BC-SMART Low Carbon Fuels Consortium

Decarbonising Long-Distance Transport

1.1.

Newsletter Issue No. 9, March. 2023 **BC-SMART decarbonisation of aviation/marine workshop**

From the BC-SMART Secretariat

As covered in more detail below, the British Columbia Sustainable Marine, Aviation, Rail and Trucking (BC-SMART) Low Carbon Fuels Consortium recently held a VERY informative workshop on decarbonising the aviation and marine sectors. Participants included BC-SMART's "coalition-of-the-willing", with representatives from national and international industry, government and the R&D community. All of the stakeholder's contributions were insightful, with BC-SMART acting as the "secretariat/dating agency"! As mentioned in previous newsletters, the coalition was formed to help the Province/Canada meet its Clean BC/National goals by reducing BC and Canada's transportation related greenhouse gases (GHGs). It achieves this goal by creating synergies between the many players needed to meet the province's (and Canada's) ambitious decarbonisation targets. As with previous workshops, one goal was to maximise the interactions between low carbon intensive (CI) fuel producers and long distance-transport users. In this way the workshop participants contributed to BC-SMART's major objectives of, (1) further developing the policies and regulatory measures that encourage the production and use of sustainable feedstocks and low-CI fuels (Government Lead) and, (2) "leveraging" the supply chain and infrastructure needed to support the production and use of sustainable feedstocks and low-CI fuels.

As discussed in the workshop, the marine sector has various ways it can lower the CI of the fuels it uses (e.g., "green" electricity, methanol, hydrogen, ammonia, drop-in biofuels) while long-distance aviation will be primarily limited to using biojet/ Sustainable Aviation Fuels (SAF).

Further details about the workshop agenda and a recording of the meeting can be accessed at the BC-SMART website (www.BC-SMART.ca). As always, we appreciate your readership and value your input and feedback. Please email us your ideas or suggestions on how we can enhance the value of the BC-SMART newsletter. Readers are encouraged to send us any updates on how the long-distance transport, including rail and trucking, which are not discussed in this issue of the newsletter, can be decarbonised.

Thank you for reading and participating in the BC-SMART network!

Hana, Susan and Jack

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Summary and Overview

As described in the workshop agenda, although the marine and aviation sectors were profiled, key players such as low-CI feedstock suppliers, oil companies, government, policy makers, etc., provided invaluable perspectives. The British Columbia (BC)/Canadian situation was also compared to what is going in the US and internationally (e.g., ITF/OECD). One aspect that was clear, "enabling" policies such as the US IRA and Europe's fit-for-55 will be needed to both facilitate the production and use of low-CI fuels and help bridge the price gap between fossil and alternative, low-CI fuels. Dave Schick (Canadian Fuels Association, CFA) chaired the first session which provided an overview of international and US strategies in *decarbonisation aviation and marine* while also summarizing some of the federal (NRCan, TBS) and industry-led (C-SAF) initiatives in trying to decarbonise Canada's marine and aviation sectors. The following session, moderated by Peter Lister (Seaspan), focused on the marine sector which profiled the various low-CI fuels that are being considered. This was an area where Canada is "walking the talk", with impressive examples from CSL, BC Ferries and Seaspan showing that the Canadian/BC marine sector is using various low-CI fuels to reduce its carbon footprint. Jennifer Kroll (BC Ministry of Energy) moderated the first of the afternoon sessions which highlighted some of Canada's "advantages", such as being a major producer of vegetable lipids (feedstock for bio/renewable diesel and biojet/SAF) and having Canadian "oil" companies (Parkland, Tidewater, Shell) already in the business of supplying (or soon to be supplying) lower-CI fuels for the long-distance transport sector. However, the US's investment in this area, from more fundamental, "academic" work supported via ASCENT through to commercialisation and enabling policies such as the IRA, indicated some of what Canada needs to do if it is serious about decarbonising its aviation and marine sectors. The closing session was chaired by Scott Stanners (BC Bioenergy Network, BCBN) where the presenters described how policies such as BC's carbon tax and Low Carbon Fuel Standard (LCFS), will be catalytic if the province is to meet its Clean BC targets. The session also described how the federal government might build on its Clean Fuels Regulations (CFR) and how measuring the carbon intensity (CI) of alternative fuels in considerably more complicated than assessing volumetric (e.g., 10% ethanol) goals. As discussed below, if we are to mitigate the increasing effects of climate change, we will need the coordinated efforts of the *coalition-of-the-willing*. This informative workshop went some way to fulfilling BC-SMART dating agency function, with the hope it leads to some long and productive relationships!

Setting the Scene

BC-SMART's ***decarbonisation of aviation/marine*** workshop focused on four, related topics, to try to better determine how BC and Canada might reach their net zero emission goals for 2030 and 2050.

The sessions included:

1. International/national perspectives on how the marine/aviation sectors might decarbonise;
2. The use of low-CI fuels by the aviation and marine sectors;
3. The important roles of feedstock providers and oil refiners in the production of low-CI fuels;
4. The key roles that policies, certification and life cycle analysis (LCA) will play;

The start of the workshop included a short description of BC-SMART's software (the policies and regulatory measures) and hardware (the supply chain and infrastructure) goals that are being pursued to support the production and use of sustainable feedstocks and low-CI fuels. British Columbia's "advantages" include enabling policies (BC LCFS, Carbon Tax), green electricity, innovative forest/pellet/oil refining sectors, and its importance as a strategic transportation hub (equidistant between Europe, Asia and South America), with access to major regional and international markets. Goals that are clearly defined in the Clean BC Roadmap (Figure 1) target the production of 1.3 billion litres of renewable fuels by 2030 and the possible inclusion of aviation/marine fuels in the BC LCFS. One result of this policy ((S&T)^2 estimation) is that BC's emissions (per capita) have decreased from 17 tonnes in 1990 to 13 in 2020.

