

Gas Fireplaces

REGULATORY PROPOSAL

PREPARED BY:

ENERGY EFFICIENCY BRANCH,
BC MINISTRY OF ENERGY AND MINES

[HTTP://WWW2.GOV.BC.CA/GOV/CONTENT/INDUSTRY/ELECTRICITY-ALTERNATIVE-ENERGY/ENERGY-EFFICIENCY-CONSERVATION](http://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/energy-efficiency-conservation)

SEPTEMBER 2016

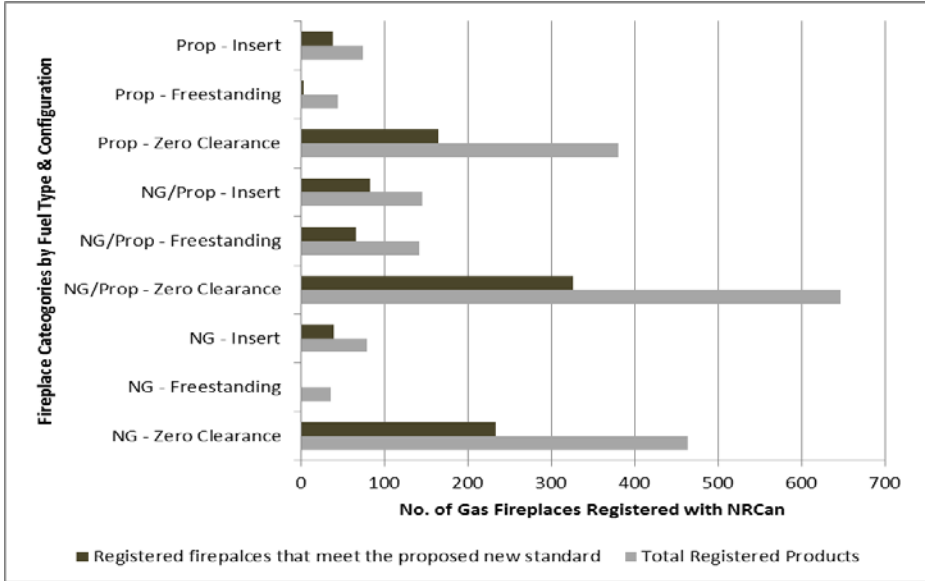
COMMENTS MUST BE RECEIVED BY NOVEMBER 4, 2016

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SCOPE AND REQUIREMENTS – REGULATORY PROPOSAL

TYPE OF DEVICE	<p>Natural gas and propane (gas) fired fireplaces: A commercially available product designed to heat indoor space and/or provide aesthetic appeal (decorative).</p> <table border="1"> <thead> <tr> <th>Primary venting options</th> <th>Primary ignition options</th> <th>Primary fireplace types</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> • Natural Draft • Power Vent • Direct Vent </td> <td> <ul style="list-style-type: none"> • Standing Pilot • Intermittent Pilot • Spark </td> <td> <ul style="list-style-type: none"> • Freestanding • Insert • Zero Clearance </td> </tr> </tbody> </table>	Primary venting options	Primary ignition options	Primary fireplace types	<ul style="list-style-type: none"> • Natural Draft • Power Vent • Direct Vent 	<ul style="list-style-type: none"> • Standing Pilot • Intermittent Pilot • Spark 	<ul style="list-style-type: none"> • Freestanding • Insert • Zero Clearance
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TEST STANDARD	CAN /CSA-P.4.1-15 - Testing method for measuring annual fireplace efficiency (FE)						
PROPOSED ENERGY PERFORMANCE STANDARD	<ul style="list-style-type: none"> • Fireplace Efficiency (FE) \geq 50% • Pilot-on-demand, interrupted or intermittent ignition system without a standing pilot light • A prescribed label as per the existing regulation 						
EFFECTIVE DATE	Products manufactured and sold after January 1, 2018						
CERTIFICATION	<p>All manufactured products must be tested and adhere to the proposed energy performance standard using the proposed test standard. Testing and verification must be performed by Certification Organizations accredited by the Standards Council of Canada. A label must be affixed to a gas fireplace sold or manufactured in B.C. that indicates that a designated tester has verified the fireplace’s energy performance, and determined that the gas fireplace meets the prescribed efficiency standards.</p>						
NEED FOR REGULATION	<p>The proposed standard will harmonize with B.C. Building Code requirements for natural gas and propane fireplaces, ensuring that retrofit and replacement fireplaces are installed with a comparable efficiency level.</p> <p>The standard will reduce energy costs for consumers, improving the affordability of houses and buildings while reducing greenhouse gas (GHG) emissions.</p> <p>The standard supports: (1) the Province’s Climate Leadership Plan Action: Regulations for More Efficient Buildings; and (2) B.C.’s energy objectives under the <i>Clean Energy Act</i> including the target to reduce GHG emissions by 33% in 2020 and 80% in 2050, as well as the objective to take demand-side measures and to conserve energy.</p>						
HARMONIZATION	<p>Effective December 2014, the B.C. Building Code required natural gas and propane fireplaces to have pilot-on-demand, interrupted or intermittent ignition systems without a standing pilot.</p> <p>The Province of Ontario released a proposed amendment that will eliminate standing pilot ignition systems used in gas fireplaces sold and manufactured in Ontario. If passed, the amendment will affect gas fireplaces manufactured on or after January 1, 2021.</p> <p>The U.S. Department of Energy (U.S. DOE) is currently conducting an energy conservation standard rulemaking for “hearth” products including freestanding,</p>						

