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BC Office

## Submission to BC Government and Climate Solutions and Clean Growth Advisory Council

MARC LEE  
Senior Economist and Director, Climate Justice Project  
Canadian Centre for Policy Alternatives, BC Office

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### Introduction

We are now coming up on three years since the Paris Agreement of December 2015. From the previous BC government's Climate Leadership Team to the federal-provincial Pan-Canadian Framework on Clean Growth and Climate Change to the last BC election, our leaders have had more than ample time to come up with a substantive plan.

In its first year in power, the new BC government has increased the BC carbon tax and improved the carbon credit, created a new [Climate Solutions and Clean Growth Advisory Council](#), and has legislated a new medium-term target of 40% reduction in greenhouse gas (GHG) emissions by 2030.

A series of "intentions papers" – on buildings, transportation and industrial emissions – has been released by the BC government in the lead up to a new provincial climate plan in the Fall. Several more intentions papers are promised for 2019. Alas, the three "intentions papers" (transportation, buildings and industry) were released on July 20, with a public comment period lasting only until August 24, or basically the time most people are on summer vacation.

In this submission, I cover three broad areas: (1) the need for greater accountability through the implementation of a carbon budgeting framework (based on the United Kingdom experience); (2) the incompatibility of LNG with BC's emission reduction targets; and (3) feedback on the emission reduction proposals in the intentions papers, broken down into household emissions and business/industrial emissions (including an updated analysis on GHG emissions and employment by sector).

## 1. Accountability and Governance: Develop a Carbon Budgeting Framework

When it comes to climate change Canada's leaders have been great at setting targets for far into the future and then failing to meet them. Nationally, this pattern goes back to PM Mulroney, and has continued through PMs Chrétien, Harper and Trudeau. In BC, Premier Campbell set a 2020 target of a 33% reduction relative to 2007 levels, and a 2050 target of 80% below. As of 2015 (the last year for which we have data), BC emissions were a mere 2% lower. The province experienced a recession-induced drop in emissions from 2008 to 2010, but since then emissions have been rising every year.

The problem with far-off targets is that it becomes easy for governments to forget about them, as they will likely be out of office well before the day of reckoning comes. What's needed even more than long-term targets are short-term targets. That is, how much are we going to reduce emissions this year, and next year, and the year after that?

In short, BC should establish a framework of "carbon budgets." Planning for carbon reductions needs to be more like the conventional way we do fiscal planning, with an annual budget, where a target is stated at the start of the year, along with actions on how it will be achieved (including credible investments that create jobs in green infrastructure), and routine monitoring and reporting. That is, it should be more like the annual BC fiscal budget process, sets out rolling three-year plans, and an independent auditor-general confirms if fiscal reporting is legit.

A precedent for this type of carbon budgeting approach can be found in the United Kingdom. The UK passed a *Climate Change Act* in 2008, which set a 2050 emissions target of 80% below 1990 levels, along with a [carbon budget system](#) based on three five-year budget periods going forward at any time. For example, the first carbon budget was for 2008 to 2012 (and was achieved), and the country is on track to meet its second (2013 to 2017) and third (2018 to 2022) carbon budgets. The UK also implemented a carbon accounting system, including international transfers and rules for moving available budget from one year or period to the next.

To provide independent oversight the UK created a publicly-funded [Committee on Climate Change](#) (CCC), which makes recommendations on mitigation measures, monitors outcomes and engages in research. The CCC's June 2017 [report](#) to Parliament, for example, runs 200 pages, provides a detailed analysis of progress to date, projections of the gap between current policies and future targets, and sector-by-sector recommendations to achieve the targets. The UK government is required to consult the CCC, and there are substantial reporting obligations on the part of government. Overall, it's a level of accountability unseen in the Canadian context.

