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Session 3 - 4

Notable Development on Oil and Gas in Canada

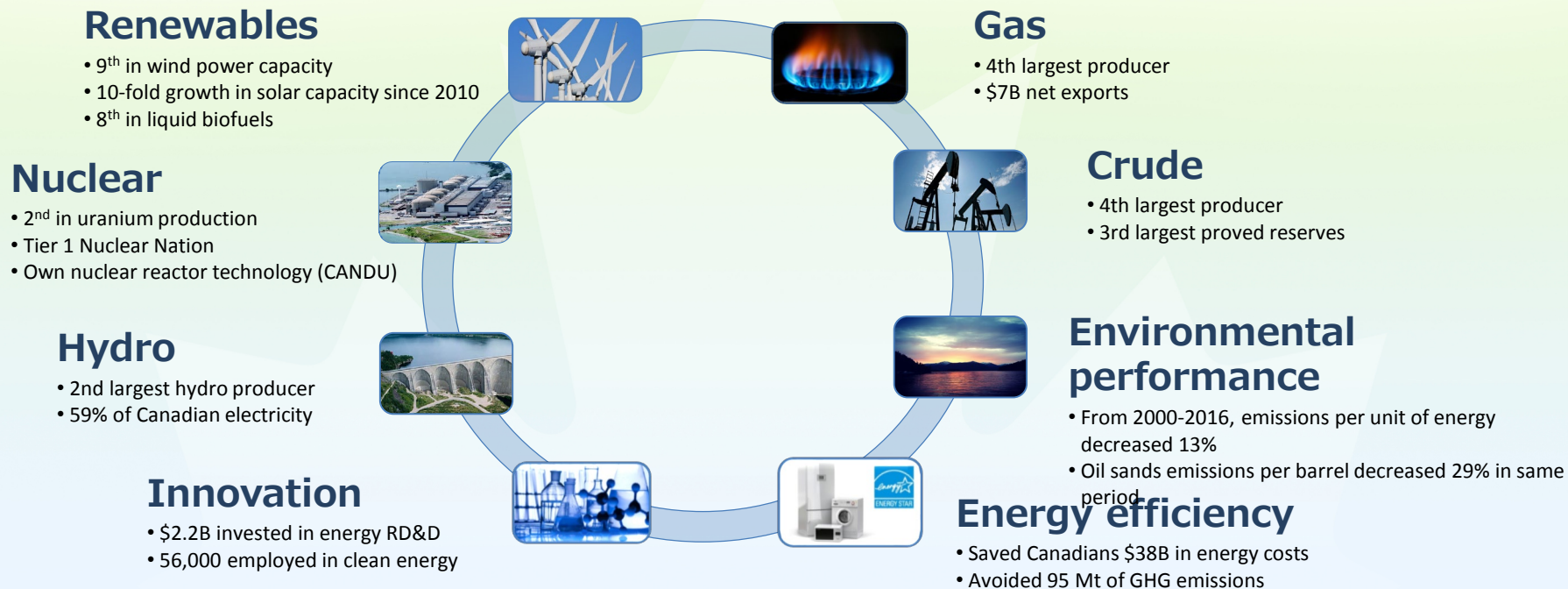
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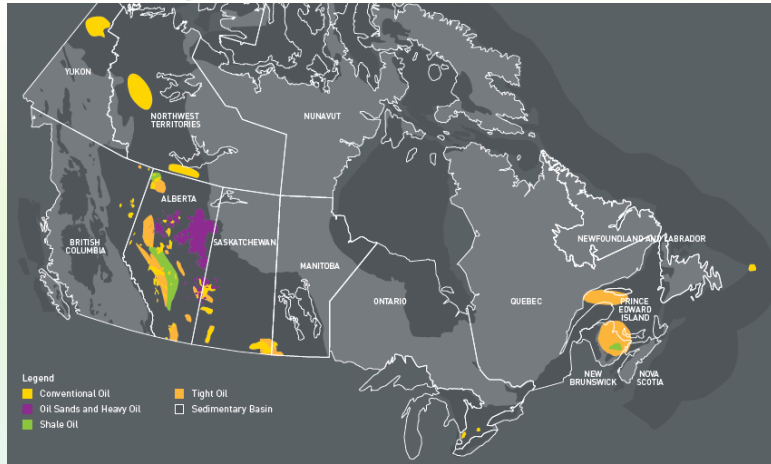
Natural Resources Canada