	<p>insert and zero-clearance types of gas fireplaces. The U.S. DOE has proposed to disallow use of constant burning or “standing” pilot ignition systems for hearth products.</p> <p>Natural Resources Canada (NRCan) is considering a standard for gas fireplaces as part of Amendment 15 to the Federal Energy Efficiency Regulations.</p> <p>No date is yet given for either the proposed U.S. DOE or NRCan standards, although both are expected to be in effect by 2021.</p>																														
<p>TRANSPARENT REGULATION DEVELOPMENT</p>	<p>Development of the regulation included the following procedures:</p> <ul style="list-style-type: none"> • Initial market analysis including installed capacity and annual sales in B.C. • Economic assessment • Regulatory assessment <p>A stakeholder consultation will be held during a 5-week public review period.</p>																														
<p>MARKET TRANSFORMATION ACTIVITY & MARKET INDICATORS</p>	<p>Availability: Aggregated shipment data across Canada indicates that approximately 96% of zero clearance gas fireplaces shipped were greater than 50% FE, 99% of freestanding gas fireplace shipments were greater than 50% FE and 94% of gas fireplace inserts were greater than 50% FE (Heating, Refrigeration and Air Conditioning Institute of Canada, 2014).</p> <p>These strong shipping numbers for higher efficiency fireplaces are reflected in the types of models registered with NRCan’s Energy Efficiency Report database. Of the 2,014 models of gas fireplaces registered with NRCan, 1,594 (79%) have a 50% FE or higher, 1,255 (62%) use some kind of on-demand ignition system, and 957 (47.5%) meet or exceed the proposed standard (i.e., 50% FE rating <i>and</i> do not use a standing pilot ignition system).</p> <p>NRCan’s database shows that there is a variety of both natural gas (NG) and propane (prop) fireplace configurations available in Canada that will meet or exceed the proposed new standard (Figure 1).</p> <p>Figure 1: Number of fireplaces by fuel type & configuration currently registered with NRCan that will comply with the proposed standard.</p>  <table border="1"> <caption>Data for Figure 1: Number of fireplaces by fuel type & configuration</caption> <thead> <tr> <th>Fuel Type & Configuration</th> <th>Registered fireplaces that meet the proposed new standard</th> <th>Total Registered Products</th> </tr> </thead> <tbody> <tr> <td>Prop - Insert</td> <td>~40</td> <td>~80</td> </tr> <tr> <td>Prop - Freestanding</td> <td>~10</td> <td>~40</td> </tr> <tr> <td>Prop - Zero Clearance</td> <td>~170</td> <td>~380</td> </tr> <tr> <td>NG/Prop - Insert</td> <td>~80</td> <td>~140</td> </tr> <tr> <td>NG/Prop - Freestanding</td> <td>~60</td> <td>~140</td> </tr> <tr> <td>NG/Prop - Zero Clearance</td> <td>~320</td> <td>~650</td> </tr> <tr> <td>NG - Insert</td> <td>~40</td> <td>~80</td> </tr> <tr> <td>NG - Freestanding</td> <td>~10</td> <td>~40</td> </tr> <tr> <td>NG - Zero Clearance</td> <td>~230</td> <td>~460</td> </tr> </tbody> </table>	Fuel Type & Configuration	Registered fireplaces that meet the proposed new standard	Total Registered Products	Prop - Insert	~40	~80	Prop - Freestanding	~10	~40	Prop - Zero Clearance	~170	~380	NG/Prop - Insert	~80	~140	NG/Prop - Freestanding	~60	~140	NG/Prop - Zero Clearance	~320	~650	NG - Insert	~40	~80	NG - Freestanding	~10	~40	NG - Zero Clearance	~230	~460
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Awareness: Retailers stock and promote a wide variety of gas fireplaces primarily on their aesthetic qualities rather than efficiency. Since 2007, B.C.'s Energy Efficiency Standard Regulation has required gas fireplaces manufactured or sold in the province to affix to them a label from a designated tester that displays the fireplace efficiency rating of the product. The intention of this initial requirement was to promote consumer and retailer awareness about fireplace efficiency.