More recently, in October 2017 the UK government released a new [Clean Growth Strategy](#), which, at 167 pages, is far more detailed than its Canadian contemporary, the *Pan-Canadian Framework on Clean Growth and Climate Change*. (Both governments have rhetorically wrapped themselves in the vague language of "clean growth" but that's a topic for another

post.) The CCC responded shortly after with its [assessment](#) of the strategy, anchored in the context of the country's carbon budgets. Its summary concludes:

Gaps to meeting the fourth [2023 to 2027] and fifth [2028 to 2032] carbon budgets remain. These must be closed. Whilst the Strategy sets out a '2032 Pathway' for sectoral emissions that would just meet the fifth carbon budget, there is no clear link to the policies, proposals and intentions that the Strategy presents. Our assessment of the policies and proposals set out in the Strategy indicates that, even if these deliver in full, there remain gaps of around 10-65 Mt CO<sub>2</sub>e to meeting both the fourth and fifth carbon budgets on the basis of central projections.

Remarkably the UK has been the most successful country in the world at reducing its emissions, which have [dropped](#) to 42% below 1990 levels and are now at 1890 levels (yes, 1890, that is not a typo). This is largely the low-hanging fruit of phasing out coal-fired electricity. Challenges remain in reducing emissions from industry, buildings and transportation.

While climate action is not perfect in the UK, this type of forward thinking and accountability would be most welcome in BC and Canada as a whole. Carbon budgets clearly have promise in providing clarity and discipline, especially when accompanied by rigorous independent oversight.

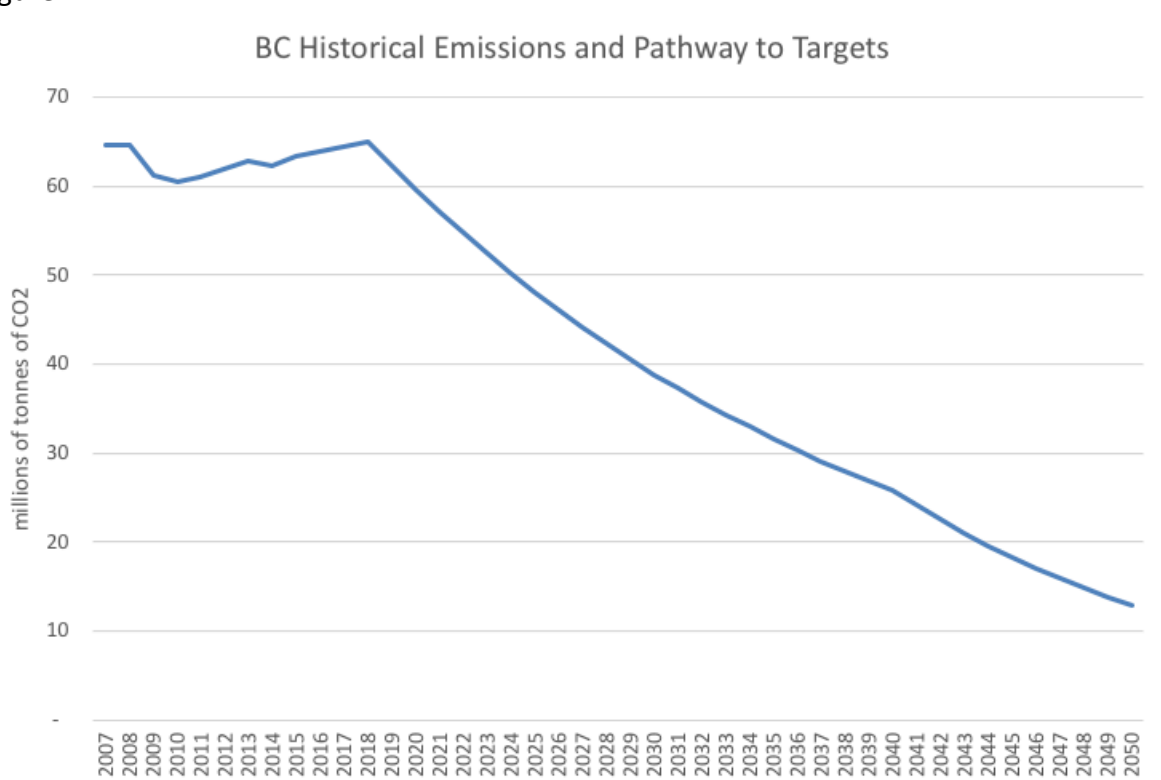
What would this look like in BC?

