PEMBINA institute

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Dear Mr. Cauchi,

Thank you for the opportunity to respond to the government's recent discussion paper and to submit comments on the proposed federal Clean Fuel Standard (CFS). The Pembina Institute is committed to participating in a constructive consultation process between Environment and Climate Change Canada (ECCC) and the many stakeholders for whom the regulation of fuels on a national basis in Canada is of paramount concern. We are pleased to be afforded the chance to engage the government early in the development of this important policy.

We begin this formal comment by explaining our general perspective on the CFS and the importance of its implementation within the wider national policy context. We also propose key design principles that we believe should guide the development of the regulation. Subsequently, we explore different questions of policy design (citing questions from the discussion paper where appropriate[1]) and offer thoughts and recommendations relating to the scope, coverage, compliance pathways and potential policy interactions of the proposed CFS.

General comments: Clean Fuels in the Pan-Canadian Climate Framework[+]

The Pembina Institute is strongly supportive of the proposed regulatory action to create a federal CFS under the *Canadian Environmental Protection Act, 1999*. We believe that the development and implementation of the CFS should be conducted in view of the broader national and international policy contexts from which the idea for a federal CFS first arose. Announced as part of the Pan-Canadian Framework on Clean Growth and Climate Change (PCF), the CFS represents a central component of Canada's plan to achieve its 2030 climate commitments under the Paris Agreement. As Canada's first coordinated climate change action plan, the PCF traces a path to ensure the country achieves its greenhouse gas (GHG) emissions target of 30% below 2005 levels by 2030.[2] Canada must do more to ensure this goal is ultimately achieved – but, in the shorter term, robust implementation of all PCF policies is critical.

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[1] This submission does not address every question listed in the CFS discussion paper. Where our comments do pertain to one of those questions, the relevant question number is stated in square brackets preceded by the letter 'Q' (after the applicable text).

+ Special thanks to Pembina Institute colleague Bora Plumptre for his research and writing support.

[2] In absolute terms, achieving Canada's emissions reduction target for 2030 means reaching a level of total annual emissions no greater than 517 megatonnes of carbon dioxide equivalent (Mt CO_2e). This represents a 30% decrease from the absolute level of emissions in 2005 (738 Mt). Available data show that the emissions trend since 2005 has shown little overall change, with emissions in 2015 at 722 Mt. Thus, Canada has just over 15 years to achieve 205 Mt of emissions reductions.

Against this backdrop, the CFS has emerged as one of the most significant federal actions within the suite of PCF policies presented to the Canadian public. Indeed, as the regulatory measure with the single largest associated estimate for potential emissions reductions, an effective CFS is the most consequential GHG action yet announced.[3] The 30 megatonnes (Mt) of reductions that this regulation could enable would amount to nearly 15% of the total reductions (205 Mt[4]) needed to meet our 2030 target. This is more than any other individual policy. Whether the CFS is successfully implemented will largely determine the success and credibility of the PCF—and therefore, in turn, Canada's ability to live up to its international climate obligations.

In light of the central importance of this proposed regulation to Canada's climate policy efforts, the Pembina Institute urges the department to do its utmost to ensure that the regulatory process upholds the federal government's stated purpose of 30 Mt of annual reductions in GHG emissions, incremental to other announced policies, by 2030. If the CFS is to be "outcome-oriented," as indicated in the government's discussion paper, then this is the primary outcome it should be designed to seek, and against which its success must be measured.

Given that Canada has never before had a federal clean (or low-carbon) fuel standard—let alone one that embraces activities beyond transportation—we applaud the government's ambition to develop a new and creative regulatory framework with broad coverage in terms of both fuels and economic sectors. The CFS is poised to become precisely the kind of long-term climate policy that Canada needs: one that reduces emissions while providing the scaffolding to encourage the development of Canadian clean technologies and low carbon fuel sources. To ensure the integrity of the overarching emissions reduction objective, we suggest ECCC pursue the following key design principles in its rule-making process:

