CLIMATE **LEADERSHIP** TEAM

Recommendations to Government

October 31, 2015

British Columbia

TABLE OF CONTENTS

BACKGROUND _____ *3*

VISION AND CONTEXT _____ *4*

OVERARCHING FRAMEWORK _____ *7*

RECOMMENDATIONS _____ *8*

GHG REDUCTION TARGETS _____ 8

FISCAL POLICY _____ 9

INDUSTRY POLICY _____ 12

TRANSPORTATION _____ 16

BUILDINGS _____ 18

COMMUNITIES _____ 19

FIRST NATIONS _____ 20

OFFSETS _____ 21

INTERGOVERNMENTAL RELATIONS _____ 22

PERIODIC REVIEW _____ 22

Appendix _____ *24*

BACKGROUND

On April 13, 2015, Premier Christy Clark announced a challenge to jurisdictions around the world - to meet or exceed the world-leading standard B.C. has set for climate action. She also announced that work was underway to build on B.C.'s successful Climate Action Plan, to move the Province's climate agenda forward, ensuring B.C. remains a global climate leader.

On April 21, 2015, Mike Bernier, Parliamentary Secretary for Energy Literacy and the Environment, was announced as the chair of a new Climate Leadership Team of leaders from B.C. businesses, First Nations, local governments, academia, and the environmental sector to provide advice and recommendations to government on a new Climate Action Plan. Vice Chair Jordan Sturdy, Parliamentary Secretary for Energy Literacy and the Environment for the Minister of Environment, took over as Chair of the Climate Leadership Team on July 30, 2015.

On May 12, 2015, Climate Leadership Team members were announced and the Climate Leadership Team's mandate was established, to provide advice and recommendations on:

- how to maintain B.C.'s climate leadership;
- updates to the current Climate Action Plan as well as new programs and policies required to achieve British Columbia's greenhouse gas (GHG) reduction targets within the context of economic growth, B.C.'s LNG Strategy and the B.C. Jobs Plan;
- actions to achieve GHG reductions required across the industrial sector, transportation sector and built environment;
- how to further the Province's government-to-government relationships with First Nations while constructively finding climate solutions; and
- how to further the Province's collaboration with local governments within the context of mutually-beneficial climate actions.

The Climate Leadership Team had nine face-to-face meetings, some of which were two day meetings. There were also four dedicated sessions concerning natural gas and LNG issues and a number of teleconference meetings. The background information on past action and effectiveness was provided by government staff. The emission and economic modelling supporting the Climate Leadership Team recommendations was provided by Navius Research Inc., a private consulting firm specializing in climate and energy modelling. Extensive policy information was provided by government staff based on the work done by five cross-government working groups on carbon pricing, transportation, industry, built environment and adaptation. A number of stakeholders were also invited to provide information and feedback to inform Climate Leadership Team recommendations.

VISION AND CONTEXT

The latest climate science shows that unprecedented climate changes are already upon us. Without significant new climate policies to reduce carbon pollution we will increase the warming of the climate system by +4 Celsius or more, unleashing "severe, widespread, and irreversible impacts globally."[1]

The US Council of Economic Advisors reports that "An analysis of research on the cost of delay for hitting a specified climate target (typically, a given concentration of greenhouse gases) suggests that net mitigation costs increase, on average, by approximately 40 percent for each decade of delay. These costs are higher for more aggressive climate goals: each year of delay means more CO2 emissions, so it becomes increasingly difficult, or even infeasible, to hit a climate target that is likely to yield only moderate temperature increases."[2]

The costs of inaction are real. British Columbia, in common with the rest of the North America, is already experiencing a dramatic increase in the severity and frequency of violent storms. The Canadian insurance industry warns that the cost of extreme weather events is skyrocketing, costing Canadians over $3.2 billion dollars last year alone. By taking decisive action now to reduce our carbon pollution and stimulate innovation B.C. will be sending consistent, credible long term policy signals to the marketplace, protecting our economy and our health, and working to ensure a stable climate.

The good news is that numerous studies have now shown us that reducing emissions can be done while maintaining economic growth and in fact, can be cheaper in the long term than delaying action to address climate change.

Heading into the next major climate conference, Paris 2015, the majority of world leaders (representing more than two thirds of the world's GHG & GDP) have made public commitments to peak and lower emissions. For the first time, many major developing nations are committed. Joining these major nation states is a rapidly growing list of global financial, religious and civil society groups.

Evidence of this global momentum abounds. Within the past year and a half, a variety of developments have set the stage for new and renewed climate leadership:

- Leading large economies have agreed to collaborate, set goals, and share expertise on climate and clean energy. A new spirit of problem solving has replaced a once-adversarial diplomatic atmosphere.
- Carbon pricing is spreading around the world and is emerging as the new normal. The share of global carbon pollution being priced has tripled since B.C. implemented its carbon tax.
- Eighty-one companies with a combined market capitalization of more than $5 trillion USD have pledged to cut their carbon pollution, invest in clean energy, and support a strong global agreement at Paris 2015.

All of these efforts—from national governments, large industries, states and provinces, cities and individual citizens—are starting to have a collective impact. This past year, global carbon pollution from fossil fuels levelled off, even as GDP continued to grow. It was the first time in nearly half a century that

[1] IPCC 2014 Synthesis Report: http://www.ipcc.ch/report/ar5/syr/

[2] The Cost Of Delaying Action To Stem Climate Change 2014: https://www.whitehouse.gov/sites/default/files/docs/the_cost_of_delaying_action_to_stem_climate_change.pdf

carbon pollution decoupled from GDP globally. The International Energy Agency, which reported the finding, cited policy action on energy efficiency and renewable energy as the main factor driving the change.

It was a remarkable signal and—as the impacts of climate change become increasingly visible and acute—it telegraphed a clear message to governments: Your efforts are essential, and you are making a difference. Keep going.

In B.C., the province's existing suite of climate policies is already globally renowned. The carbon tax currently prices pollution from combustion sources at $30 per tonne. The province cancelled two coal-fired power plants and required BC Hydro to source almost all of its electricity from clean and renewable sources. Meanwhile, a low-carbon fuel standard has averted the release of millions of tonnes of carbon pollution from tailpipes across the province.

Independent studies have verified that these climate policies are working. Carbon pollution fell in the province while the economy grew. B.C.'s businesses now enjoy one the lowest general corporate income tax rates in North America and the G7 nations. The province is home to an industry of clean power producers that has attracted billions in investment and provides renewable electricity to 1.5 million homes.

B.C.'s climate leadership policies have telegraphed a signal to investors that the province is open for business in the growing global low-carbon economy. A modest but thriving clean tech sector is creating jobs and innovation in zero-emission transportation, renewable energy manufacturing, high-efficiency building materials, energy intelligence software, and much more.

All of this success is heartening. But carbon pollution levels have started creeping up again and are projected to continue rising. As the province has acknowledged, stronger climate policies will be required to change those projections so that they align with the province's climate targets. The need for stronger policies introduces a second challenge for B.C. in that the competiveness of key sectors such as forestry, mining and natural gas could be negatively affected if B.C.'s climate policies are significantly stronger than other jurisdictions. Focusing on reducing emissions or maintaining competiveness in isolation will lead to failure. It is critical that both challenges be addressed in an integrated manner.

The task of the Climate Leadership Team is to address these two challenges by recommending policy actions that would ensure British Columbia meets its climate targets while maintaining a strong economy. Given the new wave of positive action sweeping the globe in the lead-up to the United Nations Paris climate summit—and the increasing need to act urgently and decisively—the government's timing is fortuitous.

With the opportunity to work collaboratively with a new federal government, now is the time to leverage past successes and renew our commitment to lead. By embracing the actions recommended within this document, British Columbia can build on its experience, significantly bending the curve on carbon pollution while keeping the economy strong.

The Climate Leadership Team understands its mandate to develop recommendations that concurrently achieve to the greatest extent possible the following Cornerstone Objectives:

a) Achieving B.C.'s legislated GHG emission reduction targets;
b) Maintaining a strong economy (including consideration of B.C.'s LNG Strategy and the B.C. Jobs Plan);
c) Mitigating negative impacts on vulnerable populations; and
d) Maintaining B.C.'s reputation for world-leading climate policies.

Considerable research informs our recommendations. While the Climate Leadership Team reviewed options other than those included in our package of recommendations, none were as effective in concurrently achieving the Cornerstone Objectives as those described below.

Given what is at stake, and on behalf of all of our children and their children, we urge the government to adopt the integrated and interdependent package of recommendations we present. A piecemeal approach will not prove effective economically or environmentally.

On behalf of our entire team we thank you for this opportunity. It has been an honour to serve in this important endeavour.