To illustrate such a framework for BC, let's start with historical emissions, then the BC government's new legislated targets of a 40% reduction in emissions by 2030, a 60% reduction by 2040, and an 80% reduction by 2050 (all relative to 2007). The first question is how much do emissions have to decrease each year in order to meet the target with steady and consistent reductions? There's a lag between when data are available, with the most recent data being from 2015. This lag should be addressed in concert with the new carbon budget planning framework. I estimate modest increases in emissions in 2016, 2017 and 2018 consistent with emissions growth in recent years (just under 1% per year).

To be on a smooth pathway to meeting the 2030 target, emissions need to drop 4.22% per year starting in 2019. That is, we need to plan for emissions next year (2019) to be 4.22% lower than this year (2018); then for 2020 emissions to be 4.22% below 2019; and so on to 2030. After 2030 the rate of change slows a bit to 4.0% to meet the 2040 target, then for 2041 to 2050 larger annual percentage drops of 6.7% per year are needed. BC's 2050 legislated target requires us to limit BC emissions to just under 13 million tonnes of CO<sub>2</sub>.

Note that because we are reducing emissions each year the actual annual reduction (in tonnes of CO<sub>2</sub>) falls over time. In 2019 emissions need to fall by 2.75 Mt below 2018 emissions; in 2030 they need to drop by 1.7 Mt below 2029 emissions; and by the time we reach 2050, the annual drop is 0.9 Mt below 2049. This approach allows BC to harvest the low-hanging fruit early on; and getting to the most challenging emission reductions in later years.

Figure 1:

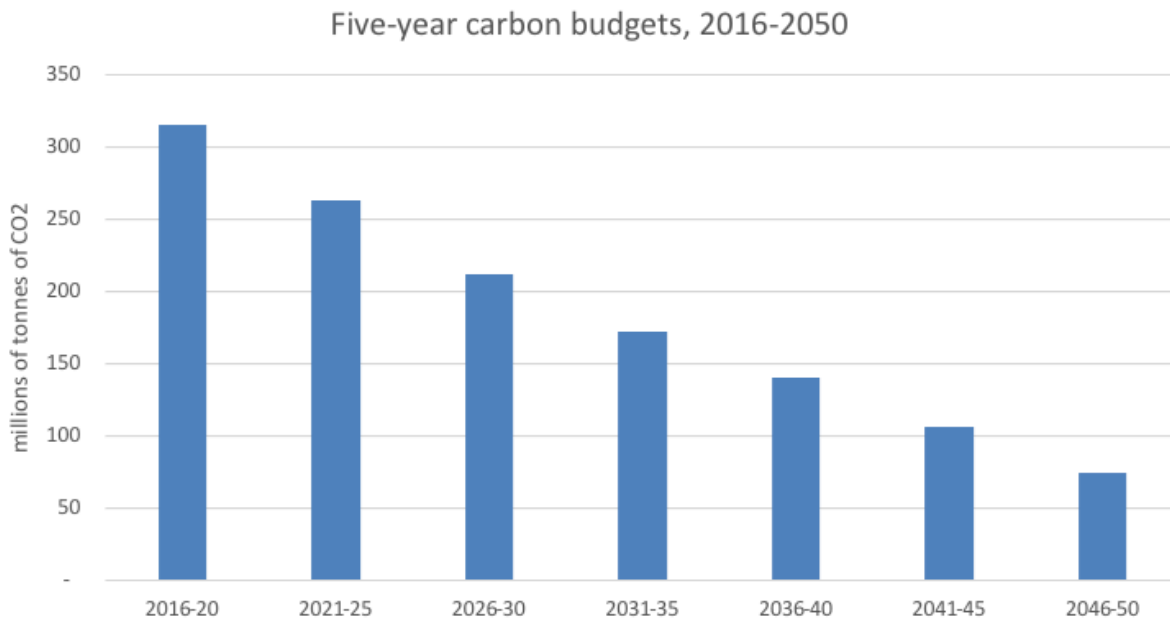


Sources: BC Greenhouse Gas Inventory for historical emissions to 2015; author's calculations for emissions 2016-2015.

This is a helpful approach because it breaks down the big drop in emissions in the future into manageable chunks. A 4.22% annual drop is not necessarily easy but people can wrap their minds around it.

