

Opportunities for Canada in a Changing Energy Sector

Pathways to NetZero





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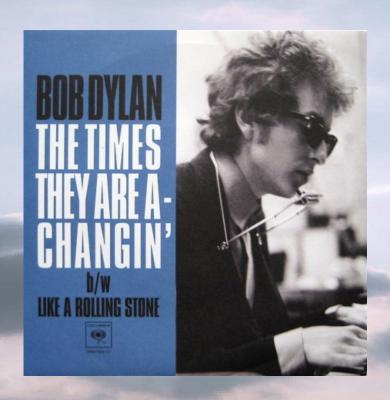


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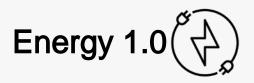


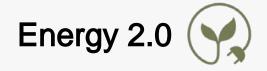
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Change is in the Atmosphere









"Global oil demand to hit preCOVID level next year: IEA" – BNN Bloomberg, June 11, 2021

"Silver lining: Biden's scrapping of Keystone pipeline allows Canada's Trudeau to move on" - Reuters, January 20, 2021

"Canada's oil sands producers form alliance to achieve netzero emissions by 2050" – Reuters, June 9, 2021

"Saudis Dismiss Call to End Oil Spending as 'La La Land' Fantasy" – Bloomberg, June 1, 2021 "Elizabeth May Says 'Oil Is Dead,' Compares Industry's Fate To Blockbuster Video"

Huffington Post, May 82020

"Ottawa enters legal battle over Enbridge's Line 5 pipeline" Globe and Mail, May 12, 2021

"Wind Turbine Blades Can't Be Recycled, So They're Piling Up in Landfills"— Bloomberg Green, February 5, 2020

"No new oil, gas or coal development if world is to reach net zero by 2050, says world energy body." The Guardian, May 18, 2021

Agenda

Commercial Framework

Regulatory Framework Jurisdictions – BC, Alberta, Saskatchewan, and Federal

Project types – hydrogen, geothermal, clean fuels

The Scaffolding of Transition



CommercializationFramework

- Policies, targets, legislation, taxes, strategies and direct or indirect funding
- Rapidly evolving

Regulatory Framework

• Old rules, new rules and how the "new energy" industries will operate

Commercialization Framework

Policies

- UNFCCC
- Paris Agreement
- Pan-Canadian Framework

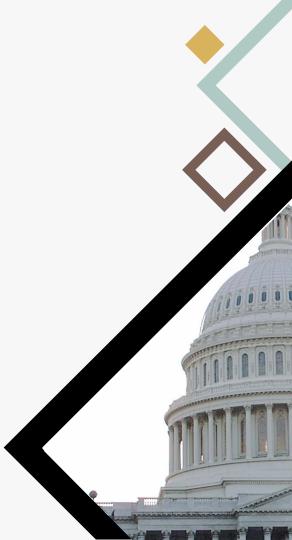
Emissions Reduction Targets

Federal targets:

- A moving target: is it 30%, 36% or-405% below 2005 levels by 2030?
- Net-zero by 2050

Provincial targets:

- British Columbia: 40% below 2007 levels by 2030 and an 80% reduction by 2050; possible netzero commitment
- Alberta: 50% below 1990 levels (relative to provincial GDP) by December 31, 2020
- Saskatchewan: reduce GHG emissions by 12 millionnes by 2030



EmissionsPricing

Federal Emissions Pricing

- Greenhouse Gas Pollution Pricion current plan is to increase the price on emissions until it reaches \$170 in 2030
- SCCReference establishing minimum national standards of GHG price stringency to reduce GHG emissibissvalid federal action
- Provinces must either enact their own equivalent regimes or the federal regime will apply

Provincial Emissions Pricing

- British Columbia: Carbon Tax Act and Greenhouse Gas Industrial Reporting and Control Act
- Alberta: Technology Innovation and Emissions Reduction Regulation
- Saskatchewan: Management and Reduction of Greenhouse Gases Act