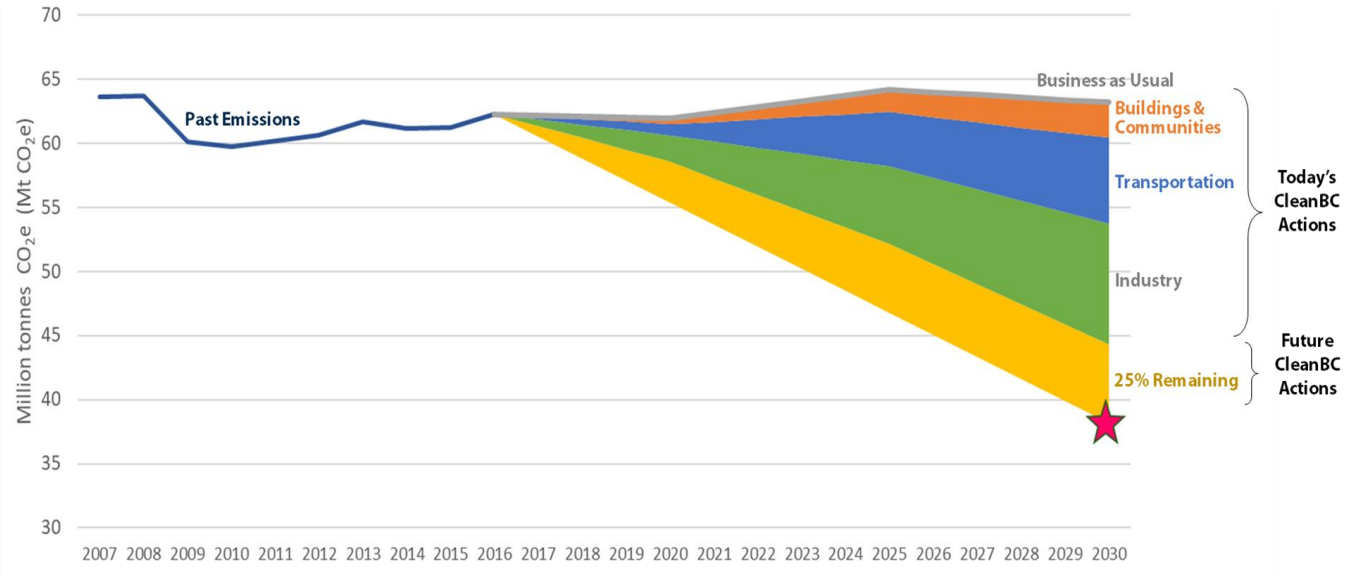

Figure 1. Pathways to meeting Clean BC targets (Source: Clean BC Roadmap, 2020 Climate Change Accountability Report)

1. International/national perspectives on how the marine/aviation sectors might decarbonise

The workshop opened with an international perspective, presented by Till Bunsen from the International Transport Forum, (ITF)/ the Organisation for Economic Co-operation and Development (OECD), where he shared insights from DT Implement, a government-industry partnership to decarbonise the global shipping, aviation and heavy-duty road freight sectors. This was followed by Jim Spaeth from the US Dept of Energy (DOE) who described the US's decarbonisation targets which include significantly decarbonising electricity by 2035 and achieving net-zero emissions by 2050. Policies such as tax credits for the production of SAF, "green" hydrogen and investments in clean energy and infrastructure improvements were just some of initiatives that were highlighted. With the help of policies such as the US's Inflation Reduction Act (IRA) the US hopes to produce at least 3 billion gallons of SAF/yr by 2030 and 35 billion gallons/yr by 2050. The US also plans to have at least 5% of its deep-sea fleet capable of using zero-emission fuels by 2030. This includes about 200 vessels using low-CI fuels and 10 international ports having the low-CI fuels infrastructure in place. However, as summarized below (Figure 2), the ongoing collaboration between US

federal agencies (DOE, USDA and DOT) suggests that a suite of technology solutions across the full transport spectrum will be required if the country is to effectively decarbonise its transport sector.