The next innovation is to bring in the UK's five-year budgets. This grouping allows some flexibility in emission reductions due to changes in the business cycle or recognizing that some major investment decisions are "lumpy" (that is, large reductions achieved once implemented). To keep things simple I have grouped five-year carbon budgets so that they line up neatly with the 2050 target, but many alternative variations are possible. My first carbon budget period is 2016 to 2020, and allows a five-year total of 314 million tonnes (Mt) of emissions. In the next five-year period, 2021 to 2025, the total permissible emissions fall to 252 Mt. And so forth.

Figure 2:



Source: Author's calculations

The nice thing about this framework is that it more closely aligns with the political cycle. Politicians can't pat themselves on the back so easily for making grand statements; they would actually need to deliver. This framework would make it easy to tie a salary bonus for a Minister and/or Premier to meeting a target.

I should note that even doing this exercise, BC is laying claim to 1.2 billion tonnes (gigatonnes or Gt) of emissions between now and 2050 – if we meet our GHG targets. At a “social cost of carbon” of \$50-200 per tonne of damages, that's \$60-240 billion in climate damages!

The world actually needs much more ambition in terms of emission reductions from rich places like BC. This year, as part of the Paris Agreement, countries are to do a “global stock-take” of commitments, with an aim of putting more aggressive pledges on the table. For BC meeting the 2030 target will be hard enough, but full decarbonization by 2050 is better aligned with where climate science tells us we need to be. With the framework above in place, it would be relatively straightforward to put the 2030 to 2050 trajectory on the more aggressive path to full decarbonization.

We also need to start accounting for the emissions from carbon we extract and export, which is burned in the US or Asia or wherever else and not counted in BC's greenhouse gas inventory. A [supply-side version](#) of carbon budgets would look at fossil fuel extraction and exports with a view towards putting those amounts on a downward trajectory as well.

The key is to actually commit to reducing emissions every year. As we get going we may need to tighten up the carbon budget to be more aligned with climate science, but at least we would be

moving in the right direction. A new framework of carbon budgets, along with independent auditing and oversight, would make our boasts of “climate leadership” much more credible.

## 2. LNG is incompatible with BC’s climate obligations

The prospects for aggressive climate action in BC are hampered by a parallel commitment to developing an LNG export industry. There are two notable LNG projects in BC. First, Woodfibre LNG is a small facility (2.1 million tonnes, or Mt, of LNG exports per year) slated for just outside Squamish. A final investment decision has been made, although construction has yet to begin. Its emission profile is diminished because it will use BC Hydro grid electricity to power the liquefaction process.

Second is the much larger and more emissions-intensive LNG Canada, which is planning for a Fall 2018 final investment decision. LNG Canada proposes to export 12 Mt of LNG per year to start, with a plan to double that to 24 million tonnes, with a project lifetime of 40 years. These amounts are what would be exported and combusted in Asia, and by accounting convention they not counted in BC’s GHG emission totals.

A new LNG Canada terminal would also increase BC’s domestic GHG emissions. The emissions from LNG Canada are from the gas supply chain (fracking, processing and transportation) and the liquefaction facility itself. LNG Canada [claims](#) its planned facility would be twice as efficient in terms of GHG emissions per tonne of LNG produced, although such a bold claim should be treated with skepticism. The proposed facility would use some BC Hydro grid electricity but only to keep the lights on; the liquefaction process itself would burn gas – a lot of it.

All told, BC emissions from the facility plus those from further up the gas supply chain would be in the range of 9-12 Mt of CO<sub>2</sub> per year. At the high end, these new committed emissions from LNG Canada would double the province’s emissions from the oil and gas sector. The smaller Woodfibre LNG project approved near Squamish would add another 1-1.5 Mt in committed BC emissions.

The problem for BC is that the province needs to be on a pathway of reducing its emissions. The new BC government has recognized this with new legislated GHG targets. They would permit BC economy-wide emissions of 39 Mt in 2030, falling to 26 Mt in 2040 and 13 Mt in 2050.

This means the LNG Canada supply chain from wellhead to loaded ship would consume 23-31% of BC’s allowable emissions in 2030, 35-46% of 2040 emissions, and 69-92% of 2050 emissions. And don’t forget that this is intended to be new production above that of the existing natural gas industry, which was responsible for 12 Mt in 2015.