Private Sector Commitments



- Changinginvestment practices and the rise of ESG
 - Canadian pension funds
 - \$70 trillion global Net-Zero Finance Alliance
- Activist shareholders
 - Proxy advisors (ISS updates)
 - Engine No.1
- Risk management and the Equator Principles
 - Project finance and lendingractices
- Net Zero
 - Oil Sands Pathways to Net Zero initiative

Clean Fuel Standards

A part of the commercialization frameworkhat mandatesa reduction of GHG emissions for liquid fuels

- Accomplished through
 - Carbon intensity reduction targets
 - Minimum renewable content blended into liquid fuels
 - Creating secondary market of tradeable credits for industry participants
- Provincial regimes, with federal standard to come

Provincial Rules in Place

British Columbia Renewable and Low Carbon Fuel Requirements Regulation

- •Increasing carbon intensity reduction requirements, set at 10.19% for 2021
- •Requirement to include 5% renewable content in gasoline
- •Requirement to include 4% renewable content in diesel

Alberta Renewable Fuel Standard Regulation

- ■Requirement to include 5% renewable content in gasoline
- ■Requirement to include 2% renewable content in diesel

Saskatchewan Renewable Diesel Act

- ■Requirement to include 7.5% ethanol in gasoline
- ■Requirement to include 2% renewable content in diesel



Federal Clean Fuels Standard Coming Soon

- Developed under Canadian Environmental Protection, 1999 and Environmental Violations Administrative Monetary Penalties Act
 - Creates obligations for <u>liquid</u> fuel producers, importers and refiners
 - Will establish a credit market with options for compliance actions:
 - Undertaking projects that reduce the lifecycle carbon intensity of fossil fuels (e.g.: Carbon sequestration and renewable electricity)
 - Supplying fuels with a lower carbon impact (e.g.: blending biofuels with conventional fuels)
 - Switching from internal reliance on conventional fuels and integrating lower-carbon fuel sources (e.g.: hydrogen, electrical power)
- Currently published in draft form, expected in force by the end of 2022
- Overlap with provincial regimes is expected



Regulating the Pathway–Frameworks for the Future

Success of energy transition turns on development and deployment of new technologies, and the fit between policy, legal and regulatory frameworks

- Clean fuels
 – adaptation of existing fuel production frameworks, expansion of regulatory regime around biofuel production
- Geothermal— new industry requiring new policies, laws and regulations
- Hydrogen
 – adaptation of existingupstream and midstream regulation

Regulatory Framework – Clean Fuels



- Frameworks evolving around secondeneration biofuels
- Applicable Regulations depend on:
 - a) Jurisdiction
 - b) Stage of fuel production
- Suppliers of biofuel feedstock vs blending downstream
- Clean fuels legislation "layered" over existing fuel production and waste managementaws
- Exciting opportunities abound, success depends on harmony between technology, policy and regulations

Geothermal Power in Canada

- Geothermalpower development is increasing in Canada
- Recent investments have demonstrated interest from established energycompanies
- Geothermal can generate baseload and deployable power
- Provides potential advantages specific to Western Canada, but faces real commercial challenges





Regulatory Framework - British Columbia

Governed by the Geothermal Resourcest

"geothermal resource" means the natural heat of the earth and all substances that derive an added value from it, including steam, water and water vapour heated by the natural heat of the earth and all substances dissolved in the steam, water or water vapour obtained from a well, but does not include

- (a) water that has a temperature less than 80° Cat the point where it reaches the surface, or
- (b) hydrocarbons;
- Ownership of Geothermal Resources is vested with the Government of British Columbia
- Royalties are specifically contemplated

Regulatory Framework – Alberta

- Governed by the Geothermal Resource Development Act
 - Geothermal rules have not yet been released by the AER
 - "geothermal resource" means natural heat from the earth that is below the base of groundwater protection
- Vests the right to explore for, develop, recover and manage geothermal resources with the owner of <u>mineral title</u>
 - Creates potential issues for the acquisition of a geothermal license
- Does not address royalties

