



Life Cycle Analysis of Biofuels

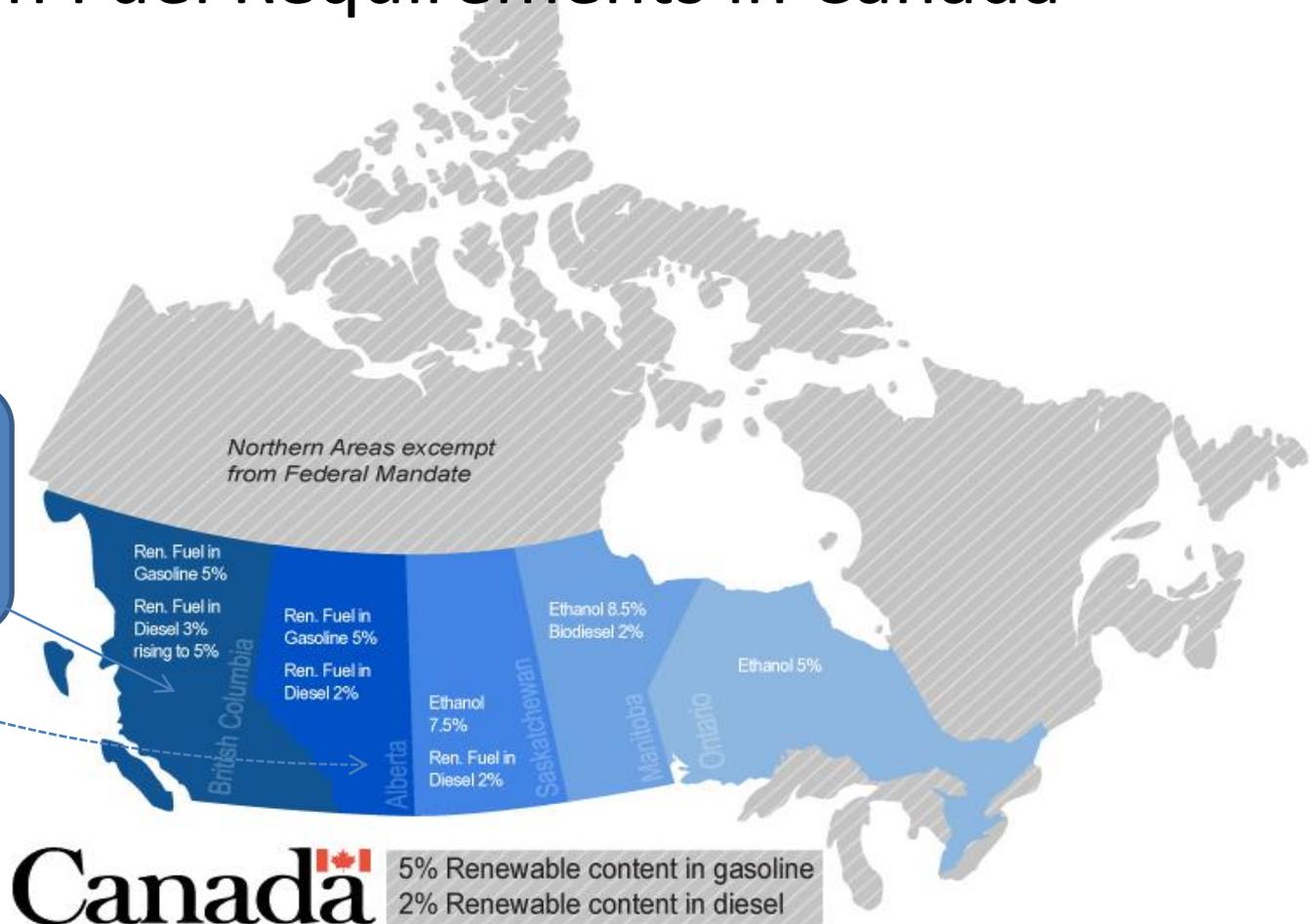
Regulatory Environment in Canada

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Low Carbon Fuel Requirements in Canada