Any way you slice it the rest of BC’s economy would have to fully decarbonize very quickly in order to accommodate emissions from LNG Canada and stay within the new legislated targets.

LNG Canada claims that this gas could displace coal, and thus be a net positive for emissions globally. But this is dangerous wishful thinking. While it's possible that shift could take place as described in China, it could also represent incremental energy supplies or could displace renewables in China's evolving energy mix. If LNG exports go to Japan or Korea, the two biggest buyers globally, they would be guaranteed to displace cleaner energy sources and therefore increase global GHG emissions.

When we include all carbon that would end up in the atmosphere, at full size LNG Canada would lead to some 93 Mt per year that would end up in the atmosphere. It gets worse because those LNG Canada numbers are not counting leakages of methane, the principal component of natural gas, which would spike emissions much higher. Methane is short lived, breaking down in about 12 years into carbon dioxide and water, but while it is in the atmosphere it is 100 times more heat trapping than carbon dioxide.

The BC government's updated climate plan, planned for Fall 2018, will land about the same time as a final investment decision by LNG Canada. While the smaller Woodfibre LNG plant could be integrated into a new climate plan, the math simply does not work for LNG Canada.

### 3. Reviewing the Intentions Papers

The ideas presented in the intentions papers, if implemented, would represent progress, especially in light on the previous government's masquerade posing as climate leaders while committing to do very little in practice and actively courting an LNG export industry. That said, we are talking about incremental progress and there's not too much that is new or aggressive in these intentions papers. Indeed, there is a surprising lack of urgency to make change happen.

In addition to the BC-wide emission reduction target the government has also promised sectoral targets for the three areas. However, these are not mentioned in any of the new materials.

Much of the public conversation on climate action is framed around reducing GHG emissions from households. Direct emissions from households, such as private vehicles and home heating, represent 30% of BC's total emissions. The other 70% of BC's total emissions are from the world of work, from agriculture, resources, manufacturing, commercial businesses and the public sector. To this end, I break out my analysis below in to household emissions then look at emissions from industry and the world of work.

#### Household Emissions: Transportation and Buildings

Reducing GHG emissions from transportation has great potential. First, because they comprise 40% of BC's total emissions. Second, the entire vehicle fleet turns over every 15 years or so, as cars need to be replaced. So new rules would be welcome to state that at a future date no

fossil-fuel-powered cars will be sold in BC, and at a later date they will be banned from the roads entirely.

Alas, the intentions paper waits until 2040 before requiring that all new cars sold be zero emission vehicles. More could be done to push the marketplace through zero emission requirements, including a faster timeline for zero emission vehicle penetration overall, as well as pushing harder for zero emission fleets (car shares, taxis and ride hailing, commercial fleets).

In addition, too much emphasis is put on improving BC's low-carbon fuel standard, with a proposal to raise it from 10% of fuel being renewables to 20%. One can argue that there are emission reductions arising from the 20% but they also lock in the fossil fuel emissions for the other 80%, so a stronger push to zero emission vehicles would be preferable.

What about transit, which was essentially ignored in the transportation intentions paper? Yes, we are finally going to break ground on the Broadway subway and Surrey LRT after a decade of wrangling. But we should have a steady stream of capital investments in place that keeps construction workers going through a series of major new transit investments over the next two to three decades.

Buildings are already a strength for BC, which has already brought in a voluntary step code for new buildings, the top step of which will become mandatory after 2032. Again, more can be done to implement building codes more quickly aggressively rather than waiting 15 years.

The step code could be improved and better aligned with climate policy by including GHG performance metrics. Moreover, any serious conversation about buildings needs to have restrictions on fossil fuel energy use, i.e. natural gas heating. Integrating with innovative low-carbon district energy systems, such as the Neighbourhood Energy Utility in Vancouver, should also be on the table. Conversion of the Central Heat operations in downtown Vancouver has great potential for lowering emissions in office buildings.

