

Clean growth pathway to 2050



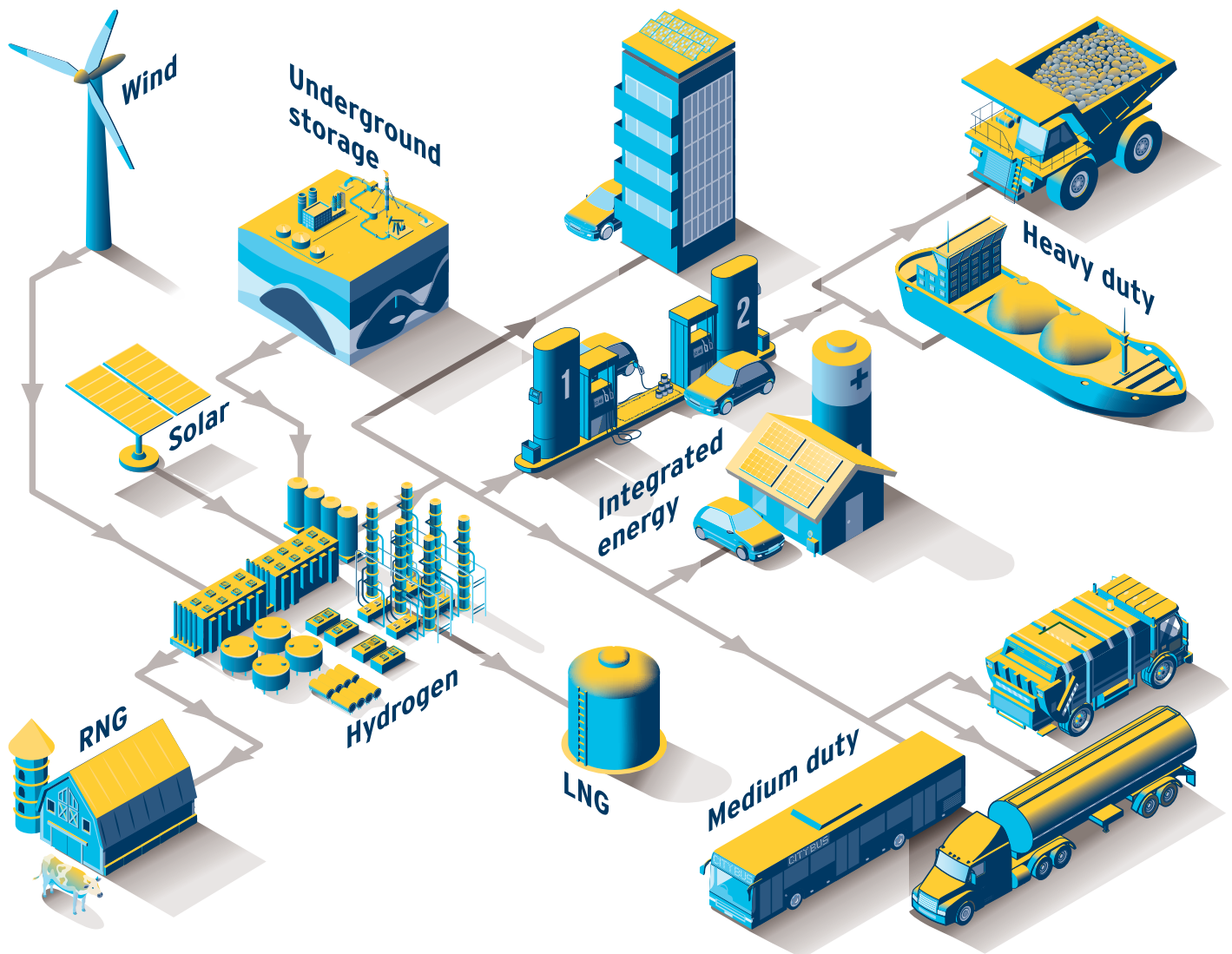
Contents

Affordability, clean energy and efficiency: FortisBC's clean growth pathway	2
Introduction	3
A made-in-BC pathway	4
Transportation	5
Cleaner transportation systems	5
Cleaner fuels	8
Turning waste into fuel	8
The potential of a low-carbon gas system	9
What is Renewable Natural Gas?	9
Cleaner vehicles	10
Displace higher carbon fuels by expanding BC's natural gas vehicle sector	10
UPS' commitment to compressed natural gas	10
Transform the light-duty transportation sector through electrification	11
<i>accelerate</i> Kootenays	11
Buildings and communities	12
Maintaining affordability for BC energy consumers	14
Incentives tied to energy efficiency and building improvements	15
Support for low-carbon innovation	16
Energy-efficiency labelling information	17
A clean growth program for industry	18
Industrial incentive	18
A Canadian first	18
Clean Industry Fund	19

Affordability, clean energy and efficiency: FortisBC's clean growth pathway

We believe FortisBC has an important role to play in helping British Columbia move to a low-carbon, renewable energy future. We see ourselves as an energy delivery company that has climate and economic solutions in the buildings and transportation sectors. Millions of British Columbians we serve in communities across the province look to us to deliver energy safely, reliably and affordably every day. As a subsidiary of our Canadian-based parent company, Fortis Inc., one of the largest energy companies in North America, we're committed to helping British Columbia achieve its climate goals and addressing climate change solutions in a global context. We're focused on providing practical solutions that can be implemented today by leveraging our existing infrastructure.

Figure 1: FortisBC's role in driving BC's sustainable prosperity



This paper presents FortisBC's pathway to align with the provincial government's goal to significantly reduce greenhouse gas emissions (GHG) while supporting economic growth and maintaining affordability and customer choice. Our approach combines several strategies that together outline a clear pathway to significant emissions reductions and signal a paradigm shift in the way we relate to energy.

