Mind the Gaps: Accelerating the Implementation of the CleanBC Roadmap to 2030

Source: Province of British Columbia, Nov, 2021

2022 Report of the BC Climate Solutions Council

Executive Summary

In 2022 B.C. was spared a repeat of the climate change-fueled heat domes, wildfires, and atmospheric rivers of 2021, but some parts of the province did experience climate-related challenges from wildfires to drought and associated water scarcity. Meanwhile, other parts of the world suffered climate impacts of an equal or even greater magnitude to B.C.'s 2021 experience.

But the climate crisis was just one of numerous crises that struck in 2022. The COVID-19 pandemic isn't yet over, Russia's invasion of Ukraine exacerbated supply chain challenges and precipitated a European energy crisis, inflation has driven up the price of most things and now economies around the world find themselves on the precipice of recession. While some suggested this confluence of crises would dampen climate action and slow the transition to clean energy the opposite is occurring, as evidenced by a doubling-down on clean energy in Europe, the United States, and Asia.

Limiting warming to the greatest extent possible will require taking more action, sooner and faster. As the most recent assessment by the Intergovernmental Panel on Climate Change (IPCC) made clear, achieving net zero by mid-century requires early action: *"Deep GHG emissions reductions by 2030 and 2040, particularly reductions of methane emissions, lower peak warming, reduce the likelihood of overshooting warming limits and lead to less reliance on net negative CO2 emissions that reverse warming in the latter half of the century."*

Scenario modeling by the International Energy Agency (IEA) and IPCC, have similarly concluded that emissions from planned/ approved fossil fuel infrastructure will exhaust the remaining carbon budget, and that we must significantly reduce global use of fossil fuels to limit warming to well below 2 degrees Celsius, ideally 1.5 degrees. These findings have implications for B.C., most notably with respect to the prospects for the province's LNG and gas sector.

While growing global efforts to address climate change will limit opportunities associated with fossil fuels, there are a range of new opportunities for clean energy technologies and their mineral inputs. The question for B.C., then, is not solely what more it can and must do to contribute its fair share of climate action, but how it can secure a growing role in delivering the critical resources and technologies required to ensure the province's and others' success, while at the same time enhancing our resilience to the impacts of a changing climate.

The government's *2022 Climate Change Accountability Report* (CCAR) provides the latest information on the province's progress towards its provincial and sectoral emissions targets. The province reports that the outstanding gap to achieving the 2025 target is 1.6 million tonnes (MT), and the 2030 target is 0.8MT. While we recognize and appreciate that the policies introduced in CleanBC take time to 'bend the GHG emission curve,' these gaps indicate that the government will need to accelerate the implementation of the *CleanBC Roadmap to 2030* and quickly develop additional policy, regulations, and/or programs as needed to achieve British Columbia's 2030 climate target.

While government must ensure all sectors reduce emissions, the Council is particularly concerned about the oil and gas, transportation, and buildings sectors. With respect to oil and gas, there are numerous proposed LNG terminals that, if built, would lead to direct emissions—and significant indirect emissions from the upstream production and transport of gas—beyond those factored into *Roadmap's* current GHG projections. The transportation sector, meanwhile, has emissions trending rapidly in the wrong direction and, due to relatively slow vehicle stock turnover, presents a particular challenge. Similarly, the challenges retrofitting the extensive stock of existing buildings (residential, commercial, and institutional) indicate that projected emission reductions will not be enough to meet that sectoral target.

To inform our recommendations, and provide constructive guidance to the government, we have identified 13 policy and process pitfalls that must be avoided if B.C. is to successfully implement the *CleanBC Roadmap to 2030* and achieve its climate targets.

The Council reiterates its support for a strong provincial climate plan that puts us on course to reaching B.C.'s 2025 and 2030 climate targets, but plans need to be followed by concrete, legislated, and regulatory actions that ensure a just and inclusive transition.

Urgent and accelerated action is needed

The Council's 2021 report highlighted the areas where the pace of action to date has not been commensurate with the degree of urgency facing our region and planet. Our concern has grown considerably over the past year. In 2022, the Council provided advice on carbon pricing as a key policy in furthering substitution away from fossil fuels and helping to achieve B.C.'s targets. While B.C.'s achievements and CleanBC actions are encouraging, success is threatened in areas where policy development and implementation is proceeding too slowly. Failure to act or deliver supporting investments not only imposes costs on businesses and society but also risks foregoing opportunities that promote low carbon resilience and enhanced economic competitiveness. Timelines for implementation of policies addressing both mitigation and adaptation need to be accelerated and fully must address all sectors of our economy, with a near-term focus on the following priorities.

Pitfalls in climate policy implementation

1. Insufficient implementation of compulsory polices to reduce GHG emissions
2. Lack of independent assessment of policy impact on GHG emissions
3. Prioritizing fossil fuel efficiency over substitution with clean energy
4. Delayed implementation undermining policy credibility
5. Concerns about affordability can thwart policy adoption
6. Continued dependence on fossil fuel electricity generation while waiting for more innovation
7. Subsidies without carbon pricing and regulations sufficient to reach targets
8. Flexible compliance pathways can reduce policy stringency
9. Extended consultative processes causing delays.
10. Utilization of offsets that will not result in incremental and permanent GHG reduction
11. Overstating the economic impact from the energy transition away from fossil fuels
12. Approval of new high-emission industrial projects
13. The "latest new" crisis requires us to stop, slow or reverse our GHG-reduction efforts

Oil and gas development

The Council seeks greater clarity and accountability for how B.C. will meet its emission targets if new large industrial projects with significant GHG emissions, such as the second phase of LNG Canada, that have already been approved begin operations or if others are approved. While electrification may offer some opportunity to avoid new emissions, there is a risk that a shortage of electricity and/or high costs for additional electricity (e.g., increased imports, transmission line construction) over the considerable life of new projects could impact the availability of electrification to reduce existing emissions (from buildings, transportation, and existing industry) and lead to higher prices for other ratepayers. Further, no details have been provided regarding how the oil and gas sector can meet the provincial sectoral target or the forthcoming federal emissions cap. Failure to achieve reductions in the oil and gas sector and other industrial sectors that intend to develop projects with large emissions risks imposing a greater burden and cost on citizens and other sectors that will have to do much more to further reduce their own emissions if B.C. is to meet its climate targets.

Clean Transportation Action Plan (CTAP)

The *Roadmap* assumes a 25 percent reduction in vehicle kilometres travelled (VKT) (4.5 MT). There are not yet specific projections for how this reduction will be achieved, notably with respect to significant changes in behaviour and long-term investments in public transportation that are unlikely to deliver significant mode shifts prior to 2030. The Council recommends prioritizing

policies that have the greatest promise to deliver not just reduced VKTs but also the GHG reductions needed to meet B.C.'s target. We urge the province to rigorously assess the emissions reduction potential of such actions and plan to make up any shortfall to the 2030 target via other measures, including in other sectors.

