

February 19, 2021

The Honourable Chrystia Freeland,
Deputy Prime Minister and Minister of Finance

House of Commons
Ottawa, Ontario K1A 0A6

RE: Pre-Budget Consultation

Dear Minister Freeland:

The Canadian Hydrogen and Fuel Cell Association is an industry and academic association that represents over 80 members of Canada's world-leading hydrogen and fuel cell sector.

Attached please find our recommendations under the 2021 Federal Budget Consultation.

Thank you!

Sincerely,



Mark Kirby
President & CEO
Canadian Hydrogen and Fuel Cell Association

Cc: The Honourable Seamus O'Regan, Minister of Natural Resources

Federal Budget 2021 Consultation

Canadian Hydrogen and Fuel Cell Association Recommendations

Context

Canada, along with more than 120 other countries and hundreds of organizations, has committed to net-zero 2050. That means over the next 30 years, we will transition the ~75% of our energy needs currently delivered as fossil fuels without carbon management, to clean fuels: power, biofuels and hydrogen – and to fossil fuels burned with carbon management through carbon capture, storage and/or utilization (CCU/S). Policy and regulation that improve the business case for clean options will continue to strengthen globally – and Canada has demonstrated it is committed to lead in this. The final split between the various clean options is open to debate, but what is becoming clear through the many studies and reports globally is the following:

1. **All** options will be significant players and **all** need to scale-up significantly.
2. The options are complementary: e.g.: hydrogen supports clean power with storage, generation, additional revenue and simplified transportation. CCU/S supports production of clean fuels.
3. A mix of solutions and allowing end users to choose will provide the best outcome: cost, efficiency, environmental impact, etc.

In this context, governments will best help their industry and citizens transition to net-zero by working to ensure all options are available at the best possible cost.

Those clean fuels will be made from wind/solar, hydro, biomass, nuclear and fossil fuels with carbon management.

In the case of clean hydrogen, NRCan's Hydrogen Strategy for Canada projects that hydrogen will represent up to 30% of Canada's energy needs. This figure is on the high end of the range of studies in Canada and abroad, which typically are 20-30%, but even at the low end, would require a scale up in hydrogen production of 10-20X – just for domestic demand. The investment required in hydrogen production, distribution and products represents a massive, trillion-dollar economic opportunity globally. The Strategy further points out that Canada is well positioned to take advantage of hydrogen energy due to its technical leadership and low-cost energy. It also highlights the enormous groundswell of interest and government support happening in other countries that is driving demand, technology and investment in hydrogen companies and projects.

We can see impact of this already:

- The \$900 million Enerkem biofuels project includes an 88 MW electrolyzer (~\$88 million) operated by HydroQuebec.

- Canadian fuel cell leader Ballard Power has seen its valuation grow to over \$10 billion, allowing it to raise hundreds of millions that will be invested in jobs, technology development and manufacturing.
- Multi-hundred million-dollar low-carbon hydrogen production projects are being developed globally – a recent Hydrogen Council report [Hydrogen Insights 2021 - Hydrogen Council](#) lists \$300 billion in announced hydrogen projects between now and 2030 – and increasing rapidly. Canada’s Quest and Enerkem projects are shown, but generally, Canada has a very small share.
- Provincial governments are moving quickly to position their provinces to take advantage of the hydrogen opportunity.

With this level of activity, it appears highly likely that hydrogen energy will be commercialized globally. Why then does Canada need to do anything special to support the sector? Can it not be left to compete with other clean options?