The B.C. based EnerChoice trademark, was developed in 2010 to help bring awareness to gas fireplace energy performance. The trademark is administered by the Hearth, Patio, and Barbecue Association of Canada. Currently, 10 of the 11 B.C.-based fireplace manufacturers identified by Ministry staff participate in the EnerChoice program.

The voluntary certification is awarded to the 25% most efficient fireplace models in each major category – inserts, freestanding, and zero-clearance. To simplify how the label is awarded, the program currently awards the label to fireplaces that meet or exceed the following minimum energy performance levels:

- Inserts – FE \geq 61%
- Freestanding – FE \geq 66%
- Zero Clearance – FE \geq 62.4%

In addition to requiring an FE rating that is consistent with these EnerChoice performance standards, FortisBC recently updated its fireplace incentive program to require qualifying products to include a number of high efficiency design features, including: no standing pilot; direct-vented (sealed); and modulating control.

Accessibility: Gas fireplaces with 50% FE or higher and a no standing pilot ignition system are widely stocked and installed throughout B.C. The installation cost of higher efficiency models is comparable to that required for less efficient models.

Affordability: A 2015 technical study commissioned by the U.S. DOE on energy conservation standards for hearth products¹ estimates that the incremental total installed cost of an intermittent ignitor (by far the most widely used non-pilot light ignition option) is \$101 USD (approximately \$132 CAD).

Acceptability: Retailers stock and promote a wide variety of gas fireplaces primarily on their aesthetic qualities rather than efficiency. From an aesthetic perspective, there are no discerning differences between high efficiency fireplaces with an intermittent ignition system and lower efficiency ones with pilot-light ignition systems.

Demand Side Management (DSM) programs to increase market share: Fortis BC has offered a rebate for EnerChoice qualified gas fireplaces since 2010. The current rebate is \$300 per unit. In 2015 FortisBC provided more than 6,088 incentives for EnerChoice fireplaces. This represents about 24% of estimated residential gas fireplace sold in B.C. in that year.

