

Workshop on APEC Coal Supply Security

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Possible coal supply risk factors that influence Asia-Pacific markets: A Canadian perspective

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Alberta
Canada

Presentation Outline

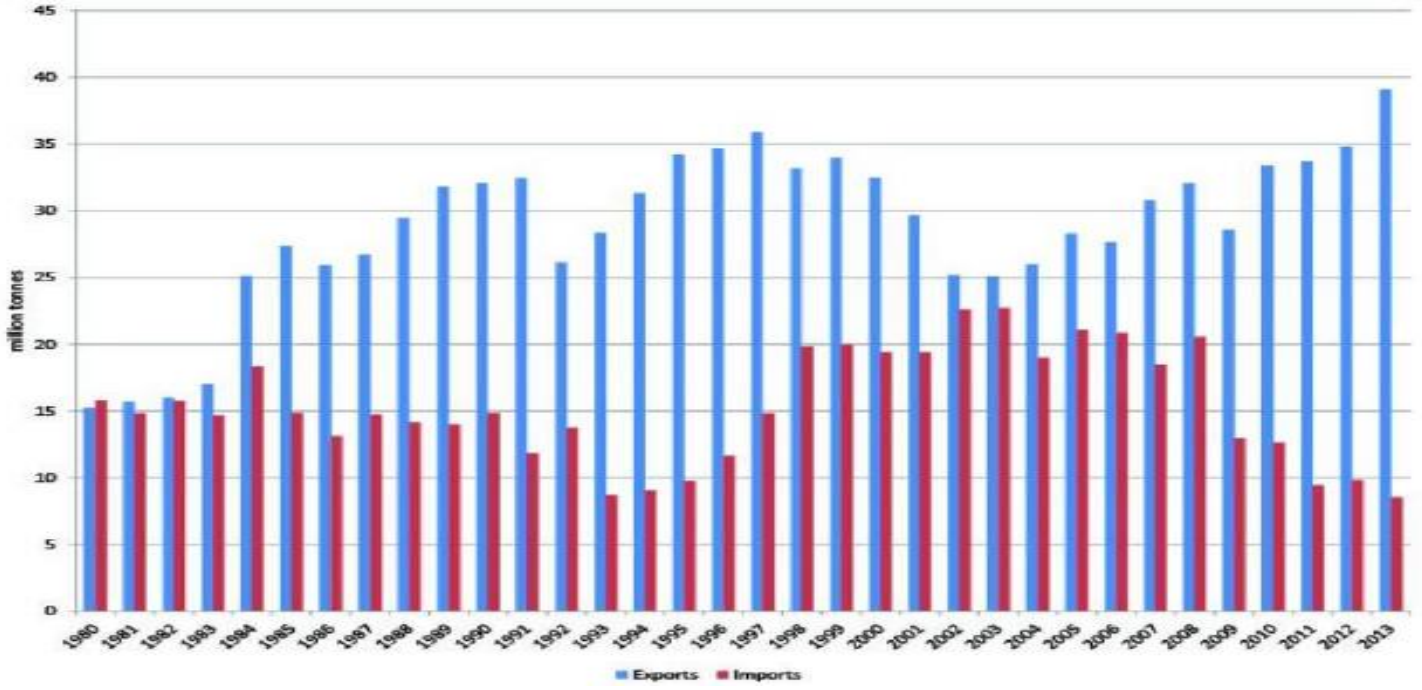
Goals:

- Provide an overview and outlook of Canadian coal supply and demand, trade and investments
- Assess key factors that might affect coal exports to Asia-Pacific markets
- Options to mitigate risks/improve supply security

Topics covered:

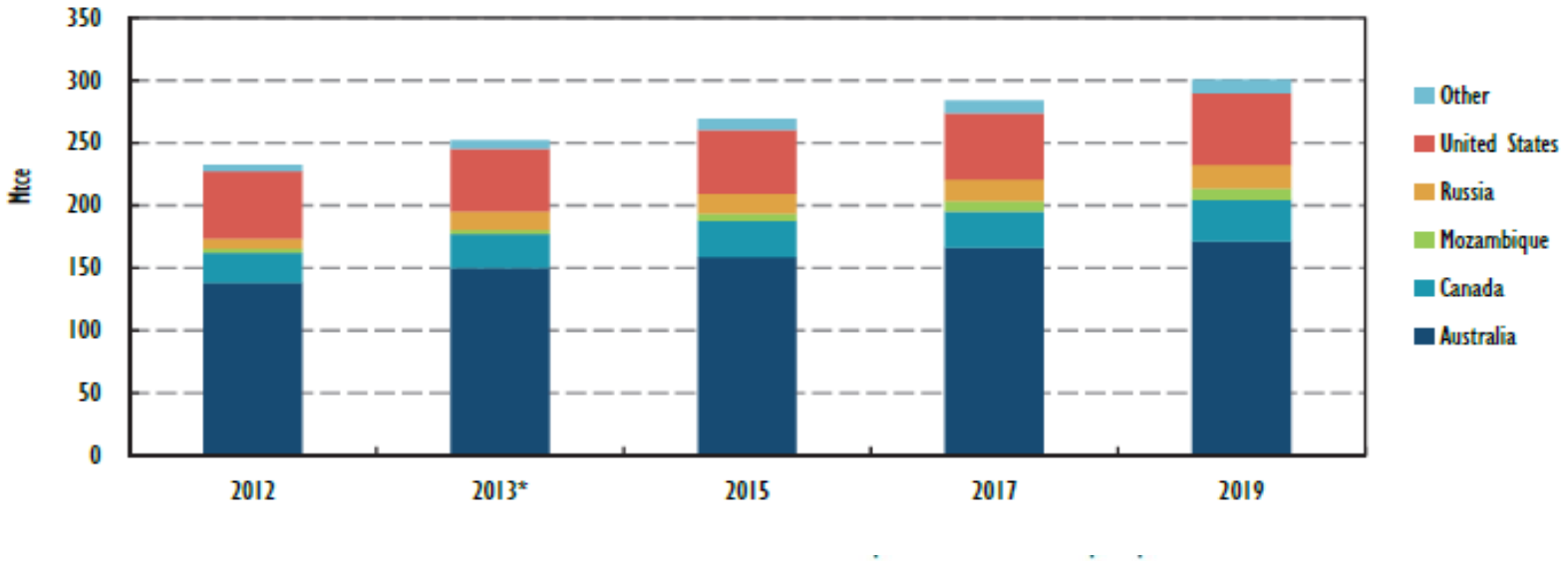
- ✓ Canadian coal exports and outlook
- ✓ Coal resources and its quality
- ✓ Production and domestic demand
- ✓ Transportation infrastructures
- ✓ Investment outlook
- ✓ Supply risk factors
- ✓ Improving Canadian coal supply security to serve Asian-Pacific markets

Canada - World's third largest met coal exporter (39 Mt in 2013)



Exports have increased since 2009 and account for more than 50% of Canadian coal production. Asia is Canada's main export market (75% of total), with highest shares to China, Japan and Korea. Canada also exports coal to the United States, Mexico, Europe and Latin America.

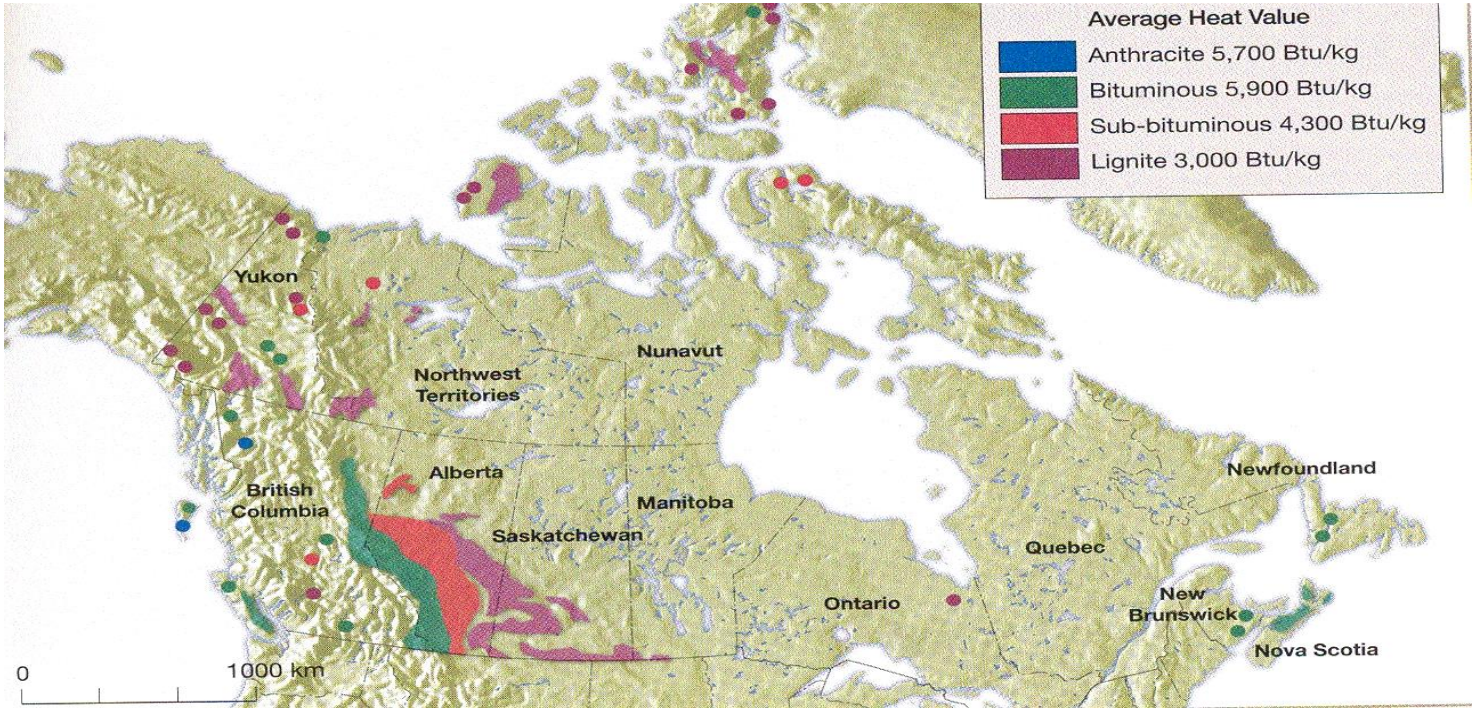
Medium term outlook for met coal exports