Sincerely, All Members of the Climate Leadership Team

Parliamentary Secretary Jordan Sturdy (MLA), Chair
Tzeporah Berman
Ian Campbell
Michelle Edwards
James Gorman
Linda Hepner
Matt Horne
Paul Ives
David Keane
Susanna Laaksonen-Craig, Ex-officio
Tim Newton
Dr. Nancy Olewiler
Zach Parker
Dr. Thomas Pedersen
Merran Smith
Luke Strimbold
Dr. James Tansey

OVERARCHING FRAMEWORK

Based on a review of its mandate, and a discussion of its mandate with the Minister and the Chair, the Climate Leadership Team focussed its work on developing recommendations for the B.C. government that would concurrently achieve to the greatest extent possible the previously mentioned Cornerstone Objectives. If any one of the Cornerstone Objectives were to be deemed not a priority, the substance of the recommendations of the Climate Leadership Team may well be different.

The recommendations of the Climate Leadership Team are to be considered as a package. Except where otherwise noted, there is consensus on the overall package of recommendations, but it is not to be assumed that there is consensus on individual items within the overall package.

Generally speaking, the Climate Leadership Team has focussed on strategic-level recommendations. It is recognized that successful implementation will require much more in the way of detailed specifics at the policy and program level.

With the assistance of Navius, the Climate Leadership Team undertook extensive modelling of different pathways for concurrently achieving to the greatest extent possible the four Cornerstone Objectives. On the basis of this modelling, and robust discussion of options, the Climate Leadership Team concludes that any pathway that concurrently achieves these four objectives will require the following four elements:

a) An increasing and expanded carbon tax;
b) Adjustment mechanisms within the carbon pricing framework to address both competitiveness impacts on emissions-intensive, trade-exposed industries (with such adjustments being designed in a manner that does not undermine the incentive to reduce emissions) and vulnerable populations;
c) Complementary polices that either enhance the effect of the carbon pricing regime and/or target emissions not effectively reached through carbon pricing; and
d) Periodic review of the foregoing three elements over time.

RECOMMENDATIONS

These recommendations, if implemented in their entirety, will best concurrently achieve to the greatest extent possible the Cornerstone Objectives. Except as otherwise noted, the following represent a consensus of the Climate Leadership Team. The recommendations in this report, and the associated rationale, reflect the opinion of Climate Leadership Members as individuals and do not necessarily represent the views of their employers or any organizations that they belong to. It is important that these recommendations are read and understood within the context of the background and rationale provided for each of them.

GHG REDUCTION TARGETS

Context and Rationale

Targets are an important tool to signal how ambitious a jurisdiction intends to be in tackling climate change. Evidence from many jurisdictions (UK, Sweden, German and the EU as a whole) suggests that setting ambitious targets for GHG reductions, coupled with policies aligned with the target, is an effective way to ensure goal-oriented public policy.

As part of the original Climate Action Plan, B.C. set ambitious greenhouse gas reduction targets. The *Greenhouse Gas Reduction Targets Act* (GGRTA) set B.C.'s GHG emissions to be reduced by at least 33 per cent below 2007 levels by 2020, and at least 80 per cent below 2007 levels by 2050. Interim reduction targets of six per cent by 2012 and 18 per cent by 2016 were also set to guide and measure progress.

B.C.'s 2020 target was ambitious when it was established in 2007 and the original Climate Action Plan included a set of policies that were an important step on the way to that target. Those policies are one of the main reasons why B.C. was able to meet its first interim target in 2012. New policies have not been added to the original policies, which plateaued in 2012. The 2020 target is extremely difficult to meet at this point. Because of these challenges, the Climate Leadership Team's recommendations will not enable the province to meet its 2020 targets.

The 2050 target is within reach with ambitious actions. We also recommend a new 2030 target that is achievable and would put the province on a credible pathway to its 2050 targets. Our recommendations are focused on getting the province on this pathway quickly and remaining on the pathway over time.

In addition, we recommend new 2030 sector-specific targets for industry, transportation, and buildings. These are based on the economic modelling done for the Climate Leadership Team, and in combination they equal the recommended province-wide 2030 target. We believe they will help foster a renewed sense of excitement for B.C., and provide guidance to the government on the more detailed policy development work that will be needed to complement our recommendations.

Recommendation 1
Reaffirm British Columbia's legislated 2050 target of achieving a reduction in GHG emissions of 80 per cent below 2007 levels.

Recommendation 2
Establish a legislated 2030 target of 40 per cent GHG reduction below 2007 levels.

Recommendation 3
Establish the following sectoral GHG reduction goals (below 2015) for 2030

a) *30 per cent for the transportation sector totalling* 6.3 *MT of CO2;*
b) *30 per cent for the industrial sector totalling* 8.4 *MT of CO2; and*
c) *50 per cent for the built environment totalling* 3.4 *MT of CO2.*

FISCAL POLICY

Context and Rationale

Fiscal policy is one of the strongest tools a government can use to encourage or discourage behaviours. Such policies can be helpful tools to encourage investment and reduce carbon pollution. They can also provide flexibility to address specific challenges within a jurisdiction, such as equity and competitiveness challenges for specific sectors. Modelling the Climate Leadership Team's recommendations shows that this suite of fiscal policy recommendations will maintain provincial GDP growth, ensure industry competitiveness and support families and jobs in the province.

Pricing carbon explicitly is an essential policy tool for reducing carbon pollution and building more resilient, low-carbon economies. Currently more than 60 countries, cities, states and provinces use carbon pricing or are planning to implement it. The value of these systems was estimated to be just under $50 billion USD in 2015. These carbon-pricing instruments include carbon taxes, emissions trading systems, and combined systems. The Climate Leadership Team reviewed these various mechanisms and recommends continuing to use a carbon tax as the pricing mechanism in British Columbia.

B.C.'s revenue-neutral carbon tax is the foundation of the province's current climate plan and it applies the same price ($30 per tonne) to almost all fossil fuel combustion in the province. Since its establishment in 2008, the carbon tax has set a price signal to encourage the market's transition to a low-carbon economy. A carbon tax doesn't require specific technologies or behaviours, but by making all renewable energy and energy efficiency options more affordable relative to fossil fuels, it drives a broader adoption of solutions.

Two important aspects of the first phase of the carbon tax were the steady schedule of increases and revenue neutrality. The low starting price that increased gradually on a transparent schedule provided certainty for businesses and investors, and gave them time to make informed decisions. The revenue neutral requirements that were established by the government mean that every dollar collected in carbon taxes is returned to businesses and households via cuts to corporate and personal income taxes. Revenue is also returned through transfers to people with low incomes and in rural and northern communities.

A significant body of evidence points to the conclusion that B.C.'s carbon tax is working both economically and environmentally. Independent research has found that since the implementation of the tax, fuel use in B.C. has dropped by 16 per cent per capita, while it has risen three per cent per capita in the rest of Canada. Within the same timeframe, between 2007 and 2013, B.C.'s real GDP grew 9.2 per cent (more than the Canadian average). The province's fiscal transfers have also assisted low-income households to adjust to a carbon price. Based on this evidence and the economic modelling from Navius, the Climate Leadership Team is recommending that B.C. continue to use our strongest tool to reduce emissions, and recommence the annual increases in the carbon tax starting in 2018, when the

carbon tax freeze ends. The Climate Leadership Team further recommends that the annual increases in the carbon tax are reviewed in five years, however, the modelling indicates that increases in the range of $10 per tonne per year will be required through to 2050 in order to achieve B.C.'s 2050 targets.

We also recommend expanding the carbon tax to include non-combustion sources of carbon pollution that can be accurately measured. Expanding the coverage will allow B.C. to meet its climate targets as cost-effectively as possible as the carbon tax currently covers only the combustion emissions that account for about 70 per cent of B.C.'s emissions. We recommend that this expansion begin in five years to continue improving data quality, and to give the sectors with significant fugitive or process emissions, such as natural gas, coal mining, and cement and metal production, time to plan and make investments to reduce their emissions where possible.

These carbon tax recommendations should not be viewed in isolation because they are just one element of fiscal policy. They should be viewed alongside the accompanying measures we are recommending to maintain B.C.'s economic competitiveness. On an economy-wide basis, and to continue B.C.'s strong support for families and businesses through revenue recycling, we recommend using a major share of the revenue from the carbon tax to reduce the PST by one basis point supported by incremental carbon tax.

Beyond the economy-wide measures, we recommend several targeted measures to maintain or enhance competitiveness – particularly for emissions-intensive, trade-exposed sectors if B.C. moves ahead of the carbon pricing and regulatory policies in place in competing jurisdictions. The government must develop clear policies that protect emissions-intensive, trade-exposed industries because there is a real risk that their competiveness will be materially impacted if the increases in B.C.'s carbon tax exceed the rate at which carbon pricing and regulatory policies are strengthened in competing jurisdictions. Government policies need to avoid an outcome where economic activity shifts from B.C. to another jurisdiction because of B.C.'s carbon tax. We believe that this objective can be accomplished through the targeted use of carbon tax revenue and that this is a preferable approach to waiting for other jurisdictions to strengthen their climate policies first. Doing so will allow B.C. to reduce carbon pollution and maintain the competiveness of the economy – including emissions-intensive, trade-exposed sectors.