This proposed regulation can be promoted by energy utilities through their Demand-Side Management (DSM) programs, leading to increased market share of compliant products prior to the effective date. In turn, part of the energy savings from the

¹<https://www.regulations.gov/document?D=EERE-2014-BT-STD-0036-0002>

proposed regulation can be attributed back to those DSM programs as per Section 4 (Subsection 1.4) of the Demand-Side Measures Regulation under the *Utilities Commission Act*:

http://www.bclaws.ca/Recon/document/ID/freeside/10_326_2008

ASSESSMENT FROM AN INDUSTRY PERSPECTIVE

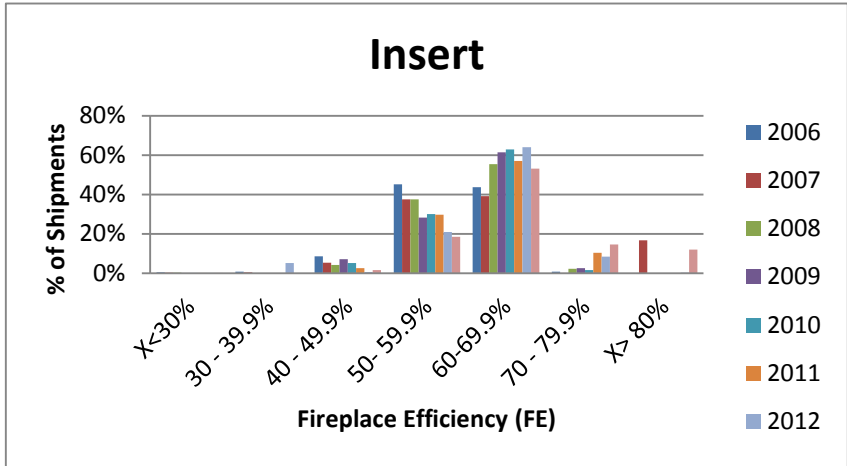
RANGE OF PRODUCTS AFFECTED	The proposed regulation affects the manufacture and sale of natural gas and propane fireplaces in B.C. The regulation would only apply to products manufactured <u>after</u> the effective date. Retailers that are selling inventory that is manufactured before the effective date can continue to do so.																																																																
COST IMPACT	As discussed above, the total incremental cost of an on-demand ignition system is relatively low. The U.S. DOE's 2015 <i>Technical Support Document: Energy Conservation Program for Consumer Products: Energy Conservation Standards for Hearth Products</i> estimates it to be US\$101 (approximately \$132 CAD). As the cost and procedure needed to install on-demand ignitors are low and most manufacturers already have experience with incorporating these ignitors into many of their models, it is expected that manufacturers will be able to adapt most of their existing standing pilot models well in advance of the proposed standard coming into effect.																																																																
COMPETITIVE ANALYSIS	Ministry staff identified 7 companies in B.C. that manufacture gas fireplaces. All of these manufacturers currently offer a range of styles with energy performance characteristics that are compliant with the proposed standard.																																																																
MARKET SHARE	<p>The Hearth, Patio and Barbeque Association (HPBA) provided the following Canadian gas fireplace shipment data (see Figure 2-4). These indicate the consumer demand for fireplaces within the 50%-69% FE range is already very strong across all fireplace configurations. These shipment percentages are consistent with the proportion of fireplaces registered with NRCan.</p> <p>Figure 2: National shipping data 2012 for insert gas fireplaces.</p>  <table border="1"> <caption>Estimated data for Figure 2: National shipping data 2012 for insert gas fireplaces</caption> <thead> <tr> <th>Fireplace Efficiency (FE)</th> <th>2006</th> <th>2007</th> <th>2008</th> <th>2009</th> <th>2010</th> <th>2011</th> <th>2012</th> </tr> </thead> <tbody> <tr> <td>X<30%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>30 - 39.9%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>40 - 49.9%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>50 - 59.9%</td> <td>45%</td> <td>35%</td> <td>30%</td> <td>25%</td> <td>20%</td> <td>15%</td> <td>10%</td> </tr> <tr> <td>60 - 69.9%</td> <td>55%</td> <td>50%</td> <td>45%</td> <td>40%</td> <td>35%</td> <td>30%</td> <td>25%</td> </tr> <tr> <td>70 - 79.9%</td> <td>10%</td> <td>15%</td> <td>20%</td> <td>25%</td> <td>30%</td> <td>35%</td> <td>40%</td> </tr> <tr> <td>X>80%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> </tbody> </table>	Fireplace Efficiency (FE)	2006	2007	2008	2009	2010	2011	2012	X<30%	0%	0%	0%	0%	0%	0%	0%	30 - 39.9%	0%	0%	0%	0%	0%	0%	0%	40 - 49.9%	0%	0%	0%	0%	0%	0%	0%	50 - 59.9%	45%	35%	30%	25%	20%	15%	10%	60 - 69.9%	55%	50%	45%	40%	35%	30%	25%	70 - 79.9%	10%	15%	20%	25%	30%	35%	40%	X>80%	0%	0%	0%	0%	0%	0%	0%
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Figure 3: National shipping data 2012 for freestanding gas fireplaces