	2012	2013*	2015	2017	2019	CAGR
Australia	142	154	163	170	175	2.2%
Canada	30	32	33	34	39	3.4%
Mozambique	3	3	6	9	10	21.4%
Russia	11	16	17	19	21	4.1%
United States	59	53	54	56	60	2.2%
Other	8	8	10	11	12	8.6%
Total	**253**	**265**	**284**	**299**	**317**	**3.0%**

Source: IEA, 2015

Canada's coal resources mainly concentrated in Western Canada



Canada holds 8.7 Gt of proved resources of coal-in-place mainly located in British Columbia, Alberta, and Saskatchewan.

Total recoverable resources are 6.6. Gt, including 3.5 Gt of anthracite and bituminous coal and 3.1 Gt of sub-bituminous and lignite (about 100 years of supply at current production rates).

In addition to the proved resources, there are 190 Gt of estimated resources of coal-in-place.

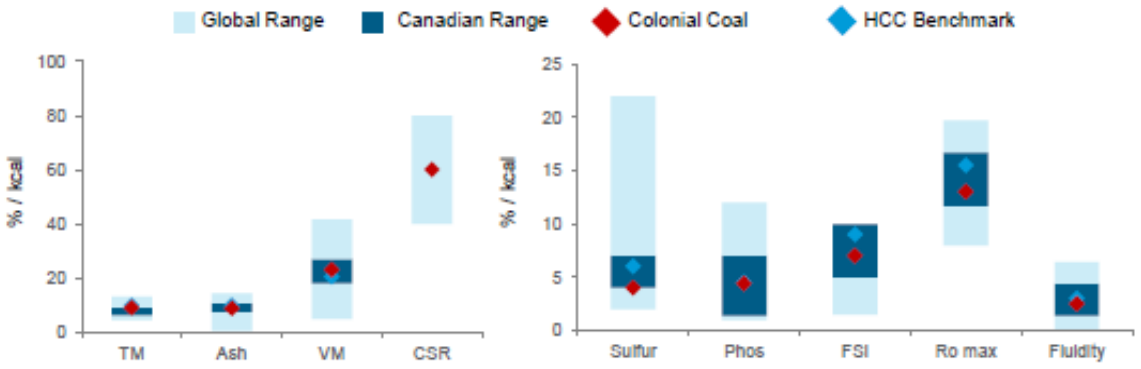
Sources: NRCan, 2015; BP Statistical Review 2014.