The recommendations include the elimination of PST on business and industry electricity rates (residential customers are already exempt). They also include an innovation fund to help establish and grow companies with the clean energy solutions needed globally, including the potential to work in partnership with other funds such as Sustainable Development Technology Canada (SDTC) and Climate Change and Emissions Management Corporation (CCEMC), and support for targeted industries to assist them in remaining competitive.

The impacts of carbon pricing on households – especially low-income households – have also been an important consideration in our deliberations. To help vulnerable communities sustain their disposable income when the carbon tax rate rises, we recommend adjusting the existing low-income and northern/rural tax credits. These adjustments should be based on the best available data to ensure that tax credits are providing an adequate level of support. We also recommend using a portion of the incremental carbon tax revenue to assist communities in making local investments that will help their residents and businesses make lower carbon choices. This could include projects such as district heating systems, car pooling, transit, walking and cycling infrastructure.

The summary of the modelling results supporting these recommendations is in the appendix. The summary results also show that external factors, such as stringency of climate policies in other jurisdictions, have a significant impact on the level of reductions the province will be able to achieve in certain sectors (e.g., if other jurisdictions fail to implement transportation policies as strong as we have recommended, the availability of zero-emission vehicles may be limited). The scale of the LNG development that will unfold in B.C. and the technologies available will also influence the level and timing of achieving the emissions reduction targets and goals.

Recommendation 4
Lower PST from 7 per cent to 6 per cent, supported by incremental carbon tax.

Recommendation 5[3]
Increase the carbon tax by $10/yr commencing in July 2018 and, also supported by incremental carbon tax revenue, concurrently:

a) Maintain those current tax reductions achieved through the existing carbon tax that are broad based, provide support to vulnerable populations, or promote GHG reductions;
b) Adjust the current low income and rural and northern tax credits to ensure the most vulnerable individuals and families are not adversely impacted; and
c) Establish targeted and transparent mechanisms for emission-intensive, trade-exposed sectors that mitigate the competitiveness issues created for those sectors if B.C.'s carbon pricing is materially greater than jurisdictions with which they compete, provided that such mechanisms are structured in a manner that does not adversely impact the price signal to reduce emissions. These adjustments should remain in place until such time that carbon pricing and regulatory policy equivalency with other jurisdictions is achieved.

Recommendation 6
Expand coverage of the current carbon tax to apply to all greenhouse gas emission sources in B.C. after five years, starting with measurable GHG emissions covered by the current reporting regulation.

Recommendation 7
Use the other incremental revenues generated from the increase in the carbon tax to:

a) Eliminate PST on all electricity rates;
b) Establish mechanisms to facilitate investments in technology and innovation that reduce GHG emissions; and
c) Establish mechanisms to provide local governments with funding for projects that will result in demonstrable reductions in GHG emissions.

[3] One CLT member is not in a position to support recommendation 5.

Recommendation 8
The scheduled annual increases in the carbon tax and the competitiveness adjustments for emission-intensive, trade-exposed sectors should be reviewed by the Province, with the support of a Climate Leadership Team, every five years, or more often where warranted, taking into consideration GHG reductions, economic competitiveness, carbon pricing and regulatory policy in other jurisdictions, and impacts on vulnerable communities.

Recommendation 9
The fiscal policies described in these recommendations should be included in the 2016 budget where applicable.

INDUSTRY POLICY

Emerging economic opportunities

The Fiscal Policy recommendations will reduce emissions and are intended to stimulate innovation and jobs within B.C.'s existing industries. There are also new economic opportunities that could become important parts of B.C.'s economy over time – particularly as the global demand for clean energy solutions grows. While some of those opportunities may develop organically over time, we think it is important for B.C. to give more thorough consideration to the province's strengths and how they match with emerging needs and opportunities. This will allow the province to determine if there need to be any additional strategies to target specific economic opportunities.

Recommendation 10
Create a task force with appropriate expertise (e.g. economics, global markets, clean innovation, environment-economy policy) to research B.C.'s competitive advantages and potential growth areas in a low-carbon economy, both within and across sectors, and to develop recommendations on stimulating these areas.

Environmental assessment

New industrial projects typically have lifespans of 30 to 50 years and the environmental assessment process is intended to examine the full project life. In the same way that B.C. is beginning to require project proponents to explore how climate change could impact their project in the future (e.g., changing precipitation patterns impacting a hydro-electricity project), it is important that the Environmental Assessment process also considers how an increasing value on reducing carbon will impact projects over the next 30 to 50 years. B.C. requires a transparent and rigorous environmental assessment process that measures the economic prospects of new development along with the GHG impacts of any project. Adding in the value of carbon treats GHG emissions as any other cost that a proponent of a project must account for in its assessment of viability of the project.

Recommendation 11
Amend the *Environmental Assessment Act* to include the social cost of carbon[4] in the Environmental Assessment process and ensure consistency with the climate action plan and carbon pricing signals.

ELECTRICITY

Under the *Clean Energy Act*, electricity generation is required to be at least 93 per cent renewable. B.C.'s clean electricity supply provides a significant advantage as the province works to reduce emissions by providing businesses and families with a low-emission alternative to fossil fuels. B.C. can build on the existing *Clean Energy Act* and move to a target of 100 per cent renewable electricity by 2025, joining the many cities, states, and nations that have made this leadership commitment.

In the near term, the role of natural gas generation on the integrated grid should be limited to providing backup and ensuring reliable service to customers. In the longer term, the fossil fuel uses should also be phased out as soon as is practicable, as renewable energy technologies mature and costs continue to decline.

There are approximately 60 remote communities — including many First Nations — in B.C. that are not connected to the integrated electricity grid. Most of these communities rely on diesel generation for power supply. While 100 per cent renewable energy alternatives are not always technically feasible, a joint effort of communities, the province, BC Hydro, and federal government agencies will help these communities displace diesel generation with a mix of renewable sources complemented with the efficient use of fossil fuels where necessary.

Recommendation 12
Amend the *Clean Energy Act* to increase the target for clean energy on the integrated grid from 93 per cent to 100 per cent by 2025 (except where fossil fuel capacity is required for back-up or reliability).

Recommendation 13
Establish a strategy (including funding) to phase out, by 2025, diesel generation in remote communities and replace it with reliable, low-GHG electricity service.

NATURAL GAS AND LNG

Natural gas production accounts for 16 per cent of the province's greenhouse gas emissions and is the largest industrial sector. In addition to being a significant provincial source of emissions, it is also the most uncertain due to market forces that affect the potential for LNG development and the accompanying upstream operations, and increased competition from U.S. natural gas for North American markets.

Natural gas production also offers some of the most significant emission reduction opportunities. The modelling and stakeholder information demonstrates the potential for substantial improvements by increasing the use of existing technologies and practices such as electric drive technologies, energy efficiency improvements, carbon capture and storage, and reduced methane leaks. All of these solutions have been used with success in B.C.'s gas sector, but they are not yet commonplace.

[4] The cost of impacts associated with an additional unit of greenhouse gas emissions.

LNG plants offer a similar set of technical opportunities to reduce emissions. The plants can rely on clean electricity instead of natural gas for both the liquefaction process and their auxiliary demands. These technologies are included to varying degrees in the different LNG proposals in B.C., but like upstream gas, they are not yet commonplace across proposals.

In considering the opportunities to reduce emissions from LNG and natural gas in B.C., there are some important positives. As mentioned, most of the technologies are well established and have been used in B.C. in some existing operations and proposed for new ones. Alberta, the province's closest competitor, has recently strengthened its carbon pricing policy and is in the process of a larger update, which is expected to include further progress on carbon pricing. And there is a broader momentum to reduce methane emissions from the oil and gas sector, which has resulted in stronger policies in states like Wyoming, Colorado and Pennsylvania. The U.S. Environmental Protection Agency is in the process of developing similar regulations.

The sector also faces some important challenges that we have accounted for in designing our recommendations. North America now has abundant supplies of relatively low cost natural gas, so B.C. is competing with a number of new suppliers for a limited market. Our recommendations to reduce the PST (generally by 1 basis point and entirely on electricity rates) and make available transitional support for emissions-intensive, trade-exposed sectors are intended to address this reality – particularly if B.C.'s climate policy materially exceeds the stringency of our competitors.

The availability of electricity transmission is also a challenge more specific to the gas and LNG sector. If a proponent wants to use clean electricity instead of gas, they need to be confident that the electricity transmission and supply will be available on the timelines they are advancing their project. Our recommendation for BC Hydro to be able to make supply commitments is intended to address this challenge. One aspect of providing electricity in a competitive, timely manner is ensuring that BC Hydro is able to commit to supply contracts that provide, on reasonable commercial terms used in other jurisdictions in similar circumstances, for damages in the event of failure to deliver new supply within agreed upon time frames and, in the case of LNG, for liquidated damages in the event of interrupted supply. In the event of any damages being payable by BC Hydro, the ratepayers should not bear the burden.