Greenhouse Gas Reduction Standard (GHGRS)

The GHGRS has been delayed to 2023 to allow for more consultation. We urge the government to ensure the standard incorporates projections that a significant shift from gas to electricity for space heating is required to meet 2030 and 2050 targets, as found in both government and Canadian Climate Institute modelling. While we appreciate that not all buildings have the capacity to quickly electrify, we advise against reliance on gas utilities to propose a compliance pathway given the obvious conflict of interest. The proposed role, responsibilities, and capacity of the BC Utilities Commission to evaluate the plans of gas utilities requires further review.

Electrifying our economy and communities

A secure and sufficient supply of electricity with a rate structure that supports substitution away from fossil fuels is essential if B.C. is to be a thriving low carbon resilient province. Assuring a secure supply to end users also requires the planning for and permitting of transmission lines within the time frame needed to meet 2030 targets. The Council offers the following prioritization for the use of B.C.'s clean electricity that ensures the needs are met for:

1) All British Columbian households, businesses and industries that are increasingly choosing to (or are required to) electrify their homes, buildings, vehicles, and operations to reduce current emissions.
2) New homes, buildings and vehicles to avoid new emissions.
3) New industrial operations so they can electrify and avoid new emissions.
4) Our neighbours, via clean electricity exports (reducing current, and avoiding new emissions).

Zero Emission Vehicles (ZEVs)

The Council supports aligning the ZEV standards for light duty vehicles with other leading jurisdictions (e.g., California, Quebec, and Canada's federal standards). The Council urges an acceleration of targets (e.g., 90% sooner than 2030) if consumer trends and supply warrant. Continued growth in freight emissions, however, threatens to eclipse the gains made from electrification of passenger and light duty vehicles. We recommend a medium and heavy-duty (MHDV) ZEV mandate be actioned as soon as possible with funding to support the transition to zero emission MHDVs.

Climate Preparedness and Adaptation Strategy (CPAS)

The Council is encouraged by government's increased focus on adaptation in 2022, but more needs to be done. We recommend the government expand the scope of adaptation actions and investments and accelerate implementation of actions under the existing Climate Preparedness and Adaptation Strategy, with attributed budgets and timelines to be publicly communicated in the next Climate Accountability Report. The paradigm needs to shift from disaster relief after the climate-related damages occur to increasing the resilience of families, companies, and communities with actions and investments that reduce the likelihood of damage. Investment in climate resilience is more cost effective than disaster relief.

Offsets

The CleanBC Roadmap modeling provides a pathway to reach our 2030 targets without a major reliance on offsets, as we have previously advised (Appendix 2 of 2020 report) and which we wish to reinforce should not be used unless they represent verifiably permanent reductions in GHG emissions that would otherwise not have occurred (additional). Offsets used to meet climate targets should be (i) limited to a prescribed maximum of total emissions as is the case, for example, in Quebec, (ii) discounted to reflect the likelihood that some will not be additional

despite the best efforts to meet additionality expectations, and (iii) located within a jurisdiction with equal or stronger climate policy. Participation in any carbon offset market requires the assurance that human rights and the rights of Indigenous peoples will be protected.

The Road Ahead

The *CleanBC Roadmap to 2030* moves the province's climate action plan forward in significant ways, but its ultimate success hinges on its timely implementation and identification of policies to fill remaining policy and program gaps. Climate impacts are being felt at home and around the world, reinforcing the urgency to cut pollution faster and accelerate the clean energy transition while simultaneously enhancing our resilience. By continuing to lead, B.C. can have safer communities, a healthier environment, and a sustainable, competitive economy. But to succeed we must do more and do it faster.

Who We Are

The Climate Solutions Council is an advisory group with a legislated mandate under the *Climate Change Accountability Act* to advise the Minister of Environment and Climate Change Strategy regarding the following:

i) Plans and actions to achieve climate targets and reduce emissions.

ii) Plans and actions to mitigate and manage climate risks.

iii) Opportunities for sustainable economic development and job creation while the province transitions to a low-carbon economy.

iv) The effects on individuals and businesses that result from actions to address climate change, including actions to reduce greenhouse gas (GHG) emissions and manage climate change risks.

v) Any other matters specified by the Minister respecting climate change.

The Council was first established in February 2020 and its current membership was appointed in April 2022. The Council continues the advisory role of the previous Climate Solutions and Clean Growth Advisory Council, which completed its mandate at the end of 2019. It includes members from First Nations, environmental organizations, business, academia, youth, labour, and local government. The Council views this broad representation as a major strength in delivering its mandate.

Global Context: A Confluence of Crises Spurs New Opportunities

In 2022 B.C. was spared a repeat of the climate change-fueled heat domes, wildfires, and atmospheric rivers of 2021, but some parts of the province did experience drought and associated water scarcity. Meanwhile, other parts of the world suffered impacts of an equal or even greater magnitude to B.C.'s 2021 experience: in the spring India and Pakistan suffered a deadly heatwave that reduced crop yields, only to be followed by devastating floods that inundated one-third of Pakistan. China suffered a record-breaking summer drought while Europe experienced record-breaking wildfires. The worst drought in decades in East Africa now threatens millions of people with starvation.

But the climate crisis was just one of numerous crises that struck in 2022. The COVID-19 pandemic isn't yet over, Russia's invasion of Ukraine exacerbated supply chain challenges and precipitated a

European energy crisis, inflation has driven up the price of most things and now economies around the world find themselves on the precipice of recession. While some suggested this confluence of crises would dampen climate action and slow the transition to clean energy, the opposite is occurring.

Speaking to the global energy crisis, Fatih Birol, head of the International Energy Agency, has noted that *"This crisis is a stark reminder of the unsustainability of the current energy system, which is dominated by fossil fuels. We have the chance to make this a historic turning point towards a cleaner, more affordable and more secure energy system. And this is already happening."*

The European Union has chosen to raise the ambition of and accelerate the timelines for its renewable energy and energy efficiency targets. In the United States, the Inflation Reduction Act—billed as the most significant piece of American climate legislation ever—will deliver US$369 billion to support the deployment of clean energy technologies, from electric vehicles to heat pumps, hydrogen production and new wind and solar power projects. Japan is ramping up its nuclear power again to reduce emissions and enhance energy security. China's massive, world-leading deployment of renewable power will soon begin to limit its reliance on coal-fired power, and a similar story is playing out in India. All these efforts build on a record-setting year in 2021, according to BloombergNEF, in which global investment in the energy transition totaled US$755 billion, a 21 percent increase from 2020.

A UN report released in the lead-up to the COP 27 climate change negotiations in Egypt found that the current global emissions trajectory would lead to 2.5 degrees Celsius of warming. While still well-off track from the Paris Agreement's goal of limiting warming to 1.5 degrees, this demonstrates important progress relative to when that agreement was signed, when the trajectory was for 4 to 5 degrees of warming. To limit warming to the greatest extent possible will require taking more action, sooner and faster. A key outcome of COP27 was a clear reiteration that the impacts of climate change will be much lower at the temperature increase of 1.5°C compared with 2°C and a clear resolve to pursue further efforts to limit the temperature increase to 1.5°C. As the most recent assessment by the Intergovernmental Panel on Climate Change (IPCC) made clear, achieving net zero by mid-century requires early action: *"Deep GHG emissions reductions by 2030 and 2040, particularly reductions of methane emissions, lower peak warming, reduce the likelihood of overshooting warming limits and lead to less reliance on net negative CO2 emissions that reverse warming in the latter half of the century."*

Achieving net zero emissions by mid-century is critical, and there is growing momentum towards this goal: [1]

- 91% of global GDP is now captured by national government net zero targets, up from 68% in December 2020.
- National government targets represent at least 83% of global GHG emissions, up from 61% in December 2020, and
- 80% of the global population (up from 52%) is represented by national net zero targets.