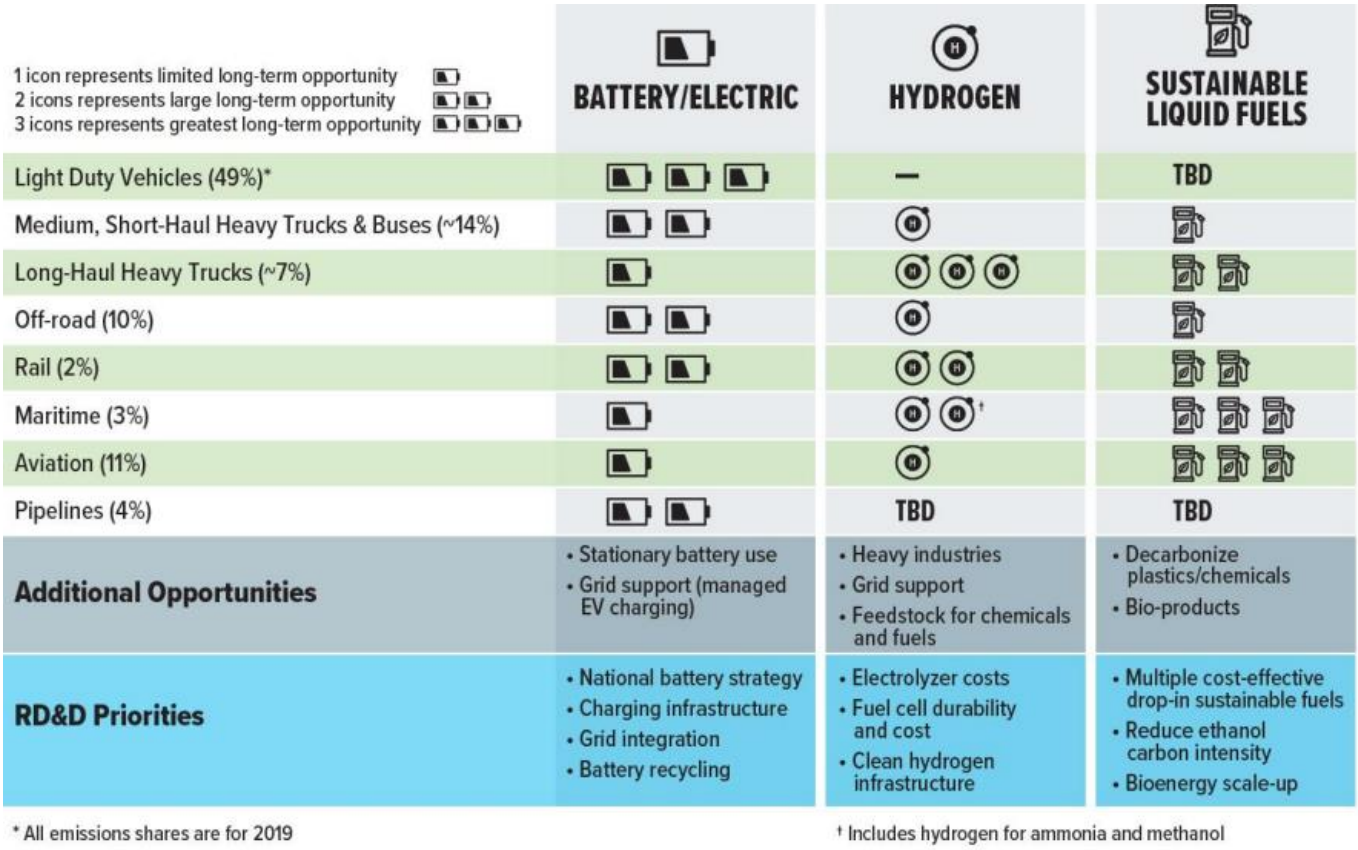

Figure 2. Technology solutions for travel modes to reach a net-zero economy in 2050 (Source: The U.S. National Blueprint for Transportation Decarbonisation)

The US IRA also includes a two-year Tax Credit for companies who blend SAF and a subsequent three-year Tax Credit for companies who produce SAF. The program also includes a grant program ($290 million over four years) to carry out projects that produce, transport, blend or store SAF or develop, demonstrate, or apply low-emission aviation technologies. To be eligible, the SAF must achieve at least a 50% improvement in GHG emissions performance on a life-cycle basis as compared with conventional jet fuel. The tax credit, which starts at $1.25/gallon of neat SAF, increases with every percentage point of improvement in life cycle emissions performance up to $1.75/gallon. The IRA provisions of interest to aviation include:

- SAF Credit (Incentive for SAF, LCA based on Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) or the Renewable Fuel Standard (RFS)). It applies to fuels sold or used after December 31, 2022;
- Clean Fuel Production Credit (Incentivized for clean transportation fuels, including SAF, LCA based on CORSIA or RFS (for SAF) and GREET (for other clean transportation fuels). It applies to fuels sold or used after December 31, 2024;
- Clean Hydrogen (Incentivized for “green” hydrogen, LCA based on GREET);

Following the US perspective, Maygan Maguire (Natural Resources Canada, NRCan) briefly summarized the outcomes of the Ottawa transportation, low-CI fuels workshop that was held towards the end of 2022, jointly organized by NRCan and the Canadian Fuels Association (CFA). She emphasized how Canadian policies such as the CFR will play a key role. However, the US IRA was perceived as a "game changer" that Canada still needed to address. Maygan also described the important role that low-CI fuels will play in meeting Canadian federal government climate goals. Based on government predictions, "clean" fuels could constitute up to one third of domestic energy demand in the high clean fuel's scenario by 2050. NRCan's $1.5B ecoENERGY for Biofuels (ecoEBF) program is an important component of Canada's renewable fuels strategies as well as the $200M ecoAgriculture Biofuels Capital Initiative and the $500M NextGen biofuels Fund. Policies such as the CFR have proven to be "catalytic" with currently planned investments by Canadian companies exceeding $15 billion dollars.

Canada is also fortunate to have initiatives such as the "*driving the demand for low-CI air and marine fuel through public and private sector procurement*", which was described by Chris Lindberg from the Treasury Board of Canada Secretariat (TBS). This program is part of Canada's "greening government" initiative which describes the nations climate change and sustainability plans. Chris described how federal government operations consumed about 360 million litres (Ml) of fuel in 2018-19 including 235 Ml of aviation fuel (148 Ml Military grade F-34 and F-44, 89 Ml Grade Jet A-1) and 125 Ml of marine fuel (96 Naval Distillate Fuel, 28 MI Marine Diesel & Diesel Fuel (Type A & Type B)). As described, the Greening Government Strategy (GGS) is a commitment to global leadership in net-zero, resilient and green operations. It has three objectives of 40% reduction of real property and conventional fleet emissions by 2025, net-zero emissions overall by 2050 and overall green & climate resilient government operations. Although Treasury Board is leading the project, experts from Department of National Defence (DND), Coast Guard, NRCan, Enviroment and Climate Change Canada (ECCC), Public Services and Procurement Canada (PSPC), etc., are all closely involved.

