



The BC-SMART Low-Carbon-Intensive-Fuels (LCIF) Consortium

Decarbonising Long-Distance Transport

Newsletter Issue 2, September, 2020



This issue of the BC-SMART (British Columbia's-Sustainable Marine, Aviation, Rail and Truck fuels) Newsletter hopes to update you on the recent activities of the Consortium as well as the latest developments in "how the world is trying to decarbonise long-distance transport".

In this Issue

From the BC-SMART Secretariat

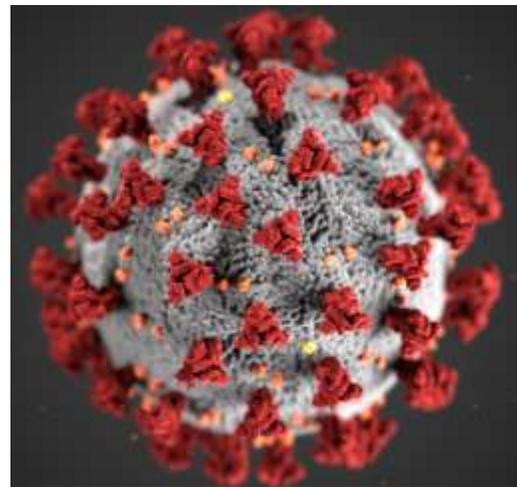
- **Crystal ball gazing: how do we decarbonise long-distance transport during/after COVID-19?**
- **Producing low-carbon intensive fuels through co-processing lipid feedstocks in BC/Canada's oil refineries**

Policy and Regulatory Developments

- **BC's Low Carbon Fuel Standard (LCFS) and Canada's Clean Fuel Standard (CFS)**

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In the News



Picture: Illustration of SARS-CoV-2 virus that causes COVID-19, Centers for Disease Control (CDC.gov)

From the BC-SMART Secretariat

Since publishing our last Newsletter, the BC SMART low-carbon-intensive-fuels (LCIF) Consortium has continued its work to encourage the production and use of low-carbon intensive biofuels for long-distance transport. Although the COVID-19 pandemic has transformed how we interact, with in-person meetings now challenging, the BC SMART Secretariat has been working with its members to explore how decarbonisation of long-distance transport can be integrated into post-COVID economic recovery plans.



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Crystal ball gazing: how do we decarbonise long-distance transport during/after COVID-19?

BC-SMART/IEA Bioenergy Task 39: Virtual Panel Discussion, June 2020:

The BC-SMART low-carbon-intensive-fuels (LCIF) Consortium and IEA Bioenergy Task 39 have been fortunate to work with a “coalition-of-the-willing” of industry, government and academic stakeholders committed to decarbonising transport, the long-distance transport sector in particular. During the last 6 months or so, COVID-19 has brought unprecedented economic challenges to every industry, including long-distance transport. On June 30, 2020, [IEA Bioenergy Task 39](#), [BC Bioenergy Network](#) (BCBN), and [BC-SMART](#) organized a webinar entitled, “Crystal ball gazing: how do we decarbonise long-distance transport during/after COVID-19?”. The internationally attended webinar brought together sector experts **David Schick** (Vice President – Western Canada, Canadian Fuels Association), **Geoffrey Tauvette** (Low-Carbon and Sustainable Aviation Expert), **Chantale Despres** (Director – Sustainability, Canadian National Railway), **Peter Lister** (Vice President – Commercial Services, Seaspan), and **Chris Vervaet** (Executive Director, Canadian Oilseed Processors Association) to participate in a **Virtual Panel Discussion** that was attended by about 180 participants from across the globe. The focus was on, “how might the long-distance transport sector decarbonise while driving national and international economic recovery and growth?” Although a description of the main takeaways of the webinar is provided in the next section, you can also access the [webinar recording](#) and [the slides](#) through the [BC-SMART](#) and [IEA Bioenergy Task 39](#) websites.