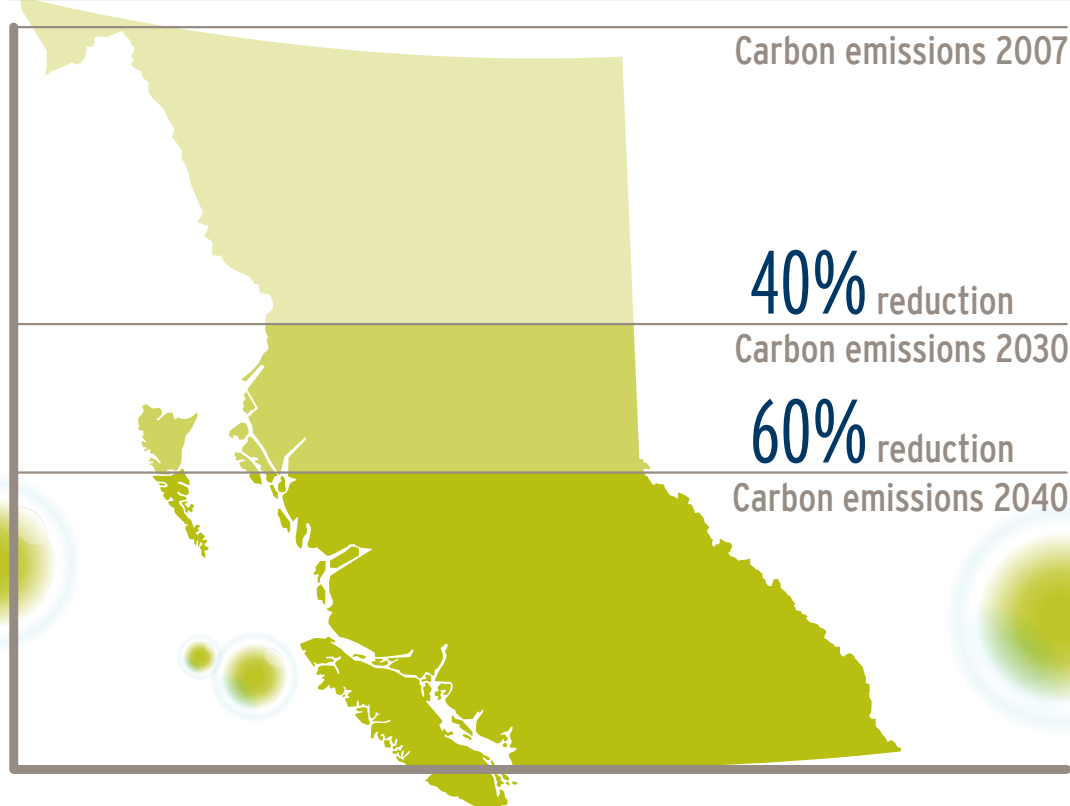
Our pathway calls for four significant shifts in our energy systems to foster market transformation:

- making significant investments in both low and zero carbon vehicles and infrastructure in the transportation sector
- transitioning from higher carbon energy sources to lower carbon sources by ramping up Renewable Natural Gas (RNG) and hydrogen deployment to achieve a ten per cent zero-carbon fuel supply by 2030 and a thirty per cent supply by 2050
- positioning BC as a vital domestic and international Liquefied Natural Gas (LNG) provider to lower global GHG emissions
- tripling our investment in energy efficiency in the built environment and developing innovative energy projects in BC's communities

Introduction

British Columbia (BC) has committed to achieving deep carbon reductions in greenhouse gas emissions by 2050. The province recently updated its climate targets to a 40 per cent reduction in carbon emissions from 2007 levels by 2030, and a 60 per cent reduction from 2007 levels by 2040. Achieving these long-term targets will require immediate and coordinated action by policy makers, regulators and industry. The province will need more than aspirations to achieve real, timely results.

Provincial Carbon Emission Goals



We believe we have a significant role to play in helping the BC Government deliver on its climate and energy goals. Our pathway is based upon our commitment to investing in projects that will make life more affordable for British Columbians, improve efficiency, reduce GHG emissions and drive innovation. By strategically managing BC's existing energy infrastructure and investing in new low-carbon energy supply, we see a long-term opportunity to continue creating sustainable, good-paying jobs across BC.

In 2015, BC's emissions were 63 million tonnes (Mt) of CO₂e. Most emissions fall into three categories: transportation, buildings and industry. We recommend any sectoral targets being considered should be proportionate to the sector's share of GHG emissions and the ability to deliver cost-effective emissions reductions using our current infrastructure.

For example, the commercial transportation sector is the largest contributor to BC's emissions at 25 per cent. The provincial government can achieve large emission reductions in transport using today's commercially-available technology. Practical and affordable solutions that can be implemented immediately should be differentiated from aspirational goals that require technology breakthroughs.

25%
of BC's CO₂ emissions
are from commercial
transportation

A made-in-BC pathway

As a utility serving gas, electric and alternative energy customers, FortisBC recommends developing an integrated, system-wide evaluation of achieving the province's carbon reduction objectives. Because FortisBC delivers the most energy to consumers of any entity in the province, we have a keen interest in British Columbians understanding the system-wide impacts of various pathways that meet the province's GHG emissions targets. BC's electric and gas energy systems work in tandem to provide reliable energy to British Columbians. Both systems complement one another, providing redundancy and a low-cost solution to delivering energy to British Columbians. FortisBC believes that the provincial pathway should be guided by strong analysis and pursue a strategy that utilizes 'every tool in the toolbox': all of our provincial energy resources and existing infrastructure will be needed to achieve long-term GHG emissions reductions.



Many low-carbon pathways have emphasized the importance of the electrification of end-uses. We agree that electricity will play a key role in reducing emissions but we also caution that there are significant challenges to this strategy. Notably, the direct substitution of electricity for gas to meet heating load, coupled with growth in other areas like electric vehicles, would far exceed the available electric infrastructure and add significant costs to the existing system which would be borne by all BC residents.

FortisBC supports the provincial government's commitment to undertake a review of BC Hydro and incorporate the findings into the Clean Growth Strategy. As we consider how best to transition to a sustainable and innovative economy, we believe there is a need to reflect the real cost of all energy in our long-term goals and strategies.

FortisBC believes that gas—as an energy carrier—will continue to be a critical component of a decarbonized energy system in BC. Gas infrastructure in the province is a multi-billion dollar asset that provides reliable, safe, affordable and high-quality energy services to British Columbians. This infrastructure is designed to serve difficult-to-decarbonize end-uses such as building and industrial heating and heavy-duty freight. Additionally, BC's gas infrastructure is equipped to handle decarbonization pathways that use drop-in fuels such as RNG and hydrogen, along with other key mitigation options like carbon capture and storage. The provincial government and stakeholders like FortisBC need to work to define the key role of the gas system to achieve our GHG reduction objectives and develop policies and other support mechanisms to leverage this system in a low-carbon transition.