Chris described how the Federal Low Carbon Fuel Procurement Program (LCFPP) has a budget of $227.9 million (over 8 years) to support the purchase of drop-in, low-CI fuels for the federal marine and air fleets. The program has a goal of reducing the GHG emissions of the federal fleets, stimulate market demand and help accelerate the transition to clean fuels. The program estimates a cumulative purchase of >325 million liters of neat low carbon fuels (>1 billion liters of finished fuels at an average blend of 30% by volume). They will work with suppliers and other major public and private-sector end users to increase the availability and affordability of Low-CI fuels.

Closing out this thought-provoking initial session, Geoff Tauvette from Canadian Council for Sustainable Aviation Fuels (C-SAF) briefly described the draft roadmap on how Canada might decarbonise aviation. The C-SAF vision includes Canada producing and using SAF/biojet fuels that are affordable, sustainable and low carbon. Geoff described how he hopes C-SAF will catalyze the Canadian "ecosystem", activate value chains, design and promote public policy, which are all important components of the "made-in-Canada" roadmap. The goal is to have C-SAF as a neutral and balanced technical expert, making it the "go-to-place" for SAF deployment in Canada.

2. The use low-CI fuels by the aviation and marine sectors

As discussed in the workshop, the aviation sector has fewer, alternative, low-CI fuels than the marine sector. Despite ongoing research on hydrogen and "green" electricity, the aviation sector will primarily need drop-in biofuels (e.g., biojet/SAF) that are compatible with existing planes and supply chains, if the sector is to successfully decarbonise over the next 20-30 years. Although Biojet/SAF will be the most significant part of this decarbonisation strategy, other measures such as increased efficiency, operational measures, etc., will also play a role. In contrast, as described below, the marine sector has various low CI fuel options.

Susan van Dyk from BC-SMART/UBC gave an overview of the decarbonisation options that are being assessed by the world's marine sector. Reducing GHG emissions in shipping will require a "basket" of measures. To date a major focus has been reducing "pollutants" such as SOx, NOx, particulates, etc., with various "lower-CI fuels" such as LNG (liquid natural gas), RNG (renewable natural gas), bio/renewable diesel, methanol, ammonia, "green" electrification, hydrogen and improving efficiency and operations (the CI of ships) all being assessed. The International Maritime Organization (IMO) has implemented multiple measures to reduce the CI of vessels and international shipping, including the EEDI (since 2013), EEXI, SEEMP, DCS and CII (Figure 3). However, these changes will primarily reduce CO_2 emissions by improving the energy efficiency of ships and operations (CO_2 per kWh transport work), rather than by using low-CI fuels. Although the sector is considering using hydrogen, ammonia, LNG and methanol as fuels, currently, the vast majority of these potentially lower-CI fuels, are made from fossil sources such as natural gas. The sector needs to use a more representative LCA methodology that promotes the use of low-CI fuels that offer substantial climate benefits. Currently, only the hull-to-wake or exhaust emissions are considered in current LCA calculations (e.g., EEDI and CII), not the full LCA of the fuel.