The International Energy Agency's (IEA) 2022 World Energy Outlook has modeled how these announced policies will shape the global energy system out to 2050 (the Announced Policies Scenario (APS)), as well as a scenario in which net zero is achieved to limit warming to 1.5 degrees (the Net Zero Energy (NZE) scenario). In both scenarios, demand for all fossil fuels (coal, oil, natural gas) declines by 2030, sooner and faster in the NZE scenario. This is consistent with the findings of the Intergovernmental Panel on Climate Change (IPCC), which has concluded that emissions from planned/ approved fossil fuel infrastructure will exhaust the remaining carbon budget, and that we must significantly reduce use of fossil fuels to limit warming to well below 2 degrees Celsius.[2]

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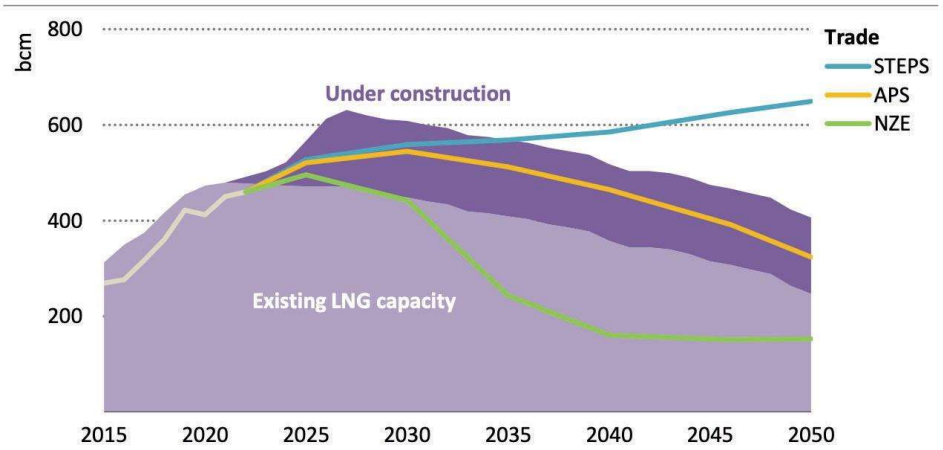
[1] Net Zero Stocktake 2022. Net Zero Tracker.

[2] Climate Change 2022: Mitigation of Climate Change, IPCC, 2022

Of note for B.C. are the implications for the liquefied natural gas (LNG) sector (Figure 1). In the APS, global trade in LNG peaks before 2030 before declining by about 30% by 2050, while in the NZE global LNG trade peaks in the mid-2020s and then falls to 2021 levels by 2030, before declining sharply to 2050. In neither scenario is there any need for additional LNG capacity beyond what currently exists or is under construction, and under the NZE scenario there is potential threat of stranded assets for plants currently under construction.

FIGURE 1: EXISTING AND UNDER CONSTRUCTION LNG CAPACITY AND TOTAL INTERREGIONAL LNG TRADE BY SCENARIO, 2021-50[3]

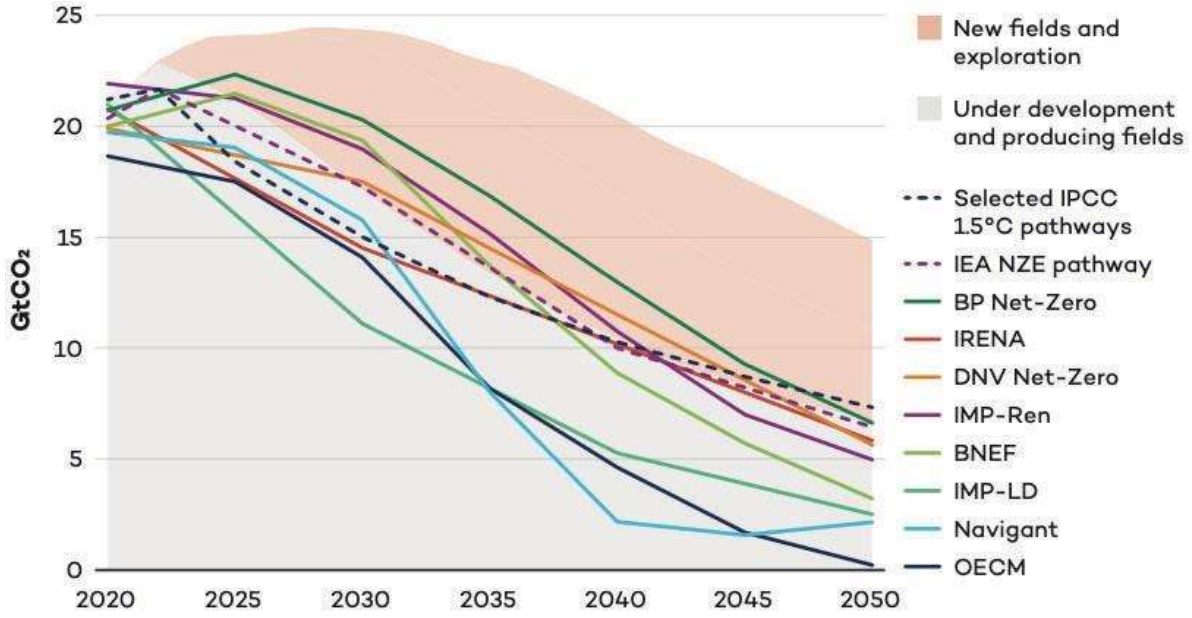


These findings are consistent with other organizations' modeling of pathways to limiting warming to 1.5 degrees Celsius (Figure 2), which concur that global oil and gas production must decrease by at least 65% by 2050, and that developing any new oil and gas fields would prevent the world from limiting global warming to 1.5°C or create stranded assets.[4]

[3] World Energy Outlook 2022. International Energy Agency.

[4] Navigating Energy Transitions: Mapping the road to 1.5°C. International Institute for Sustainable Development. 2022.

FIGURE 2: GLOBAL OIL AND GAS PRODUCTION, BASED ON OTHER SELECTED 1.5 DEGREES CELSIUS PATHWAYS[5]



Sources: BNEF (2021); BP (2022); Byers et al., (2022); DNV (2021) ; IRENA (2022); Navigant (2018); Rystad Energy (2022b); Teske et al., (2022).