Transportation

The transportation sector accounts for 39 per cent of BC's total emissions, making it the most important sector where we can achieve significant and immediate carbon reductions with technology that is available to us today. FortisBC is a leader in North America, providing innovative and clean technology that lowers emissions throughout the transportation sector.

The decarbonization of BC's transportation sector will require the use of all tools available to us including:

- cleaner transportation systems, including increased investment in fuelling infrastructure, clean trade corridors
- displacing high-carbon fuels with cleaner fuels like natural gas, RNG, biofuels or hydrogen
- cleaner vehicles that use alternative fuels, electric power or hybrid technologies

BC's transportation sector accounts for

39%

of our CO₂ emissions

Cleaner transportation systems



Marine

The marine sector represents a massive GHG reduction and economic opportunity that should be the top priority in the province's Clean Growth Strategy. BC has had excellent early success in advancing liquefied natural gas (LNG) in the domestic marine sector that serves as a foundation to build upon for other markets.

BC Ferries launched their fourth LNG vessel this summer with a fifth expected next year and Seaspan Ferries now operates two LNG vessels in BC waters. With five LNG vessels in operation, BC Ferries, for example, expects to reduce their fuel costs by millions of dollars and CO₂ emissions by 21,500 tonnes annually, the equivalent of taking approximately 4,400 vehicles off the road per year. To put that in perspective, that's more than double the 2,200 battery electric vehicles that were purchased in all of BC in 2017.

The *Spirit of British Columbia* is the first vessel in the world to refuel LNG through delivery on a fully enclosed vehicle deck. In collaboration with BC Ferries, FortisBC developed a proprietary tanker truck technology to deliver fuel while on board the

BC Ferries new Salish Orca is fuelled by natural gas—an innovative and clean solution that will provide benefits to BC Ferries' customers and the provincial economy.

vessel. Innovative solutions like this help make it easier for transportation customers to make the switch to LNG.

The conversion of BC Ferries' two largest ships in the fleet, along with the introduction of three new natural gas-fuelled Salish Class vessels last year, improves sustainability and affordability for ferry users. FortisBC is proud to have partnered with BC Ferries to develop these innovative and clean solutions that will provide benefits to BC Ferries' customers and the provincial economy.

Clean Trade Corridors

FortisBC applauds the provincial government for initiating the Clean Transportation in BC Trade Corridors initiative. We see this multi-stakeholder collaboration as an essential forum to ensure that BC and Canada are in position to capitalize on international conventions that will reduce the use of dirtier fuels and drive the adoption of LNG in the marine sector. The group's mandate to improve competitiveness and reduce GHGs is well focused and timely—conventions set by the International Maritime Organization (IMO) will take effect by 2020 which is an incredibly short period to transition the practices of international vessels in BC's ports.



Marine vessels that regularly call at BC ports originate from ports of other countries are not included in the provincial emissions inventory, yet these vessels emit a significant amount of emissions when in transit and when berthed in our ports. GHG emissions from this segment of international marine transport are approximately 70 million Mt of CO₂e per year—greater than BC's total annual GHG emissions. These emissions should be considered as part of the province's global GHG reduction strategy by displacing high-carbon marine fuels with low-carbon LNG.

GHG emissions from international marine shipping currently represent around 2.6 per cent of total global emissions, but this share could more than triple by 2050 if measures are not taken to help speed a transition to a low-carbon environment in this sector. Following the Paris Climate Agreement, discussions began at the IMO to agree to an Initial Greenhouse Gas Strategy to stipulate significant measures to mitigate emissions. In April 2018, the IMO agreed on its first strategy to reduce GHG emissions in the international shipping sector to meet the Paris Agreement goals. The IMO strategy includes a target to reduce carbon emissions by at least 50 per cent compared with 2008 levels by 2050. This strategy presents a challenge for a sector that has traditionally faced significant barriers to innovation and an opportunity for BC to position itself as a low-carbon fuel provider in the form of LNG.

Low-carbon fuels such as LNG will be critical to achieving the IMO emission reduction targets. BC is well-positioned to assist in these efforts and become a world leader in LNG bunkering. The provincial government should consider developing policies to

start addressing these emissions such as including the ability to generate compliance credits with the Renewable and Low Carbon Fuel Requirement Regulation if international marine vessels use lower carbon fuels such as LNG.



FortisBC was the first company in the world to offer onboard truck-to-ship LNG bunkering. This proprietary design was developed by collaborating with Seaspan Ferries, BC Ferries and their shipbuilders to create a customized solution to fit our customers' needs.

FortisBC has the infrastructure in place to be ready for 2020. FortisBC has completed construction of a \$400-million LNG expansion project at our Tilbury facility which includes a new storage tank and additional liquefaction capacity. Plans are being developed to increase the Tilbury LNG facility's liquefaction capacity up to to three million tonnes per annum, expand LNG storage by another 92,000 cubic metres and provide ship loading facilities to serve these markets. Our Tilbury LNG facility is powered by electricity, creating safe, clean, low-GHG emitting LNG.

Locally, other agencies such as the Port of Tacoma are also working to position themselves for success. Puget Sound Energy (PSE) is developing an LNG production facility that will enable LNG supply for marine and transportation markets in the region. This LNG facility will incorporate LNG liquefaction, storage and bunkering to the marine market. The project is scheduled to be completed in late 2019 and would compete with BC. FortisBC believes there is a limited window of time for BC to establish itself as an LNG bunkering hub before 2020. BC has an advantage as we have an ample supply of clean LNG available at globally competitive rates.

FortisBC recommends the following actions:

- Continue supporting the Clean Transportation in BC Trade Corridors initiative. Specifically, the opportunity to introduce a pilot program to convert drayage vehicles from diesel to compressed natural gas (CNG) and the advancement of the LNG bunkering in advance of 2020. The provincial and federal governments need to advance the regulation, financial tools for bunkering infrastructure and policies to establish BC as a global leader in LNG bunkering.
- Amend British Columbia's Renewable Low Carbon Fuel Reduction Regulation to generate credits for LNG bunkering that lower international shipping emissions.
- Work with the federal government to develop policies that account for the role of BC LNG in meeting global GHG reduction targets via Article Six of the Paris Agreement.