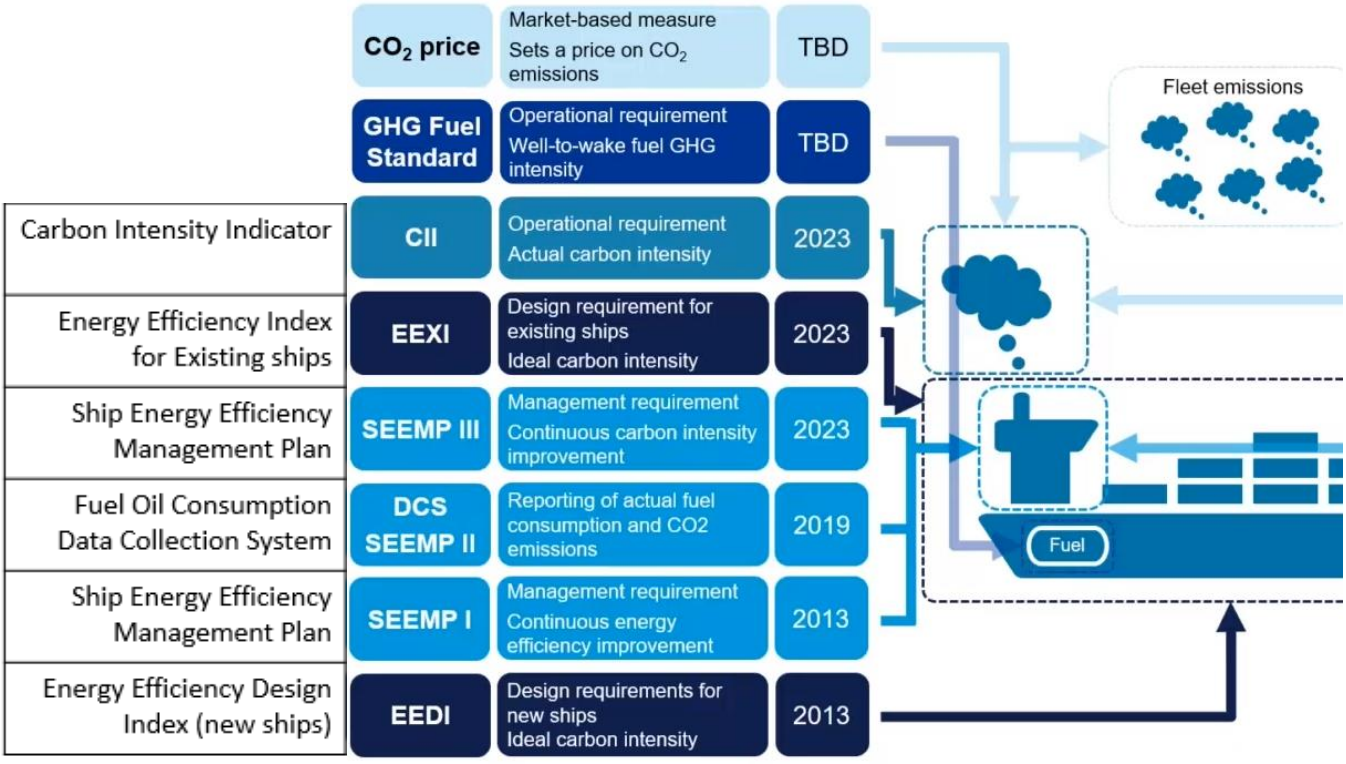

Figure 3. The current IMO regulatory framework to reduce GHG emissions (Source: DNV)

Susan described how the IMO has recommended reducing the carbon emissions of the sector by 50% by 2050 (compared to 2008 levels). As summarized in Figure 4 and Figure 5, IMO has also suggested that, as well as using low-CI fuels, various logistic, digitalization, hydrodynamics, low-CI fuels and carbon capture and storage will need to play a role.

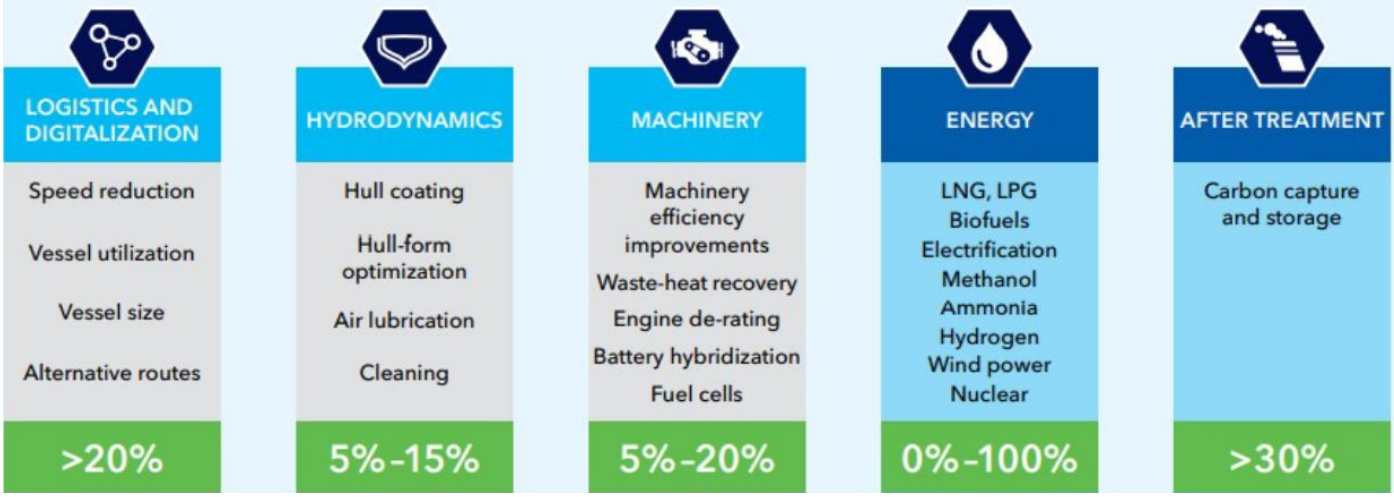

Figure 4. GHG emission reduction potential of technologies that contribute to shipping decarbonisation (Source: Vidovic et al., 2023)

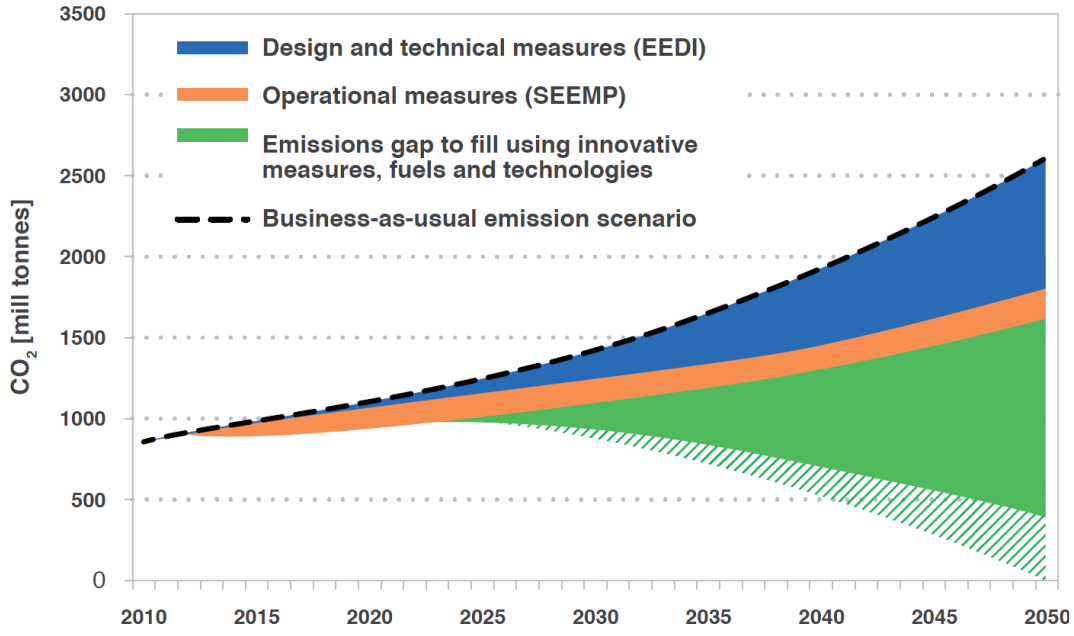

Figure 5. Proposed GHG reduction pathway to achieve IMO's ambitious goals (Source: IMO)