While increasing global efforts to address climate change will limit economic opportunities associated with fossil fuels, the IEA's APS and NZE scenarios see a range of new opportunities. The IEA sees Canada emerging as a net exporter of low-emissions hydrogen, and we are well-positioned to meet demand for critical minerals for clean energy technologies (Figure 3), which is set to rise two to fourfold by 2030 (depending on the scenario). According to BloombergNEF's latest analysis, Canada's recent investment in its upstream clean energy supply and increasing demand in the US-Mexico-Canada Agreement region—coupled with our large raw material resources and mining activity and strong positioning in environmental, social and governance (ESG) factors—has increased Canadian competitiveness in the battery supply chain, now ranked second in the world.[6]

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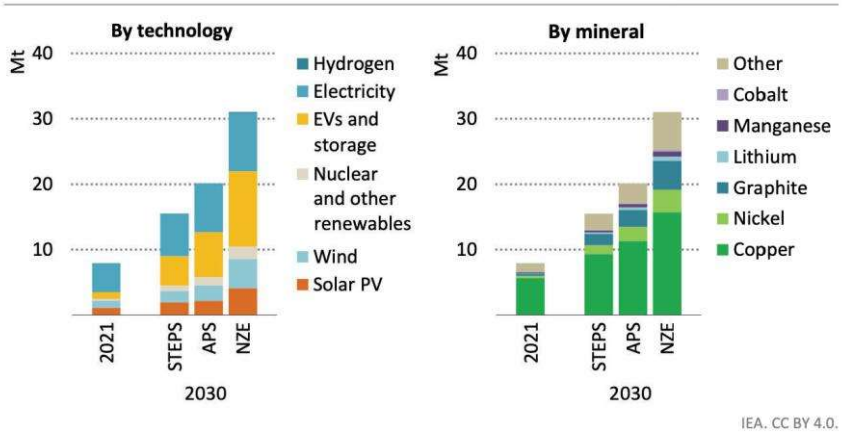
[5] Navigating Energy Transitions: Mapping the road to 1.5°C. International Institute for Sustainable Development. 2022.

[6] Source: China's Battery Supply Chain Tops BNEF Ranking for Third Consecutive Time, with Canada a Close Second. BloombergNEF. November 12, 2022.

FIGURE 3: MINERAL REQUIREMENTS FOR CLEAN ENERGY TECHNOLOGIES BY SCENARIO, 2021 AND 2030[7]



Notes: Mt = million tonnes; EVs = electric vehicles. Includes most of the minerals used in various clean energy technologies, but does not include steel and aluminium. See IEA (2021b) for a full list of minerals assessed.

The question for B.C., then, is not solely what more we can and must do to contribute our fair share of climate action, but how we can secure a growing role in delivering the resources and technologies required to ensure our and others' success, while at the same time enhancing our resilience to the impacts of a changing climate.

State of Play in B.C.

In 2018 the B.C. government developed the *CleanBC* plan to support achievement of the province's legislated 2030 GHG reduction target for 40% fewer emissions relative to 2007 emissions. In 2021, this plan was augmented by the *CleanBC Roadmap to 2030*, which sought to reduce the projected gap to achieve the 2030 target and support achieving a more ambitious 2050 commitment of net zero emissions.

This year saw the release of the *2022-2025 Climate Preparedness and Adaptation Strategy*, outlining actions to increase climate resilience in the province. While this strategy is a good start, concrete actions are urgently needed that focus on climate resilience across the province, particularly in areas most vulnerable to impacts from a changing climate. Economic policies and programs that can support B.C.'s climate actions are included in the *Stronger BC* economic plan, released in the spring of 2022.

The government's *2022 Climate Change Accountability Report* provides the latest information on the province's progress towards its provincial and sectoral emissions targets. As illustrated in Figure 4, the outstanding gap to achieving the 2025 target is 1.6 million tonnes (MT), and the gap to achieving the 2030 target is 0.8MT, a remaining gap of 3%. This gap is greater than what government indicated in its 2021 accountability report, which stated that with the *Roadmap* it anticipated achieving its 2030 target. The gap is due to regular annual changes in the National Inventory Report and the Provincial Inventory, and improvements to forecasting that are reflected in the modelling. Regardless, the implication is that the government will need to either/both go beyond or go faster than what is included in the *Roadmap* in order to achieve the 2030 target.

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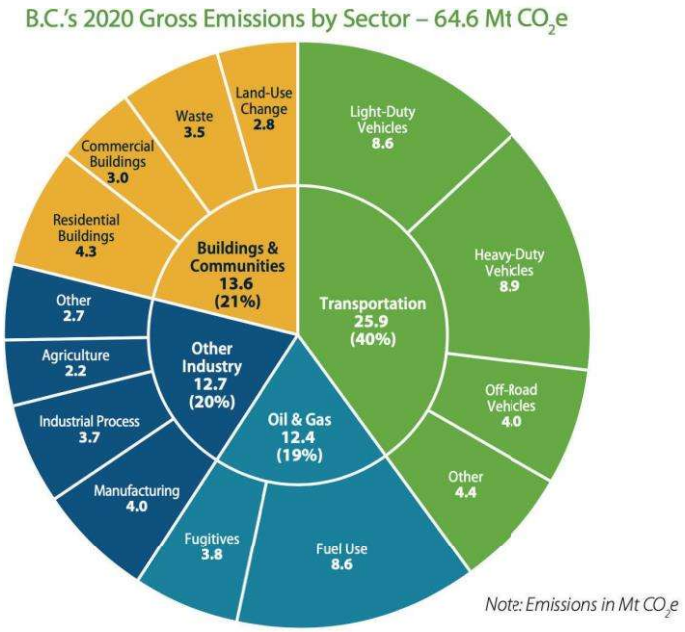
[7] World Energy Outlook 2022. International Energy Agency.

FIGURE 4: CLEANBC PROJECTIONS TO 2025 AND 2030[8]

Figure 5 illustrates emissions per sector in 2020, and Table 1 documents sectoral emission trends relative to 2007 (the baseline year) and projects them in 2030, presuming successful implementation of the *Roadmap*. However, as noted, these 2030 forecasts could be negatively impacted by either or both weaker policy stringency or slower delivery, relative to the *Roadmap*, or new large industrial projects that were not accounted for in *Roadmap* emission forecasts.

FIGURE 5: SECTOR-SPECIFIC EMISSIONS IN 2020[9]



[8] 2022 Climate Change Accountability Report. Government of British Columbia.

[9] 2022 Climate Change Accountability Report. Government of British Columbia.

TABLE 1: PROGRESS TO SECTORAL TARGETS[10]

Sector	2030 target change from 2007	2030 projection ($MtCO_2e$)	2020 emissions change from 2007
Transportation	-27-32%	-30%	+11.7%
Buildings and Communities	-59-64%	-38%	-9.9%
Oil and Gas	-33-38%	-32%	-7.2%
Other Industry	-38-43%	-39%	-8.4%

These forecasts assume the full implementation of announced emissions reduction measures (Appendix 1). It is possible that internal and external factors will lead us to reduce emissions by more than our target but it is important to highlight the factors that could revise these projections downwards, including:

- Policy stringency and/or timing lagging what was committed to in the Roadmap
- New large industrial projects with significant emissions not accounted for in Roadmap emissions forecasts and without planned measures to mitigate emissions

