



**CRIN Co-processing Webinar**  
**Calgary June 17, 2019**

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# PARKLAND BURNABY REFINERY



- Parkland Refining (B.C.) Ltd. Operates a refinery on Burrard Inlet near Vancouver
- Acquired from Chevron in October 2017
- The Burnaby refinery supplies 25% of the transportation fuel needs in British Columbia
- Capacity of 55 000 barrels a day
- Operating since 1936



# POLICY BACKDROP

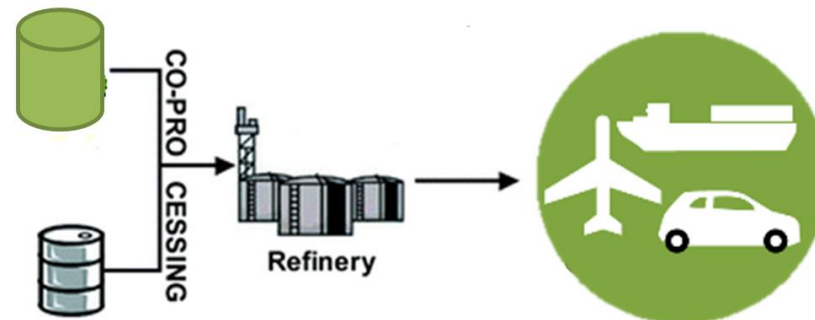
- **B.C. Renewable and Low Carbon Fuel Requirements Regulation**
  - 2 Parts – Volumetric renewable requirements 4% diesel and 5% gasoline
  - Superseded by qualitative Low Carbon Fuel Standard
  - 10% reduction in carbon intensity of transportation fuels by 2020. 2010 baseline
  - Additional 10% reduction between 2020 and 2030
- **Canadian Clean Fuel Standard**
  - Federal low carbon fuel standard starting 2021 for liquid fuels
  - Includes gaseous and solid fuel as well as for buildings and industry

**Low carbon policies will drive change for petroleum refiners**



# WHAT IS CO-PROCESSING?

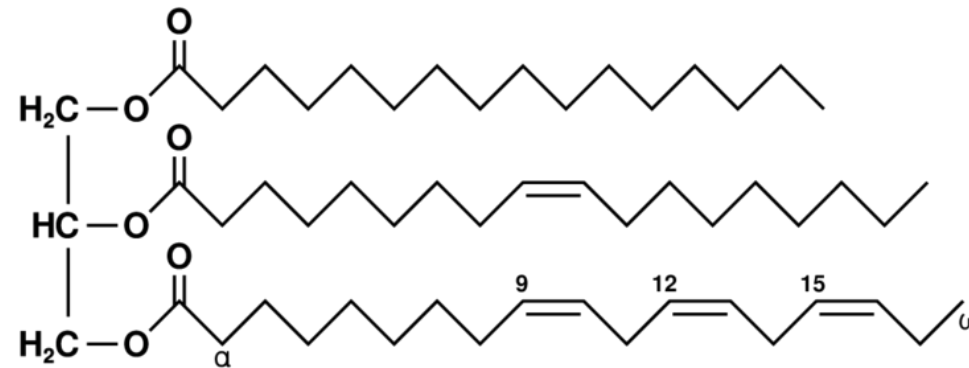
- Supplement crude oil with renewable feedstock
- Co-processing bio-oils with petroleum feedstock produces transportation fuels having lower Carbon Intensity (CI)
- Pursuing lipids and 2<sup>nd</sup> generation feed stocks
- Planning for feedstock flexibility and multiple insertion points
- Parkland approach makes renewable gasoline, diesel and jet
- Support from BC government (MEMPR)





# 'NEW CRUDE' 1<sup>st</sup> GENERATION: COMMERCIALY AVAILABLE

- Feedstock for co-processing which is currently available at scale
- Animal (tallow) and vegetable oils (canola)
- More oxygen than petroleum crude but also a much higher hydrogen content
- Learnings support ongoing development
- For instance, logistics and storage a challenge





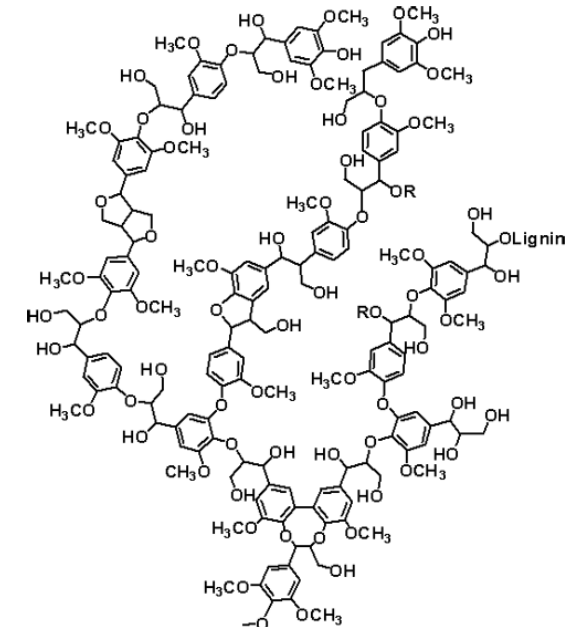
# CO-PROCESSING TRIALS

- Trials build understanding downstream impacts to equipment, yields and economic impacts as well as inform capital investments needed for commercialization:
  - First commercial scale canola test run in 2017
  - Tallow in 2018
  - Longer pre-commercial test runs underway
  - Planned rateable commercialization in 2020
- Feedstock challenges:
  - Volumes at viable economics
  - Suitable chemical and physical characteristics
  - Low Carbon Intensity (CI)
  - Reliable supply chains - aggregation, logistics and storage



## 2<sup>nd</sup> GENERATION: RESEARCH AND DEVELOPMENT

- Source material: wood waste, forest residues, agricultural waste, other lipids, municipal sewage sludge
- Four methods of production
  - Thermal Pyrolysis
  - Catalytic Pyrolysis
  - Hydro Thermal Liquefaction (HTL)
  - Gasification and Recombination (Fischer-Tropsch)
- Significant challenges for co-processing
  - Oil miscibility
  - Unstable – polymerizing
  - High in oxygen and other contaminants
- Parkland is working with several technology partners on solving problems and scaling from R&D to commercial scale





# BENEFITS

- **Lower carbon intensity** and GHG emissions of liquid fuels (gasoline, diesel, jet fuel)
- **High demand products**, economic case and compliance value
- **GHG reductions** from coprocessing are material and near term
- Reducing impact and **increasing value** of waste residuals (tallow, forest residue, municipal wastes)
- **Evolving** existing infrastructure for commercial production of renewable fuels. Maintains utilization
- Leveraging existing technical expertise and innovation





# OTHER BENEFITS OF CO PROCESSING

- **No change** to fuel distribution system, consumer behaviour, or customer-facing infrastructure
- **No new engine design** or fleet requirements
- **New feedstocks** can be brought on stream as available
- **Demonstrates** petroleum industry a constructive partner in meeting climate policy goals





# CHALLENGES

- Stakeholder understanding of petroleum industry scale
- Establishing new supply chains
- Consumer education and acceptance of low carbon fuels
- Directing biomass to transportation fuels
- Pacing considerations pertaining to capital planning. Conflicting priorities of emissions changes and fuel specifications
- Political will to implement climate policy given higher costs
- Measuring renewable composition of new fuels (C14)
- Policy timelines vs. political cycle
- Trade exposure



**COME GROW WITH US**

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