Canada's LNG Opportunity

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CANADIAN ASSOCIATION OF PETROLEUM PRODUCERS

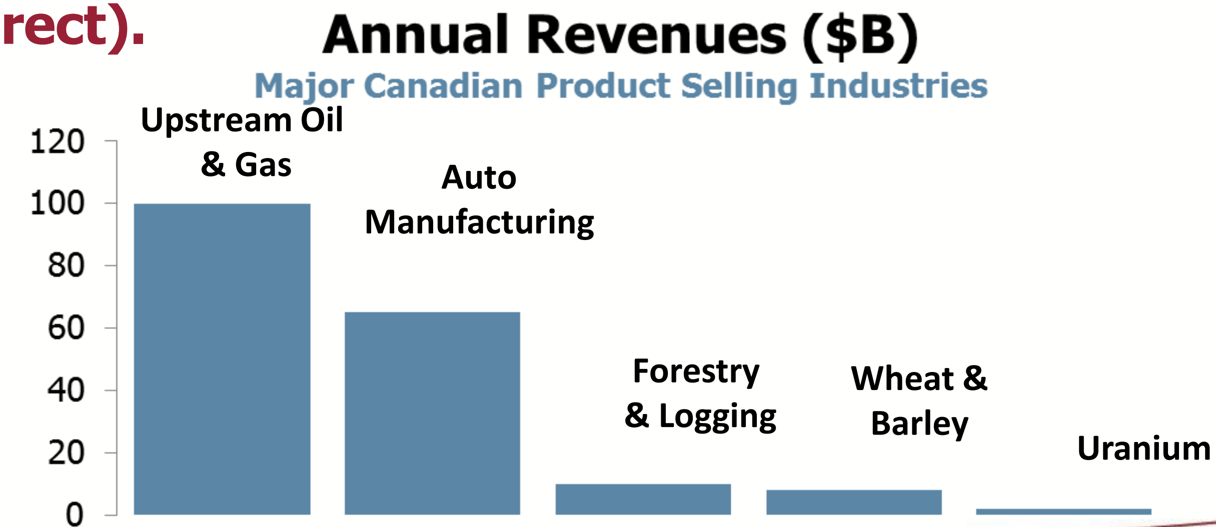
CAPP RESPONSIBLE CANADIAN ENERGY™

Canadian Association of Petroleum Producers

- **Large and small producer member companies**
  - Explore for, develop and produce natural gas, natural gas liquids, crude oil, and oil sands throughout Canada
  - Associate members provide a wide range of services that support the upstream crude oil and natural gas industry
- **About 90 per cent of Canada's natural gas and crude oil**
- **Part of a national industry with revenues of $110 billion per year**
- **Canada is the 5th Largest Producer of Natural Gas Globally**
- **Canada is the 6th Largest Producer of Crude Oil Globally**

The Oil and Natural Gas Industry
A Key Driving Force in the Canadian Economy

- **Industry invested $67 billion in Canada in 2013**
  - Largest single private sector investor in Canada
- **Payments to governments average about $18 billion per year**
- **Oil and gas accounts for**
  - 20% of value on Toronto Stock Exchange
- **Oil and Gas accounts for close to 18% of exports**
- **Industry employs more than 550,000 in Canada (direct & indirect).**



Investment in B.C.'s natural gas sector

- $5 billion estimated for 2013
- $5.2 billion invested in 2012
- $13.4 billion spent on acquisitions in B.C. gas plays by foreign companies from 2010 to date
- Opportunity to Export LNG will encourage future investment

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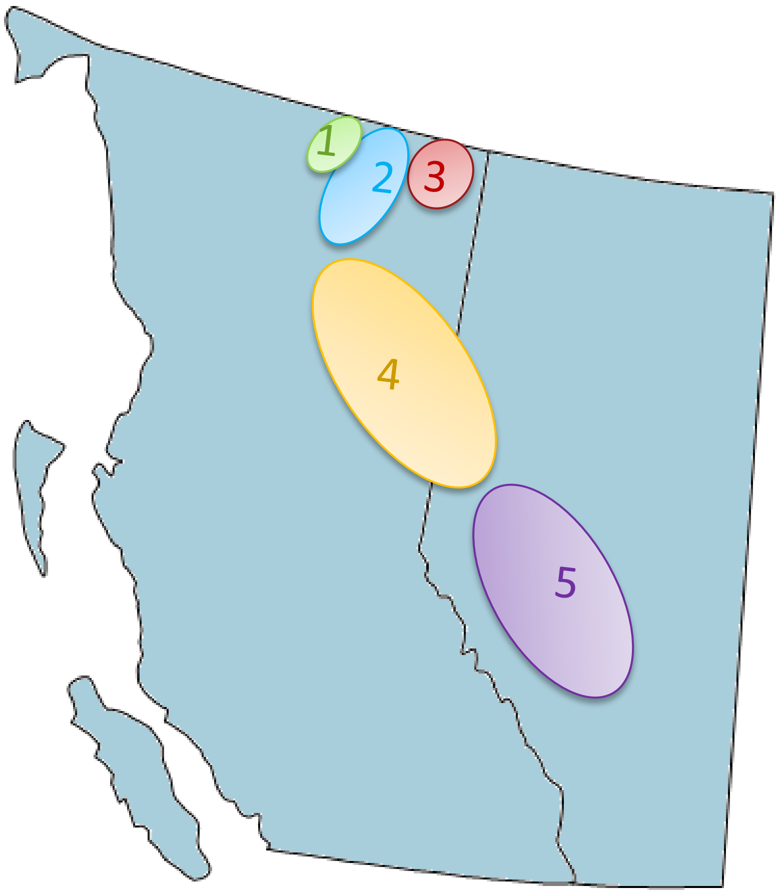
LNG Export Opportunity