What about a retrofit program for existing housing and buildings? Since the expiration of the LiveSmart BC program many years ago no such funding has been available. The intentions paper hints at a new round of funding but does not state dollars or the parameters for such a program. Based on our [climate justice research](#) a multi-year retrofit program should start with the oldest, least efficient housing as well as multi-unit buildings, including rental apartments. In contrast, previous programs have tended to go mostly to the already affluent, and are plagued by free rider problems (meaning those subsidized would have done the work anyway). We estimated that a \$2.2 billion program over ten years would spur significant GHG reductions and fight energy poverty, while supporting about 12,000 direct jobs per year.

Another missing piece links buildings and transportation: the need for better land use planning to develop more complete communities, where the most common destinations are much closer together, and the need for extreme commutes by car is vastly reduced. Government decisions around locating public services can help to anchor these communities, and with an aging



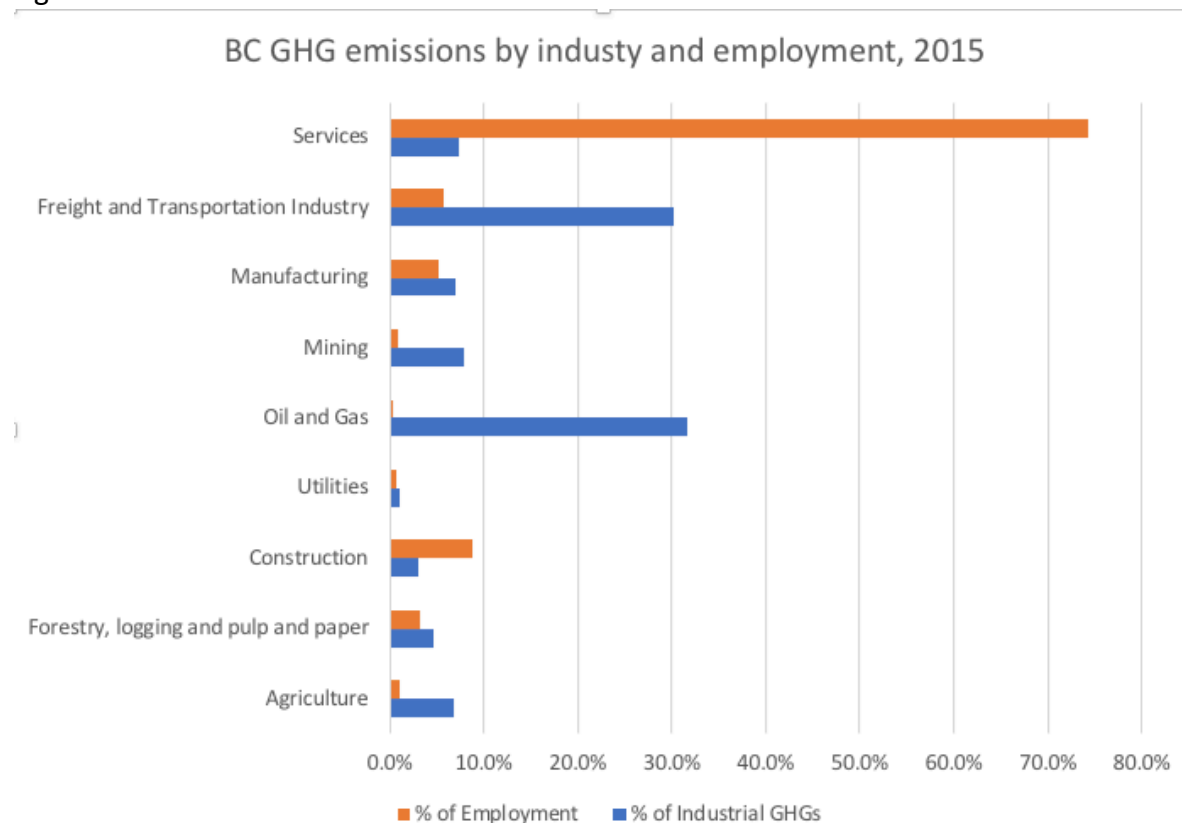
population we will need complementary investments in health care, residential care and so forth that keep seniors closer to the services they need.