Canadian Coal Quality

Main characteristics

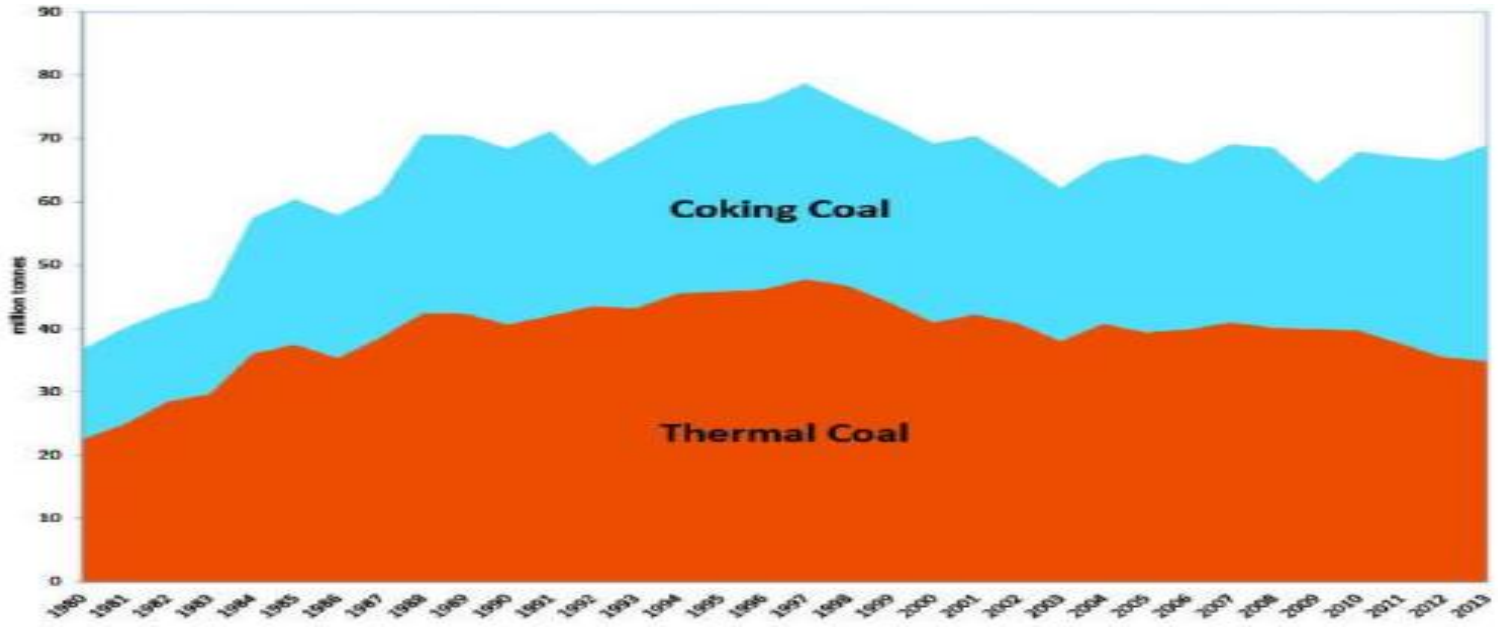
- Relatively higher-grade coal
- Low sulfur, generally less than 1 %.
- Ash content of 10-30 weight per cent;
- Low/medium volatile-matter yield;
- Rich in inert content (25-45%)
- Most in standard quality classification G3 (Balmer) and G4 (Moura)

Benchmarking



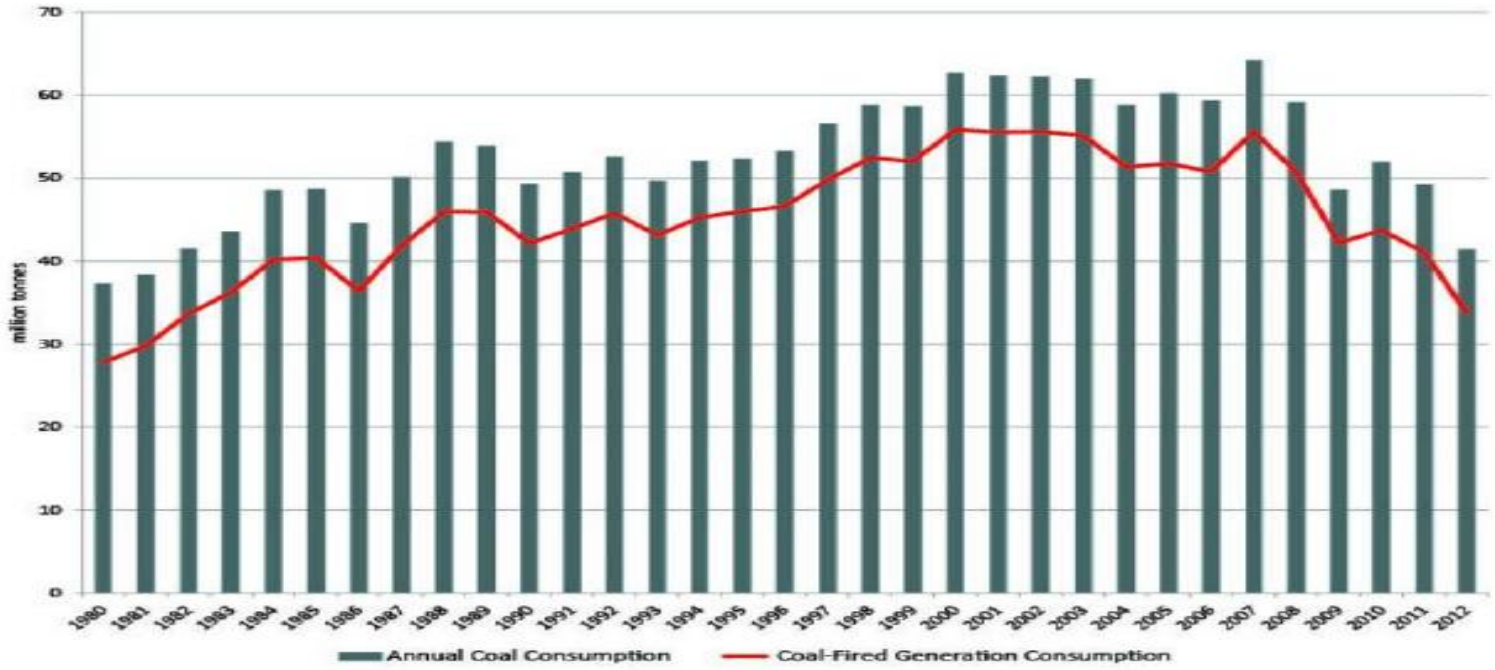
Sources: WoodMac, BC Ministry of Energy and Mines, CCIC,