In the event that B.C.'s carbon tax is implemented in a manner recommended, and BC Hydro successfully develops and implements the recommended strategy to develop the competitive, timely supply of electricity to support electrification, an inevitable economic consequence is that within a decade, future LNG projects will take place by way of e-drives or other zero emission technology.

Our recommendations to restart annual increases in the carbon tax in 2018 and broaden the base of the carbon tax in five years are intended to be the main drivers of change in the gas sector. The carbon tax has already worked to improve the business case for electrification and increased energy efficiency, and we are confident that building on this approach will yield results in a way that gives the sector an opportunity to innovate and gives government an opportunity to manage concerns related to competiveness. A potential exception is fugitive and vented methane emissions. While we think the default approach should be to expand the carbon tax coverage, we recognize that methane regulations for the oil and gas sector are evolving rapidly in Canada and the U.S. As a result, it will be important to evaluate the environmental- and cost-effectiveness of those regulations, along with the learning from

B.C.'s five-year effort to reduce methane emissions by 40 per cent, and the anticipated effectiveness of expanding carbon tax coverage.

The five-year window before the carbon tax coverage is expanded to non-combustion sources within the natural gas sector is intended to give the industry an opportunity to make progress reducing GHG emissions. This is particularly true for methane emissions where, based on analysis from Navius, ICF, and B.C.'s natural gas producers, we believe a 40 per cent cut is possible over the five years. This will be a challenging objective to achieve, but the opportunity to take advantage of existing incentives such as offsets and the forthcoming green infrastructure tax credit make it feasible.

We believe that our package of recommendations can help the gas sector contribute to the province's climate goals while also maintaining its competiveness. These efforts will also allow B.C. to contribute to broader efforts in the US and Canada aimed at reducing methane from the oil and gas sector. B.C. can become the preferred jurisdiction when it comes to developing natural gas with near zero emissions.

Recommendation 14
Instruct BC Hydro to develop a strategy (generation and transmission) to supply in a competitive, timely manner the clean electricity required to facilitate electrification of upstream natural gas, LNG, and associated infrastructure. Amongst other things, the strategy should enable BC Hydro to commit to supplying new industrial projects with clean electricity by project start up, if necessary through the use of temporary natural gas generation until transmission infrastructure is available.

Recommendation 15
Reduce fugitive and vented methane emissions by:

a) Establishing a goal of 40 per cent reduction for fugitive and vented methane within five years;
b) Requiring industry through regulation to implement leak detection and repair (LDAR) programs in line with best practices in North America;
c) Developing best practices for methane reduction, including transparent reporting, through a collaborative initiative involving the provincial government, industry, and other stakeholders with expertise in this area (in a manner similar to Colorado and Pennsylvania) and seek alignment with Canada and other provincial jurisdictions in this regard; and
d) Providing that at the time of the first five year review of the Climate Leadership Plan, a new reduction goal for fugitive and vented methane emissions should be established and a determination made whether future reductions in fugitive and venting methane emissions are best achieved through expanding the coverage of the carbon tax to such emissions as provided for in recommendation 6 (the default), a continuation on a voluntary basis of the best practices developed above for methane reduction (provided the industry has reached the 40 per cent methane reduction goal within five years), or such best practices developed for methane being mandated by regulation at that time (with such regulations to be reviewed every five years thereafter).

FORESTRY AND AGRICULTURE

Forestry and the forest sector play a significant role in both climate adaptation and mitigation. Managing B.C.'s forests for improved climate resilience through enhanced silviculture activities and adapting protected areas strategies to address climate adaptation would increase carbon storage, resiliency and future timber supply. The consideration should cover all aspects of climate change resilience from species selection and pest resistance to growing more trees. These outcomes would generate increased economic activity and jobs in the forest sector, as well as in the tourism sector and across B.C.'s economy as a whole.

Programs like "Wood First" encourage the forest industry, government and other stakeholders to advance innovation in B.C.'s forest manufacturing, new products and the built environment through value-added wood products. This helps spur further innovation in other jurisdictions and expand local and global markets for new and existing products, while promoting climate-friendly construction and supporting B.C.'s forest-dependent communities.

Improving the utilization of wood can increase available fibre for all forest products. Improved utilization of lower-quality wood and wood residue provides a fibre source particularly suitable for energy purposes, including bioenergy and new products such as biofuels. There is also an opportunity to improve energy efficiency through fibre-based products used, for example, in insulation. Given the increase in lower quality fibre in B.C. due to the mountain beetle infestation, increased utilization and use of these fibre sources is particularly important.

Climate change will significantly increase the agriculture sector's business risk and management complexity, but will also bring opportunities for the agriculture sector. To reduce the risks and to take advantage of the opportunities, the sector will need to adapt and build climate resilient farm practices in the face of issues such as increasing frequency and magnitude of drought and extreme weather events.

Recommendation 16
Update current forest and agriculture policy, regulation and protected areas strategies to account for climate change impacts.

Recommendation 17
Update current forest policy and regulation to increase utilization of forest residue for energy purposes and increase carbon sequestration.

Recommendation 18
Create a task force with appropriate expertise to review and update carbon management best practices for the agriculture sector.

TRANSPORTATION

Context and Rationale

Transportation is responsible for 37 per cent of emissions in B.C. We now have the technologies – such as biofuels and hybrid-electric vehicles – to enable a transition to zero and low-emission transportation options. Our recommendations focus on making these technologies and fuels available to individuals and industry across the province.

The existing acts, regulations and standards provide a solid foundation for further action. The Low Carbon Fuel Standard is among B.C.'s most successful policies for reducing greenhouse gas emissions — takes the equivalent of 190,000 cars off the road every year. Keeping that success going requires increasing and expanding the standard.

The Greenhouse Gas Reduction (Clean Energy) Regulation, announced in May 2012 and enabled under the *Clean Energy Act*, allows utilities to offer incentives for natural gas vehicles and to build natural gas vehicle fuelling infrastructure. The Regulation also allows utilities to make time-limited investments with spending caps on expenditures, in total up to $102 million over five years, in order to "kick-start" the natural gas vehicle market.

B.C. also has legislation for a zero-emission vehicle standard, but has yet to implement it. Since cars and trucks account for 13 per cent of B.C.'s total emissions, it is necessary for car buyers to have cleaner options. This standard would increase zero-emission vehicle choices for consumers in the province by mandating sales targets for electric vehicles. Leading jurisdictions, such as California, have used this standard to successfully drive electric vehicle adoption. Canadian research also shows that a zero-emission vehicle standard is the optimal policy for increasing zero-emission vehicle sales[5].

This combination of policies would work to give B.C. businesses and individuals access to the affordable vehicles and fuels necessary to run B.C.'s economy while meeting its climate targets.

Building on expertise already in B.C. and on the availability of natural gas and propane in the province also creates opportunities to reduce transportation emissions. Supporting both the vehicle and fuelling infrastructure simultaneously is important to maximize the impact of the policies. Improved commercial transportation efficiency can also be achieved through, for example, larger vehicle size, which reduces both the number of vehicles on the road and the total fuel used and GHG emissions produced to transport a given payload.

Recommendation 19

Develop a low-carbon transportation strategy for transitioning the transportation sector to emit 30 per cent fewer GHGs by 2030 including the following key elements:

a) Establishing the following Zero Emission Vehicle targets for the sale of new light duty vehicles:
   i) 10 per cent of sales by 2020;
   ii) 22.5 per cent of sales by 2025; and
   iii) 30 per cent of sales by 2030;
b) Increasing the Low Carbon Fuel Standard to 20 per cent by 2030;
c) Broadening the LCFS coverage to include all vehicle fuel use with the exception of aviation fuel;
d) Enhancing incentives and infrastructure necessary to support both increased commercial transportation efficiency (size of vehicles) and natural gas/propane conversions in the commercial transport sector (including marine); and
e) Establishing revenue neutral PST for all vehicles based on grams of CO2 per km, similar to many European vehicle registration systems.

[5] Axsen, Jonn. (2015) Electrifying Vehicles: Insights from the Canadian Plug-in Electric Vehicle Study. http://www.rem.sfu.ca/people/faculty/jaxsen/cpevs/

BUILDINGS

Context and Rationale

Buildings represent 11 per cent of B.C.'s total greenhouse gas emissions. The province has significant opportunities to reduce the amount of energy that buildings need, meet those needs with clean electricity instead of fossil fuels, and increasingly rely on materials that store carbon (e.g. wood) to build them. By acting on these three opportunities, B.C. can reduce carbon pollution, cut energy and carbon costs, and improve comfort and indoor air quality. The province's building sector has the skills and experience to help with this transition.

Modelling of our recommendations finds that B.C can reduce emissions by 50 per cent by 2030, which is the target we have consequently recommended for the sector. To achieve that outcome, we have highlighted four buildings-specific recommendations that are designed to complement the fiscal policy recommendations: accelerate improvements in the building code's energy efficiency requirements, provide further public sector leadership for government's own buildings, target programs for existing buildings, and enhance standards for heating equipment and appliances.