The answer is no. For several reasons:

1. Hydrogen needs special support to compete with other, more established clean fuels: power, biofuels
 - a. Hydrogen energy is at a much lower level of technical readiness than other options.
 - b. Costs for fuel and fuel cell vehicles are currently higher than competing technologies, although projections are that by 2030 they will be at or below competitive technologies.
 - c. Hydrogen requires transformational change, which entails risk, and requires support to de-risk and address challenges
2. In addition to the advantages it enjoys, Canada has some significant disadvantages that need to be overcome to ensure hydrogen energy commercialization happens here:
 - a. It is a small market
 - b. Its population is spread out over vast distances, making distribution (a major cost for hydrogen) particularly difficult
 - c. It does not have many head offices for major energy companies or OEMs
 - d. It is later than major competitors, (Europe, California, Japan, Korea, China) in implementing policy to support clean fuels, so many companies are behind in planning for net-zero
 - e. Most Canadians and Canadian industry have little awareness of hydrogen energy
3. Other countries are investing heavily in hydrogen energy and are aggressively promoting their ability to supply hydrogen, products and technology. They are attracting private sector investment, OEM attention and customers.

If Canada does not put in place support for hydrogen energy commercialization in place to overcome these challenges, it will fall behind:

- It will lose out on major export markets for products and energy
- Its industry will be disadvantaged by not have access to low-cost hydrogen and fuel cell products
- Canadian companies in the sector will be forced to relocate and invest overseas to compete.
- The transition to net-zero will be slowed

As such, the CHFCA recommends prompt and significant support for the sector. This support will trigger corresponding investment from other levels of government and from the private sector. Post-2030, hydrogen energy will be fully competitive with other clean solutions and not require extra support, but in the interim, targeted funding is vital.

Hydrogen Strategy for Canada

The Strategy recommends 32 actions in 8 pillars. It further recommends \$5-7 billion in support over 5 years. The CHFCA endorses the recommendations.

The eight pillars are:

Pillar 1: Strategic Partnerships - Strategically use existing and new partnerships to collaborate and map out the future of hydrogen in Canada.

Pillar 2: De-Risking of Investments - Establish funding programs, long-term policies, and business models to encourage industry and governments to invest in growing the hydrogen economy.

Pillar 3: Innovation - Take action to support further R&D, develop research priorities, and foster collaboration between stakeholders to ensure Canada maintains its competitive edge and global leadership in hydrogen and fuel cell technologies.

Pillar 4: Codes and Standards - Modernize existing and develop new codes and standards to keep pace with this rapidly changing industry and remove barriers to deployment, domestically and internationally.

Pillar 5: Enabling Policies and Regulation - Ensure hydrogen is integrated into clean energy roadmaps and strategies at all levels of government and incentivize its application.

Pillar 6: Awareness - Lead at the national level to ensure individuals and communities are aware of hydrogen's safety, uses, and benefits during a time of rapidly developing technologies.

Pillar 7: Regional Blueprints - Implement a multi-level, collaborative government effort to facilitate the development of regional hydrogen blueprints to identify specific opportunities and plans for hydrogen production and end use.

Pillar 8: International Markets - Work with our international partners to ensure the global push for clean fuels includes hydrogen so Canadian industries thrive at home and abroad.

Funding amounts for each pillar are not defined.

CHFCA Budget Analysis – 2021-2025 (5 year)

The CHFCA prepared an analysis with an eye to achieving meaningful targets for hydrogen energy penetration in 2025 and 2030, with the objective that post 2030, Canada is fully prepared to expand the hydrogen grid from coast to coast, and to implement hydrogen energy applications in heating and transportation. A summary is below.