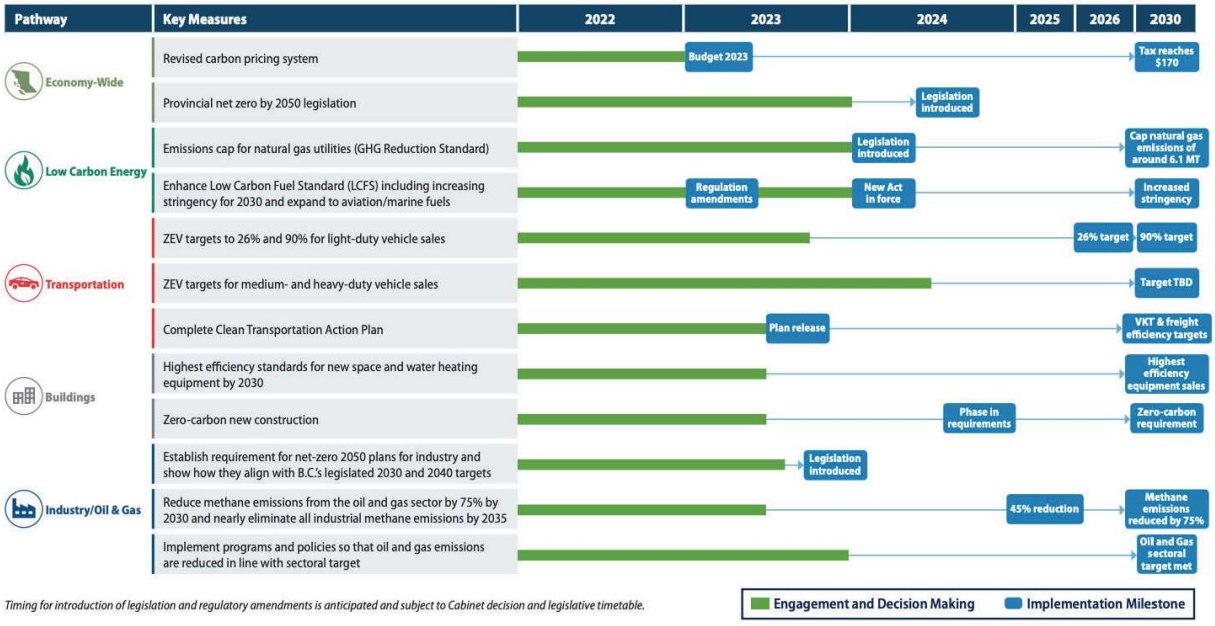
While government must ensure all sectors reduce emissions, the Council is particularly concerned about the policy gaps in oil and gas, transportation, and buildings sectors. With respect to oil and gas, there are numerous proposed LNG terminals that, if approved, would lead to direct emissions—and indirect emissions from the upstream production and transport of gas—beyond those factored into *Roadmap* projections. The transportation sector, meanwhile, has emissions trending rapidly in the wrong direction and, due to relatively slow vehicle stock turnover, presents a particular challenge. Similarly, the challenges retrofitting the extensive stock of existing buildings (residential, commercial, and institutional) indicate that projected emission reductions will not be enough to meet that sectoral target.

The *2022 Climate Change Accountability Report* (CCAR) indicates that B.C.'s emissions in 2020 have declined by 5 percent relative to 2019, but just 1 percent relative to the 2007 baseline used for the province's legislated targets. The 2020 numbers reflect the impact of COVID-19, and we anticipate that the 2021 emissions data will show a rebound from 2020. That said, we recognize and appreciate that the policies introduced in CleanBC take time to 'bend the GHG emission curve' and modeling of these initiatives shows that the coming years will start to show more significant emission reductions, as illustrated in Figure 4 above.

Key features of the *Roadmap* that the Council has been tracking in 2022 include the planned strengthening of the Zero Emission Vehicle (ZEV) mandate for light duty vehicles, establishment of a cap on GHG emissions from gas utilities, and a commitment to meet or exceed the federal benchmark carbon price of $170 per tonne by 2030. The Council appreciates the inclusion of the Roadmap Implementation Plan (Figure 6) that shows plans and progress. We are looking to see progress in critical sectors, particularly oil and gas, transportation, buildings, and electricity supply, as well as new policy development for agriculture, forestry, and land use planning. The Council would also like to see the Province deliver on its commitment to include 2040/2050 emissions projections in the next CCAR. To help the public contextualize pathway indicators (Appendix C of CCAR) and understand whether the province is on or off track, we recommend including targets for these indicators.

[10] 2022 Climate Change Accountability Report. Government of British Columbia.

FIGURE 6: CLEANBC ROADMAP TO 2030 IMPLEMENTATION PLAN[11]



While the *Roadmap* policy initiatives introduced thus far are commendable, as noted in the *B.C. Environment, Social and Governance (ESG) Summary Report* "…there is much more to do. The most recent emissions projections show the road ahead is significantly more challenging than it was known to be in 2018, or even 2021. While there are several reasons for this shift, including revised emissions methodology from the federal government, **it is clear that substantial new and sustained action is required to meet the provincial government's commitments.**" (**emphasis added)**

Beware the 13 Implementation Pitfalls

As noted above, the B.C. government has acknowledged that its 2030 forecasts could be negatively impacted by either or both weaker policy stringency and slower delivery, relative to the *Roadmap*, or new large industrial projects that were not accounted for in *Roadmap* emission forecasts. There are numerous implementation pitfalls that, unless carefully avoided, risk leading to these challenges and, ultimately, a failure to achieve the province's targets, despite government's good intentions. To help decision makers in the public and private sector better achieve their climate goals and avoid pitfalls, we offer an analysis of pitfalls in climate policy implementation.[12]

Pitfall #1: Insufficient implementation of compulsory polices to reduce GHG emissions

There is great appeal in setting targets for desired actions and outcomes at some future date. But targets need timely implementation of compulsory policies with increasing stringency to reach them, or they will fail. Research shows a policy portfolio that contains a combination of a rising price on carbon pollution and regulations that require the phase-out of unabated burning of fossil fuels are successful in significantly reducing emissions. The following chain of logic identifies the pathway to

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[11] Appendix 2. 2022 Climate Change Accountability Report. Government of British Columbia.

[12] "Adapted from a working paper by M. Jaccard {2022} "Reasons for GHG policy failure."

reduce emissions significantly and credibly: (1) governments implement compulsory policies, (2) the policies lead companies, institutions, and households to reduce their GHG emissions; and (3) the net impacts of these actions are assessed (and hopefully confirmed) by independent energy-economy-emissions modelers and public dissemination of emissions data each year.

Pitfall #2: Lack of independent assessment of policy impact on GHG emissions

Credible independent assessments of GHG policy claims provides accountability. The U.S. Energy Information Administration (EIA) and Energy Modelling Forum at Stanford offer examples of independent bodies that assess the credibility of government policy. Clearly stated assumptions and model limitations will allow those within and outside of government to assess progress to targets and the validity of government claims.

Pitfall #3: Prioritizing fossil fuel efficiency over substitution with clean energy

Substantial efficiency improvements in the production, delivery, and use of fossil fuel-based energy over the past three decades have not achieved significant GHG emission reductions. Reductions in the use of fossil fuels per unit output or per capita reduce operating costs and hence are more efficient, but populations and economies are growing as are the number of different energy services per GDP and per capita, leading to growing or at best plateauing GHG emissions. If, instead, the focus is on energy substitution—replacing fossil fuels with clean energy— technologies will become more energy efficient and operating costs decline. Compare, for example, the efficiency of an electric car with a gasoline car, or that of an electric heat pump with a natural gas furnace.