Canadian Coal Production (about 70 Mt in 2013)



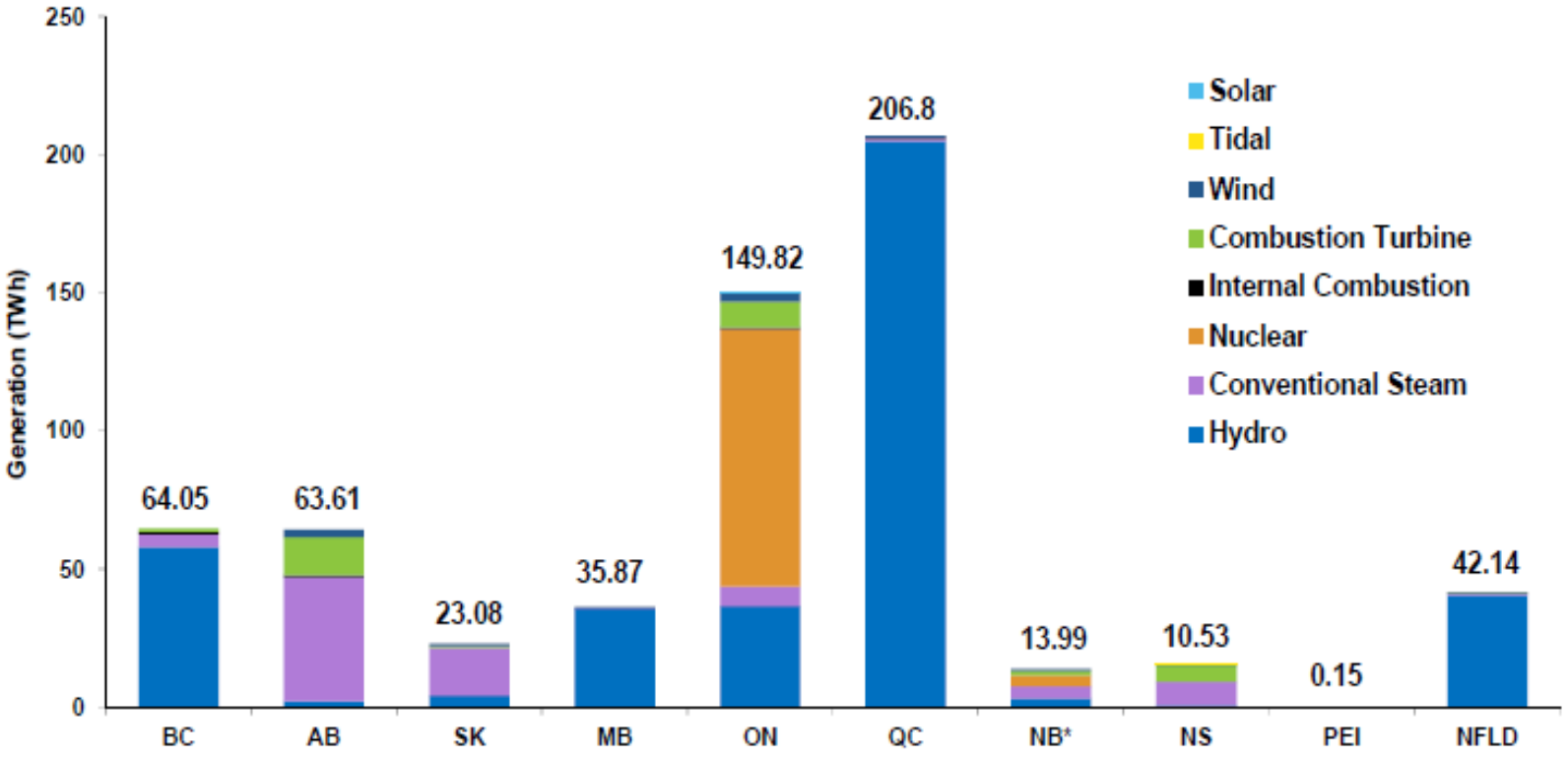
Canadian coal production capacity currently stands at 76 Mt.
While thermal coal production is declining, met coal production has continued to increase to serve growing coal demand in the Asia-Pacific region.
Nearly all of Canada's met coal, produced in Alberta and British Columbia, is exported; most thermal coal is used domestically.

Domestic Coal Consumption



Coal is primarily used domestically in the power sector for coal-fired electricity generation.
Coal consumption in Canada has declined in recent years due to fuel substitution and closures of coal-fired power plants.
Ontario completed in 2014 a total phase-out of coal-fired generation in the province.