1. **Maintain ambition**: Express clear, ambitious performance-based lifecycle carbon intensity targets for each regulated fossil fuel that become increasingly stringent each year. Further, support additional electrification and other diverse fuel sources over the initial 2019-2030 compliance timeframe. Ensure targets to 2030 are established up front, since predictable targets are essential to stable, long-term incentives for market participants to drive down emissions.
2. **Maximize compatibility**: Proactively seek opportunities for regulatory alignment and harmonization with other jurisdictions (both provincial and international) in order to maximize program compatibility, reduce administrative and compliance costs across boundaries, and create more cost effective trading markets.
3. **Keep it simple:** Strive for policy that is clear to all regulated parties and that enhances the likelihood of compliance by avoiding unnecessary complexity, particularly across sectors and across regions.
4. **Manage against price shocks**: Enhance policy stability and market certainty by establishing a schedule for policy updates, a mechanism for policy review and an initial cap on credit prices.
5. **Improve over time:** Sustain policy flexibility by using review processes to incorporate new scientific information, and allow flexibility to respond to uncertainties regarding newly

[3] The Economic Analysis Directorate at ECCC estimates the CFS could yield between 26 Mt and 32 Mt of GHG emissions reductions (incremental to other policies) in 2030, depending on whether the 2015 or 2016 GHG Emissions Reference Case (Emissions Trends) is applied as the baseline. See slide deck: "Modelling the GHG Impacts of the Clean Fuel Standard," Economic Analysis Directorate, Environment and Climate Change Canada (February 2017). https://drive.google.com/open?id=0B5lNNz63xpM_TEs2T0djeGJERXM

[4] The math of climate target compliance depends on the baseline chosen. We calculate the absolute figure for the 2030 target annual emissions level (517 Mt) based on figures from the latest *National Inventory Report* (2017), which covers the period 1990 to 2015. It should be noted that this yields a slightly lower level for compliance than is suggested under the Pan-Canadian Framework (and reiterated in Part I of *NIR 2017*), which interprets the 2030 target using the 2016 version of the inventory.

incentivized technology, fuel performance and availability, market responses to fuels, and the environmental/social sustainability of outcomes.

6. **Measure progress:** Perform ongoing program evaluation to assess actual GHG reductions and administrative costs of the regulatory program. Share the results of policy evaluation; communicate ongoing costs, benefits, and co-benefits (e.g. health impacts of reduced particulate emissions); and indicate plans for future policy change in a manner that is responsive, not reactive, to assessed effects.
7. **Keep the pace:** Given the central importance of the regulation, it is essential it is implemented quickly and with integrity. ECCC should ensure that, throughout its consultation process, it remains focused on highest probability pathways to achieving the GHG outcome. In our view, the highest probability pathway to success is one that sees expeditious implementation of regulations and targets to support the overall CFS policy objective.

In our view, the Government of Canada can measure its success on this file by its ability, over the next few years, to design regulations that ensures the buildings, industry and transportation sectors deploy an increasingly large portion of low carbon fuels over the course of 2020 to 2030. We look forward to the Government of Canada demonstrating, at the conclusion of its consultation process, that its regulatory approach and timelines will ultimately achieve 30 Mt of reductions in 2030.

Bearing these considerations in mind, we now turn to various technical issues pertaining to the design of the regulation.

Sector-specific coverage and stringency

As indicated above, the Pembina Institute is supportive of proposed broad coverage of the clean fuel standard in terms of both economic sector (transportation, industry, homes and buildings) and fuel type (liquid, solid, gaseous).

Given that greater economic efficiencies are possible further up the fuel value chain, we support ECCC's intent to regulate fuel suppliers. Producers and importers of fuels have a high degree of control over the composition of the final fuel, and they have the ability to work with actors upstream to source lower GHG products and to produce different blended products. All of this indicates that the suggested point of regulation could be both efficient and effective from an environmental perspective. [Q2, Q3]. In our view carbon intensity standards should be established – in addition to decline rates – for all regulated fuel types, and those standards should be upheld in all cases of combustion. Setting different GHG standards for fueling depending on the sector in which they are combusted would be administratively complex and risks sending mixed signals to upstream producers [Q8].

I. Opportunities to reduce emissions in the built environment through low carbon fuels

The Pembina Institute's vision for buildings is that the sector secure 40-50% emissions reductions by 2030 and 80-100% reductions by 2050, in line with *Canada's Mid-Century Long-Term Low-Greenhouse Gas Development Strategy*. This will require that provinces adopt net-zero energy ready requirements for new buildings by 2030, as envisioned in the *Pan-Canadian Framework on Clean Growth and Climate Change*.