However, it is clear that low-CI fuels will play a major role in reducing marine derived emissions (including carbon) and that the entire life cycle, including the CI of the fuel itself (as gCO_2/MJ), needs to be considered. As discussed later in the workshop, although LNG can result in significant NOx, SOx, etc., reductions, it is more of a "transition" fuel as it still results in significant carbon emissions. Although bio/renewable/co-processed diesel can provide a "drop-in" low-CI fuel, (as demonstrated by Canada Steamship Lines (CSL)

and discussed later in this newsletter) the BC marine sector is also assessing other ways in which to decarbonise, such as the use of "green" electricity. However, as described in detail by CSL, the "drop-in" nature of biofuels means they can be used to lower CI emissions without the need for substantial infrastructure investments.

Next, Colleen Hanlan described how BC Ferries transported 22 million passengers and 8 million vehicles each year using its fleet of 39 ferries. The company has a goal of reducing its emissions by 27% (by 2030) using bio/renewable diesel, green electrification, operational efficiencies, advanced technologies and fleet modernization. Currently 29 of their 39 ferries use ultra-low sulfur diesel, which includes 5% biodiesel, six ferries using LNG, two using renewable diesel, one using ultra-low sulfur diesel (which includes 20% biodiesel), and one that will soon be on a trial to run on 100% biodiesel. A current focus is displacing conventional diesel with low-CI alternatives. Colleen also mentioned that BC Ferries' "newbuild" vessels are designed with the potential to utilize low-CI fuels, to ensure the company meets its future emission reduction objectives.

In his presentation, Yousef El Bagoury described how Canada Steamship Lines (CSL) is currently using biodiesel to decarbonise its shipping operations. In 2022, CSL used 8 Ml of B100 with eight of the company ships using this fuel. Yousef suggested that the Government could further facilitate the decarbonising of the Canadian marine sector by developing policies that would make the price of marine biodiesel equivalent to the cost of fossil fuels. For example, a three-time (3x) multiplier (for compliance credits) would help the marine sector within the CFR policy. Yousef emphasized the need for policy support (to help bridge the price gap between biodiesel and fossil fuels), by facilitating low-CI fuel production while enhancing the conversion/construction of a low-CI fuels distribution infrastructure across the St. Lawrence - Great Lakes region.

The morning session closed with a presentation by Ahmed Khan (Seaspan Ferries), who provided an overview of the companies decarbonisation initiatives, including leveraging their access to lower carbon fuels. They are currently using LNG/hybrid fuels, plus supplementing the LNG with RNG, to further lower the CI of their operations. The company has also used B100 (derived from soy and canola) which has shown a greater than 90% reduction in the CI of their operations, when compared to using conventional diesel. They have also been assessing the use of electric trucks with the potential of full fleet replacement.

3. The important role of feedstock providers and oil refiners in the production of low-CI fuels

One of Canada's "advantages" is its ready access to feedstocks (lipids such as canola, and biomass such as forest and agricultural residues), as well as "green" electricity. Chris Vervaet from Canadian Oilseed Processors Association (COPA/CCC) summarised the potential growth in the world's vegetable oil output (Figure 6). In 2022, about 23% of the Canadian vegetable oil was used by the fuel sector with the rest primarily used in food related applications. Canada produced more than 18 million tonnes of Canola in 2022 and has a target of producing 30 million tonnes/yr by 2040. However, the percentage of vegetable oils used to make fuels is not expected to increase. Chris showed that crop cultivation was the largest contributor to carbon emissions (54%), followed by renewable fuel production (23%) and crushing (20%). Programs such as the BC LCFS have shown that canola derived renewable diesel reduces GHG emissions by 93% when compared to fossil derived diesel.

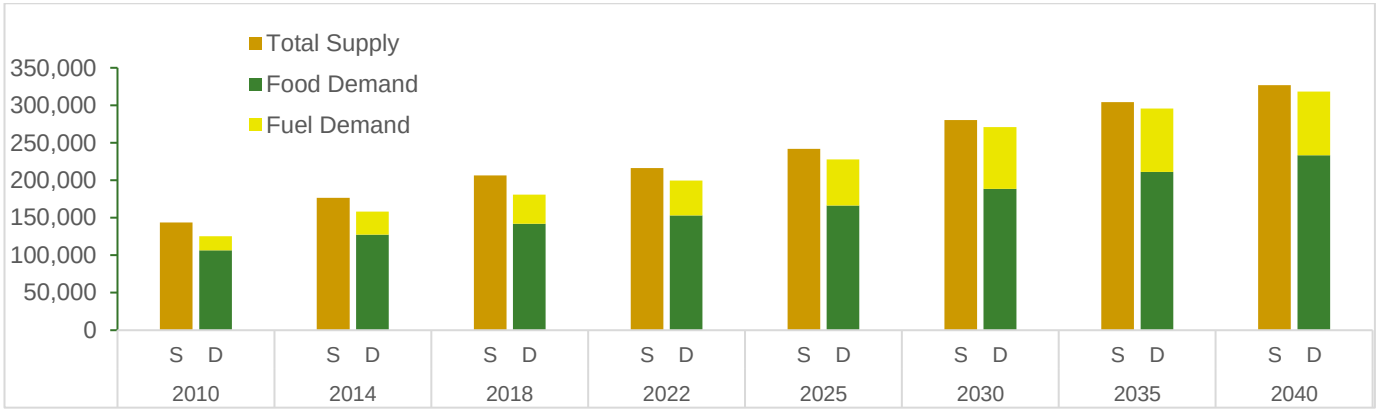

Figure 6. Global vegetable oil supply and demand (thousand tonnes) (Source: LMC Oilseeds & Oils Report, 2022)