The potential to produce 650 million litres of low-carbon-intensive-fuels (LCIF) by co-processing lipid/oleochemical feedstocks in BC oil refineries

At the request of BCBN, the BC-SMART Secretariat recently completed a study which assessed BC’s potential to produce 650 million litres of low-carbon-intensive-fuels (LCIF) annually by co-processing lipids at BC’s two oil refineries and the potential of this approach to reduce the Province’s GHG emissions.



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One of the main findings was that CleanBC's renewable fuel production goal of 650 ML/year could be achieved if a 30% co-processing ratio was used at both of BC's oil refineries. Current and future Canadian oilseed and vegetable oils production can readily meet the feedstock demands needed to meet CleanBC's target (of 650 ML of renewable fuels by 2030) using a co-processing approach.

The study also estimated that the annual avoided CO₂eq emissions could range from 279,000 tonnes (at 5% co-processing rate) to 1.7 million tonnes (at 30% co-processing rate). Thus, the annual avoided CO₂eq emissions, if a 30% co-processing rate was used, would be about 28% of the CleanBC goal of reducing 6 million tonnes of CO₂eq from the transport sector by 2030.



Picture: Canola Council of Canada

Canola oil is one of the lipid feedstocks considered for co-processing at BC oil refineries

Based on the active, international participation and the ongoing discussions it generated, this inaugural BC-SMART webinar seems to have been a tremendous success. We are very grateful to David Schick for moderating the discussions and the excellent panel members (described later) who made the webinar so informative and interesting. We also want to thank the very engaged participants and Anna Ringsred, (Senior Policy Analyst at the BC Ministry of Energy, Mines, and Petroleum Resources), in particular, for sharing details about British Columbia's Low Carbon Fuel Standard (LCFS).

As always, we appreciate your readership and value your input and feedback. Please email us (nuwan.kapu@ubc.ca) with any ideas or suggestions you might have on how we can increase the value of this newsletter for you.

Thanks for reading and participating in the BC-SMART low-carbon-intensive-fuels (LCIF) Consortium.

Nuwan, Mahmood, Jianping, and Jack



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Crystal ball gazing: how do we decarbonise long distance transport during/after COVID-19? ([click to watch](#)) ([click for slides](#))

Webinar Takeaways

We were fortunate to have David Schick, Vice President – Western Canada, [Canadian Fuels Association](#) (CFA), with over 30 years of experience in the energy sector, to moderate the discussion. In his opening remarks, Dave underscored the commitment of CFA membership to transition to a low carbon economy. Canada’s refining sector contributed \$10.2 billion to the Canadian economy in 2018 and has invested

(CFA) members are actively engaged in solutions to support transition to a low carbon economy

– David Schick, Vice President – Western Canada, Canadian Fuels Association



over \$12 billion in improving its environmental performance since 2000. Dave stressed the importance of striking a balance between economic recovery and decarbonisation. He eloquently described both the challenges and opportunities arising from Canada’s resource-based economy, vast geography, urban-rural differences and the need to meet the country’s climate change commitments. He suggested that leveraging the country’s established energy infrastructure will be essential if Canada is to have a successful, greener post-COVID recovery and he is confident that CFA members can adapt their operations to supply lower-carbon fuels in support of such an effort.

Aviation

Airlines have been hit particularly hard by the COVID-19 pandemic with Geoffrey Tauvette, a Low-Carbon and Sustainable Aviation fuel expert, stressing the enormity of the problem by pointing out that the sector is expected to lose more than \$84 billion in 2020! However, a small “silver-lining” that parallels these



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economic woes is that aviation’s global greenhouse gas emissions have dropped to pre-2005 levels. Although the International Air Transport Association (IATA) expects revenue to recover to 2019 levels by 2024, in Post-COVID times, unless mitigation efforts are adopted, GHG emissions are forecasted to rise to over 600 million tonnes by 2024 and continue to increase (Figure 1). The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) scheme put forward by the International Civil Aviation Organization (ICAO) aspires to carbon-neutral growth from 2020 and 50% net CO₂ reduction by 2050 relative to 2005 levels. However, many