Expanding our natural gas liquefaction capacity by

92,000
cubic metres

Cleaner fuels

FortisBC supports the provincial government's proposal to support the transition to cleaner fuels. We see RNG as being an essential component of this transition.

FortisBC was the first utility in North America to offer RNG to residential customers in 2011. RNG is a critical source of renewable energy that is helping the province achieve its GHG emission reduction target. Farms, landfills and other suppliers like the City of Surrey have teamed up with FortisBC to capture methane (CH₄) from organic waste, which would otherwise escape into the atmosphere. This methane, also known as biogas, is purified to make RNG.

FortisBC's RNG program is enabled by a British Columbia Ministerial Regulation, the Greenhouse Gas Reduction Regulation (GGRR). The GGRR has facilitated the development of five operational projects which are forecasted to supply over 203,000 GJ of RNG this year. These facilities capture biogas, clean and upgrade the biogas into RNG, and inject the RNG into our distribution system. Since the RNG offering launched to residential customers in June 2011 and commercial customers in March 2012, over 9,000 customers have subscribed to this offering and have helped reduce GHG emissions an equivalent amount to removing 7,200 cars from the road.

Though FortisBC has achieved important early successes in the residential and commercial sectors, further work is required to grow BC's supply of RNG for use in the transportation sector. Innovations in biogas could boost our supply of RNG to between 25 and 46 per cent of FortisBC's annual natural gas demand by 2036. Power-to-gas, the process of converting electric power into carbon-neutral hydrogen, presents a further opportunity and could account for between five and 15 per cent of annual demand by 2036.

We believe that hydrogen will be a key driver towards reducing BC's carbon emissions, not only as an alternative fuel to enable the decarbonisation of heating, but as a means of storing renewable power (hydroelectric, solar and wind) and, through this, linking together the decarbonisation of the building, industry and transport sectors. We believe in taking a system-wide perspective of hydrogen as a technology that further integrates the electric and gas systems by acting as a high capacity storage medium for carbon-free power generation and a carbon-free fuel for heat and transport.

Turning waste into fuel

Earlier this year, we joined the City of Surrey and the Government of Canada to open North America's first closed-loop waste management system. The facility will convert curbside organic waste into renewable biofuel to fuel the City's fleet of natural gas powered waste collection and service vehicles. Under this closed-loop system, waste collection trucks will literally be collecting their fuel source at curbside. Excess fuel will go to the new district energy system that heats and cools Surrey's City Centre.



The potential of a low-carbon gas system

In our 2017 Long-Term Gas Resource Plan, FortisBC outlined a preliminary analysis of initiatives that could achieve significant GHG emissions reductions by 2030. Emissions reductions opportunities for FortisBC fall into three categories: i) decarbonizing pipeline gas with RNG, hydrogen and carbon capture and storage; ii) energy efficiency and demand-side management (DSM); and iii) fuel switching from more carbon-intensive energy to pipeline gas and LNG.

Should low-carbon gases like RNG and hydrogen achieve a notable share of the total supply in the gas distribution system, FortisBC estimates that the technical potential to reduce GHG emissions would be up to 2.7 and 5.0 Mt. This would reduce emissions from natural gas consumption by between 25 per cent and 42 per cent from 2007 levels in the industrial, commercial and residential sectors.

In the transport sector, FortisBC could achieve 0.3 Mt of domestic reductions and 10.7 Mt from international shipping by 2030. This highlights the significant potential for the gas system to be a key contributor to the province's climate objectives. Ambitious provincial incentives and other policy support would be required to expand the supply of low-carbon gas to this scale. But, maintaining a role for gas within a low-carbon transition ensures that customers maintain their choice of energy supply and lowers the technology risk and costs of a narrowly defined abatement pathway. Such a pathway would also ensure that provincial energy resources and infrastructure are leveraged for a made-in-BC solution.

Growing BC's low-carbon fuel sector will require a number of actions from the province:

- identify RNG as an essential component of the province's clean growth pathway
- address regulatory barriers to expanding utility investment in RNG projects
- streamline regulations to enable RNG production from agricultural waste
- provide support to advance the commercial production of hydrogen as a form of RNG

Domestic carbon reductions from international shipping of

10.7

metric tonnes

What is Renewable Natural Gas?

Renewable Natural Gas (RNG) is a carbon-neutral energy source, because it does not contribute any net carbon dioxide into the atmosphere. RNG is produced in a different manner than conventional natural gas. It is derived from biogas, which is produced from decomposing organic waste from landfills, agricultural waste and wastewater from treatment facilities. The biogas is captured and cleaned to create carbon-neutral RNG.



Peter Schouten, Owner Operator, Fraser Valley Biogas. One of FortisBC's first RNG suppliers.

Cleaner vehicles

Displace higher carbon fuels by expanding BC's natural gas vehicle sector

Commercial transportation accounts for 25 per cent of total GHG emissions in BC and more than half of these emissions originate from road freight transport. By increasing our efforts to displace higher carbon fuels in the heavy-duty vehicle and marine transport sectors, BC can achieve substantial emissions reductions.

By converting heavy-duty truck fleets and transit vehicles to LNG or CNG, we're helping the province meet its carbon emission reduction goals while helping operators save on fuel costs.

FortisBC natural gas for transportation customers are realizing anywhere from 25 to 60 per cent reduction in fuel costs. This helps improve the competitiveness of our private and public sector partners. Since initiating our efforts to introduce cleaner vehicles in 2010, we have eliminated more than 110,000 tonnes of CO₂e and displaced more than 145 million litres of diesel.

Natural gas can reduce GHG emissions by up to 30 per cent compared to diesel and gasoline. Additionally, switching to natural gas fuel can improve air quality: natural gas vehicles emit virtually no particulate matter, and they emit up to 95 per cent less nitrogen oxides (NOx).