Canada

Canada is a global energy leader with world-class assets and expertise

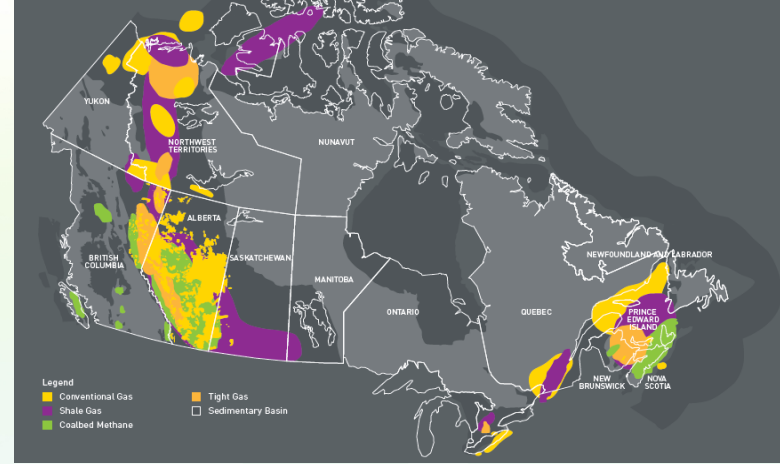


Oil & gas resources are concentrated in certain areas



Oil/Liquids Reserves

- Oil sands resources are concentrated in Western Canada (170 B barrels, and over 315 B barrels as technology improves)
- Proven conventional, offshore, and tight oil resources span the country (4.7 B barrels)
- Arctic oil presents another opportunity



Natural Gas Resources

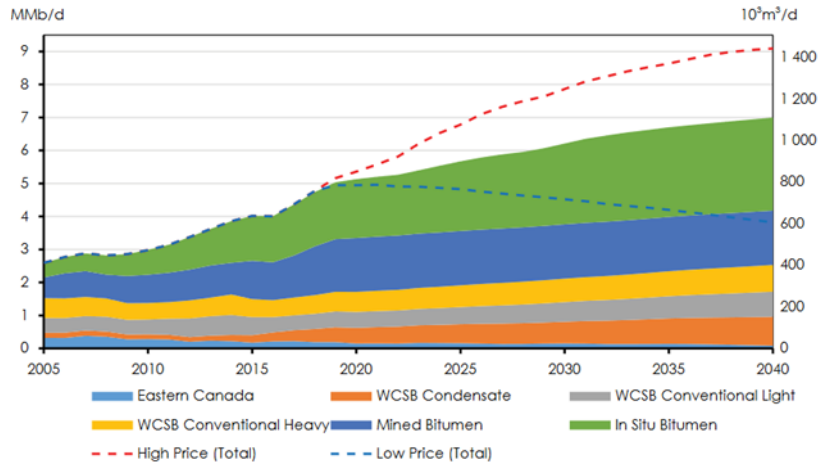
- Canada has up to 1,800 trillion cubic feet of marketable natural gas resources, most of which is unconventional (shale/tight gas, coalbed methane) mainly concentrated in Alberta and British Columbia
- Montney basin are rich in liquids and low CO₂



Canada's production outlook remains strong

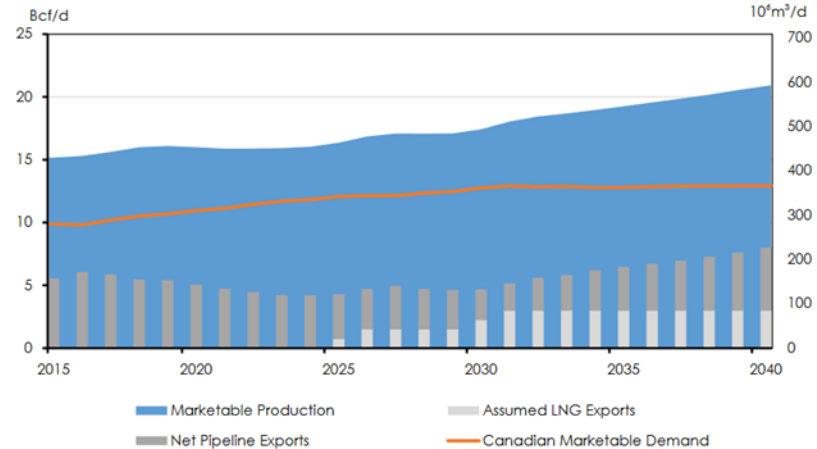
- Oil production forecast dependant on pricing – in situ oil sands to lead growth

Canadian Crude Oil (and equivalent) Production
Historical from 2005 and Forecast to 2040



- Natural gas production to grow steadily with increasing demand and exports

Canadian Natural Gas Production, Demand, and Exports
Historical from 2015 and Forecast to 2040