To provide more of a US perspective, Michael Wolcott described how the ASCENT (Aviation Sustainability Center and research) program has helped accelerate SAF development, highlight environmental and economic sustainability concerns and generally shown how SAF can decarbonise aviation. The program has enhanced collaboration between universities, industry and international groups such as Federal Aviation Administration (FAA), ICAO, Transport Canada, U.S. Environmental Protection Agency (EPA), Department of Energy (DOE), US Department of Agriculture (USDA), Air Force Research Laboratory (AFRL) and the defense Logistics Agency Energy. ASCENT's work has shown how the estimated value of each component, e.g., the policy revenue, capital intensity of the pathway, the cost of the feedstock, the scale of non-feedstock operating costs (Figure 7), etc., all influence the minimum selling price of the SAF. For example, using corn ethanol to make biojet/SAF might seem attractive from a feedstock availability point-of-view, however, the relatively poor CI reduction and the current RIN classification for ethanol mean that various aspects, such as better policy support for this pathway, needs to be addressed. Although cellulosic ethanol could have a lower CI than either sugar-or-starch derived ethanol, the technical feasibility and cost of making this so-called 2G ethanol remains problematic. With current US federal policies, hydro-processed esters and fatty acids (HEFA) derived SAF should be competitive with conventional fuels, particularly when using "waste" feedstocks, such as tallow or used cooking oil (UCO). However, these "waste" feedstocks are limited and unlikely to support the production of large quantities of SAF (read more).

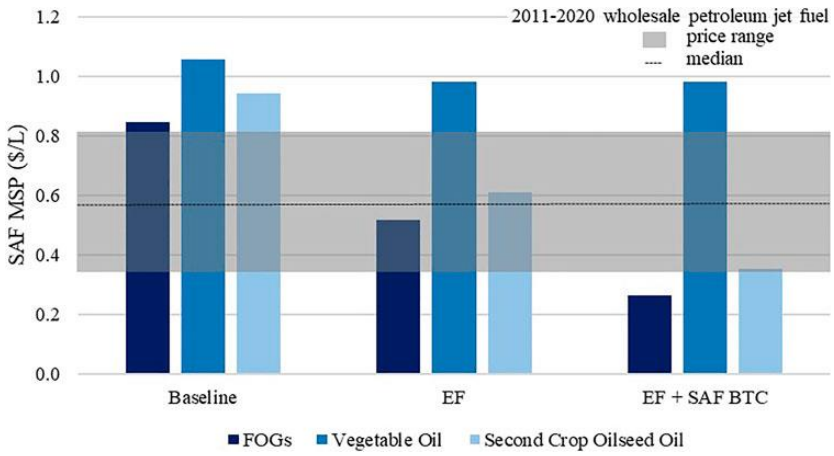

Figure 7. SAF Minimum Selling Price (MSP) (Source: ASCENT)

Mike also described how the US IRA has incentivized the production and use of SAF and green hydrogen in the US. As mentioned earlier, the IRA is seen as "game changer" by Canada and other non-US countries with these countries struggling to define how they might establish their own policies to encourage domestic production and use of low-CI fuels.

As well as feedstocks (biomass, lipids) and "green" electricity, other BC/Canada advantages are its oil refineries (e.g., Parkland and Tidewater) who plan to decrease their carbon footprint by expanding their co-processing operations and establish stand-alone drop-in biofuels facilities. Rob Pinchuk summarised Parkland's progress in lowering the CI of the fuels they produce by co-processing lipid feedstocks. Parkland has doubled its production, from 80 Ml in 2022 to currently over 200 Ml. The refinery is co-processing 20% renewables in their Fluid Catalytic Cracker (FCC) and they plan to increase co-processing capacity to 6,000 barrels per day (BPD). Rob described how co-processing at the FCC enables greater feedstock diversity (Figure 8). The benefits of a co-processing approach include low capital requirements, fast implementation and feedstock flexibility. Rob highlighted the importance of provincial government support via the BC Ministry of Energy and programs such as the Low Carbon Innovation and Part 3 credit grants. These were integral to Parkland's plans to make lower CI fuels. He also highlighted the benefits of partnerships, such as the collaboration with UBC/BC-SMART in better tracking the "green molecules" during co-processing and working with groups such as Grace who is their catalyst supplier.

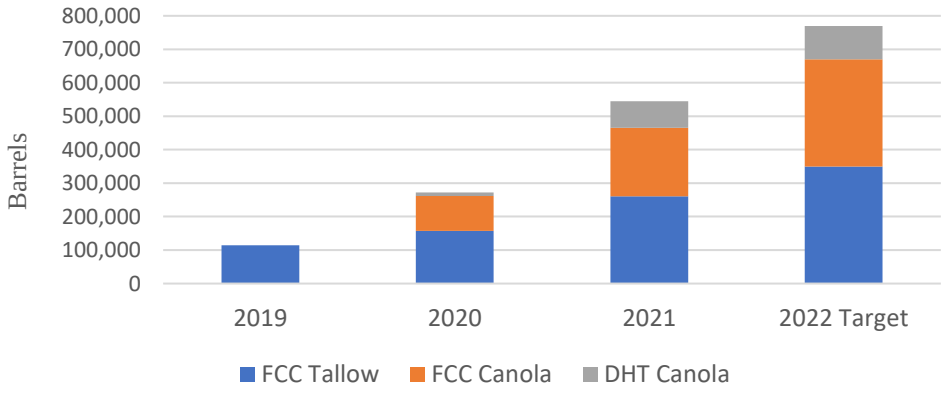

Figure 8. Parkland's yearly co-processing rates (Source: Parkland)

Krasen Cherenkov from Tidewater Midstream followed this talk by providing a detailed overview of the company's progress in building a Renewable Diesel and Renewable Hydrogen Complex at its Prince George refinery. The revamped facility will include a pre-treatment unit that will allow increased flexibility in processing various lipid/oleochemical feedstocks while using the HydroFlex technology to produce 3,000 BPD of renewable diesel from a mixture of lipid feedstocks.