FortisBC recommends the following actions:

- continue supporting investment in CNG transit vehicles and fuelling infrastructure to displace higher carbon fuels and reduce particulate emissions
- expand the GGRR and develop a BC Ports incentive program to convert the 1,700 trucks in BC's drayage sector to CNG or CNG/Hybrid trucks, covering the full cost of the vehicle and reducing both the particulate and GHG emissions associated with BC's ports
- expand eligibility for BC's CEV Specialty-Use Vehicle Program to include hybrid vehicles that include an alternative fuel, such as CNG or hydrogen
- undertake a review of Ministry of Transportation policy to permit low emission natural gas and hydrogen vehicles to use designated HOV lanes on key trade corridors such as Highway 99 and Highway 1

UPS' commitment to CNG

Earlier this year, we partnered with the world's largest package delivery company to launch a compressed natural gas fuelling station and vehicles in Vancouver, BC. Seven CNG highway tractors and 40 delivery trucks were added to the current Canadian UPS fleet of over 2,900 package cars, tractors and shifters. Presently, more than 40 per cent of the UPS fleet in Canada runs on alternative fuels. UPS Canada now joins over 800 transit buses, commercial vehicles and freight vehicles powered by natural gas here in BC.



Transform the light-duty transportation sector through electrification

The light-duty transportation sector accounts for 14 per cent of BC's total GHG emissions. This includes light-duty passenger vehicles and trucks that use gasoline or diesel. Electrification of this segment provides a promising pathway to reduce emissions, as cost and performance of the underlying battery technology has seen dramatic improvements in recent years. The automotive industry is responding with many new electric vehicle models arriving in the showrooms of almost every manufacturer.

Growth in the electric vehicle segment is happening in BC but further incentives will be required to achieve government's goal of 5 per cent of all new light-duty vehicle sales. EV sales in 2017 increased by 53 per cent compared to 2016 and were accelerated by an expanding lineup of fully electric vehicles. However, while there has been an increase in the sale of EVs since 2013, at approximately 1.7 per cent of total vehicle sales in 2017 for BC, EV sales are still a small portion of the overall market. FortisBC supports the province's proposal to continue providing vehicle incentives.

Additional EV charging infrastructure will be critical to advancing the adoption of EVs in the province. Without adequate charging infrastructure deployed throughout the province to allow zero emission vehicles to travel throughout BC safely and conveniently, it is unlikely that the EV market share will progress quickly. Further collaboration between the province, local governments and FortisBC and BC Hydro can address this gap.

We recommend that the province take the following actions:

- continue providing incentives for EV vehicles and infrastructure
- support increased utility investment in EV charging infrastructure in BC
- leverage existing FortisBC CNG fuelling infrastructure to include fast-charging EV stations
- develop measures to encourage charging station installations at businesses and other buildings as part of a smart grid

Light-duty transportation
accounts for

14%

of BC's total GHG emissions

accelerate Kootenays

FortisBC is a core funder of the *accelerate* Kootenays initiative, a collaborative project that will address the charging infrastructure gap across the Kootenay region in Southeast British Columbia. Earlier this year, we opened five electric vehicle Direct Current Fast Charging (DCFCs) stations in the region, connecting the West Kootenays to surrounding regions for electric vehicle travel.

All West Kootenay stations were installed by Kootenay-based electricians, creating local employment opportunities for residents.

All are part of the broader *accelerate* Kootenays initiative which will ultimately facilitate the installation of 13 fast chargers and 40 Level two chargers in communities across the Kootenays, resulting in over 1,800 kms of connected electric vehicle travel. The fast-charging stations are critical infrastructure to allow electric vehicle drivers to travel to and through the region, and to facilitate increased adoption of electric vehicles locally.



Buildings & communities

FortisBC is uniquely positioned to be a key agent of the government's strategy to reduce GHG emissions in buildings and communities in a cost-effective, market-driven manner. We provide energy in the built environment through gas, electricity and as an alternative energy provider.



The marketplace recognizes the affordable, high-quality, reliable and safe energy services delivered by FortisBC. Over three million British Columbians use natural gas every day with over 58 per cent of households using natural gas as their primary heating source. The preference for gas is reflected by our continued customer growth. In fact, 2017 was FortisBC's best-performing year for customer growth, with many new customers converting their home heating system from high carbon fuels such as heating oil. This emphasizes the foundational role of gas infrastructure in BC's energy system. To achieve the provincial government's GHG reduction objectives, consumer preference for gas as a low-carbon and affordable energy source should be recognized and harnessed.

In 2017, we opened the door to our new LEED-equivalent Kootenay Operations Centre outside of Castlegar, BC.

Even though customer additions to FortisBC's gas system were at record-levels in 2017, the amount of gas used on a per customer basis declined by 1.8 per cent in 2017 on a weather normalized basis. This speaks to the success of energy-efficiency measures in the province including FortisBC's energy conservation programs, federal and provincial policies and the gradual but concerted shift in the built environment to more energy-efficient dwellings.

The unique aspect of the gas system is that it is specifically designed to address heating demand. Seasonal changes in heat demand (referred to as "peak load" or "peak demand") can be up to 400 to 500 per cent greater than FortisBC's average demand. For comparison, peak load in the FortisBC electric system is approximately 40 per cent higher than average load. If BC used electricity as the primary source for heat, the seasonal variability of heating load would create a huge need for energy storage. Hydropower could meet the storage requirement were it not for the magnitude of heat load in BC. The approximate peak-hour heating load in 2017 in FortisBC's gas system was over 12 GW of electrical capacity equivalent (at a one-to-one unit energy conversion basis). In other words, electrifying heating could require almost a doubling of the existing hydroelectric capacity in BC even before considering the electrification of some part of the transportation fleet or other energy end uses and the additional transmission and distribution requirements. Recognizing this, decarbonizing the gas flowing through the system while maintaining the use of that system is a prudent and low-cost strategy to ensure that BC achieves its climate targets.

Stronger codes and standards over time

We support stronger codes and standards that result in increased energy efficiency. We support an approach that is aligned with the current BC Building Code and BC Energy Step Code (BC ESC) targets. The BC ESC provides an incremental and consistent approach to achieving more energy-efficient buildings in a cost-effective manner while also reducing GHG emissions.

Codes and standards should stay consistent to achieve energy-efficiency gains

The BC ESC was developed after an extensive, multi-year engagement process. As a member of the Energy Step Code Council, FortisBC provided insights into the development of the BC ESC, particularly with respect to ensuring affordability needs for British Columbians are addressed, while supporting continuing innovation in the use of energy in buildings.

In addition to supporting long-term improvements in energy efficiency in the BC Building Code, the BC ESC ensures the consistency of building regulations in the province; a key to ensuring clear regulation for builders and developers looking to build in multiple municipalities. The BC ESC provides a provincial framework that replaces the patchwork of different green building standards that have been required or encouraged by local governments in the past. This allows local governments to play a leadership role in improving energy efficiency, while providing a single standard for industry, and build capacity over time.