Pitfall #4: Delayed implementation can undermine policy credibility

Governments are under pressure to implement technology-transforming policies gradually to minimize the costs to consumers and industry. But long phase-in periods may create uncertainty about the credibility of the policy commitment, whether there will be changes in the future, and thus can delay investment.

Pitfall #5: Concerns about affordability can thwart policy adoption

Effective policies such as carbon taxes and flexible regulations will raise energy prices at least until technological development and economies of scale in producing substitutes can moderate or offset the increases. Effective policy design such as gradual increases in tax rates and regulatory stringency combined with programs that target those most impacted or vulnerable is the way to address this issue rather than avoiding or delaying the use of these effective policies or adopting ones that are less effective under the guise of protecting consumers and industry.

Pitfall #6: Continued dependence on fossil fuel electricity generation while waiting for more innovation

Delaying policy implementation until there is more innovation of zero-GHG energy and technology options and arguing that natural gas is an essential ‘transition fuel’ belies evidence that many technologies that are referred to as “untried” have been commercially available and successful in non-climate applications. Examples are technologies that can back up the variability of wind and solar: pumped hydro, large battery banks, expanded grid interconnection, turbines burning hydrogen, biomethane or biodiesel, existing hydro reservoirs, compressed air, biomass plants, nuclear, interruption and shifting of some industrial load, short-term increases in industrial co-generation, shifting of some commercial demand, shifting of some residential demand.

Pitfall #7: Subsidies without carbon pricing and regulations sufficient to reach targets

Subsidies to industry and households can be an important component of a policy portfolio when directed at reducing the costs of the energy transition away from fossil fuels, but they are insufficient

by themselves as it isn't tenable to deliver them at the scale and for the duration that would be required absent other policy instruments. Moreover, subsidies are not 'free' money, there are tradeoffs in terms of higher taxes or lower expenditures on other government initiatives and priorities.

Pitfall #8: Flexible compliance pathways can reduce a policy's stringency

Regulations that allow flexible compliance pathways can lower the costs of compliance, for example, if they enable those being regulated to trade amongst themselves. But in the design of these mechanisms, it is important to avoid giving credits for actions that regulated parties would have taken as part of their lowest cost path to compliance with the regulation. Credits for actions that would be in the regulated party's interest absent the credits as policy stringency increases effectively serve as loopholes that can slow emission reduction efforts.

Pitfall #9: Extended consultative processes causing delays

Governments may employ lengthy consultative processes as a means of feigning climate-sincerity, the result being to delay the implementation of effective GHG-reducing policies indefinitely. In other cases, governments' aspirations for unanimous policy support can lead to extended consultative processes that effectively waste or delay a policy opportunity.

Pitfall #10: Utilization of offsets that will not result in incremental and permanent GHG reduction

The only offsets that are almost certain to be incremental and permanent are processes that extract carbon from the atmosphere and store it in geological strata, not on the earth's surface as plants that can be removed or burned in future (e.g. direct air capture with injection into stable saline aquifers and bioenergy with carbon capture and injection into saline aquifers).

Pitfall #11: Overstating the economic impact from the energy transition away from fossil fuels

Industries, communities, regions, and provinces whose economies have benefitted from a high-GHG path dependent on fossil fuels will focus on job and revenue losses from the energy transition to net zero and argue for slowing climate policies. In contrast, while the jobs and economic activity from the low-carbon resilient economy are growing and present an opportunity in B.C. to provide province-wide benefits, they take time to come to fruition and appear riskier than depending on fossil fuels for jobs and tax revenues. But history is replete with example of jurisdictions and companies that took those risks and thrived, creating high value jobs and economic prosperity.

Pitfall #12: Approval of new high-emission industrial projects

Governments that are implementing a portfolio of effective GHG-reducing policies can fail to achieve their GHG targets because they subsequently allow one or more high-emission industrial projects that are not regulated to be zero-emission. These may be fossil fuel projects that expand extraction and/or processing or other industrial plants that are allowed to install conventional high-emitting processes (steel, cement, aluminum, bulk plastic, pulp & paper). There are many rationales for approval, the most frequent being that this project is somehow less emitting than projects somewhere else in the world or they will help to reduce emissions globally. Those claims are hard to verify, but even if they could be, added GHG emissions domestically will mean all other sectors will face even higher costs and more stringent policy to offset those emissions. That is neither cost efficient nor fair.

Pitfall #13: The "latest new" crisis requires us to stop, slow or reverse our GHG-reduction efforts

The next crisis could be a military conflict, a diplomatic threat, an energy embargo, a short-run energy market imbalance, an economic recession, a trade war, a financial collapse, pandemics, or even—ironically—an extreme weather event that disrupts energy supply. Those wanting to protect their interests will argue that now is not the time to implement strong climate policy, but by this logic, there

is never a good time because the whole point of policies to achieve an energy transition that yields a low carbon resilient economy is to move away from the status quo.

Avoiding Pitfalls and Accelerating the Pace to Net Zero

Heading into 2023, B.C. is at a crucial juncture in its efforts to achieve its climate change targets and navigate the energy transition in a way that builds a sustainable, competitive economy. Encouraging progress has been made implementing the commitments laid out in the *Roadmap* and the government has placed a welcome focus on climate resilience with its Climate Preparedness and Adaptation Strategy, which is now backstopped by the new Ministry of Emergency Preparedness and Climate Readiness. Nonetheless we highlight critical areas where policy development and implementation must be accelerated and/or strengthened.

We focus on eight key opportunities and offer recommendations designed to avoid the policy pitfalls described in the preceding section.

Opportunity #1: Greenhouse Gas Reduction Standard (GHGRS)

The Greenhouse Gas Reduction Standard (GHGRS) has been delayed to 2023 to allow for more consultation. Modelling by both the province and the Canadian Climate Institute anticipates that meeting B.C.'s 2030 emissions target cost-effectively and getting the province on a path to net zero in 2050 will entail a significant shift from gas to electricity for space heating. The Council's 2020 report emphasized "*In addition to the 2030 target, reduction requirements should be set to align with the provincial government's 2040 and 2050 targets, including the overarching CleanBC objective of transitioning away from fossil fuels toward clean energy."* However, the proposed GHGRS is at risk of implementation pitfalls. It relies in the first instance on gas utilities—whose core business is most directly threatened by that transition—to propose a compliance pathway. The GHGRS does not, however, specify a role for BC Hydro in advancing the alternative of electrification of heating.

The approach puts the onus on the B.C. Utilities Commission (BCUC) to evaluate the credibility of gas utilities' plans to meet their emissions obligations at a reasonable cost, presumably via renewable natural gas (RNG) and other low carbon gases (e.g., hydrogen). This is a very different role from the BCUC's historical mandate to regulate price and supply. Our concern is with delays in ramping up the capacity of the BCUC to acquire the personnel, experience, and expertise to take this on, and the absence of a clear mandate to the BCUC to align its decision-making with the province's legislated climate targets. Preparing to do so will entail a fundamental transformation of the Commission.

