured pilot input × 0.5;
d) for fireplaces with an on demand pilot ignition system timed for a maximum of 7 days operation, Q_P = measured pilot input × 0.25; and
e) for fireplaces with an intermittent ignition system, Q_P = 0.

Test Procedure Excerpt

6.14.2

For direct vent gas fireplaces, the effective flue gas temperature difference at start-up of the system burner, $\theta_{F,ON}$, shall be calculated, expressed in °C (°F) and defined as follows:

a) at the maximum input rate:

$$\theta_{F,ON,H} = \left[T_{F,SS,H} - T_{F,ON,H(\tau_1)}\right] e^{t_1/\tau_{ON,H}}$$

b) at the minimum input rate:

$$\theta_{F,ON,R} = \left[T_{F,SS,R} - T_{F,ON,R(\tau_1)}\right] e^{t_1/\tau_{ON,R}}$$

where

$T_{S,SS,H}$	=	calculated stack gas temperature at steady state and maximum input rate, under typical field condition, °C (°F)
$T_{S,SS,R}$	=	calculated stack gas temperature at steady state and reduced input rate, under typical field condition, °C (°F)
$T_{F,ON,H(t_1)}$, $T_{F,ON,R(t_1)}$	=	values defined in Clause 6.12
e	=	base (2.718) of natural logarithms
t_1	=	value defined in Clause 6.12
$\tau_{ON,H}$,$\tau_{ON,R}$	=	values defined in Clause 6.12