SAF is the best medium term solution (to cut emissions from aviation)

– Geoffrey Tauvette, Low-Carbon and Sustainable Aviation expert

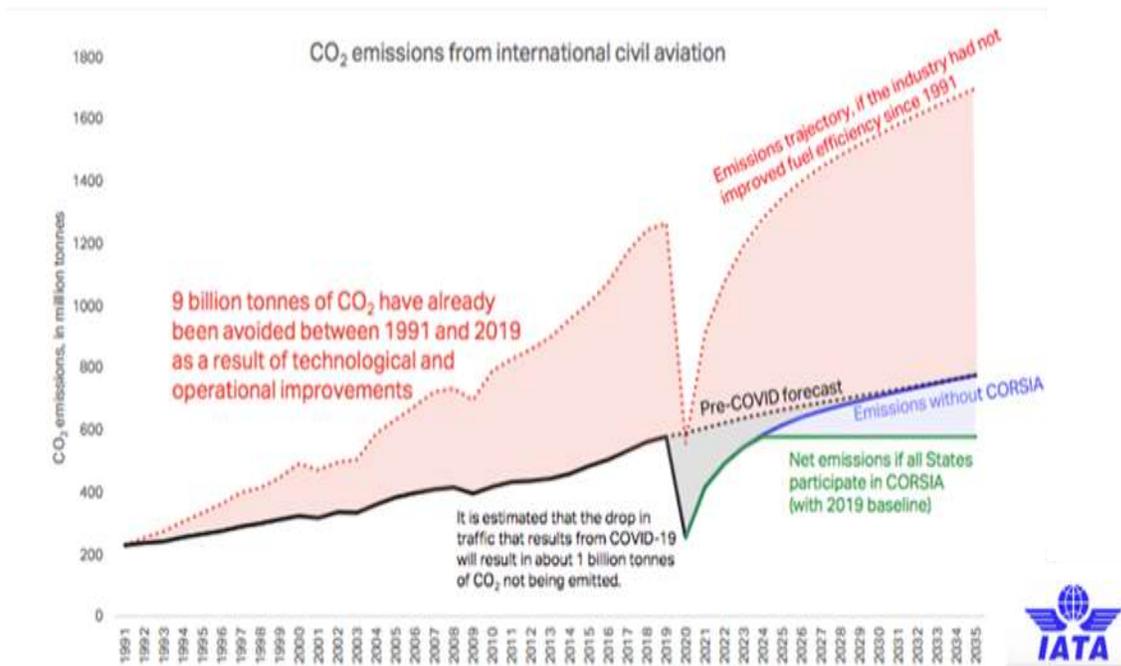


Figure 1: CO₂ emissions from international civil aviation (International Air Transport Association)

airlines are in “survival mode” and OEMs (original equipment manufacturers) are also struggling financially. Thus, while older inefficient equipment will likely be retired to save costs, it is unlikely that



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industry will have the required funds to focus on implementing technology innovations such as new airframes or engines with lower fuel consumption. Thus, lower-carbon-intensity biojet fuels will be of even more importance to reduce emissions.

Geoff also indicated that, currently, Sustainable Aviation Fuels (SAFs) are not cost-competitive with fossil jet fuel and the global supply of biojet fuel is VERY limited. As current policies, such as British Columbia Low Carbon Fuel Standard (BC LCFS), favour the production of renewable fuels used for road transport, Geoff stressed the need for policy drivers to both bridge the price gap between fossil jet fuel and SAFs, while encouraging the allocation of these lower-carbon-intensive-fuels to the aviation sector rather than to land transport applications where there are alternatives such as hybrid, electric or even hydrogen power.