B.C. can maximize the benefits from these recommendations if their objectives and implementation are aligned over the next 10 years. Doing so will provide a longer planning horizon for the province, local governments, and industry that can set up bigger gains that wouldn't be possible with less foresight and leadership now. Experiences such as Brussels', which saw energy efficiency requirements in new construction transform from amongst the worst in Europe to amongst the best over an eight-year period, give us confidence that B.C. can achieve these benefits over the next decade. Doing so will require the province to start quickly and develop and commit to a long-term roadmap.

Affordability for building owners, occupants, builders, developers, and the provincial government is a critical consideration. As a first step, constructing higher performance buildings and upgrading existing ones will reduce energy and carbon costs, and help offset the costs of making those investments. We also recommend financing programs to help British Columbians and B.C. businesses access the capital needed. Support for training, more efficient permitting, increased building code compliance and a simplified code will also support better results and help to manage costs. And where possible, we recommend working in partnership with leading jurisdictions such as California and the Pacific Coast Collaborative to achieve and maximize economies of scale.

The buildings sector also represents an important economic export opportunity to the province, particularly as it relates to new buildings. Our recommendations would see increasing use of wood products and a rapid transition to buildings that are energy efficient enough to be able to meet most of their energy needs with on-site renewable energy (e.g., equivalent to net zero ready or Passive House standards). In taking a leadership role in moving towards these higher levels of performance, B.C. will be well positioned to supply the design and construction expertise, and building materials to other jurisdictions.

Recommendation 20

Establish by 2016 a buildings strategy that by 2030 reduces greenhouse gas emissions from the sector by 50 per cent, and includes the following core elements:

a) Commencing in 2016, require that all new public sector buildings increase the use of materials that sequester carbon, and have the capacity of meeting most of their annual energy needs by on-site renewable energy;
b) Revisions to the building code that require new buildings to (i) increase use of materials that sequester carbon and (ii) have the capacity of meeting most of their annual energy needs by on-site renewable energy within 10 years;
c) Programs (such as on-bill financing) that encourage retrofits that reduce GHG emissions and encourage energy efficiency in existing building stock; and
d) Standards that transition the market to high-efficiency electric heating equipment, building components and appliances.

COMMUNITIES

Context and Rationale

Communities have influence over approximately 40 per cent of greenhouse gas emissions in British Columbia and are a key partner in reducing greenhouse gas emissions. The B.C. Climate Action Charter has been a successful approach to encourage communities to take action, and 96 per cent of all local governments have signed the Charter. By signing on, local governments commit to measure and report on their community's greenhouse gas emissions profile. They will also work to create compact, more energy efficient communities and accelerate the uptake of district energy systems, renewable energy, and green and resilient infrastructure. The Climate Action Revenue Incentive program offsets the carbon tax for local governments who have signed the B.C. Climate Action Charter.

We recommend that the B.C. government and municipalities reinvigorate their relationship around the Climate Action Charter and focus on taking it to the next level.

A significant share of all food is wasted. About half occurs at the household level and the rest through production, processing, transportation and retail of food. Reducing waste would save businesses and consumers money, and reduce waste disposal costs. Improved organic waste diversion would prevent the loss of organic waste as a resource.

While the analysis shows only modest greenhouse gas emissions reductions from mode shifting in the long-run, in the short-run a variety of measures can facilitate emissions reductions, including improved transit access, reliability and frequency, as well as the creation of communities more conducive to transit, walking and biking.

Communities have also been dealing with climate variability and extreme weather events for decades, and have developed forecasting and preparedness tools and processes to cope. As the frequency and severity of weather events increase, communities will need new information as well as new resources and strategies to empower them to apply their existing knowledge, and to continue to offer their residents a stable environment in which to live, grow and work.

Communities are not unique in their need to adapt to climate disruption. Broad action is required across the economy and land base. However, the adaptation recommendations are captured in this section as many of the impacts are experienced by communities and their residents.

Risk management begins with clearly assessing the sources of risk. Adequate protections can then be resourced and put in place over time. Monitoring the sources of risk, the level of preparedness and the success of solutions when they are deployed will allow communities to ensure they are sufficiently protected from the potential economic and ecological impacts future climate change may bring.

Recommendation 21
Undertake a collaborative review and update of the Climate Action Charter to align provincial and community goals.

Recommendation 22
Create a waste-to-resource strategy that reduces GHG emissions associated with food waste, organic waste, and landfills.

Recommendation 23
Support increased use of public transit and other mobility options that reduce GHG emissions.

Adaptation

Recommendation 24
Undertake the following actions regarding climate change adaptation and mitigation:

a) Update by 2020 hazard maps for all climate related hazards;
b) Invest in sufficient monitoring systems, especially in the areas with monitoring information gaps, to ensure the change can be managed effectively;
c) Develop a policy framework to guide the provincial government's management of the risks associated with a changing climate; and
d) Increase communications to public.

FIRST NATIONS

Context and Rationale

First Nations communities are an important part of the cultural and economic fabric of British Columbia. As with new resource development, infrastructure programs and revenue generation in the province, First Nations governments and the provincial government will need to collaborate and partner. This will help ensure that already vulnerable and under-resourced First Nations communities are not excluded from the benefits of a climate resilient strategy. It will also include them in the potential future economic benefits of adopting innovative approaches to reduce emissions and energy consumption. First Nations have strong potential to champion clean economic growth that respects the values they hold for nature and their communities.

Over hundreds of years, First Nations have developed a deep understanding of the land and hold extensive traditional knowledge that can benefit the existing data, information and knowledge regarding B.C.'s land base. First Nations are also uniquely positioned to implement adaptation on the land base.

Climate change pays no attention to cultural or economic differences, but access to adequate solutions is often limited by these differences. All British Columbians should have access to similar programs to ensure their families and communities are prepared and resilient.

Recommendation 25
Adaptation

a) Traditional knowledge should be used when appropriate and available as part of the hazard mapping information.
b) Allocate appropriate resources for research and modelling of the impacts of climate change on the inherent and treaty rights of indigenous people.

Recommendation 26
Work with First Nations communities and federal agencies to ensure transition to reliable, low GHG electricity service in communities currently dependent on diesel generation.

Recommendation 27
Ensure the First Nations clean energy business fund effectively enables new business opportunities.

OFFSETS

Context and Rationale

Greenhouse gas offsets have played a vital role in the development of international climate agreements and are an important vehicle to convey technology and financial assistance to developing countries. Many jurisdictions—including B.C., California, Canada and the European Union—have used offset programs to make it possible to adopt stronger reduction targets while managing the economic impact on their economies and stimulating innovation. As offsets allow for one unit of carbon pollution in exchange for one unit of reduction, offsets must be credible, additional, and conform with stringent international standards and jurisdictional regulations.

B.C. has an offset program operated under legislation. The province could expand the use of offsets beyond the Carbon Neutral Government Program to specific industrial sectors, or use them to help meet provincial carbon reduction targets. The amount of offsets permitted and the timeline for using them should be limited in B.C. to ensure they don't become a barrier to reducing carbon pollution directly.

Limited use of high-quality, credible greenhouse gas offsets from other jurisdictions could make additional funds available to invest in higher-cost innovative reduction technologies in B.C., and those technologies could be exported once developed and proven. Like taking out a loan to allow a business to invest in the equipment it needs to generate revenue, offsets can provide a short-term financial bridge to lower-cost, larger-volume reductions. However, given concerns about the credibility of offsets from some jurisdictions outside of B.C. and their ability to ensure greenhouse gas reductions, any external offsets considered should meet or exceed the standards set in B.C.

Recommendation 28
Undertake a review of the current offset policy to determine if changes are required to support the new Climate Leadership Plan.

INTERGOVERNMENTAL RELATIONS

Context and Rationale

Major jurisdictions around the world are currently moving aggressively with new greenhouse gas reduction strategies and commitments, including the United States, China and the European Union. In Canada, there is significant effort underway in a number of jurisdictions to develop and implement policies that address climate change at multiple levels. Currently, Quebec is pricing carbon through an emissions trading system with California under the Western Climate Initiative and Ontario has announced it intends to join this cap and trade system. Furthermore, carbon policy in Alberta is also under review.

Recommendation 29
If the majority of Canadian provinces opt for carbon pricing via emissions trading to cover greenhouse gases from large final emitters, a review should be undertaken of mechanisms to integrate a carbon tax with a cap and trade framework for the B.C. context.

Recommendation 30
British Columbia should work closely with the federal government and the other provinces, as well as with the other jurisdictions in North America to achieve parity with B.C.'s climate action policies.

Recommendation 31
British Columbia should take leadership in seeking alignment with Canada and other provincial jurisdictions regarding best practices for methane reduction from the oil and gas sector, including transparent reporting and carbon pricing and regulatory policies.