Coal use in Canadian electricity generation 2013

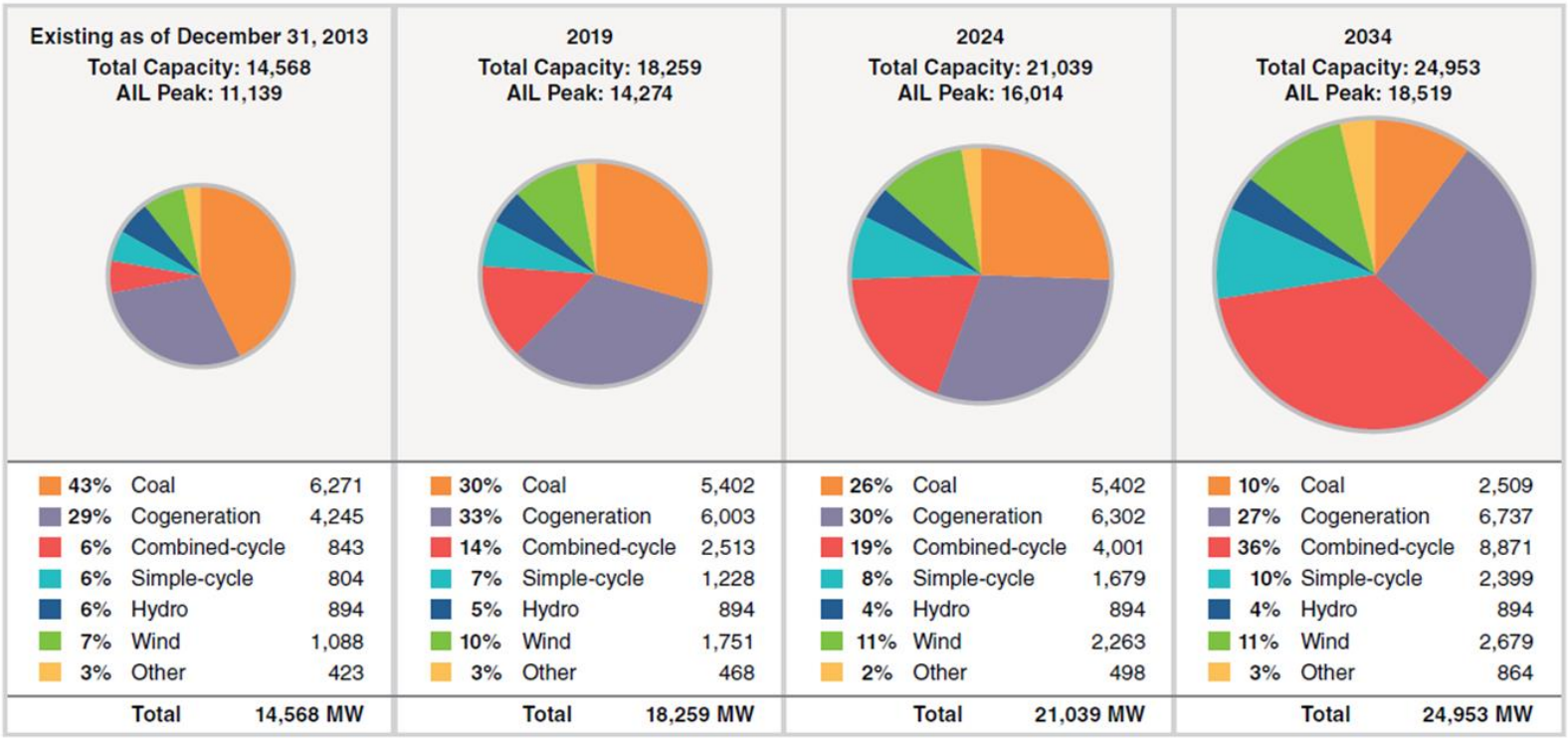


Source: Data from Statistics Canada

Regulation of GHG emissions from coal-fired electricity generation

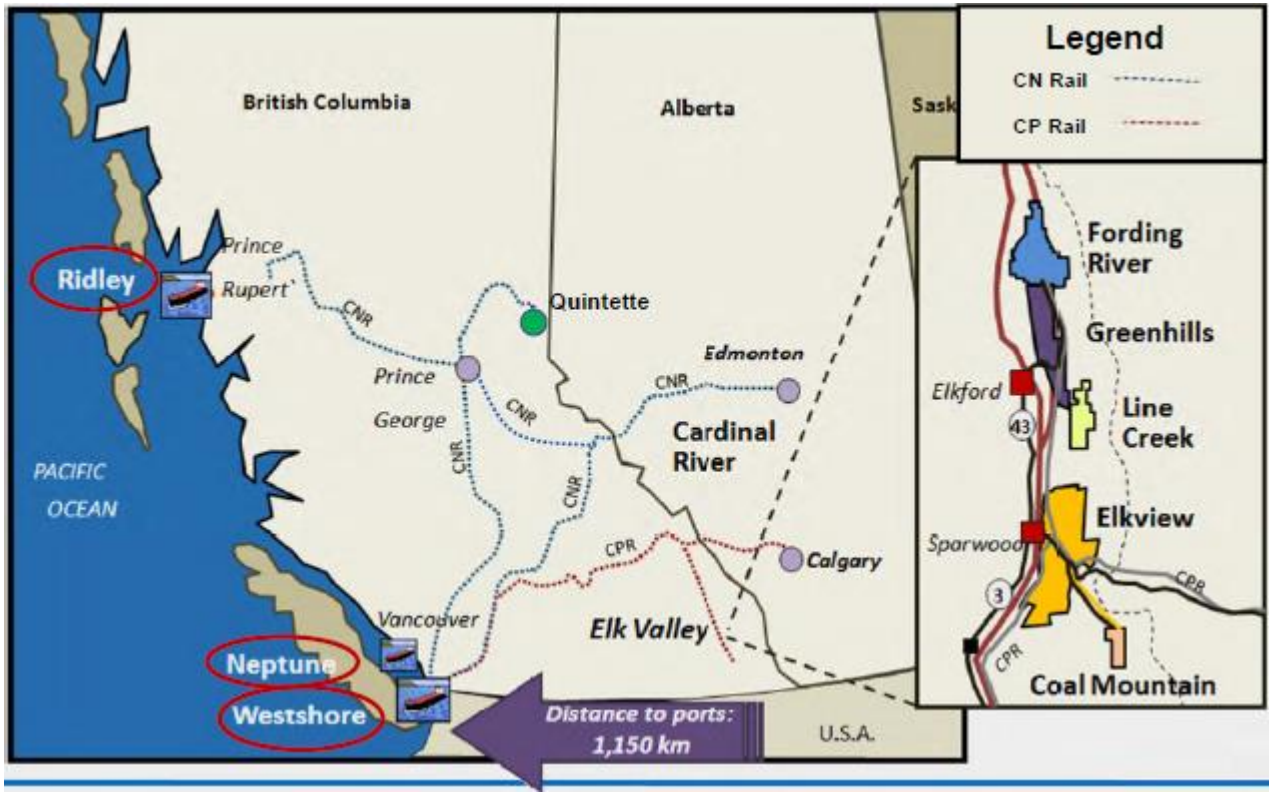
- Effective July 1, 2015
- Set emissions performance standard of 420 kg of CO2 per MW-hour electricity produced for new coal-fired electricity generation units (those commissioned after July 1,2015), and units that have reached the end of their life.
- Existing and new units may apply for a deferral in meeting the performance standard if the technology for Carbon Capture and Storage (CCS) is incorporated.

Alberta generation mix



Source: AESO, June 2014

Major rail and port infrastructures in Western Canada



Canadian coal exports benefit from a well-developed and integrated multi-modal transportation system including extensive rail infrastructures and efficient and expanding ports. Coal is the number one dry bulk commodity transported by rail domestically.

Main seaborne export facilities are located in Vancouver and Prince Rupert areas, including the Westshore, Neptune and Ridley terminals.