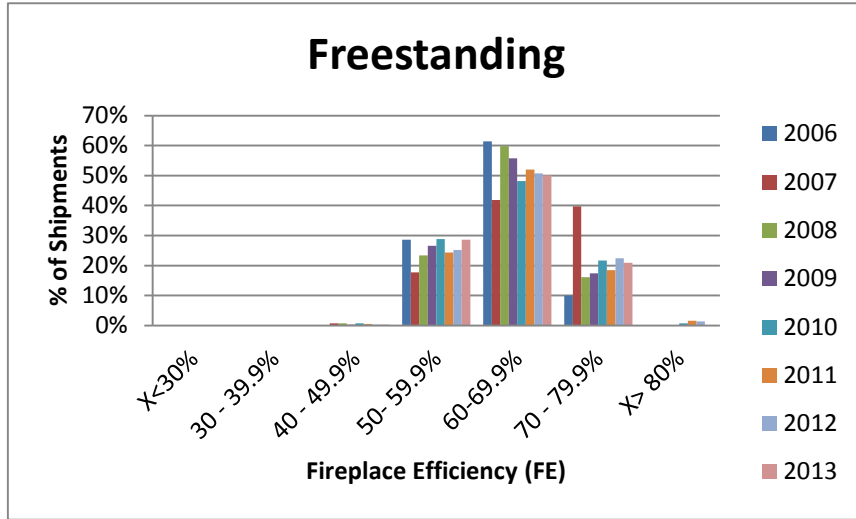
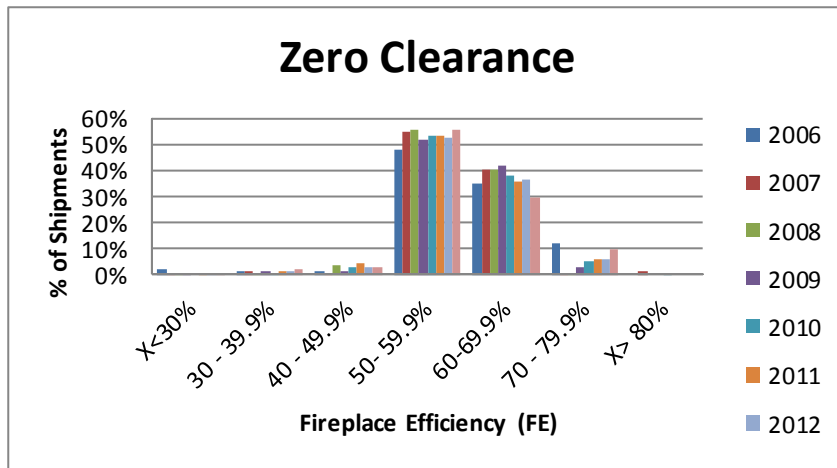
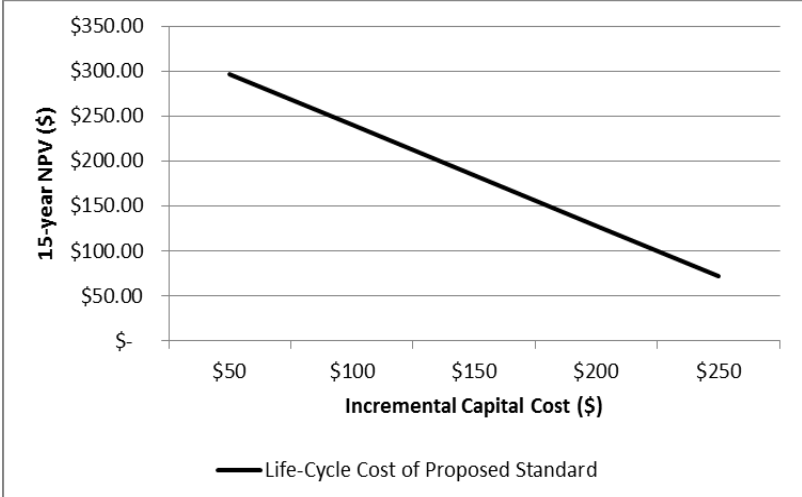