PERIODIC REVIEW

Context and Rationale

Once targets are set, they must be reviewed periodically to ensure they remain relevant and B.C. makes progress toward meeting them. This periodic review is critical to maintaining momentum in transitioning away from fossil fuels to low-carbon targets for 2050. Emissions levels, economic impacts, costs to households and quality of life, business conditions, and actions taken by other jurisdictions are all factors that will shift over time. As such, they require monitoring and adjustments in the focus and degree of effort expected from specific policies, programs, communities and technologies. Regular review and monitoring will allow B.C. to intentionally adjust its strategy and tactics as needed to ensure success.

A changing climate will bring new challenges for generations. The sooner a jurisdiction can adopt approaches to monitor climate change and its impacts, the sooner a dynamic platform can be established to support a vibrant low-carbon economy and a resilient environment.

A five-year review cycle will allow time for new policies to take hold and demonstrate their effectiveness. A five-year cycle is also likely to be needed to cull or revise underperforming or ineffective policies and programs, to allow for timely and efficient redeployment of climate action resources.

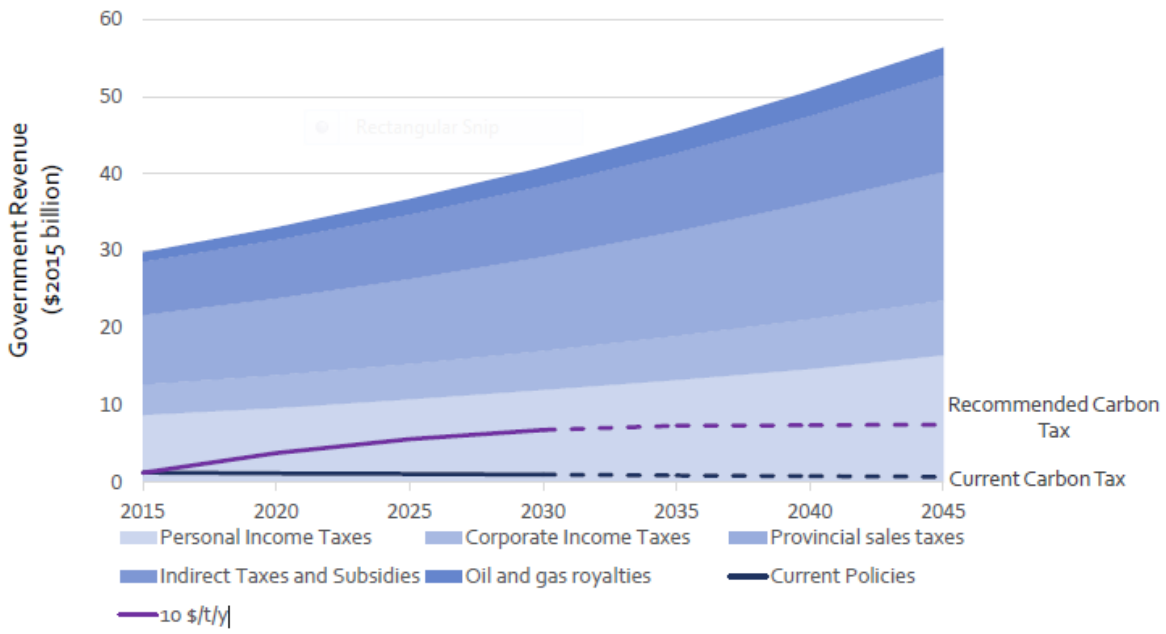
As the climate changes, B.C.'s critical economic, ecological and food supply sectors—such as agriculture, energy, forestry and fisheries—will need closer management attention. This will help ensure they are sustainable under long-term climate scenarios and have adequate assistance surviving short-term extreme climate events. Reviewing B.C.'s climate targets and progress every five years balances timeliness and cost-management considerations appropriately, in recognition of B.C.'s size and complexity.

Recommendation 32
Government should undertake a review of its Climate Leadership Plan and policies at least every five years supported by a Climate Leadership Team.