Long-haul Trucking

Peter Lister, Vice President – Commercial Services, [Seaspan](#), emphasized Canada’s vast geography and the country’s reliance on long-distance transport to access domestic and international markets (Figure 2). Over 325,000 long-haul trucks currently operate in Canada, consuming 6.2 billion litres of diesel annually. Several approaches have been proposed to decarbonise trucking and each of these options has its pros and cons. For example, long

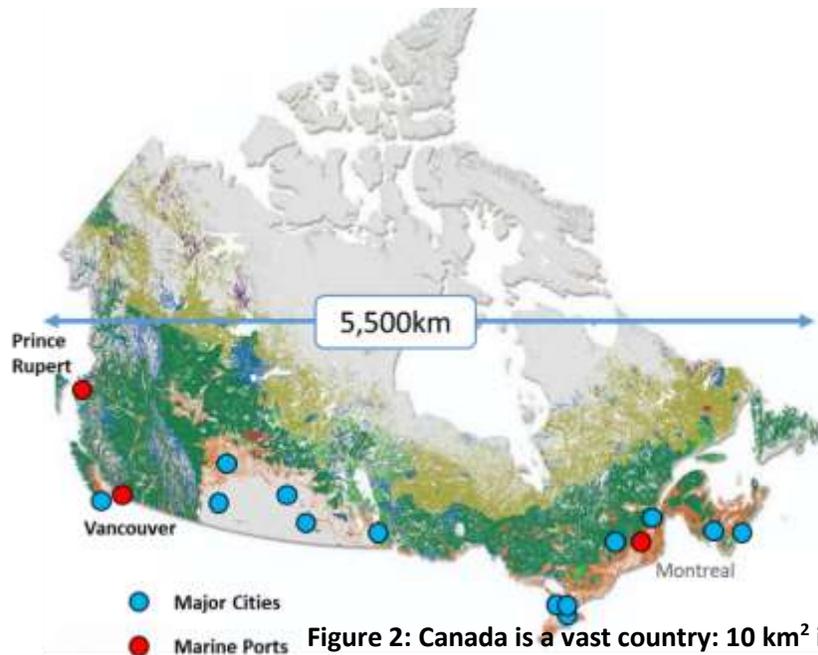


Figure 2: Canada is a vast country: 10 km² in area and 5,500 km across, making decarbonisation of long-distance transport, in particular long-haul trucking, challenging.



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charging times makes electrification impractical in the near-term while the use of liquified natural gas (LNG) faces infrastructure limitations. Low-carbon liquid fuels, particularly renewable diesel, are attractive in the near-term due to their compatibility with existing infrastructure, lower NO_x and particulate matter emissions, and tolerance of high blend level.

Marine Transport



Reducing environmental impact is a core value of Seaspan

**– Peter Lister, Vice President –
Commercial Services, Seaspan**

Canada has three major ports (Vancouver, Prince Rupert, and Montreal) that connect the country to international markets. The Port of Vancouver is the largest port with 3160 vessels berthing every year. The principal regulatory drive to mitigate emissions from global shipping is the International Maritime Organization's (IMO's) 2050 target, which calls for at least a 50% reduction in GHG emissions compared to 2008 levels. The IMO also proposes caps on sulfur and particulate material emissions with the shipping sector hoping to meet these standards through exhaust scrubbers, new engine designs, or alternative fuels such as LNG or methanol. Using Seaspan, a Vancouver-based marine transport and services company, as an example, Peter illustrated how coastal shipping companies could reduce emissions. Seaspan operates the largest fleet of ferries, tugs, and barges in Canada consuming 33 million litres of ultra-low sulfur diesel annually. The company continues to

reduce its emissions through modernization of its fleet using LNG and lithium battery bank powered vessels and some new vessel designs to reduce CO₂ emissions by about 2000 tons per year. Seaspan is also running trials using biofuels.