The BC ESC focuses first on building envelope design with a goal of taking incremental steps to make buildings net-zero energy ready by 2032. It provides for a fuel neutral approach and focuses on the efficiency of buildings and equipment. By focusing on building and equipment efficiency, both overall energy usage and GHG emissions are reduced while building comfort is increased. While costs increase at higher levels of the code, energy usage decreases help offset the increase in overall costs to consumers. The BC ESC also provides flexibility to meet the changing needs and abilities of local governments, industry and technologies. It does this by providing local governments with the tools to pursue a long-term vision for the future of energy efficiency of buildings and related climate action initiatives. As a new code structure, the BC ESC, similar to other changes in the BC Building Code, requires time to learn, implement and see results. It is common practice to make changes to the code only every five to seven years to allow the industry and consumers to become familiar with the change.

Adding additional regulations into the BC ESC, such as the proposed GHG intensity (GHGi) requirement, before results of the adoption of the existing BC ESC are understood and realized would be premature and could lead to unintended consequences: higher energy costs, impaired housing affordability and a loss of choice for consumers. The provincial approach should support consumer choice, by allowing designers and builders to continue to choose gas, electricity, or other energy sources for their project. A fuel-neutral approach provides builders with the flexibility to make energy-efficient buildings using all the available technologies along with managing their costs. It also empowers builders and developers to pursue innovative, creative, cost-effective solutions, and allows them to incorporate leading-edge technologies as they come available. We believe that committing to the current



BC ESC is a prudent measure accounting for the scale of change that the new code presents to the market and the importance of aligning the code across the province.

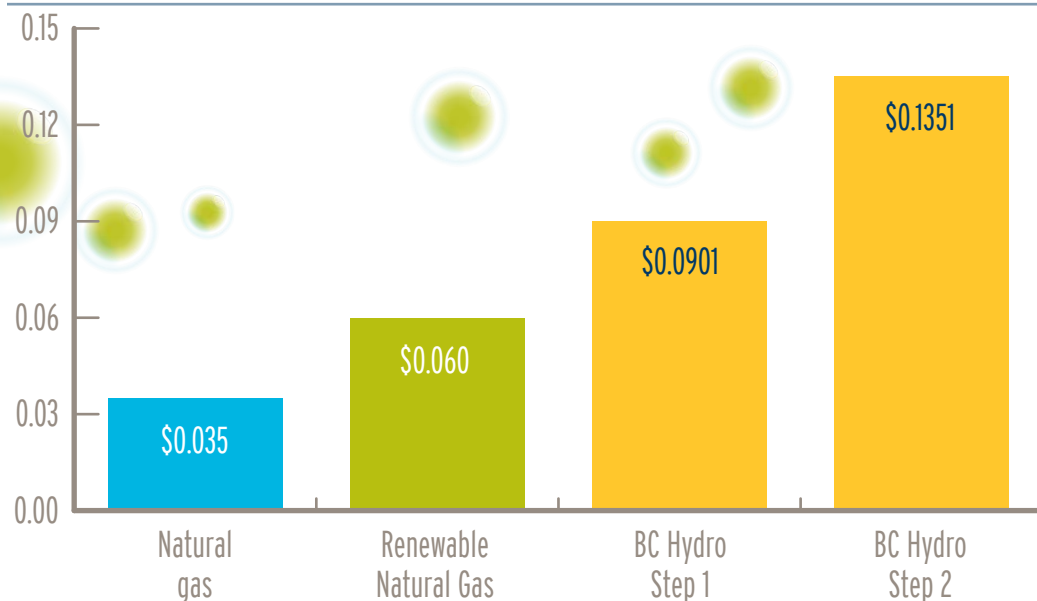
FortisBC has been, and continues to be, a strong advocate for the use of the BC ESC. For example, FortisBC and the City of Vancouver signed a Memorandum of Understanding (MoU) which ensured that the City would introduce pathways that used the BC ESC for builders to comply with the City’s Zero Emissions Building Plan. Under these compliance pathways, builders can choose to follow the BC ESC without additional requirements such as a GHGi target. FortisBC also committed to developing a DSM program based on the BC ESC in the MoU. By having new pathways aligned with the BC ESC, FortisBC could provide DSM incentives to lower the costs of achieving the BC ESC to builders in Vancouver while still achieving meaningful improvements in the energy efficiency and GHG reductions of new buildings. Were the province to allow a patchwork of BC ESC along with municipally-specific GHGi requirements, FortisBC would not be able to provide DSM incentives to moderate the affordability pressures of new ambitious codes that restrict access to the gas system.

BC should seek alignment with national codes and standards to ensure consistency with other jurisdictions as it considers a new code for retrofits. The federal code for alterations to existing buildings should serve as a template for BC, as suggested. Because of the scale of the retrofit challenge, clear goals and objectives need to be identified to ensure that all players in this sector have a role. FortisBC is exploring innovative partnerships to demonstrate building energy retrofits and we believe that large GHG reductions consistent with the province’s long-term GHG objectives are possible while still maintaining connection to the gas system.

Finally, we recommend that any further changes to the BC Energy Efficiency Standards Regulation should be aligned with federal standards to ensure consistency for equipment manufacturers. We agree with the Canadian Homebuilders Association that it is likely that manufacturers will focus efforts on areas with the greatest market share, national and international, and BC’s initiatives may not be as lucrative to encourage the necessary research and development in comparison to federal approaches.

Maintaining affordability for BC energy consumers

Residential gas \$/kWh price comparison



Affordability is the key concern among BC residents and FortisBC customers while producing energy locally is the top policy priority for government to consider. As we transition to a low-carbon economy, care must also be taken to ensure that we pursue cost-effective strategies that will not result in higher costs for energy consumers.

Consumer priorities on energy issues

In August 2018, FortisBC commissioned Innovative Research Group to conduct a survey on consumer priorities on energy issues. The survey found that:

- For 42 per cent of respondents affordability is the top priority in their personal energy choices, followed by the environment (24 per cent) and reliability (22 per cent).
- When it comes to government policy, the top priority is helping the economy by producing energy locally (28 per cent), followed by affordability (27 per cent), with environment third (21 per cent).