Low Carbon
Fuel
Requirement



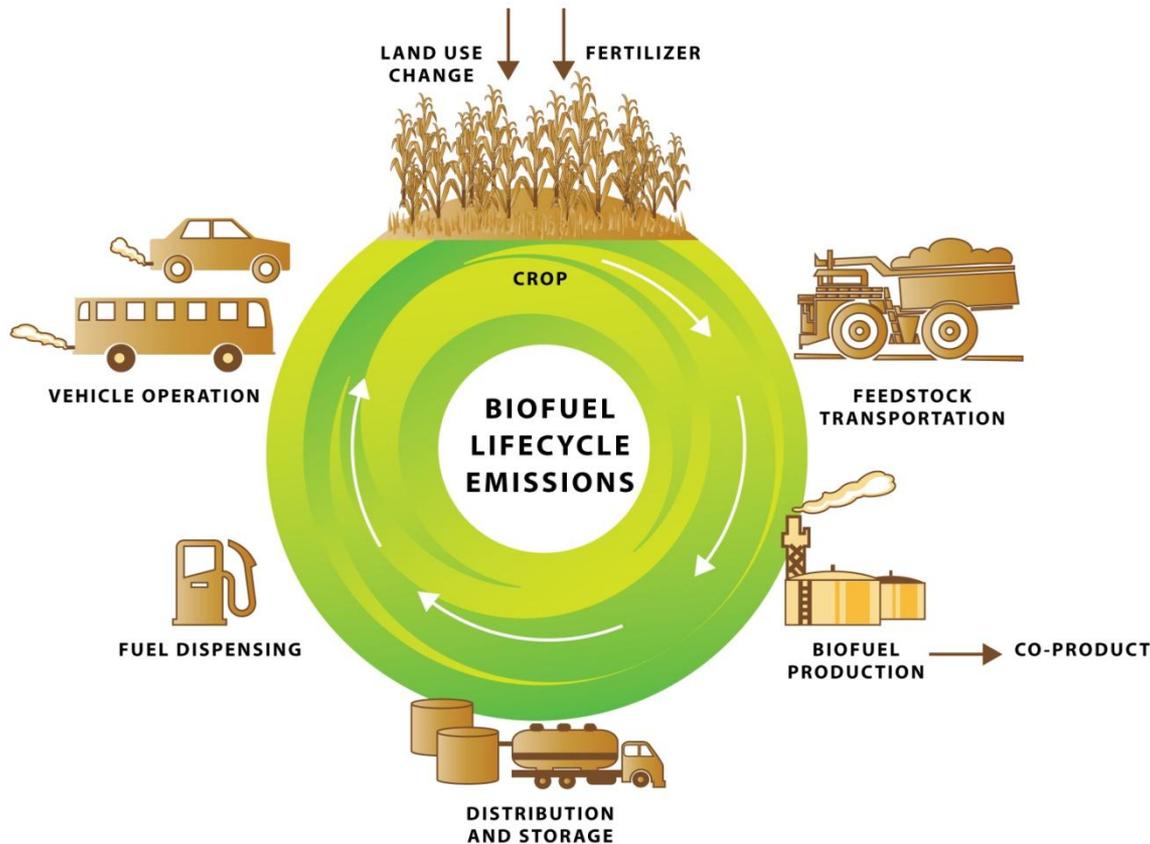


Life Cycle Assessment in Canada

- Calculation of LCA for Transportation in Canada
- Alberta's Emissions Eligibility Standard
- BC's Low Carbon Fuel Requirement
- Challenges and Lessons Learned
- Opportunities for Improvement
- Future Areas of Research



LCA for Transportation in Canada



- GHG Genius
- ISO 14040 and 14044
- Data for fuels used in Canada



Calculation of Carbon Intensity

Fuel Dispensing
Fuel Distribution and Storage
Fuel Production
Fuel Transmission
Feedstock Recovery
Land Use Change
Fertilizer Manufacture
Gas Leaks and Flares
CO ₂ and H ₂ S Removed
Emissions Displaced
Fuel Use



Alberta's Renewable Fuels Greenhouse Gas Emissions Eligibility Standard

- Must demonstrate 25% fewer gas emissions than the equivalent petroleum fuel
- GHGenius version 3.19