Summary	2021-2025			2026-2030	
Hubs	20			30	
LD Vehicles	6000			57000	
HD Vehicles	1502			9012	
Gas Blending (% of total PJ)	0.17%			1.1%	
Capital & Operating	2021-2025		Funding Source	2026-2030	
	Total	Federal Government		Total	Federal Government
Hydrogen Production Capital*	\$369	\$184	Clean Fuel Fund	\$2,367	\$1,183
Distribution & Storage					
Liquefiers	\$200	\$100		\$200	\$100
Hub Pipelines	\$75	\$38		\$360	\$180
Storage	\$300	\$150		\$630	\$315
Subtotal Distribution & Storage	\$575	\$288	Clean Fuel Fund	\$1,190	\$595
Fueling Stations	\$950	\$440	NRCan, CFS Credits	\$3,270	\$975
Applications					
Vehicles	\$1,860	\$609	ZEV Program	\$10,300	\$1,263
Gas Blending Stations	\$150	\$75	CFS Credits	\$600	\$300
Subtotal Applications	\$2,010	\$684		\$10,900	\$1,563
Operations					
H2 Strategy Implementation (NRCan)	\$25	\$25		\$25	\$25
Hydrogen Purchases	\$519	\$84	Clean Fuel Fund	\$5,471	\$647
R,D&D at Hubs	\$900	\$315	SDTC Hydrogen Fund	\$2,250	\$788
Directed research at private companies	\$100	\$75	NRC	\$100	\$75
Hub Costs (Management, Project Dev.)	\$115	\$109	SIF	\$158	\$154
Subtotal Operations	\$1,659	\$608		\$8,004	\$1,688
Major Projects**	\$2,000	\$1,000		\$3,000	\$1,500
Total	\$7,562	\$3,204		\$28,730	\$7,504

* - assumes 100% electrolysis. Other, lower cost options may be available in some areas.

** - major projects will arise that are important to maintain leadership and that require significant funding. Eg: an Alberta pipeline project; major wind/hydrogen projects in BC, AB, NS; export projects (production, pipeline, terminal, ship)

The following is a breakdown of CHFCA recommendations

Recommendation	Details	2021-2025 Amount (\$MM)	Strategic Pillar
1. The CHFCA supports the climate action policies announced by the government	1.1. Price on carbon 1.2. Clean fuel standard 1.3. Focus on building back cleaner, with stimulus spending focused on clean infrastructure 1.4. ZEV support 1.5. Public transit support	These policies are technology neutral	2, 5
2. Increase funding support for zero-emission options to prepare for net-zero. Provide direct funding to Hydrogen as it is less established than other clean fuel options such as power and biofuels.	2.1. Dedicated funding for hydrogen (total). (Detailed recommendations in the attached table.) 2.2. Support the provincial strategies to enable de-risking 2.3. Source of funding: 2.3.1. Allocate a portion [\$500 MM?] of the \$1.5 B Clean Fuel Fund specifically to fund hydrogen projects 2.3.2. Allocate a portion of the ZEV funding 2.3.3. Allocate a portion of SIF funding 2.3.4. Increase NRCan station funding 2.3.5. Provide additional funding to enable the emerging industry.	\$3,125 (total of amounts below)	All
3. Increase spending on research, development and demonstration	3.1. Allocate clean fuels research at universities and government research facilities, to hydrogen related technologies – production, fuel cells, distribution, storage, etc. 3.2. Leverage our research facilities such as CNL and others to enable the industry 3.3. Direct research funding to the private sector to address core technology issues	Existing Existing \$75 \$358	3

	3.4. Develop a focused program under SDTC for hydrogen-related demonstrations at Hydrogen Hubs –		
4. Establish a SIF Hydrogen Pillar under the SIF Industrial Transformation fund – similar to the battery pillar	<p>4.1. Collaborate with provinces on blueprints</p> <p>4.2. Funding for Hub feasibility studies – similar to Green Municipal Fund but open to industry looking to study projects that lead to decarbonization</p> <p>4.3. Establish a network of Hydrogen Hubs with reasonable but aggressive timelines to provide critical infrastructure to support research, demonstration and deployment</p> <p>4.4. Develop pre-FEED-level analysis for hydrogen export projects</p>	<p>\$5</p> <p>\$100</p> <p>\$4</p>	1, 2, 3, 6, 7, 8
5. Increase allocation for Light and Heavy-duty fueling station construction	<p>5.1. Commit to building out appropriate number of hydrogen stations along all major highway corridors to support transportation across the country as per the Hydrogen Strategy.</p> <p>5.2. Ensure Incentive financeable, capacity-based CFS credits CFS credits are available to support station construction</p> <p>5.3. Align with provincial funding</p>	\$440	2
6. Support FCE vehicle deployments	<p>6.1. Support deployment of light and heavy-duty applications</p> <p>6.2. CIB – ensure program works and allocates \$429MM (capital) \$100 M (fueling stations) and \$50 MM (fuel) to support H2 transit buses and fuel supply – because many elements are made in Canada as well as the fuel.</p> <p>6.3. For LD FCEVs, replenish the Transport Canada purchase and lease incentives budget with a specific allocation for FCEVs, and remove the MSRP cap for FCEVs given their lower state of commercial maturity / higher cost vs BEVs</p>	\$609	2