Figure 4: National shipping data 2012 for zero-clearance gas fireplaces



ASSESSMENT FROM A CONSUMER PERSPECTIVE

DATA AND ASSUMPTIONS	<ul style="list-style-type: none"> As the vast majority of fireplaces shipped already meet or exceed the proposed FE level, Ministry staff assumed 50% FE fireplaces with standing pilot as the baseline energy performance level for fireplaces sold in B.C. Residential natural gas rate in 2018 (including all applicable taxes): \$12.88/GJ Annual escalator for natural gas price: 0.75% (Real) Consumer discount rate is 6% Annual energy consumption of an average standing pilot light (based on 2015 DOES study): 4.21 GJ/yr Operational cost of electric intermittent ignitor: \$15/yr Expected product life: 15 years The incremental cost of a gas fireplace with pilot-on-demand, interrupted or intermittent ignition system is \$132 installed. A sensitivity analysis is used to estimate the impacts that lower or higher
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	installed costs will have on consumer life-cycle costs.																																								
COST-BENEFIT ANALYSIS	An economic model using the above data and assumptions yielded the following results for the year that the new standard comes into effect (see Table 1):																																								
ENERGY SAVINGS CONSUMERS	<p>Table 1: Consumer Impact Summary for Each Major Fire Place Configuration</p> <table border="1"> <thead> <tr> <th>Fireplace Configuration for Natural gas-fired fireplaces/stoves (input rate <103,000 BTU/h; <30.0kW)</th> <th>Zero-Clearance</th> <th>Insert</th> <th>Free-standing</th> </tr> </thead> <tbody> <tr> <td>Gas Savings (GJ/yr)</td> <td>4.21</td> <td>4.21</td> <td>4.21</td> </tr> <tr> <td>Gas Savings – First Year</td> <td>\$49</td> <td>\$49</td> <td>\$49</td> </tr> <tr> <td>GHG Savings (kg CO₂e/yr)</td> <td>214</td> <td>214</td> <td>214</td> </tr> <tr> <td>Incremental Installed Cost</td> <td>\$132</td> <td>\$132</td> <td>\$132</td> </tr> <tr> <td>Simple Payback Period (yrs)</td> <td>4</td> <td>4</td> <td>4</td> </tr> <tr> <td>NPV (15 yrs, 6% discount rate)</td> <td>\$204</td> <td>\$204</td> <td>\$204</td> </tr> </tbody> </table> <p>In summary, for an incremental capital cost of \$132, residential dwellings will save \$49 per year on their home energy bills which will result in a net benefit of \$204 over the estimated 15-year life of the product.</p> <p>A sensitivity analysis was performed on varying incremental capital costs (Figure 5). The 15-year NPV remains positive in all cases assessed.</p> <p>Figure 5: Impact of Varying Incremental Capital Costs on Life-Cycle Costs</p>  <table border="1"> <caption>Data for Figure 5: Impact of Varying Incremental Capital Costs on Life-Cycle Costs</caption> <thead> <tr> <th>Incremental Capital Cost (\$)</th> <th>15-year NPV (\$)</th> </tr> </thead> <tbody> <tr> <td>50</td> <td>295</td> </tr> <tr> <td>100</td> <td>235</td> </tr> <tr> <td>150</td> <td>175</td> </tr> <tr> <td>200</td> <td>115</td> </tr> <tr> <td>250</td> <td>55</td> </tr> </tbody> </table>	Fireplace Configuration for Natural gas-fired fireplaces/stoves (input rate <103,000 BTU/h; <30.0kW)	Zero-Clearance	Insert	Free-standing	Gas Savings (GJ/yr)	4.21	4.21	4.21	Gas Savings – First Year	\$49	\$49	\$49	GHG Savings (kg CO ₂ e/yr)	214	214	214	Incremental Installed Cost	\$132	\$132	\$132	Simple Payback Period (yrs)	4	4	4	NPV (15 yrs, 6% discount rate)	\$204	\$204	\$204	Incremental Capital Cost (\$)	15-year NPV (\$)	50	295	100	235	150	175	200	115	250	55
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NON-ENERGY BENEFITS	A number of features used to improve the efficiency of fireplaces also lead to improvements indoor air quality and comfort. For example, a direct vent fireplace releases all exhaust gases to the outside, ensuring higher quality indoor air.																																								
IMPACT ON BUILDERS	The regulation is expected to have negligible impact on builders from a cost perspective since the installation cost of a high performing gas fireplace is comparable to the cost of installing a base model fireplace.																																								