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Rail Transport

Rail is one of the greenest modes of long-distance transport and Chantale Despres, Director –



CN is moving the sustainable economy

Sustainability,

*– Chantale Despres, Director – Sustainability,
Canadian National Railway*

[Canadian National
\(CN\) Railway,](#)

confirmed that rail is about 4-5 times more fuel-efficient than trucks with rail-mediated-freight transport showing lower emissions, as compared to trucking, by about 75%. Chantale indicated that Canadian National (CN) not only strives to reduce its own emissions, but also hopes to help its customers to transition to a more sustainable and lower carbon economy. The firm’s 20,000 route mile network connecting nine ports on three coasts and many cities across North

America provides lower carbon transport to a variety of goods, including electric vehicles, biofuels, food, and even bitumen. The CN rail company has avoided emitting 45 million tonnes of carbon since 1993 through fuel efficiency gains. It has also set a “science-based” target of a 29% reduction in emissions by 2030 (based on a 2015 baseline) using a combination of fleet renewal including more fuel-efficient locomotives and



Figure 3: CN’s strategy to reduce GHG emissions by 29% by 2030

innovative technologies such as anti-idling and cleaner fuels

(Figure 3). The company has also signed a Memorandum of Understanding with Transport Canada to reduce its carbon emissions by 6% (2017 baseline) over five years from 2017 to 2022.



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The Oilseed Industry: Canadian Feedstocks for Low Carbon Fuels



Biofuel production from vegetable oils sourced from oilseeds has been a commercial process since the early 2000s. Canola (or CANadian-Oil-Low-Acid) is the major oilseed grown in Canada with 18.6 million tonnes produced in 2019. Chris Vervet, (Executive Director, [Canadian Oilseed Processors Association](#)) underscored that, primarily due to modern agricultural practices, Canadian canola's lifecycle carbon intensity is one of the lowest in the world and that the Canadian canola industry is committed to sustainability, targeting an 18% reduction in energy use and a 40% improvement in land use efficiency

Biofuels from canola oil are proven, efficient, sustainable, and ready

– Chris Vervet, Executive Director, Canadian Oilseed Processors Association

by 2025. Vegetable oils can be used for both feed and fuels as the Canadian canola industry has a proven track record of increasing productivity since the 1990s. With the industry having goals of 52 bushels per acre yield and 26 million tonnes overall seed production by 2025, the industry is confident that it can meet both food and fuel demands.

Policy and Regulatory Developments

Developments in British Columbia's Low Carbon Fuel Standard and Canada's Clean Fuel Standard

British Columbia's Low Carbon Fuel Standard (BC LCFS) is one of the most successful emission reduction legislative measures that is being used globally. Speaking at the West Coast Bioenergy Guild webinar organized by [BCBN](#) on August 12, 2020, Anna Ringsred, Senior Policy Analyst at the BC Ministry of Energy, Mines, and Petroleum Resources ([BC MEMPR](#)), described the elements and successes of the legislation. BC LCFS consists of both renewable fuel volume requirements (Part 2 of the act) and lifecycle (feedstock production/acquisition through fuel use) carbon intensity (CI) reduction targets (Part 3). The Part 2 component requires most gasoline and diesel supplied in BC to contain at least 5% and 4% renewable



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content by volume, respectively. To comply with the Part 3 component, fuel suppliers (producers and importers) must reduce the carbon intensity of the provincial transportation fuel mix (gasoline, diesel, and substitutes) by 20%, by 2030, from a 2010 baseline.



The legislation initially mandated a 10% carbon intensity reduction by 2020. This has since been amended to 9.1% due to the difficult economic environment resulting from the COVID-19 pandemic and a corresponding, significant, reduction in the demand for transportation fuels. For different fuel classes, BC MEMPR has established carbon intensity limits that decrease yearly to a cumulative decrease of 20% by 2030. A fuel supplier generates credits for fuels supplied in BC with a carbon intensity below the carbon intensity limit while fuels having a carbon intensity over the limit accrue debits. Each credit or debit is equivalent to 1 tonne of CO₂eq and a supplier's balance must either carry zero or more credits (in other words, no debits in their account) to comply or face a non-compliance penalty of \$200/debit. BC's fuel suppliers can comply with BC LCFS by either supplying low carbon intensity fuels, buying credits from other fuel suppliers, or earning credits through Part 3 agreements. One of the critical features of the BC LCFS is that the ability to trade credits provides a "market-based mechanism" for compliance.