Achieving near-zero carbon emissions in new net-zero energy-ready building construction can be accomplished through the use of electric appliances and by the concurrent decarbonization of the electric grid. However, for buildings with high heat loads (e.g. hospitals, pools), lower emissions could be obtained by deploying Renewable Natural Gas (RNG) as a heating fuel.

In addition, meeting this sectoral target will require that 30% of the building stock undergo an emissions-reducing retrofit by 2030, with the remainder of the building stock retrofitted by 2050. According to our preliminary assessment of B.C.'s building stock and current policies, that province must target a retrofit penetration rate of 3% of buildings each year, aiming for 60% GHG reductions on average. We expect a similar scale of effort to be necessary in the rest of Canada. This goal can be achieved through a combination of switching buildings to low-carbon fuels (e.g. clean-grid electricity) and by achieving GHG savings through energy efficiency measures.[5]

We expect renewable natural gas (RNG or biomethane) and low-carbon electricity to be the primary sources of lower-carbon fuel in the building sector. Combustion or gasification of biomass as a feedstock for thermal district energy systems can also play a role in dense urban areas.

The primary feedstocks for the biogas used to refine RNG can be broadly grouped in three categories:

- agricultural sources such as unused crop residues, animal manure from livestock operations, and food/organic waste from industrial, institutional, and commercial entities (such as food processors/manufacturers and wholesalers, supermarkets, restaurants, hospitals, and educational facilities)
- forestry byproducts such as wood waste generated during harvest and milling operations and urban wood waste including municipal trimmings and land clearing residues
- municipal solid waste (landfill) and bio-solids (sewage sludge) from wastewater treatment plants

Buildings that currently utilize natural gas for heating may be able to utilize RNG without any modifications by taking advantage of existing natural gas delivery infrastructure. In this case, the conversion to RNG would be achieved at an upstream location, with existing pipelines and distribution systems being converted to RNG without noticeable impact to the end user.

Depending on the electricity source, the electrification of heating loads in buildings can also lower the carbon intensity of the sector. Low-carbon electrification can be achieved using on-site renewable energy, grid-supplied electricity, or a mix of both. Provincial or regional variations in the carbon intensity of the electricity supply should be accounted for when considering grid-connected buildings.

Finally, buildings can be connected to low-carbon district energy systems, which utilize gasification of biomass in a central heating plant to supply hot water or steam to several buildings for the purposes of meeting heating demand.

There are two proven technological approaches to the production of RNG. For the biogas used to derive RNG, the main method is anaerobic digestion (a biochemical process). Syngas (an alternative RNG input composed mainly of carbon monoxide, carbon dioxide, and hydrogen) can also be produced through gasification, a thermochemical process applicable to a wide range of organic materials. The use of syngas requires an additional "methanation" step before it becomes a natural gas equivalent. Gasification processes have been piloted more extensively in Europe than in North America, but the process is proven. A 2013 Alberta Innovates study proposed a 10-year timeline for gasification-methanation technology development. During Technical Webinar #3, the Canadian Gas Association suggested this technology was still five years out.[6] Accordingly, ECCC should expect gasification facilities—whose products generally have better carbon intensities than anaerobic digesters—to start coming online around 2022-23 [Q20].

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[5] Tom-Pierre Frappé-Sénéclauze et al., *Deep Emissions Reduction in the Existing Building Stock: Key elements of a retrofit strategy for B.C.* (Pembina Institute, 2017). http://www.pembina.org/pub/building-retrofits

[6] Paul Cheliak, *Clean Fuel Standard Webinar: The Natural Gas Opportunity in Buildings*, Environment and Climate Change Canada Clean Fuel Standard Technical Webinar #3: Industry and Buildings (Canadian Gas Association, April 10, 2017), Powerpoint presentation, slide 6.

i. Other opportunities in the buildings sector

In addition to the above comments, we view the Clean Fuel Standard as an opportunity to further advance the Government of Canada's commitment to support fuel switching from diesel to clean energy in Indigenous communities. According to the Government of Canada, 257 of the 292 remote communities are not connected to provincial or territorial electrical grids and are predominately run by large diesel-powered generators [Q23]. Further, the Government of Canada can use its commitment to greening government operations and procurement to create markets for low carbon fuels and to de-risk the deployment of new technologies by employing public buildings to build demand and accelerate innovation [Q22].