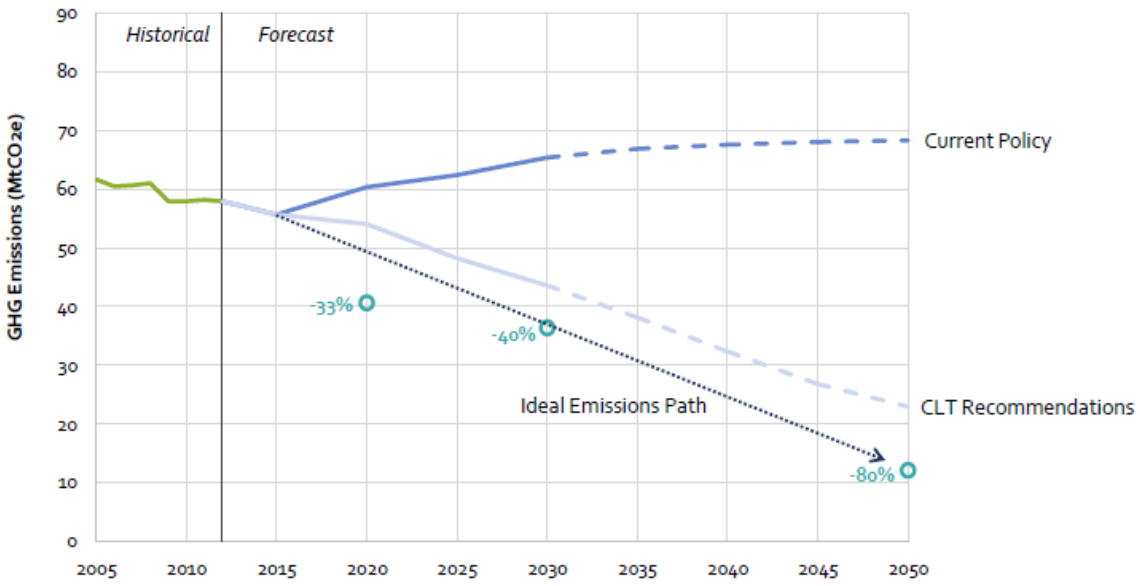
Appendix

Summary of Modelling Results

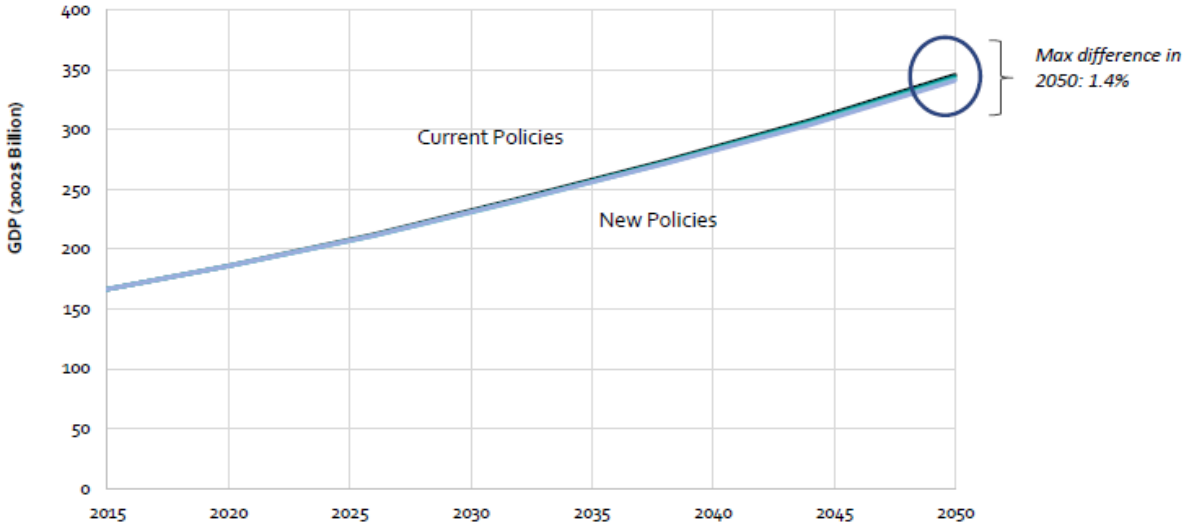
Carbon tax revenue forecast



Greenhouse gas emissions forecast



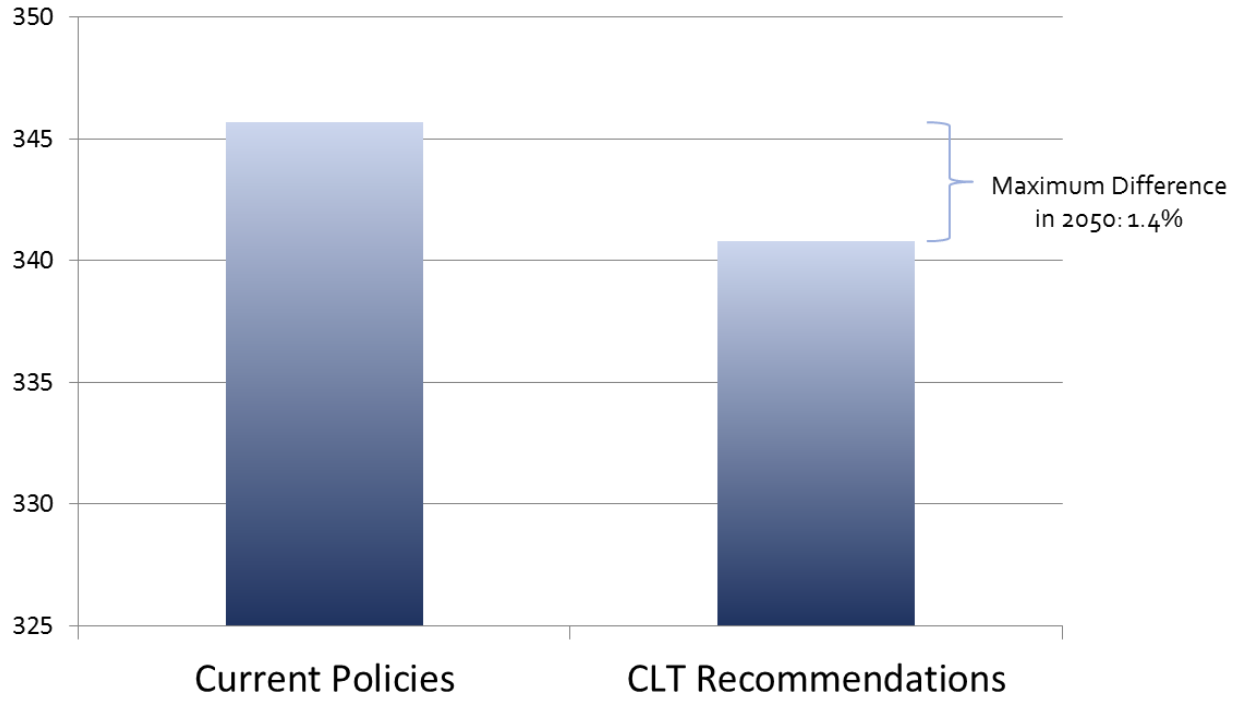
Provincial GDP forecast



Economy continues to grow - Average annual growth in GDP, 2015-2050

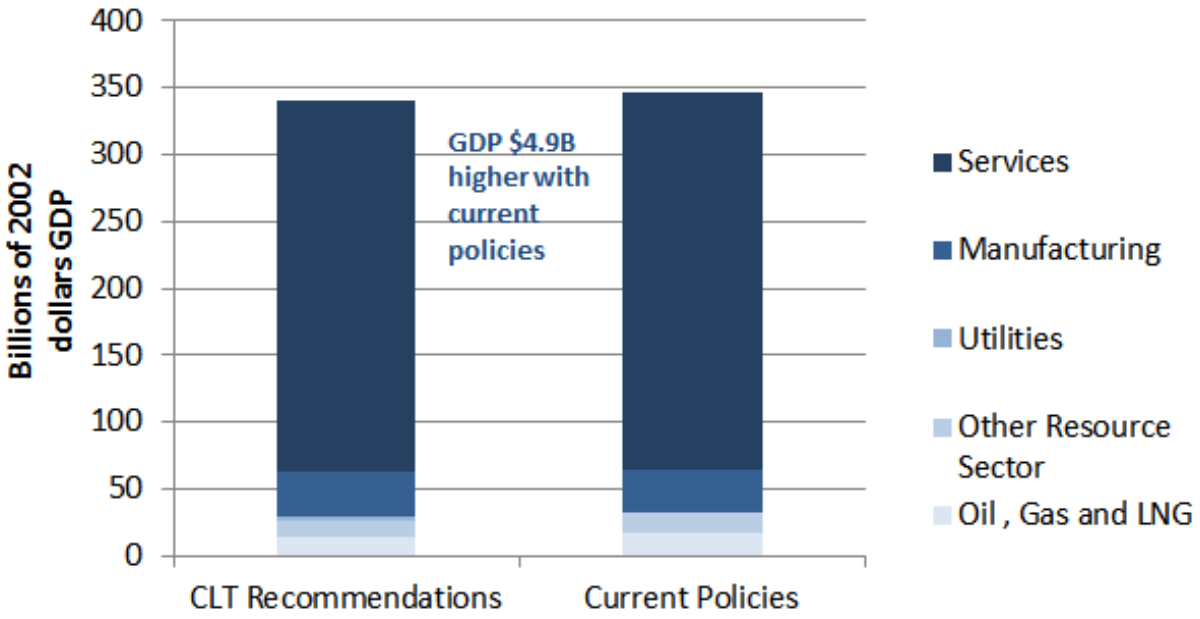
- Current Policy: 2.11%
- CLT Recommendations: 2.07%

Provincial GDP forecast for 2050

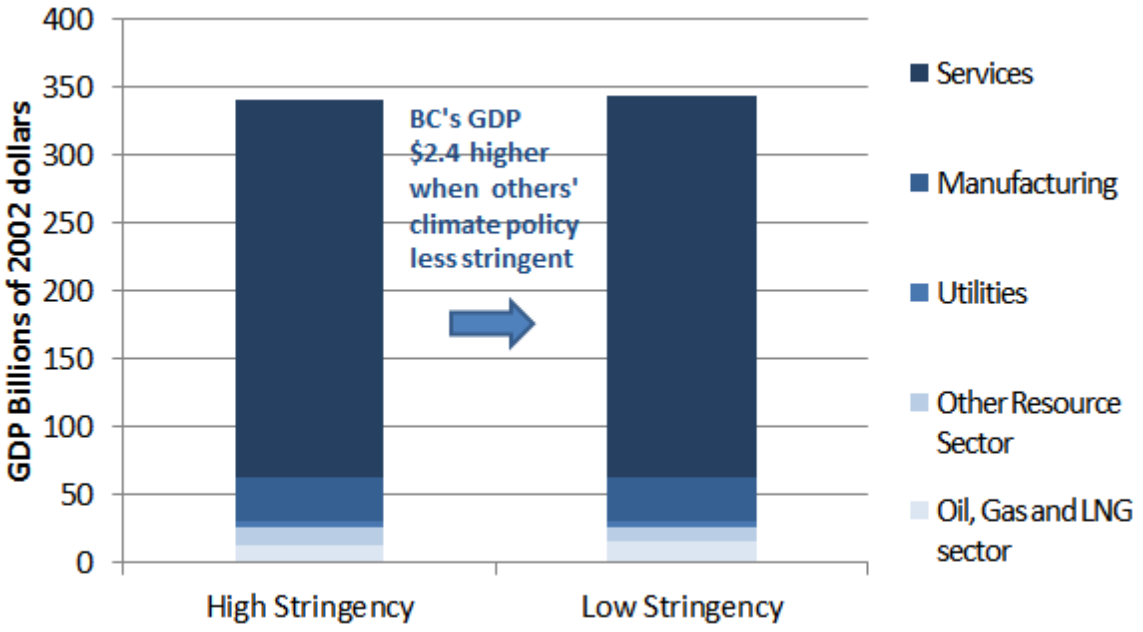


Economy continues to grow – The forecasted maximum difference is small

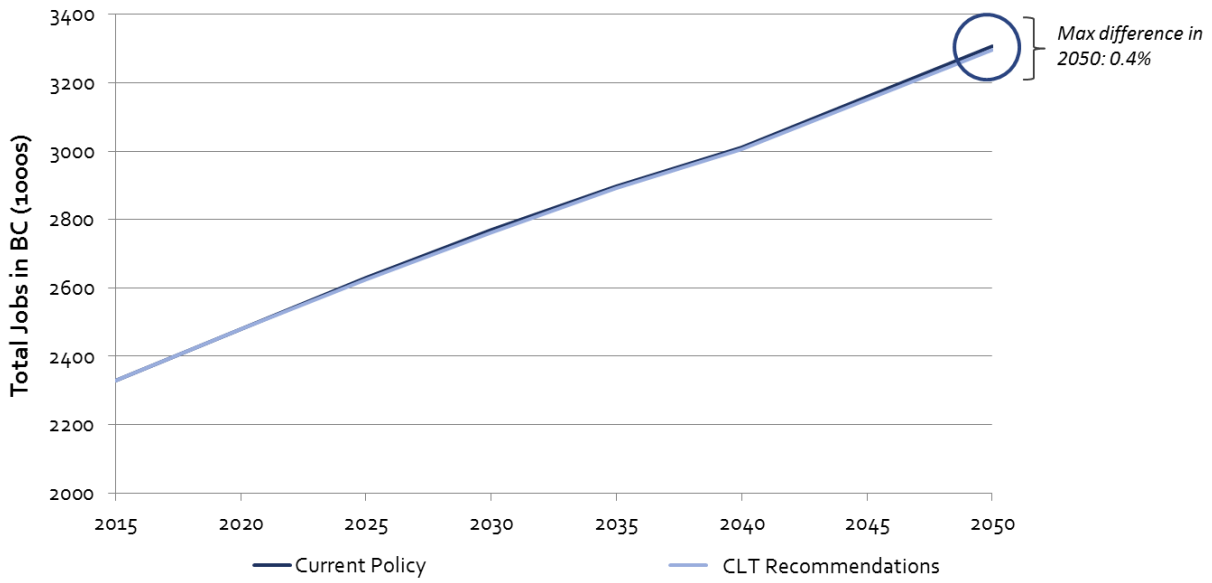
Provincial GDP forecast for 2050 by sector