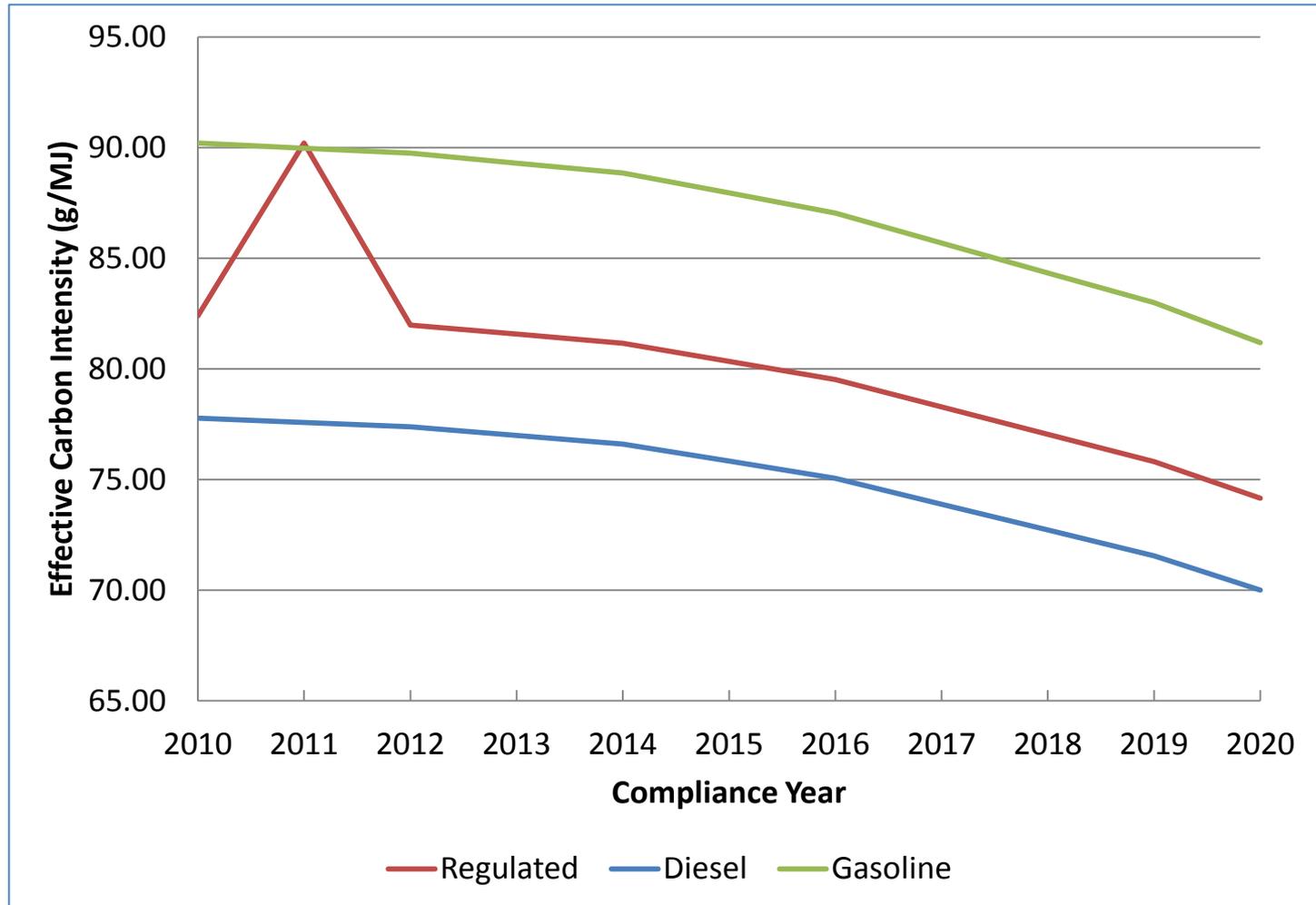


BC's Renewable and Low Carbon Fuel Requirements Regulation

- 5% provincial annual average renewable content in gasoline
- 4% renewable content in diesel in 2011; 5% for 2012 onward
- 10% reduction in carbon intensity by 2020
- GHGenius version 3.16c



The How: Low Carbon Fuel Requirement





2010 Reported Carbon Intensity Values

Fuel	Prescribed Carbon Intensity	Average Reported Carbon Intensity
All Fuels	82.40	82.40
Gasoline Class	90.21	88.56
Diesel Class	93.33	77.07
Gasoline and Diesel		83.66



Results of 2010 Reporting Year

Volume of gasoline class renewable fuel supplied	Total volume gasoline class fuel supplied	Percent
301,084,967.00	4,760,228,028.00	6.33

Volume of diesel class renewable fuel supplied	Total volume diesel class fuel supplied	Percent
95,758,137.00	3,026,771,175.00	3.16

Total renewable fuel supplied	Total fuel supplied	Percent
396,843,104.00	7,786,999,203.00	5.10



Challenges and Lessons Learned

- Sustainability/Indirect Land Use Change (ILUC)
- Credit trading and validation
- Gasoline to Diesel
- Compliance Pathways
- New Fuels



Opportunities for Improvement

- Harmonization with other jurisdictions leading on climate change such as Alberta and California
- New technology and markets



Future Areas of Research

- Sustainability/Indirect Impacts
- Economic Impact Assessment
- Compliance Pathways
- Impact of Other Legislation
- Marketing/Role of Consumers



Ministry of
Energy and Mines

Thank you

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