II. Treatment of electricity within the regulation

Across Canada, efforts are underway to expand the use of clean electricity. There is much more to do, however, to take Canada across the finish line to a 100% renewable energy system. Canada's pathway to deep emissions reductions, consistent with those required by the Paris Agreement, requires the country to move away from fossil fuels and towards clean electrification of the economy. Done right, this electrification pathway offers job creation potential and will help build healthy and resilient communities across the country.

As it relates to broad consideration of electricity within the rules, we urge ECCC to ensure the CFS takes into account the wide variety of grid intensities across Canada. Fuel switching to electricity will not have the same GHG benefit across Canada, and therefore ECCC should not establish an average GHG intensity of electricity for crediting purposing. Rather, the regulation should be designed to offer as much accuracy on the carbon intensity of an electricity grid as possible, and should be tailored to reflect regional (and evolving) realities. As a first step, we suggest ECCC establish provincial grid intensity values to be reassessed annually. [Q9, Q14, Q19, Q24].

In order for the federal CFS to be successful, it must encourage electrification and efficiency improvements in all three regulated sectors. In the transportation sector, electrification can be supported through the creation of third-party credits for incremental actions, as is the case in B.C and California. In the case of buildings and industry, the analogous third party crediting system is less clear – though we support the notion in principle and look forward to further elaboration on this point from ECCC. Likewise, we look forward to discussion with ECCC regarding the role of the CFS as a tool to encourage – and therefore credit – additional energy efficiency measures.

III. Policy signals to the oil and gas sector

A CFS could act as a performance-based subsidy for fuels with GHG performance less than the standards established by ECCC.[7] This is a powerful tool to drive environmental performance, and the Government of Canada should use this power with care and an eye to Canada's long-term climate interests. In addition to setting predictable targets for fossil fuel GHG intensity improvements, we view differentiation between crude oil types produced in or imported into Canada as an essential component of a credible CFS.

We were disappointed to see ECCC take an early position against differentiation of crude oil types. We believe in order to bolster policy signals around GHG performance in Alberta, and more broadly to promote efficiency and innovation upstream, improved crude oil GHG performance should be rewarded.

[7] Stephen P. Holland et al., "Some Inconvenient Truths About Climate Change Policy: The Distributional Impacts of Transportation Policies," Working Paper (National Bureau of Economic Research, September 2011). https://www.nber.org/papers/w17386

Life cycle assessment tools

GHGenius is the reporting tool used in British Columbia's low carbon fuel standard and Ontario's *Greener Diesel* regulation. While GHGenius presents a good starting point for discussions regarding the CFS, it must be modernized if ECCC intends to employ it as the primary tool for life cycle assessments (LCAs). In particular, we recommend that emissions related to indirect land-use change (ILUC) be considered in the life cycle analysis – and, therefore, GHGenius must be updated to incorporate values for ILUC. During this modernization process, ECCC should look to the U.S. LCA tool, GREET which is used in California and Oregon, to improve harmonization between all LCVA programs.[Q26, Q27]

Scientific studies have not yet yielded a strong consensus on quantitative estimates of the ILUC effect. However, if ECCC ignores the carbon and other GHG emissions associated with land diversion in calculating life cycle GHG emissions, it will effectively impute a value of zero to this potentially major effect, which for some alternative fuels could even overwhelm GHG gains made relative to displaced petroleum-based fuels. In our view, assuming a zero value in this way would be inappropriate and contrary to the stated objective of the policy. The prudent approach would be to use available science (and learning from other jurisdictions, including California and Oregon) to assign an initial conservative value, and to provide a mechanism (i.e. policy updates) by which that value could be updated as scientific understanding improves. At the same time, companies could be encouraged to focus on the development of biofuels with low GHG emissions and minimal ILUC effects, especially "second-generation" fuels created from wastes and residues or from algae and renewable hydrocarbons. These feedstock materials are preferable to intensively farmed food crops [Q28].

Compliance

Given that the CFS covers fuels used in transportation, buildings and industry, critical questions remain to be answered about how the regulation will be designed. For example, it must be determined whether credits will be tradable across the three sectors, how transactions will occur, and whether there will be a floor or ceiling price on the credits. In our view, a credit trading mechanism with a decline rate tied to overall intensity improvements is key to ensure that lower carbon fuels are privileged within the CFS – and could send a strong signal to upstream producers to deploy new technology (at greater rates), depending on the level of ambition with which the standards are set.