North American Ports to Asia Vessel Transit Times in Hours

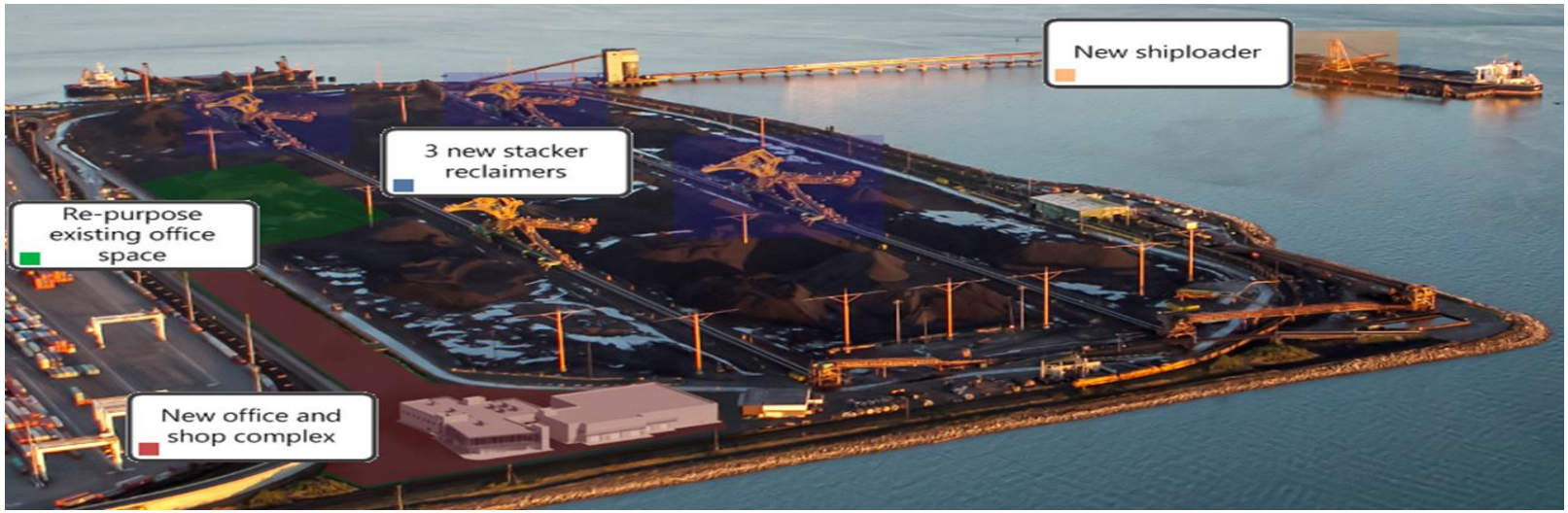
Canadian ports transit time advantage

From/To	Hong Kong	Kaohsiung	Shanghai	Kobe	Tokyo	Yokohama	Busan
		Taiwan	China	Japan	Japan	Japan	South Korea
Prince Rupert	264	253	232	205	192	191	209
Vancouver	289	276	255	227	214	213	231
Seattle	288	275	255	226	214	213	230
Tacoma	290	276	255	227	215	214	231
Oakland	303	290	275	241	228	227	246
Los Angeles	319	306	291	259	243	242	262

Source: CN

Westshore Terminal in Port Metro Vancouver

- Part of Port Metro Vancouver; 32 km south of Vancouver (B.C.)
- For much of the past decade, the busiest single coal export terminal in all of North America
- Contracted volume reaching 19 Mtpa
- Firmly positioned for capacity expansion – construction under way
- Increasing shipments from U.S. mines (9.3 Mt in 2013) mostly from Montana and Wyoming
- Owned by the Westshore Terminals Investment Corporation
- Westar Management has a long-term, renewable contract to operate and manage the terminal



Ridley and Neptune Terminals

Ridley Terminals: Owned by a Crown corporation.
Located in Prince Rupert, B.C.
Annual capacity 18 Mt, expansion underway to 25 Mtpa
Onsite storage capacity 1.2 Mt.
Contracted volume of at least 3 Mt
Deep sea port, single berth vessels up to 250,000 DWT
Operate at 25% of its capacity in 2015, with coal shipments down to 3.5 Mt.
The government, through Canada Development Investment Corp., is looking for a buyer.

Neptune Terminals
Located in North Vancouver, B.C.
Capacity increased from 9 Mtpa to 12.5 Mtpa in 2013
Two shiploaders up to 2,700 tph
Vessels up to 185,000 DWT
Served by CN Rail

Potential risk factors affecting coal export capability

Risk factors	Comments
Government policies	Generally not restrictive on energy production and exports ; Access to new energy markets in Asia-Pacific a top policy priority
Regulation	Regulation aims at responsible resource development but does not limit growth; Environments reviews may be costly and time consuming with uncertain outcomes
Investments in mining, infrastructures	Low price and resulting project economics not conducing of investments; Risk of high labor costs mitigated by cuts in planned energy investments;
Market conditions	Favorable supply and demand trends in spite of current industry slump; resulting in growing surplus; Opportunities in thermal coal exports
Social licensing	A key issue in energy infrastructure development in Canada; may impose significant delays or even cancellation in project development or cancellation of a project

Coal supply risk mitigation options

Risk factors	Options for consideration
Government policies	Clear and long term policy directions in resource development, trade and investments Policy development in consultation with industry
Regulation	Industry and regulator collaboration Work with key stakeholders Address key issues upfront Clarity, transparency and coherence in regulation
Investments in mining, infrastructures	Cost and schedule certainty Efficient investment plans Plan for modular expansion Partnerships in supply value chain
Market and operational conditions	Closed collaboration importers/exporters to anticipate market needs Target and operate in the lower half of the cost curve On-going assessments of supply risk factors/logistics Develop emergency response plans in case of supply interruptions
Social licensing	Increased public awareness Allow sufficient time for permitting/social licensing Fair compensation Collaboration and partnerships

Key points

- ✓ Western Canada has vast coal resources including some of the world's highest quality coking coals
- ✓ The region enjoys access to extensive rail networks and major deep water seaports with large export capability
- ✓ Canadian ports in British Columbia provide the closest port of entry on the west coats of North America to Asia
- ✓ Canada's coal supply to Asia-Pacific markets is currently secure. While there are limited areas of concern, there is no threat of sufficient magnitude facing Canadian energy security to alter Canada's situation in global coal exports in the foreseeable future.

Thank you for your attention!

Q&As?