The survey was conducted between August 3 and 14, 2018 among a sample of 1,328 randomly-selected British Columbians. The survey used a mixed-method online and phone methodology. Interviews in English (n=1,024) were conducted using a representative online panel and in-language interviews in Cantonese, Mandarin, and Punjabi (n=304) were conducted over the phone. Results were weighted to a sample size of n=1,200 based on age, gender, region of the province and mother tongue.

We also believe that regional differences in BC should be taken into account. For example, policies that restrict choice will disproportionately impact energy consumers outside of the Lower Mainland and Southern Vancouver Island that reside in BC's colder regions. Similarly, regions that rely on BC's natural gas industry to drive the provincial economy, should also be taken into account.

FortisBC's RNG, while more expensive than natural gas, is still approximately half the price of electricity in BC and with a lower carbon intensity. This demonstrates the potential for the gas system to achieve significant, affordable GHG reductions with low-carbon drop-in fuels such as RNG and hydrogen. To achieve this potential, supportive policies that provide incentives and opportunities to invest in low-carbon gas supply will be needed over the long-term. These investments will only happen as long as the gas system remains a viable productive asset and consumers have the choice to continue to connect to and use gas.

It is for all these reasons that we believe an approach that targets increased energy efficiency and allows for consumer choice and innovation is consistent with the broader government objectives: making life more affordable and growing the BC economy while taking action on climate change.

Incentives tied to energy efficiency and building improvements

We support increasing energy-efficiency incentives. FortisBC is seeking to significantly expand energy-efficiency investments in our DSM portfolio. Our proposal currently before the British Columbia Utilities Commission (BCUC) includes more than doubling energy efficiency spending from 2016 levels by 2019 and with further increases over the next four years. By 2022, we are committed to investing more than \$96 million annually, approximately tripling our 2016 spending.

FortisBC estimates that this increased funding would effectively double annual natural gas energy savings and GHG emissions reductions, with the majority of savings occurring in the built environment. Annual energy savings would be in the order of one million GJ of gas which will in turn lead to reductions in GHG emissions of approximately 50 thousand tonnes of CO₂e per year.

We are also seeking approval to expand our electricity DSM portfolio. In our 2019 to 2022 DSM Plan, which is currently before the BCUC for review, we are seeking a 21 per cent spending increase over what we put forward in our long-term DSM Plan. We expect to achieve 17 per cent more energy savings than set out in the long-term plan, or 130 GWh over the plan period.

Through assisting customers in moving to higher-efficiency equipment, supporting the BC ESC and advancing energy conservation in BC overall, our expanded energy efficiency programs will positively impact the province and support the achievement of BC's GHG emissions reduction goals. These measures will also support the BC government's commitment to improving affordability: individual customers will reduce their energy consumption and their energy bills.

FortisBC is supportive of the proposal to develop an incentive program to complement existing utility-led energy-efficiency programs focused on retrofits. We believe that if utility and provincial actions are well-designed, they could leverage each other and strengthen participation. We advocate for the provincial government to continue to work closely with utilities in designing this program.

Committed to investing
more than

\$96 million
annually by 2022

Advanced Metering Infrastructure (AMI) is a valuable tool in helping our customers across BC improve energy efficiency and reduce GHG emissions in residential and commercial buildings. This technology is providing FortisBC's electric customers with more control over how they use energy. To date, we have installed over 134,000 AMI meters in our electric service territory and we seek to extend these benefits to our natural gas system. This technology is the foundation of a more modern natural gas system that improves the customer experience by empowering them to access data to make informed decisions about their energy use. With advanced meters, our natural gas customers will have the information they need to inspire mindful choices like using digital control to better manage use of heating appliances or making energy-efficiency upgrades to their homes. This technology could also help facilitate more investment in behind the meter solutions by identifying buildings well suited to energy-efficiency upgrades and integrating those solutions to the broader system to maximize energy-efficiency gains. We recommend that the provincial government provide support for wider deployment of AMI across BC's natural gas network.

Support for low-carbon innovation

FortisBC is well-positioned to identify innovation investments to reduce the carbon footprint of BC's energy system. FortisBC is interested in investing in core research focused on opportunities relevant to BC. This could include ultra high-efficiency gas-fired heat pumps, hydrogen production technologies, measures to reduce the carbon intensity of natural gas such as carbon capture and storage, and near zero GHG engines in vehicles. Without innovation funding from FortisBC or other agencies focused specifically on addressing GHG emissions within BC's unique energy system and fully integrated gas supply, transitioning the gas system to align with the provincial climate targets will be even more challenging.

We recommend that the province consider mechanisms for utility-led innovation investment aimed at reducing GHGs or directing a portion of Innovative Clean Energy (ICE) funding to utility-led projects.

FortisBC also seeks to expand BC's supply of clean energy. Wood and forest residues could significantly expand the amount of RNG supply in BC but, to unlock this potential, focused support for innovation from the public and private sectors will be needed. Of the total supply potential for RNG, wood has the largest share representing approximately 50 per cent of natural gas consumption in Canada. There are a number of other co-benefits of harnessing the potential of wood feedstocks for RNG. These include reducing GHG emissions in BC's forestry-based industries while providing them with new, meaningful financial benefits. This could increase the competitiveness and international market share of Canadian forest industries and boost employment in the sector. However, there are still important technological gaps and high costs associated with wood-based RNG production meaning that, to-date, there has been limited RNG production from wood. The provincial government should identify RNG from wood feedstocks as a key priority for its innovation and climate objectives and work with the forestry sector, FortisBC and the research community to realize this opportunity.

We are supportive of new policies that will support utility investment to broaden our supply of clean energy to include new forms of alternative energy. For example, FortisBC Alternative Energy Services (FAES) is a leader in providing cost-effective, high-performance thermal energy solutions (TES) in BC's building sector. For example, our Marine Gateway and Telus Gardens energy systems in Vancouver, both use renewable and recycled energy to improve efficiency and emissions by 50-80 per cent compared to conventional systems. To date, FAES has invested more than \$62 million in high-efficiency energy systems which we own and operate on behalf of our customers.

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In order to accelerate FAES' contribution to providing highly efficient and low-carbon energy systems, we propose that government support a move to facilitate adoption of a regulated pooled cost model for TES providers. This recommendation would ultimately lead to faster market adoption of TES solutions.