In general, we endorse the notion that the final regulation should provide as much compliance flexibility as possible, as performance-based regulations coupled with innovative trading schemes can ultimately deliver on GHG and innovation goals [Q29]. We therefore agree with ECCC's proposal to develop various compliance options for regulated parties, including:

- Reducing the average carbon intensity of the fuel mix sold or supplied by switching to (or blending) lower carbon fuels;
- Reducing facility emissions;
- Obtaining credits from other fossil fuel or alternative fuel suppliers; and
- Generating credits from other actions that either reduce the carbon intensity of fuels, improve market access for lower carbon fuels, or increase demand for lower carbon fuels.

We also agree that credit banking, which can lower costs and stabilize prices, should form another key element of the CFS compliance system. The temporal flexibility offered by credit banking recognizes that the regulator cannot perfectly predict future technological advancement, and thus cannot determine in advance the most optimal and cost-effective schedule for phasing out higher carbon fuels. Banking would also complement a back-loaded approach to scheduled compliance targets, which would mandate modest reductions in carbon intensity in early years, but increase in stringency in later years. Back-loading compliance in this manner is desirable in order to allow more time for investment and new technologies

and fuels to develop, and to provide a market signal for future demand of lower-carbon fuels. At the same time, care must be taken to avoid placing too much of the envisaged carbon intensity reductions in later years.

The caveat to our endorsement of multiple flexibilities is that the determination of how compliance options are structured must be governed by the constraint of declining annual carbon intensities for regulated fuels, and ultimately by the overall policy objective of cost-effective emissions reductions. In light of this, it will be important to ensure that fuel refiners/producers (as obligated parties) face at least two separately developed standards: one for gasoline and its substitutes, and another for diesel and its substitutes. Credit and deficit generation should be separated between these two fuel pools so as to ensure that the CFS does not create an incentive to shift from one fossil fuel to another as a compliance strategy (since the carbon intensities of gasoline and diesel are not usually aligned, and fuel-switching in this way would not yield any real carbon reductions). However, credits between the two pools should be fungible, so that deficits accruing to the pool associated with higher-cost reductions can be offset by credits generated through compliance beyond the standard in the pool where cheaper carbon intensity reductions are possible.

With respect to the possibility of other forms of credit trading limitation, our position is that ECCC should conduct further work to understand what credit creation opportunities (i.e. compliance pathways) exist in each sector. The department should undertake research to characterize (and potentially model) realistic compliance pathways for each sector *prior* to rendering a decision on whether to partition one, such as transportation, from the others. Such a decision should not be taken lightly, since the introduction of sector-specific credit trading restrictions may weaken the overall cost-effectiveness of the policy [Q29].

The principal rationale for trading is that it can reduce compliance costs by enabling carbon intensity reductions to occur where they are most affordable.[8] Consequently, the CFS may lose this cost-per-tonne advantage if ECCC opts for sectoral partitioning. On the other hand, given the risks that an "all-sectors" regulated fuels pool may pose to the long-term decarbonization of the transport sector, we acknowledge that the isolation of transport fuels from other sectors may ultimately be justifiable.[9] But, at this stage of regulatory development, we believe the decision merits additional assessment and transparency.

On the question of whether credits may be generated by activities outside those directed at lowering emissions within fuels' life cycles, we believe the federal government could build on the approach adopted in British Columbia [Q30]. If such "additional" projects are considered for inclusion under the standard, ECCC should support regulatory alignment by developing a federal analogue to the "Part 3 Agreements" under the BC Renewable and Low Carbon Fuel Requirements Regulations. These Agreements are performance-based and provide credits conditionally on the achievement of project milestones. In addition to broadening the range of compliance options, the inclusion of a project-based alternative credit creation mechanism can increase the supply of credits and act as a form of cost containment [Q31].[10]

In terms of the types of eligible projects, the transportation sector will require significant infrastructure investments to support the transformational changes necessary to move to a low carbon economy. For

[8] J. Rubin and P.N. Leiby, "Tradable credits systems design and cost savings for a national low carbon fuel standard for road transport," *Energy Policy* 56 (2013), 16-28.