Moving from a provincial perspective to more of a global one, Jenna Annand described Shell's goals of becoming a net-zero emission energy business by 2050 and its plans to reduce absolute emissions by 50% by 2030. Shell also plans to supply 10% of its total aviation fuel sales as SAF by 2030. Jenna summarised some of the challenges of decarbonising the marine sector such as the long life cycle of assets, technically complex to electrify, the need for new infrastructure for fuel bunkering and supply and the IMO being slow to develop more ambitious regulations. She remined the group that, although the aviation sector appears to

be further ahead in its decarbonisation strategies, in 2019 global biojet/SAF production was less than 0.1% of total aviation fuel consumption. This alone indicates that need for "enabling" policies to drive investment and encourage supply and demand.

4. The key role that policies, certification and life cycle analysis (LCA) will play

The closing session of the workshop discussed how previous volumetric targets (e.g., 10% ethanol) were easier to define, quantify and develop policies to meet, than it was to reduce the CI of alternative fuels. For example, although various routes to SAF/Biojet have been ASTM certified, the cost and more importantly the CI the low carbon fuel is still evolving. Michael Rensing described how the International Air Transport Association (IATA) estimates that global SAF production will reach at least 300 Ml in 2022, which is a 200% increase on the 100 Ml produced in 2021. He also suggested that the amounts of available feedstocks are unlikely to meet long-term demand while remaining environmentally sustainable. Currently, most of Canada's renewable diesel comes from the US and, with policies such as the US IRA, it will be difficult for Canadian producers to compete. Amy Teucher from the BC Ministry of Energy, Mines and Low Carbon Innovation described how low-CI fuels for marine use in ferries, tugboats, recreational and fishing boats are already included in the BC LCFS. The BC LCFS is designed to reduce BC's reliance on non-renewable fuels, reduce the environmental impact of fuels and spur growth in the clean fuels industry. The proposed changes to the *Low Carbon Fuels Act*, that should be introduced in 2024, will include a low-CI "jet fuel category" and a similar category aimed at decarbonising marine fuels.

The final speaker was Don O'Connor (S&T)^2, who was tasked with trying to pull the deliberations together, while offering his own insights as a long term LCA champion. He encouraged the group to look at the big picture, such as population growth, existing/developing supply chains, etc., and that a holistic approach should be undertaken to support the programs. Don suggested the Canadian government develop policies and programs that support financial investment decisions that maximize low-CI fuel production and use. For example, develop a long-term industrial and innovation strategy that builds on Canada's strengths such as producing cheaper and sustainable oilseeds, building on established biomass supply chains, encouraging Canadian refiners to decarbonise, etc.

The information discussed at the BC-SMART workshop provided food-for-thought for the following day's workshop led by the Chris Lindberg (TBS) on, "Accelerating the Deployment of SAF in Canada". As mentioned earlier, this workshop had a goal of collecting feedback for the LCFPP which has a budget of $227.9 million (over 8 years) to support the purchase of drop-in, low-CI fuels for the federal marine and air fleets. This program is part of Canada's "greening government" initiative which describes the nations climate change and sustainability plans.

Summary of the workshop

BC and Canada are fortunate to have many "champions" who are currently decarbonising their operations, from forward-thinking oil refineries through to marine and aviation companies who are assessing various low-CI fuels. However, it was clear that the "right" policies will play a major role as most, if not all, low-CI fuels will initially be more expensive that current, fossil derived fuels. Although provincial (BC LCFS)

and federal (CFR) policies will play a key role, the US IRA was perceived as a "game changer" that Canada needs to address. As was discussed, "enabling" policies such as the US IRA and Europe's fit-for-55 will play important roles in both facilitating the production and use of low-CI fuels and help bridge the price gap that is currently the case between fossil and alternative, low-CI fuels. For example, most of renewable diesel fuels used in Canada comes from the US, and with policies such as the US's Blender's Tax Credit (BTC) and the IRA it will be difficult for Canadian producers to compete. However, in many areas BC/Canada is "walking the talk", with impressive examples from CSL, BC Ferries and Seaspan showing that its marine sector is already assessing various ways to reduce its carbon footprint. We are also fortunate to have C-SAF acting as Canada's "neutral-and-balanced" facilitator, who is currently developing an overall strategy to produce and use low-CI aviation fuels.

As was discussed, even though groups such as ICAO (the International Civil Aviation Organization) have set net zero GHG emissions targets for aviation by 2050, have established CORSIA to develop a global sustainability framework for fuels and their certification (subsequently verified by ISCC or RSB), the workshop participants recognized that the "devil-is-in-the details" when it comes to representative LCA's. Although default carbon intensities have been established for different low-CI fuel pathways and LCA methodologies established to calculate actual carbon intensities, it is likely that various factors, such as the international nature of long-distance transport, different geographical conditions and, most importantly, that nature of the policies in play, will all influence our success in decarbonising BC's, Canada's and worlds long distance transport sectors.

If you would like to be part of the **"Coalition of the Willing"** and continue to receive our newsletter and occasional updates about BC-SMART consortium, please contact us at:

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