Source: National Energy Board 2018



Notable Development: Canada's LNG Progress

- ✓ **World class gas reserves:** over 70 trillion cubic feet of proved natural gas reserves and up to 1800 trillion cubic feet of marketable resources
- ✓ **Cost-competitive supply:** low cost gas enabling value-added opportunities such as petrochemicals
- ✓ **Access to clean, cheap power:** upstream increasingly using renewable hydro electricity
- ✓ **Fewer shipping days to Asia:** 10 days, half of time from US Gulf
- ✓ **Cleanest LNG facilities:** 50% lower GHG emissions than global average
- ✓ **Strong government and Indigenous support of LNG**



Notable Development: Canada's LNG Progress

- ✓ **Eighteen proposals** to build LNG export facilities on both coasts
- ✓ October 2018 – Positive final investment decision to move forward with **LNG Canada** facility
 - Shell, PETRONAS, PetroChina, Mitsubishi, KOGAS
 - 26 million tonnes per annum at full build out
 - Lowest GHG emissions intensity in the world among large facilities



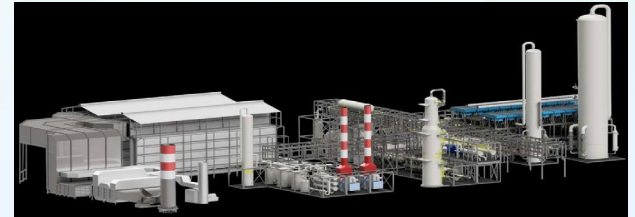
“LNG Canada represents the **largest private sector investment project in Canadian history**. It is a vote of confidence in a country... to develop our energy in way that **takes the environment into account**, [working in] **partnership with Indigenous communities**.”

- *The Rt. Hon. Justin Trudeau, Prime Minister of Canada*



Notable Development: Diversification - Alberta's Petrochemicals Industry

- ✓ Canada Kuwait Petrochemical Corporation to build a \$4.5 billion **petrochemical complex** in Sturgeon County
 - A fully integrated propane dehydrogenation and polypropylene production facility, and associated infrastructure
- ✓ Inter Pipeline considering to build a **petrochemicals facility** in Alberta's Industrial Heartland
 - To convert propylene produced from Alberta propane into higher value products including acrylic acid (used in consumer products like adhesives, diapers, floor polishes and paints)
- ✓ Inter Pipeline also constructing the \$3.5 billion Heartland **petrochemical Complex** near Edmonton
 - Propane dehydrogenation and polypropylene facility
- ✓ New Nautical Energy **methanol plant** in Grande Prairie



Notable Development: Progress in Oil Sands R&D

Transportation

Canapux Solidified crude wrapped in polymer - An environmentally secure way of transporting bitumen or heavy crude

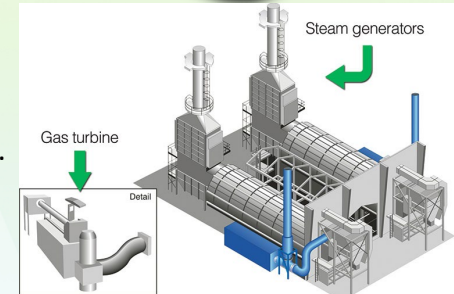
- Float in water, environmentally inert, and cannot leach or dissolve into the environment.



Greenhouse Gases

Gas-Turbine Once Through Steam Generator - Co-generation technology to produce electricity while producing steam

- Reduces reliance on grid electricity and results in a net reduction in carbon intensity per-barrel.



Water

Cross Flow Filtration - A filtering technology to dewater tailings

- Increases the amount of water available for recycling and reduces the need for tailings ponds.



Land

Faster Forests - Accelerating the reclamation process of areas that have been disturbed by oil sands exploration

- To date, the Faster Forests program has resulted in almost three million trees and shrubs being planted on approximately 1,000 hectares of land in Northern Alberta.



Notable Policy Development

Environmental management

- ✓ **First Ministers' consensus on the importance of electrification to a clean energy future**
- ✓ **Creating certainty through carbon pricing – Federal carbon tax in place in 2019**
- ✓ **Modernizing environmental and regulatory processes**
- ✓ **New Regulations to manage methane emissions from the oil and gas industry**
- ✓ **Investing in clean growth and performance improvements through innovation**

Supporting development

- ✓ **Investments being supported by 12-year, over \$180B federal infrastructure plan**
 - **LNG, pipelines, oil sands, refining, petrochemicals, electricity (transmission, nuclear, hydro, renewables)**



APEC Cooperation

- **Technology and information sharing**
 - Explore new means of information exchange
 - Electronic, periodical reports
- **More opportunities for engagement**
 - Industrial participation in hosting of site visits
 - Targeted sub-sector workshops (e.g. LNG)



Thank
You!



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