[9] The bundling of clean fuels regulations for transportation with those for building and industry could also threaten potential linkages with transportation-only clean fuels markets in other jurisdictions (which could threaten long-term cost-effectiveness). See submission from Advanced Biofuels Canada.

[10] Sonia Yeh et al., "A Review of Low Carbon Fuel Policies: Principles, Program Status and Future Directions," *Energy Policy* 97 (October 2016): 220–34.

example, deploying wide-scale electric vehicle (EV) charging stations, from both public and private investments, will be necessary to overcome barriers of EV adoption, such as range anxiety. As outlined in the Deep Decarbonization Pathway Project (DDPP) report, the electrification of transportation — particularly light-duty passenger vehicles, light and medium freight transport and rail — is essential to achieving a science-based long-term decarbonization trajectory for Canada. According to the DDPP report, EVs will account for nearly 100% of all light-duty passenger vehicles in 2050 and a 53% improvement in energy productivity in the freight sector due to fuel switching.[11] Recent climate models suggest that for Canada to achieve a 30% emissions reduction by 2030, at least 15% of Canadian personal vehicle transportation needs to be electrified through clean power sources.[12] This puts additional demand on grids and creates new demand for widely accessible charging infrastructure. Currently there are only 21,000 EVs on the road in Canada.[13] Similarly, other forms of alternative fuels such as hydrogen will also require infrastructure investment.

In view of these needs, we recommend that ECCC consider investments in low-carbon transportation projects to be eligible to meet compliance. At the same time, we are cognizant of the fact that credits generated in this way would not strictly represent emissions reductions, but would rather act purely as units of compliance. We therefore recommend that credits generated from additional projects should be limited in one (or both) of the following ways:

- a limit on the number that may be generated/issued in any compliance period, equal to a reasonable percentage of the sum of all debits reported by regulated parties during the previous compliance period (this figure is 25% in BC's *RLCFRR*); and/or,
- by installation date (such as installing charging infrastructure from 2018 to 2025). Examples may include, but are not limited to, installing fast chargers for vehicles, hydrogen and compressed natural gas fueling infrastructure, charging pads for buses installed by transit agencies or municipalities. Compliance for these types of projects will require clear protocols to determine who owns the credit (e.g., the developer of the technology, the fuel supplier who installs a fast charger, the municipality, etc.)

The CFS should also be designed so that opt-in providers of low-carbon solutions—even if they are small companies or community-based organizations—are able to generate credits for verifiably reducing emissions. Potential voluntary credit generators could include renewable electricity companies, EV manufacturers or charging companies, advanced biofuel companies, and others. Training may be required to facilitate participation by smaller businesses or organizations [Q30].

Finally, we wish to acknowledge that ECCC may consider formally capping the market price of credits to provide stability to the program and protection for consumers. If it does so, it should anticipate and announce the possibility of price increases at the conclusion of regularly scheduled policy reviews [Q31].

As indicated previously, the final regulation should provide for a regular, periodic policy review that assesses market effects (and possible failures) to date, and that incorporates the findings of new scientific information regarding environmental effects, fuel performance, life cycle carbon intensities, and so forth. Building this administrative capacity for policy adaptation will help to facilitate compliance, minimize negative impacts, and build a valuable knowledge base from which to promote the twin aims of reducing

[11] Pathways to Deep Decarbonization in Canada (2015), http://deepdecarbonization.org/wp-content/uploads/2015/09/DDPP_CAN.pdf (pages 26 and 29-30).

[12] Canadian Academy of Engineering et al. (2016), *Canada's Challenge and Opportunity: Transformations for major reductions in GHG emissions*. https://www.cae-acg.ca/projects/trottier-energy-futures-project

[13] Plug'n Drive, A Guide to Electric Cars, https://plugndrive.ca/electric-cars-available-in-canada

emissions and stimulating innovation [Q32]. In addition, each regulated party should be required to file both an annual plan reporting on its anticipated method of compliance, as well as quarterly compliance reports. These documents would also help to build policy knowledge and create space for potential adaptation.

IV. Governance

Tracking compliance within the CFS may be difficult when projects or actions taken can potentially be used to comply with myriad other provincial regulations. Clear mechanisms need to be put in place to ensure that actions taken are additional to other regulations, are not double-counted, and are undertaken within a policy context that establishes clear ownership.