The costs of error are potentially great: overconfidence in gas utilities' own emissions projections will either result in failure to meet our emissions targets or stranded fossil-fuel infrastructure and equipment, with higher costs as a result for households and businesses.

We are also concerned that reliance on purchasing "notional RNG" (credits for RNG produced and/or used outside B.C.) will not have sufficiently robust accounting to guarantee a concomitant decrease in natural gas and GHG reduction in the other jurisdiction. Domestic production of RNG is also an important opportunity to create clean energy jobs and foster a circular economy, notably within the forest and agriculture sectors. Any reliance on international credits to meet these requirements would represent a significant shift in provincial policy without acknowledgement or public discussion.

Finally, the current proposal misses the opportunity to expand and strengthen B.C.'s existing expertise in renewable electricity and provide more economic development opportunities across the province and support Reconciliation. BC Hydro, many First Nations, and renewable energy companies would

benefit from a greater emphasis on producing more clean electricity in B.C, which includes a range of co-benefits. For example, small-scale hydro can produce co-benefits in the form of flood control.

Our advice reiterates and builds upon the previous Council's advice on the predecessor policy proposal: the Clean Portfolio Standard.

Recommendations to the Province:

a) The current Greenhouse Gas Reduction Regulation should be updated immediately to enable utilities to procure up to 30% RNG; this should not be delayed until the GHGRS is finalized.

b) The government needs to establish clear targets for minimum RNG content requirements and specific measures to achieve these targets, so that the BCUC can fulfill its current responsibility for determining a cost-effective means to achieve climate targets.

c) Renewable gas credits from other provinces (i.e., "notional RNG") to meet compliance obligations should be limited in time and amount and only if there is a rigorous carbon accounting system in place that clearly demonstrates a concomitant decrease in natural gas consumption in the exporting province.

d) Any other domestic offsets/credits toward GHGRS compliance must be real, additional, permanent, verifiable, quantifiable, enforceable, and provide co-benefits, and should be limited to ensure that the focus is on reducing emissions from transportation, buildings, and industry. Quebec's framework serves as a useful example.[13]

e) The previous Council's letter of November 2020 contains additional recommendations regarding offsets that remain relevant.

Opportunity #2: Clean Transportation Action Plan (CTAP)

The *Roadmap* assumes a 4.5 MT emissions reduction will be achieved as a result of a 25 percent reduction in vehicle kilometres travelled (VKT). While we would welcome policies that have the co-benefits accruing from a reduction in VKTs (e.g., congestion in major metropolitan areas), our concern is that the large list of policy instruments under consideration have historically been challenging to implement given the complexity of jurisdictional governance frameworks and the reliance on behavioural changes, which take time and are difficult to predict. Measures such as investments in transit and rail infrastructure, and urban planning to transition to more compact communities, are laudable and will undoubtedly be critical in achieving longer term goals, but we are skeptical that they will deliver the projected reductions in VKT and associated emission reductions by 2030.

Recommendations to the Province:

a) Rapidly identify and focus scarce resources on a limited number of policies that are administratively feasible and, based on other jurisdictions' experience, likely to deliver highest impact. We urge the province to rigorously assess the emissions reduction potential of such actions as soon as possible to plan as needed to make up any shortfall to the 2030 target via other measures.

b) Work through and with the Union of BC Municipalities, and other pertinent parties—such as the BC Municipal Climate Leadership Council and the First Nations Leadership Council—to interface with and advance additional funding for planning and coordination for infrastructure and land-use decisions that are multi-region in nature.

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[13] Carbon Markets: Offset Credits. Québec Ministere de l' Environnement de la Lutte contre les changements climatiques, de la Faune et des Parcs.

c) Continue and accelerate actions that support smart growth principles for local government decision making over local land-use and transportation.

d) Although attention to cities is essential as that is where most people live and move around, it will be important also to ensure inter-community and intra-community options exist other than by private vehicle. Clean transportation options must be accessible across the province and recognize the circumstances affecting youth and vulnerable populations.

Opportunity #3: Zero Emission Vehicles (ZEV)

The Council is supportive of proposed ZEV standards for light duty vehicles (LDVs), to be aligned with California, Quebec, and expected federal standards. However, continued growth of medium and heavy-duty vehicle (MHDV) emissions will eclipse the gains made zero emission LDVs. Action in this sector is needed quickly, but data to inform action is currently lacking.

Recommendations to the Province:

B) Consider accelerating targets (e.g., 90% sooner than 2030) if consumer trends and supply availability indicate such a possibility, especially if needed to address an emission reduction shortfall should the VKT target prove unfeasible.

C) Recognize however that a rapid transition of the vehicle stock to ZEVs, which is essential for the reasons we have provided above, reduces the GHG benefits of VKT reduction policies. Tightening the 2026 ZEV stringency can be a more reliable and cost-effective means of decreasing transportation related GHGs emissions in the 2030 timeframe of the *Roadmap*.

D) A MHDV ZEV mandate needs to be actioned as soon as possible and increased effort to decarbonize the existing fleet of MHDVs undertaken**.** We understand that the level of funding to support MHDV decarbonization has been identified in modelling but has not yet been approved. This is an urgent area for action.

E) As highlighted in previous Council advice, it is critical to ensure sufficient charging infrastructure across the province, including in more remote/rural communities, to ensure public confidence in ZEV purchases.

F) Electricity pricing for households must not deter electrification of transportation (and heating), which will require a shift away from the current two-tiered rate structure.

G) Work with ICBC to consider adopting preferred insurance rates for ZEVs.

H) Engage with industry to understand how other tools, such as depreciation tax credits, supportive refinancing programs, and bulk-buying can be used to further enhance the turnover in existing commercial fleets to ZEVs.

Opportunity #4: Oil and Gas Development

The Council seeks greater clarity and accountability for how B.C. will meet its emission targets if new large LNG projects and/or other fossil-fuel based projects with significant GHG emissions are approved and/or begin operation, for example LNG Canada Phase 2. While electrification may offer some opportunity to avoid new emissions, there is a risk that a shortage of electricity and/or high costs for additional electricity (e.g., increased imports) could impact the electrification and reduction of existing emissions (from buildings, transportation, and existing industry). While carbon capture, utilization, and storage technologies have promise, implementation has thus far been slow worldwide, with current costs a barrier. Further, the government has not provided details regarding how the oil and gas sector can meet the provincial sectoral target or the forthcoming federal emissions cap.

Failure to achieve reductions in the oil and gas sector risks imposing a greater burden and cost on other sectors if B.C. is to meet its climate targets.

Recommendations to the Province:

a) We strongly support the direction outlined in recent mandate letters for Ministers of Environment and Climate Change Strategy and Energy Mines and Low Carbon Innovation to work together to develop policies and regulations that meet B.C.'s 2030 sectoral and methane targets for the oil and gas sector while ensuring alignment with a federal cap on oil and gas emissions. Clarity on the path forward for the oil and gas sector is needed no later than the end of 2023.

b) Follow through on the commitment to eliminating all fossil fuel subsidies. This also requires that no additional subsidies (tax exemptions or reductions, grants, infrastructure investments, etc.) are extended to LNG or upstream gas production. As outlined in the mandate letter for the Minister of Energy Mines and Low Carbon Innovation, “Review and identify opportunities to transition fossil fuel subsidies to the clean tech and clean energy sectors”.

c) Require that all LNG operations that have received approvals but not yet received a final investment decision, such as LNG Canada phase 2, and those seeking approvals (now or in the future) fit within the CleanBC Plan, and that they deliver on the *CleanBC Roadmap to 2030* commitment that requires new large industrial facilities (in any sector) to submit verifiable plans demonstrating how they align with B.C.’s legislated and sectoral targets and how they will achieve net zero emissions by 2050. The Council believes this is consistent with your mandate letter addressing industrial emissions.

d) Work with communities, First Nations and workers in oil and gas producing regions to identify and advance economic diversification opportunities and seek federal collaboration and funding to support this transition.