	6.4. Establish a new federal voucher program for heavy duty vehicles (e.g. like California HVIP, sized to close the delta between a diesel and zero emission alternative. Would be around \$300k - \$400k per FC bus or truck)		
7. Support hydrogen blending in NG for res/comm heating and industrial use	7.1. Increase H2 in NG for Res/Comm heating to 2% (average) by energy by 2030 7.2. Increase H2 in NG for Industrial applications to 0.5% (average) by energy by 2030 7.3. Support blending stations	\$75	2
8. Support hydrogen production, distribution and storage buildout	8.1. Increase clean H2 supply for transportation and heating applications by 140 TPD by 2025; 8.2. Support short (~15km avg) pipeline networks at Hydrogen Hubs 8.3. Support liquefiers to provide national merchant supply and enable exports. 8.4. Support hydrogen storage at hubs and power to gas location	\$369 \$38 \$100 \$150	2
9. Support hydrogen fuel costs	9.1. Support and guarantee fuel purchases 9.2. Work with provinces to obtain low power rates for electrolysis	\$84	2
10. Tax relief for clean fuel infrastructure: including H2 production, distribution, fueling stations	10.1. Establish credits under CFS based on clean hydrogen – which will be used for all new heating/transportation applications. Do not use average hydrogen carbon intensity which reflects legacy hydrogen for industrial processing. 10.2. Tax credits for clean fuel infrastructure, including HFS 10.3. Enhance SR&ED tax credits for hydrogen related projects		2

<p>11. Allocate funding for NRCan Strategy implementation</p>	<p>11.1. Communications, working groups, etc</p>	<p>\$25</p>	<p>1, 4, 5, 6, 7, 8</p>
<p>12. Industrial Processing – not included</p>	<p>12.1. Industrial processing, such as refining, chemical, biochemical, steel and fertilizer production is a huge opportunity for clean hydrogen. Many Hubs will be baseloaded on hydrogen demand for industrial processing.</p> <p>12.2. Hydrogen needs and support will vary widely from location to location.</p> <p>12.3. The price on carbon and the clean fuel standard will be significant drivers of clean hydrogen use in these industries</p> <p>12.4. The Industrial transformation fund will assist this transition.</p> <p>12.5. For the above reasons, this analysis does not include required support to industrial processing. Close cooperation with industrial processing companies is needed to ensure synergy – especially in hydrogen production, locations of Hubs and distribution/storage optimization</p>		<p>1, 2</p>
<p>13. Major Projects</p>	<p>13.1. Opportunities for major projects will arise that will be extremely important in keeping Canada relevant in the global hydrogen sector, and to show the viability of large-scale hydrogen projects. The specifics are impossible to forecast at this point, but may include:</p> <p>13.1.1. A production, pipeline, terminal and shipping opportunity to ensure Canada participates in the emerging global export market, similar to what Australia is doing (export) and Rotterdam is doing (import). This may come up on the East Coast or West Coast.</p> <p>13.1.2. An Alberta pipeline project to connect the Heartland with Calgary and/or the US market.</p> <p>13.1.3. Major wind/solar to hydrogen projects (GW scale) as are being developed in Spain, Saudi Arabia,</p>	<p>\$1,000</p>	<p>2, 8</p>

	<p>Australia, China. These may emerge in northeast BC, AB, offshore in the Maritimes, the Gaspé, etc.</p> <p>13.2. We recommend allocating at least \$1B to support such projects over the next 5 years.</p>		
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