Another example of low-carbon, FortisBC-led innovation is the proposed Ellison Community Solar Pilot project that could be the largest utility-owned solar project in BC. Interest in solar is on the rise and we seek to provide an easy, affordable option for our customers who want to use solar energy to meet a portion of their electricity needs. Our aim is to develop a solar program for customers who are interested in solar, but the upfront cost, placement, operation or maintenance of a rooftop system is not desirable. The province should create opportunity for future utility investment in clean energy projects where there is consumer demand for these offerings.



Energy-efficiency labelling information

FortisBC supports the province's goal to improve information for building owners and residents on the energy performance of buildings. As the province develops this program, total energy consumed, carbon footprint and overall cost should all be included in the energy labeling information. FortisBC looks forward to working with the province to further develop this proposal.

A clean growth program for industry

Industry is an important part of the Provincial economy and our customer base. Of FortisBC's million customers, less than a thousand are industrial clients, yet these firms consume approximately one-third of FortisBC's total gas demand. To these customers, gas is a low-cost, efficient, reliable and high-quality fuel source. FortisBC is proud to be the energy supplier of choice to the industries that propel BC's economy.

FortisBC agrees with the provincial government that reducing GHG emissions must happen alongside a strengthening economy. Reducing GHG emissions through investment, technology and sustainable growth must be fostered in a framework to ensure BC's businesses and industries are not put at a competitive disadvantage. The intention to develop an effective Clean Growth Program for Industry is an important objective of the provincial government. To this end, we believe that an incentive-based approach for industry is an important development.

We also believe that BC needs to be in alignment with the rest of Canada. The federal government's output-based system in the Carbon Pricing Backstop provides more relief to industry while still maintaining the same marginal incentive to reduce GHG emissions. BC should commit to reviewing and evaluating outcomes from the two systems. If the federal approach demonstrates better outcomes for emissions and the economy, then BC should adopt this system to create a level playing field for industries across Canada.

Industrial incentive

We believe that setting the performance benchmark at the level of the cleanest facilities in the world is an ambitious but achievable starting point as many industries in BC are already world-leading environmental performers. Because the Clean Growth Program for Industry aims to improve the international competitiveness of BC's industries, we support the benchmark level as the best performing international firm or facility.

Industries within BC or Canada should not be used to set the benchmark. This would force domestic firms to compete against each other and incur costs with no impact on their international competitiveness. As provincial carbon policy costs begin to align under the Pan-Canadian Framework, the incentive for domestic firms to reduce their carbon emissions is evened.

In fact, BC's approach to tax all of a firm's carbon emissions up to \$30 per tonne applies significantly more carbon costs than the approach used in the federal output-based allocation system which applies the carbon price only on emissions above the benchmark. This means that even with an aligned price on carbon, BC firms would be disadvantaged compared to other provinces.

A Canadian first

Climate change is a global issue, and FortisBC is committed to being part of the solution. One of the ways we're doing this is by exporting liquefied natural gas (LNG) to countries like China that are looking to significantly reduce their greenhouse gas emissions.

Late last year, FortisBC notched a milestone by delivering the first shipment of LNG from Canada to China. Since then, our shipments have continued, with the most recent one arriving in Shanghai in May.

As China's LNG imports continue to increase, analysts predict it could one day eclipse Japan as the world's biggest importer of natural gas. This presents a unique opportunity for FortisBC, which has the only two LNG storage facilities on Canada's West Coast.



FortisBC's LNG facility in Delta, BC has been operating since 1971 and in order to meet the growing demand for LNG it recently underwent a \$400-million expansion.

This market shift is about more than just an economic opportunity for Canada. Underlying this trend is the fact that natural gas is a strong energy option for countries like China that are looking to transition from high-carbon fuels to cleaner and more affordable alternatives.

FortisBC offers an abundant supply of LNG that meets high environmental standards. In fact, when FortisBC's Tilbury LNG plant expansion is operational later this year it will be one of the cleanest LNG facilities in the world.

The additional GHG reduction that would be achieved by using domestic firms for the performance benchmark is marginal while simultaneously not improving the competitive position of BC firms in the international market. Because BC's firms compete for market share against international firms, ensuring that carbon costs are moderated compared to the next best international performer should be the key objective. We believe this makes both economic and environmental sense. Incentivizing firms to achieve the lowest carbon intensity than the next best global performer ensures that carbon leakage is minimized while firms in BC are allowed to grow.

The provincial government should use a consistent approach when setting the benchmark across all industries. This means that determining the benchmark for incumbent industries such as mining and pulp and paper should be the same as for nascent industries such as LNG exports. A consistent approach ensures industries of the future can compete for global markets just as today's industries can. FortisBC also supports the principle of consistency regarding the threshold to enter the program at 10,000 tonnes of annual GHG emissions. This will ensure that all large industries can access carbon tax incentives. The government should monitor this threshold and consider opportunities for smaller firms to opt-in to the program.

The threshold and the benchmark should also account for all emissions whether from combustion, process or fugitive. Firms that demonstrate real investments in technologies and practices that reduce process and fugitive emissions should be able to report those savings toward their emission intensity.

A threshold of
10,000
tonnes

will ensure all large industries can access carbon tax incentives

Clean Industry Fund

FortisBC supports the creation of the Clean Industry Fund as a way to invest carbon revenues into direct emissions reductions and innovation in low-carbon technologies. The fund should only be available to firms that are participants in the Clean Growth Program. The fund should be additional to existing government funds for innovation and technology and focused on industrial improvements. The scope for funding should be broad and include direct facility-level improvements, research and development, pilots and demonstrations and projects across the energy supply chain that will lower the carbon intensity of fuels. FortisBC anticipates that it would be a recipient of funds to develop leading technologies in, for example, efficiency, RNG and hydrogen that would improve the carbon intensity of industrial clients.

Investments from the fund should allow projects that achieve both short and long-term GHG reductions and be fuel neutral. A common and agreed framework to evaluate proposals that emphasized cost-effective short term reductions or long-term projects with high reduction potential should be negotiated with Clean Growth Program participants.

FortisBC believes that the government should target industry specific reductions along with system-wide initiatives that could reduce the carbon intensity of all industries. A priority list of actions could be developed in consultation with industry to earmark fund dollars for high-payoff strategies. We believe that one such strategy is to support clean gaseous fuels such as RNG and hydrogen. A specified and focused tranche of support from the fund could have an outsized role to improve the carbon intensity of all industries in BC.

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