### Emissions from Industry and Work

One of the intentions papers, *A Clean Growth Program for Industry*, proposes that a portion of new and incremental carbon tax revenues to be used as incentives for large industry either through rebates to the best performers or to be used to fund emission reduction projects. While this is an intriguing use of carbon tax revenues, the whole point of a carbon tax is to change incentives to affect decision-making. It would be better to simply commit to a schedule of raising the carbon tax annually.

Missing from the industry intentions paper is any sense of what the emissions profiles of different industries are, and in particular, the fossil fuel industries themselves. To fill in the gap, I updated an [analysis](#) of emissions and employment published by the Climate Justice Project in 2010. Figure 3 shows BC's industrial mix in terms of both GHG emissions and employment. The results include all industrial and commercial emissions in BC (70% of total emissions) – household emissions from personal transportation and home energy use are not included. Data limitations mean that the analysis is for broad industry categories only.

Figure 3:



Source: Author's calculations based on BC GHG inventory report and employment statistics for NAICS.

The vast majority of work done by British Columbians is in the provision of services (not including transportation), comprising almost three-quarters of employment. This is as diverse a sector as it is large, ranging from professional work to many less glamorous and more precarious jobs. For the most part, those service industry jobs are low-carbon: only 7% of emissions come from this sector, related to heating and cooling of office buildings. Decarbonizing the sector is largely a matter of improving energy efficiency and switching fuels to renewable sources in buildings.

For the sectors that have relatively high GHG emissions compared to employment a few hotspots jump out: oil and gas; freight and transportation; mining; and agriculture. Almost one-third of industrial/commercial emissions are from the oil and gas sector, but the sector accounts for only 0.4% of BC employment.

The climate price of creating an LNG export industry would be to lock BC into a high-emissions trajectory for several decades to come. And yet LNG Canada's regulatory [filings](#) state that while several thousand jobs would be created in the 2-3 year construction phase, only 200-400 permanent jobs would be created at full build-out.

Mining in BC comprises 8% of industrial/commercial GHG emissions but 0.8% of jobs. This includes mining for metals as well as minerals like coal. The latter may face challenges in the push to a low-carbon economy, although the vast majority of production is not thermal coal for electricity production but metallurgic coal used in steel-making. Mining metals such as lithium and rare earth materials, on the other hand, could be growth industries for BC.

Freight and other transportation services represent another 30% of industrial/commercial GHG emissions, and just under 6% of employment. Finally, among the hot spots, agriculture comprises just under 7% of emissions but has 1% of total employment. A central challenge on this front is that we all need to eat and BC is far from food-secure, so we need to find ways to bring those emissions down while expanding the food we produce in the province.

How industrial emission reductions will be achieved is not addressed in the intentions paper, only that some carbon tax revenues will be put on the table as an incentive for companies to meet certain benchmarks. Indeed, resolving the contradictions between climate and industrial policies is central to breaking from "business as usual". Business lobbyists argue that "emissions-intensive trade-exposed" (EITE) industries should be exempted from climate measures because they would adversely affect their "competitiveness" relative to other jurisdictions.

All of this points to the need for strategies that advance decarbonization in different sectors of the BC economy. Sectors should have a hard emissions cap that is reduced over time. Sectoral councils involving business, labour and government would then be tasked with achieving emissions reductions.

In addition, the best defense is a good offense: efforts to create new green jobs in areas that decarbonize the economy, as well as more inherently green jobs in the service sector, such as child care and seniors' care workers. These jobs are also much more likely to be done by female workers, whereas much of the industrial jobs tend to be done by men.

### Where to next?

The new BC government intentions papers include a handful of policy ideas that would push BC incrementally towards its 2030 GHG target of 40% below 2007 levels. But the sum total of what's there leaves the reader wondering just how those targets can actually be met. While we await a full plan later this fall, the good intentions on offer this summer lack the urgency called for by climate science and fail to confront the entrenched power of the fossil fuel industry.

Some critics will state that whatever BC does on climate matters barely at all on a global scale. That's true, but BC is a rich place full of smart people and resources, so if we can't do it here then no one can. Leadership means actually bending the curve on emissions by pushing ourselves into new territory. Given the overall state of climate policy in Canada there is real potential for BC to re-assert leadership on the climate file, but to get there we need a coherent plan that rejects fossil fuels in favour of zero carbon alternatives.