Opportunity #5: Highest Efficiency Equipment Standard (HEES)

The *Roadmap* included a provision that after 2030 all new space and water heating equipment sold and installed in B.C. will be at least 100% efficient (i.e., electric resistance heating, heat pumps, and hybrid electric heat pump-gas systems). The Council is supportive of the province’s plan to regulate efficiency of space and water heating equipment.

Recommendations to the Province:

a) Consider implementing energy efficiency requirements as soon as possible and ideally before 2030 with consideration of regional climate zones and available technologies.

b) While we recognize that efficiency standards will generate emission reductions, we would like to see ongoing discussion and consideration of carbon-intensity requirements where feasible in the regulations.

c) Engagement with professional associations and third-party networks can help to ensure effective professional compliance with the HEES and to prevent equipment installers from using out-of-province equipment purchases to circumvent in-B.C. purchase standards.

d) It is crucial that the province has the workforce with the knowledge and capacity to advise building owners on the equipment best suited to their needs and the expertise to install it. Strong alignment with the HEES is required in the *Future Ready: Skills for the Jobs of Tomorrow* plan.

e) Work with expert institutions to ensure effective use of climate modelling data in energy planning for new buildings to ensure long-term resilience of systems.

f) Provincial modelling shows that switching to electric heat-pumps is cost effective for most climate zones in B.C. We therefore support flexibility for dual fuel options *only* in the coldest climate zones, and for the most complex buildings, where electric options are not yet available or feasible.

g) Use the HEES to support greater development of manufacturing potential of clean energy equipment in B.C.

Opportunity #6: Adaptation and Climate Resilience

The Council is encouraged by government's increased focus on adaptation in 2022 and in mandate letters, but more needs to be done. The paradigm needs to shift from disaster relief after the climate-related damages occur to increasing the resilience of families, companies, and communities with actions and investments that reduce the likelihood of damage. Investment in climate resilience is more cost effective than disaster relief.

The Council looks forward to working with the new ministry of Emergency Management and Climate Readiness. We are pleased to see in the ministry's mandate letter an emphasis on consultation with communities and Indigenous Peoples to produce a provincial hazard risk vulnerability assessment that will help develop a province-wide disaster and climate risk reduction plan. We also acknowledge in the mandate letter the obligation to lead cross-ministry coordination for the government's work to enhance B.C.'s resilience and work through the *2022-2025 Climate Preparedness and Adaptation Strategy* (CPAS) and other relevant policy documents. We also strongly support continuing a whole-of-government approach with the requirement to improve *"transparency and awareness of these initiatives and their impacts by developing new tools for the public to access information on existing risks and work to improve resilience."* We believe there is significant opportunity to build on the existing CPAS plan and to support the consultation process and integrated plan development.

Recommendations to the Province:

a) *Accelerate* the implementation of actions in CPAS 2022-2025 with attributed budgets, funding, and timelines to be publicly communicated in the next Climate Change Accountability Report;

b) Develop an explicit, measurable, and ambitious series of climate adaptation targets;

c) Align policies throughout all levels of government and relevant agencies to reduce risk from climate impacts. This may mean changes in, for example, land-use policy to avoid building in flood plains.

Opportunity #7: Electrifying our economy and communities

A secure and sufficient supply of electricity with a rate structure that supports substitution away from fossil fuels is essential if B.C. is to be a thriving and resilient low carbon province. Assuring a secure supply to end users also requires the planning for and permitting of transmission lines within the time frame needed to meet 2030 targets. The Council offers the following prioritization for the use of B.C.'s clean electricity that ensures the needs are met for:

1) All British Columbian households, businesses and industries that are increasingly choosing to (or are required to) electrify their homes, buildings, vehicles and operations to reduce current emissions.
2) New homes, buildings, and vehicles to avoid new emissions.
3) New industrial operations so they can electrify and avoid new emissions,

4) Our neighbours, via clean electricity exports (reducing current and avoiding new emissions).

We strongly support the direction in the Minister of Energy, Mines and Low Carbon Innovation's mandate letter to deliver the following actions, and encourage the Climate Action Secretariat to collaborate in efforts to:

- Develop and implement a climate-aligned energy framework for B.C. with an overall goal of maximizing our province's production of clean energy to use at home and for export.
- Work with BC Hydro to implement its Electrification Plan and to ensure the province is well positioned to electrify B.C.'s economy and industry, including options for Indigenous ownership and/or equity interest in BC Hydro infrastructure and Indigenous partnership in clean energy projects.
- Work with the BC Utilities Commission to identify an appropriate role for the Commission in supporting B.C.'s clean energy transition, in alignment with our province's climate goals to achieve net zero by 2050 and affordability objectives.

Opportunity #8: Minimizing reliance on offsets

The *Roadmap* modeling provides a pathway to reach our 2030 targets without a major reliance on offsets and we advise against their use unless they represent verifiably permanent reductions in GHG emissions that would otherwise not have occurred (incremental).

Recommendations to the Province:

Offsets used to meet climate targets should be:

a) limited to a prescribed maximum of total emissions as is the case, for example, in Quebec,

b) discounted to reflect the likelihood that some will not be additional despite the best efforts to meet additionality expectations, and

c) located within a jurisdiction with equal or stronger climate policy.

d) Participation in any carbon offset market requires the assurance that human rights and the rights of Indigenous peoples will be protected.

Conclusion

The *CleanBC Roadmap to 2030* is a good plan, but its ultimate success hinges on its implementation progressing at a pace that will enable the province to achieve its legislated climate targets. Climate impacts are being felt at home and around the world, reinforcing the urgency to cut pollution faster and accelerate the clean energy transition while simultaneously enhancing our resilience.

We are encouraged that Premier Eby has made continued climate action a government priority that is included in the mandate letter for all Cabinet members: *"We will continue our work investing in British Columbians, fighting racism and promoting equity, and building a clean economy that addresses our obligations to combat climate change by driving down emissions, while creating good, family supporting jobs."* We urge you to continue to work with Premier Eby and all of your Cabinet colleagues to ensure an effective, efficient all-of-government implementation of the *Roadmap*.

By continuing to lead, B.C. can have safer communities, a healthier environment, and a sustainable, competitive economy. But to succeed we must do more and do it faster.

The Climate Solutions Council provides strategic advice to government on climate action and clean economic growth. It includes members from First Nations, environmental organizations, industry, academia, youth, labour, and local government.

B.C. Climate Solutions Council
2022 Members

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David Black, Past President, MoveUP
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