To that end, we recommend that ECCC establish a registry that has a fair, consistent and balanced governance structure and that guidance for new pathways (i.e. guidance documents or protocol development for a new technology) include a stakeholder engagement process. Reporting and compliance information should also be publicly available. The registry should provide training for those companies that are subject to the regulation or who wish to opt in to the program [Q26, Q27].

We recommend that ECCC establish a registry that has a fair and balanced governance structure and that guidance for new pathways (i.e. guidance documents or protocol development for a new technology) include a stakeholder engagement process. Reporting and compliance information should also be publicly available. The registry should provide training for those companies that are subject to the CFS or who wish to opt in to the program. The reporting structure should also make sure there are mechanisms in place to avoid double-counting. If ECCC intends to use the GHGenius model, it would need to be reformed to include these recommendations.

Policy harmonization and other interactions

The implementation of the CFS regulation, in conjunction with other federal, provincial and territorial measures, will lay the groundwork to accelerate decarbonization. In particular, the carbon price and the CFS are valuable policy tools because they lay the foundation for reductions in whichever sectors of the economy are positioned to move first, and most cost-effectively. As price ramps and stringency increase, additional emissions reductions are unlocked.

Harmonization or alignment can span many different aspects of regulatory design, but some of the most crucial of these are (temporal) baselines, carbon intensity targets (and their set rates of decline), fuel blending requirements, accounting methodology, and reporting practices. ECCC should also weigh the benefits and risks that would be involved in enabling the transferability of credits between comparable jurisdictions with similar standards already in place. A harmonized standard would provide administrative and compliance ease across boundaries, and, if designed appropriately, would provide firms with cost-effective trading mechanisms to achieve the policy's required emissions reductions. A harmonized and stringent standard would also provide the market conditions necessary to allow market-ready and emerging clean fuel technologies greater access to markets and financial investment [Q1].

It will be critical for the CFS to be aligned and harmonized with similar fuel standards (often called low carbon fuel standards) in other jurisdictions such as British Columbia, California and Oregon as well as with provinces that have emerging standards such as Ontario's modern Renewable Fuel Standard. Importantly, harmonization means incorporating knowledge about the future direction of other policies, and not only their current level of stringency (for instance). A harmonized and comparatively stringent standard would also provide the market conditions necessary to allow market-ready and emerging clean fuel technologies greater access to markets and financial investment. However, in our view, the early

focus should be on broad principles of environmental integrity rather than specific policy or market linkage mechanisms.

V. Understanding and managing policy overlaps

The federal CFS is under consideration at a time of immense climate policy reform at the national and sub-national levels. This has increased by a significant measure the likelihood that Canada achieves its international climate commitments.[14] However, it has also increased the risks of policy mismatch and unintended consequences.[15] While very important to consider, we view these policy overlaps as largely complementary and helpful in terms of Canada's overall ability to achieve its 2030 climate commitment.

i. Overlap with carbon pricing regimes

In our view, the B.C. and California experiences with LCFSs and carbon pricing systems suggest that policy interactions will be positive – and will unlock more emissions reductions than would otherwise occur with one policy approach alone. Putting a price on carbon pollution internalizes the cost of GHG emissions in everyday choices and business decisions – and a stringent CFS ensures that consumers and firms have ready access to solutions to reduce their GHG consumption. Importantly, this coordinated climate policy approach also helps to minimize price impacts on consumers by increasing the supply of low carbon goods across Canada.

It will be the case that, especially in the short term, the CFS policy accelerates emissions reductions that would not occur under a direct carbon pricing mechanism. Because of this, we view the CFS and carbon pricing as essential complementary measures to achieve Canada's national and sub-national climate objectives.

ii. Overlap with existing renewable fuel regulations

Huang et al. (2012) find that combining the RFS with an LCFS policy leads to reduced production of first generation biofuels and an increase in second-generation or "advanced" biofuels compared to the RFS alone. The combination of policies also achieves greater GHG reductions. The study's authors write the following:

> "Imposition of a carbon price with the RFS and LCFS policy primarily induces fuel conservation and achieves larger GHG emissions reduction compared to the other policy scenarios. All these policy combinations lead to higher net economic benefits for the transportation and agricultural sectors relative to the no policy baseline because they improve the terms of trade for the United States."[16]