Regulatory Framework - Saskatchewan

- No specific legislative framework in place for geothermal projects
- Permit applications are processed through the Integrated Resources Information System
- No statutory definition of geothermal resources; no definitive statement of ownership of geothermal resources

Royalties on Geothermal Power

- Two leading geothermal nations, Iceland and New Zealand, do not charge royalties to geothermal project proponents
- Is there a theoretical or moral basis for charging royalties on geothermal power
- Possible alterative royalty structures
 - Depletion beyond point of sustainability
 - Rental principle



Commercialization of Hydrogen

Strategies:

- Federal: the Hydrogen Strategy for Canada
- British Columbia: the British Columbia Hydrogen Study
- Alberta: the Natural Gas Vision and Strategy



Commonthemes among the strategies and studies

- A focus on regional advantages and competencies
- Strategic partnerships and jurisdictional cooperation
- Policy and regulatory harmonization; standardization
- De-risking pilot projects and early investments

Regulation of Hydrogen

Jurisdictional Matters

- Anyhydrogen industry will be primarily regulated at the provincialevel
- Interprovincialtransportation and exports to be federally regulated; possible impact assessments

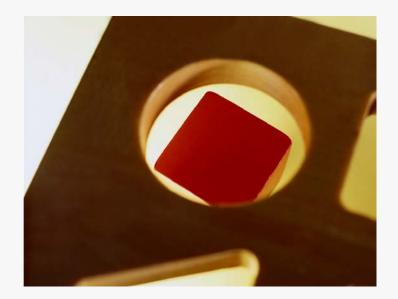
Primary Regulators

 Giventhe similarities and overlap between hydrogerand the natural gas industry, existing federal and provincial regulators will likely continue to be involved

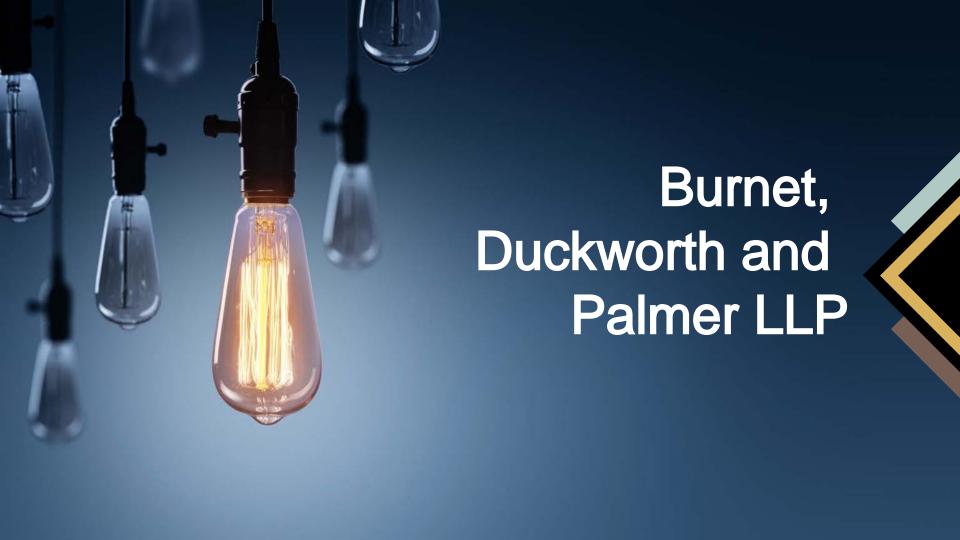
The Regulatory Framework

- Currentlysubject to existing provincial statues and regulations that govern:
 - Environmental assessments
 - Facilities
 - Pipelines
 - Carbon capture and storage
 - Water use

In somecases, this is a "square peg round hole" approach and some ambiguity exists in the current regulatory framework







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