ASSESSMENT FROM A PROVINCIAL GOVERNMENT PERSPECTIVE
**ECONOMIC
ASSESSMENT
FROM A
PROVINCIAL
PERSPECTIVE**

(Aggregate energy, emission and net cost savings)

Modeling Assumptions:

- Gas fireplaces sold in B.C. in 2015: 25,500
- The percentage of total gas fireplaces sold with a standing pilot light is based on the proportion estimated for zero-clearance fireplaces as these represent 75% of gas fireplace shipments in Canada from 2006-2012
- Market share of zero-clearance, gas fireplaces sold with a standing pilot ignition system: 62% of fireplaces rated between 50 and 59% FE have a standing pilot ignition system; 43% of fireplaces rated between 60 to 69% FE have a standing pilot ignition system; and 15% of fireplaces rated between 70-79% FE have a standing pilot ignition system
- Incremental installed cost of intermittent ignition system: \$132
- Energy consumed by pilot light when fireplace is not being used: 4.21 GJ/yr
- Incremental operation and maintenance cost for electric intermittent start: \$15/year.
- Product lifetime: 15 years
- Natural growth of intermittent ignition system: 2%/year.
- 6% provincial discount rate
- 90% of fireplaces sold are fuelled by natural gas, 10% are fuelled by propane.
- Natural gas rates used as a proxy for propane fireplaces
- Blended GHG factor of 50.89 kgCO₂e/GJ (90% x natural gas factor 49.75 + 10% x propane factor 61.15)

The following three metrics illustrate the benefit of the regulation from an energy, emissions, and cost perspective:

Cumulative Gas Savings (GJ/yr) in 2025	505,480
Cumulative Energy Bill Savings in 2025	\$5.8M
Cumulative GHG Savings (t CO₂e/yr) in 2025	25,723
Provincial NPV	\$23M

In summary, British Columbians as a whole will see 505,480 gigajoules of gas savings in 2025 and will save \$23M over and above the incremental capital costs. In addition, greenhouse gas reductions of 25,723 tonnes will be achieved in 2025.

**ADMINI-
STRATIVE
FEASIBILITY
FOR
COMPLIANCE
AND
ENFORCEMENT**

Compliance and enforcement approach under the *Energy Efficiency Act* is based on random inspections and response to compliance complaints. Enforcement will rely upon required product labels.

NOTES

REGULATORY ASSESSMENT COMPLETED BY	Rylan Nowell Technical Advisor Tel: (250) 953-3756 E-mail: Rylan.Nowell@gov.bc.ca	Tom Berkhout Senior Policy Advisor Tel: (250) 953-3153 E-mail: Tom.Berkhout@gov.bc.ca
DATE	September, 2016	