This research suggests that ECCC should maintain the federal Renewable Fuels Regulations until they are made redundant by the effects of the CFS or a rising price on carbon [Q36]. In our view, ECCC should ensure it tracks the effectiveness of other complementary measures and signals to the liquid fuels industry

[14] Government of Canada et al., *The Pan-Canadian Framework on Clean Growth and Climate Change* (2016), p. 44-45. https://www.canada.ca/content/dam/themes/environment/documents/weather1/20170125-en.pdf

[15] Dave Sawyer and Chris Bataille, "Taking Stock: Opportunities for Collaborative Climate Action to 2030—Policy Brief 2: The Pan-Canadian Framework on Clean Growth and Climate Change," (Decarbonization Pathways Canada, March 2017). https://www.enviroeconomics.org/single-post/2017/03/31/Taking-Stock-Opportunities-for-Collaborative-Climate-Action-to-2030

[16] Haixiao Huang et al., "Stacking Low Carbon Policies on the Renewable Fuels Standard: Economic and Greenhouse Gas Implications," *Energy Policy* 56 (May 2013): 5–15.

that the RFS will be phased-out as its effects are made irrelevant, and replaced instead with a single, technology-neutral low carbon fuel standard.

Sustainability criteria in the Clean Fuel Standard

The European Union (EU) regulatory framework for low-carbon fuels in the transportation sector (i.e. the Fuel Quality Directive) outlines a number of sustainability criteria for biofuels and bioliquids, including a rising minimum threshold for GHG carbon intensity savings (currently at 50%) that alternative fuels must meet if they are to count towards compliance.[17] Further, it excludes the use of biofuels derived from specific land categories that are "highly biodiverse" or which possess "high carbon stock," such as primary forest, grasslands, wetlands, and peatlands.[18] These are relatively straightforward sustainability criteria that we recommend ECCC adapt to the Canadian context [Q38].

Jurisdictions that have experimented with low-carbon fuel standards and other biofuel policies have taken different approaches to the promotion of broader sustainability criteria. While some, like the EU and the UK (under its Renewable Transport Fuel Obligation), have imposed new goals and reporting requirements for environmental and social sustainability on biofuel production, they have not included metrics for reported impacts in calculations for compliance credits.[19] California, by contrast, requires monitoring and reporting only with respect to progress on GHG emissions reduction, but includes a non-specific requirement for future sustainability provisions in its LCFS.[20]

In sum, the major international policy precedents for Canada's CFS recognize the need to incorporate sustainability requirements (e.g. for sustainable agricultural production and reduced environmental damage/degradation) and to provide some way of accounting for the impacts that large-scale biofuel production may have on local communities, land rights issues, and labour welfare. They also recognize the corresponding need to develop procedures to guide the monitoring, reporting, and verification of such schemes.

However, there is also general acknowledgement of the limited experience in implementing sustainability standards for lower carbon fuels over large geographical and political regions. Policy-makers are understandably wary of the challenges associated with (i) measuring sustainability, (ii) identifying the right incentives to meet sustainability goals, and (iii) accounting for market-mediated systemic effects (such as food prices, indirect land use change, and cumulative environmental impacts).[21] Given this reality, we echo our previous recommendation that further consideration be given to the development of a CFS policy framework that can respond to progress in scientific understanding and improvements in modelling, while also ensuring the stability of expectations regarding compliance. Sustainability concerns are valid and must continue to feature in the policy development process both prior to and following the initial implementation of Canada's CFS.

[17] European Union Directive 2009/30/EC of the European Parliament (Fuel Quality Directive), Article 7b, "Sustainability criteria for biofuels," http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32009L0030

[18] European Union Science Hub, "Sustainable transport and fuels." Last updated July 18, 2016. Accessed April 15, 2017. https://ec.europa.eu/jrc/en/research-topic/sustainable-transport-and-fuels

[19] David Andress, T. Dean Nguyen, and Sujit Das, "Low-Carbon Fuel standard—Status and Analytic Issues," *Energy Policy* 38, no. 1 (January 2010): 580–91.

[20] Sonia Yeh and Daniel Sperling, "Low Carbon Fuel Standards: Implementation Scenarios and Challenges," *Energy Policy* 38, no. 11 (November 2010): 6955–65.

[21] Ibid.

We appreciate the opportunity to provide comments and want to express our interest in participating in technical working groups as they are established. Please don't hesitate to contact us should you have any questions.

Sincerely,

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