Additionally, Part 3 agreements (an agreement between a fuel supplier and the BC MEMPR) incentivise fuel suppliers to undertake actions that increase the use of low carbon fuels sooner than would otherwise have occurred and have a reasonable possibility of reducing GHG emissions. Suppliers are awarded credits for meeting project milestones even though actual emission reductions may yet to be realized. A good example is Parkland Refinery Ltd.'s developmental efforts to co-process lipids.



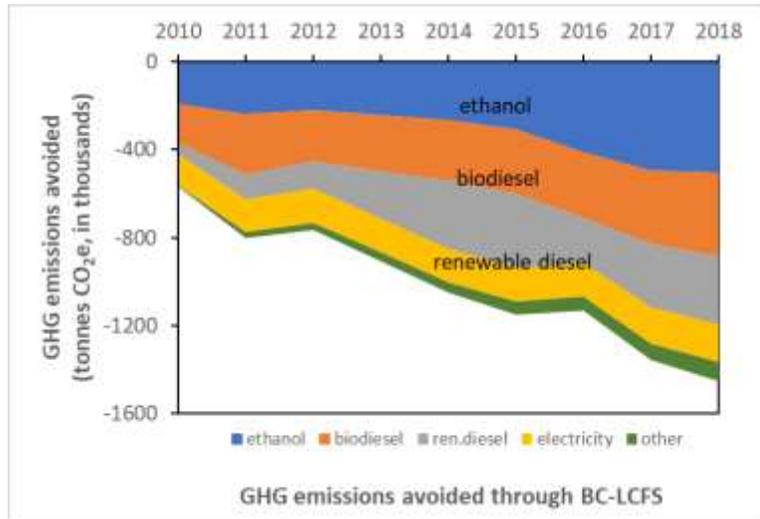
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The success of the legislation is exemplified by the fact that the BC LCFS has resulted in the avoidance of over 9 million tonnes of cumulative GHG emissions from 2010-2018 globally, with over 7 million tonnes accounted for by biofuels. The BC MEMPR is considering several amendments to the legislation. At present, the BC LCFS relates to only gasoline, diesel and their substitutes, such as ethanol, biodiesel, and renewable diesel. Since marine and air



transport account for substantial emissions, the ministry is considering the inclusion of jet and marine fuel classes. One option is to expand the legislation to treat jet and marine fuels similar to diesel and gasoline classes and increase the emission reduction obligations of all suppliers. The other is to allow suppliers of aviation and marine fuel to opt-in and create credits without the added burden of compliance debits for higher carbon intensity fuels. It is likely that an opt-in approach will bridge the price gap between renewable jet (SAFs) and marine fuels, support market development as well as help establish fuel quality standards.

Part 3 agreements not only lay the groundwork for additional low carbon intensity fuel supply in the long-term but also help create compliance credits in the short-term. Credit generation is essential because, with increasingly stringent carbon intensity limits, fuel suppliers will require more compliance credits. Currently, only Part 3 fuel suppliers are eligible to enter into Part 3 agreements and other players in the value chain do not have a clear opportunity to generate credits and capture value. Therefore, the Ministry is contemplating expanding Part 3 agreement eligibility to others involved in fuel supply, such as feedstock and fuel intermediate producers as well as retailers who supply low CI fuels directly to consumers. However, there is a concern that the increasing demand for compliance credits may lead to higher credit



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prices in the credit market and higher compliance costs. Also, market prices higher than \$200/credit may prompt some suppliers to settle debits by paying off the incurred monetary penalties. This could result in a failure to achieve the intended emissions reductions while fuel consumers may also face higher prices at the pump. In response, the Ministry is considering more stringent compliance penalties and new compliance assurance mechanisms.