2050 GDP forecast – effect of other jurisdictions

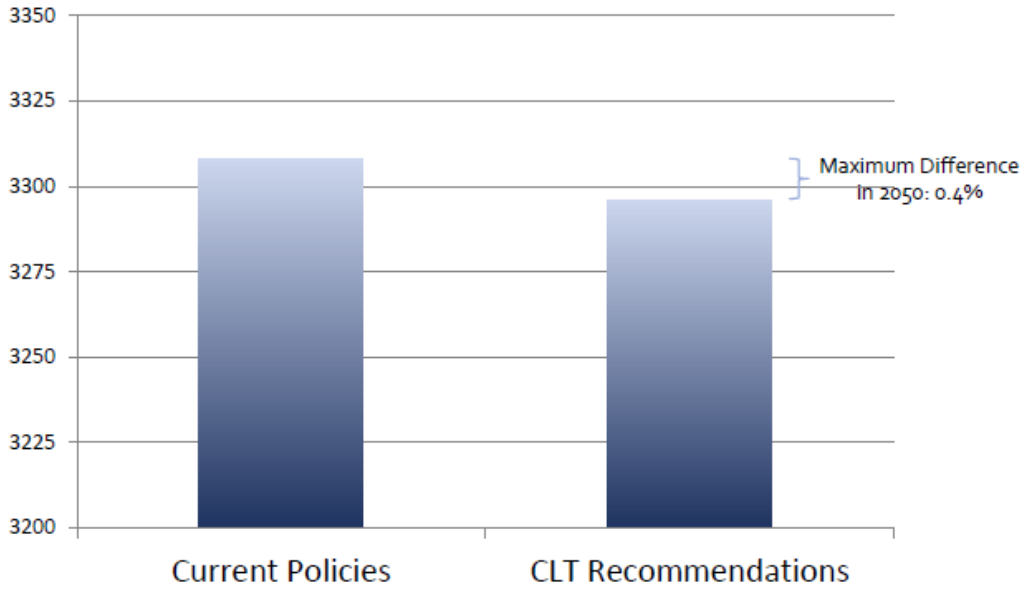


Provincial jobs forecast



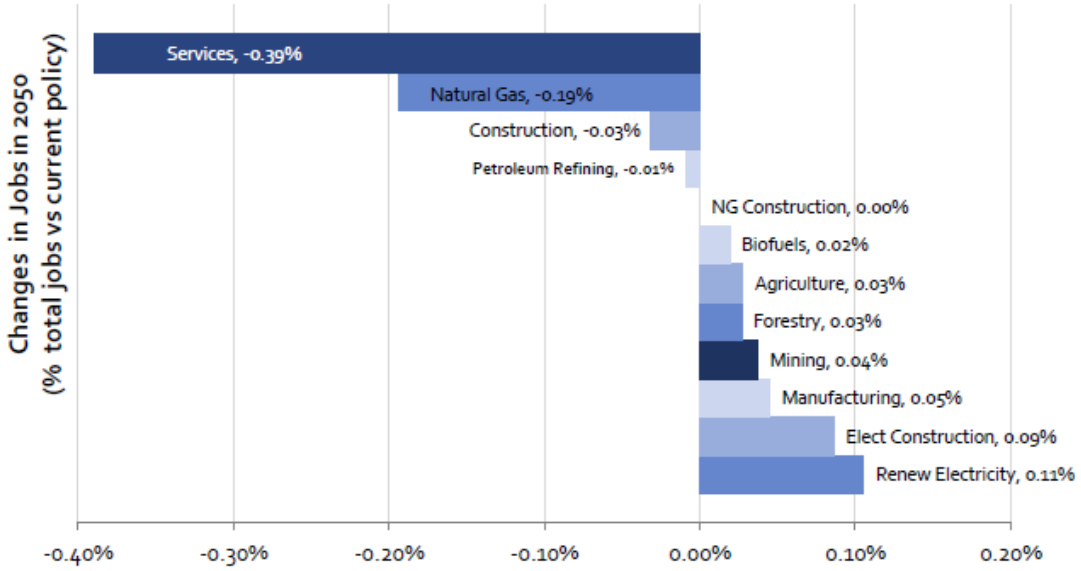
Climate policy will not have a large impact on jobs. Total jobs in BC will be in the millions, whereas the impact of climate policies will be in the thousands

Provincial jobs forecast for 2050



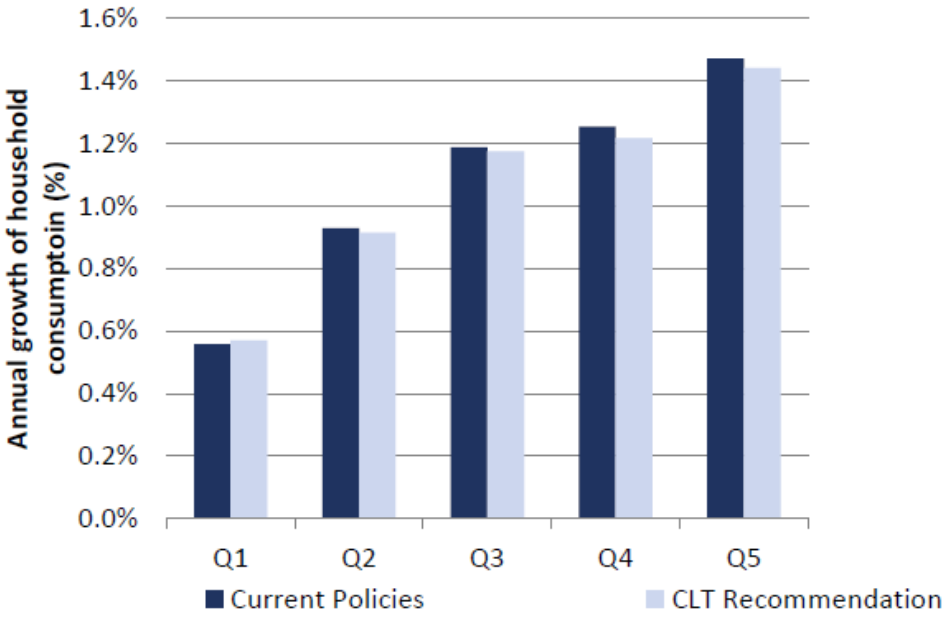
The jobs continue to increase – The forecasted maximum difference is small

Provincial jobs forecast for 2050 by sector



Like with GDP, the job outcomes of different sectors vary.

Potential distributional impacts



Household consumption continues to grow in each quintile. In general, the impact of the policies are felt most by the wealthiest households (i.e., households in the top two quintiles).

Summary of forecasted fiscal impacts

The estimated fiscal impacts are based on the policy assumptions used in the Navius modelling. As such, they need to be considered illustrative, order of magnitude estimates. A diligent analysis will need to be conducted by the Finance Ministry to fully examine the fiscal impacts. The Climate Leadership Team is not suggesting to have revenue and expenditure to be out of balance and has not, for example, explicitly recommended a PST 1% cut in 2018 in their recommendation 4. The Climate Leadership Team suggests that government consider phasing in the tax reductions, tax credits, targeted measures for emissions-intensive, trade-exposed sectors, and other fiscal expenditures at a rate that more closely matches incremental revenue.

Estimated Fiscal Implications of the Recommendations										
($bn unless otherwise mentioned)										
	2016	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**
Rate ($/t)	30	30	40	50	60	70	80	90	100	110
Scope (Mt) - illustrative, no emissions resp	44	44	44	44	44	44	44	60	60	60
Revenues existing ($bn)	1.2	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Revenues new ($bn)			0.28	0.56	0.84	1.12	1.4	2.86	3.22	3.58
Revenues total ($bn)	1.2	1.3	1.58	1.86	2.14	2.42	2.70	4.16	4.52	4.88
Existing tax cut package:										
corporate $bn	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
personal $bn	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Low income and rural and Northern $bn	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.27
New Tax Cut Package										
PST 1% cut			0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Low income household adjustment total			0.27	0.31	0.35	0.39	0.43	0.79	0.85	0.91
Low income/households adjustment new			0.04	0.08	0.12	0.16	0.2	0.56	0.62	0.68
Targeted EITE measures %			31.40%	31.40%	31.40%	31.40%	31.40%	41.00%	41.00%	41.00%
Targeted EITE measures $bn			0.50	0.58	0.67	0.76	0.85	1.71	1.85	2.00
PST elimination for electricity			0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Total Tax Cuts	1	1	2	2	3	3	3	4	4	4
Net Revenues	0	1	-0.7	-0.5	-0.4	-0.2	-0.1	0.2	0.3	0.5
Technology Fund								0.08	0.15	0.23
Local Government								0.08	0.15	0.23