The Canada Clean Fuel Standard: Revision of Publication Timeline

The proposed Canada Clean Fuel Standard (CFS) plans to reduce GHG emissions by 30 million tonnes per year by 2030. The CFS will cover liquid, solid, and gaseous fuels with those requirements relevant to liquid fuels coming into effect in 2022. Environment and Climate Change Canada (ECCC) expects to implement the solid and gaseous fuel regulations in 2023. The legislation will require obligated parties to reduce fuel carbon intensity by 13% by 2030, increased in June 2020 from the original target of 11%. This amounts to a reduction of 12 g CO₂e/MJ for fossil fuels against a 2016 baseline. [However, due to COVID-19, ECCC has delayed the publication of proposed regulations until the end of 2020 and the agency expects to finalize the obligations by late 2021.](#)

Webinars and Conferences

IEA Bioenergy Webinars

- IEA Bioenergy Webinar (May 2020) IEA Bioenergy, Global Collaboration on Sustainable Bioenergy, A Look Forward ([click to watch](#)) (click for slides).
- IEA Bioenergy Webinar (April 2020) Advanced Biofuels – Potential for Cost Reduction ([click to watch](#)) (click for slides).



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Biofuel Digest's DigestConnect

- DigestConnect#20 (August 2020): California Here I Come: Biofuels Digest editor Jim Lane discusses advanced biofuels in California with Dave Rubenstein the CEO of California Ethanol & Power and Mark Riedy, the dean of renewable energy project finance and a partner at Kilpatrick Townsend Stockton ([click to watch](#)).
- DigestConnect#17 (July 2020): Renewable Diesel: Biofuels Digest editor Jim Lane discusses renewable diesel with Emerging Markets CEO Will Thurmond ([click to watch](#)).
- Biofuel Digest Webinar (July 2020): Port of Rotterdam: Opportunities in renewable fuels and chemicals at the port ([click to watch](#)).
- DigestConnect#9 (May 2020): A role for renewable fuels in Green Recovery: Biofuels Digest editor Jim Lane discusses with Joanne Ivancic of Advanced Biofuels USA, Graham Noyes of the Low Carbon Fuels Coalition, and Jeremy Martin of the Union of Concerned Scientists ([click to watch](#)).

Virtual Bioenergy Symposium, Biomass Energy Network, University of Alberta

- Producing Renewable Biofuels through Co-processing/Co-refining – Bioenergy/Biofuels R&D at CanmetENERGY Devon (August 2020). Jinwen Chen Director, Downstream and Renewables, and Anton Alvarez-Majmutov, R&D Lead, Renewables, Hydroprocessing and Modeling, CanmetENERGY Devon, Natural Resources Canada ([click for slides](#))
- A Utilities Perspective on Renewable Natural Gas (August 2020). Jeff Zimmer, Senior Engineer, Renewable Natural Gas, ATCO ([click to watch](#)) ([click for slides](#)).



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- Under Construction: Refocusing Our Renewable Fuels Research and Innovation Priorities (July 2020). Susan Carlisle, Clean Energy Manager, Alberta Innovates ([click for slides](#))

In the News

- Fueling the Future: Sustainable Aviation Fuel Guide 2020. The Business Aviation Coalition for Sustainable Aviation Fuel ([click for pdf](#)).
- Boeing's breakthrough recycling of aerospace carbon fibre wins accolades for sustainability ([Read more](#)).
- Despite the challenges of COVID-19, Air Canada reiterates its commitment to sustainability ([Read more](#)).
- Velocys' waste-to-jet-fuel process moving forward ([read more](#)).
- Airlines for America, a trade organization for leading US airlines, including American and Delta, welcome the approval of new sustainable aviation fuel pathway ([read more](#)).
- Renewable diesel production capacity increasing with petroleum-to-renewable diesel conversions ([read more](#)).
- CVR Energy, Pennsylvania is looking into converting part of its refining capacity to renewable diesel to reduce its exposure to RIN exposure ([read more](#)).
- Global Clean Energy Holdings is planning to retool their newly acquired Alon Bakersfield Refinery to produce renewable diesel from organic feedstocks such as vegetable oil ([read more](#)).
- Neste partnering with OKQ8 to sell Neste MY Renewable Diesel at more than 200 sales points in Sweden by the end of the year ([read more](#)).
- Petrobras to begin HVO production tests ([read more](#)).