- **Will have Significant Impact on Upstream Development and is driven by:**
  - Large Resource Potential and Strong Technology Foundation
  - Oversupplied North American Market
  - Rapid Growth in World LNG Trade
  - Geographical proximity to growing Asian Markets
  - Foreign Investment playing an Important Role in Developing the Unconventional Resource Base

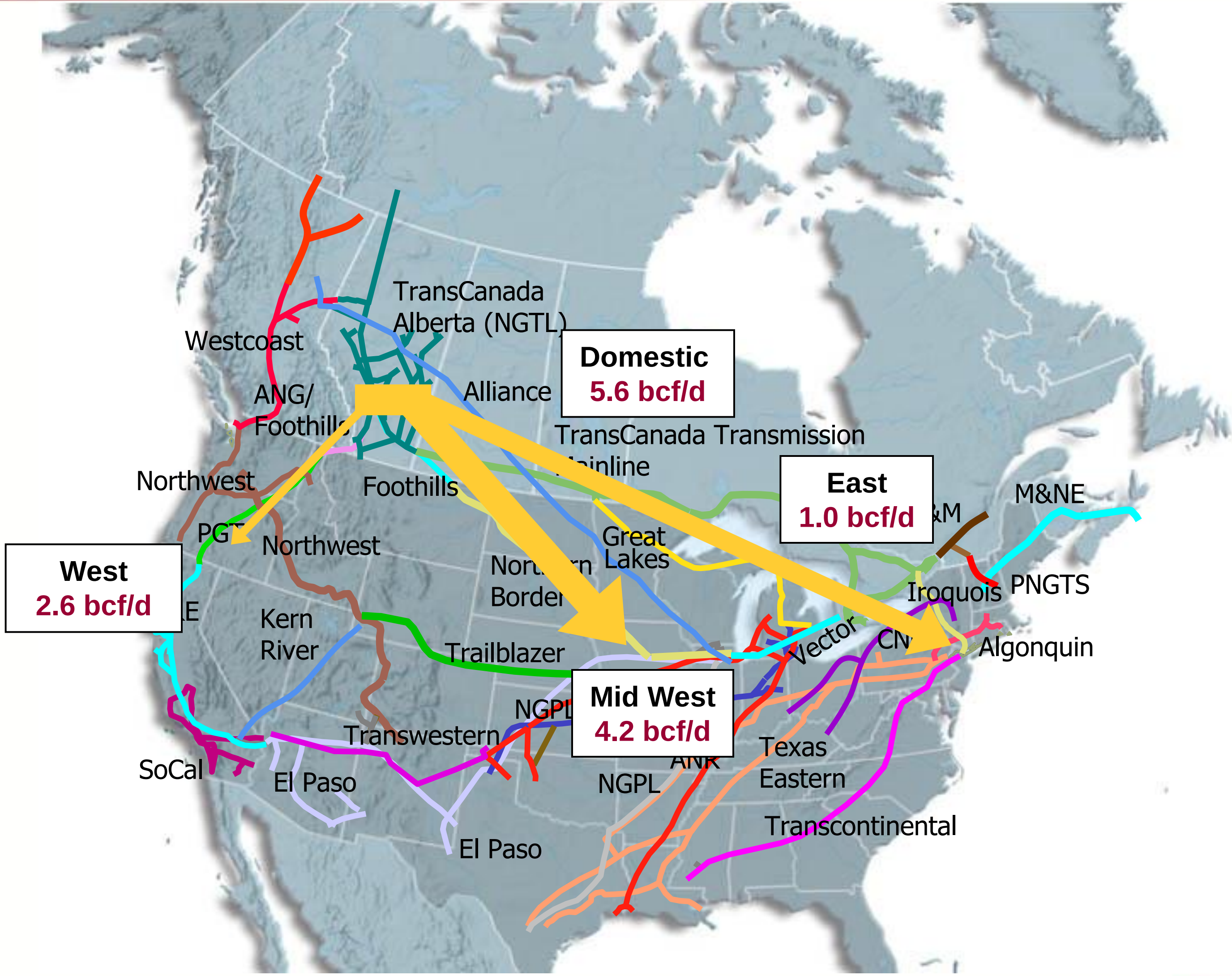
Western Canada Unconventional Gas Plays: Estimated Marketable Gas



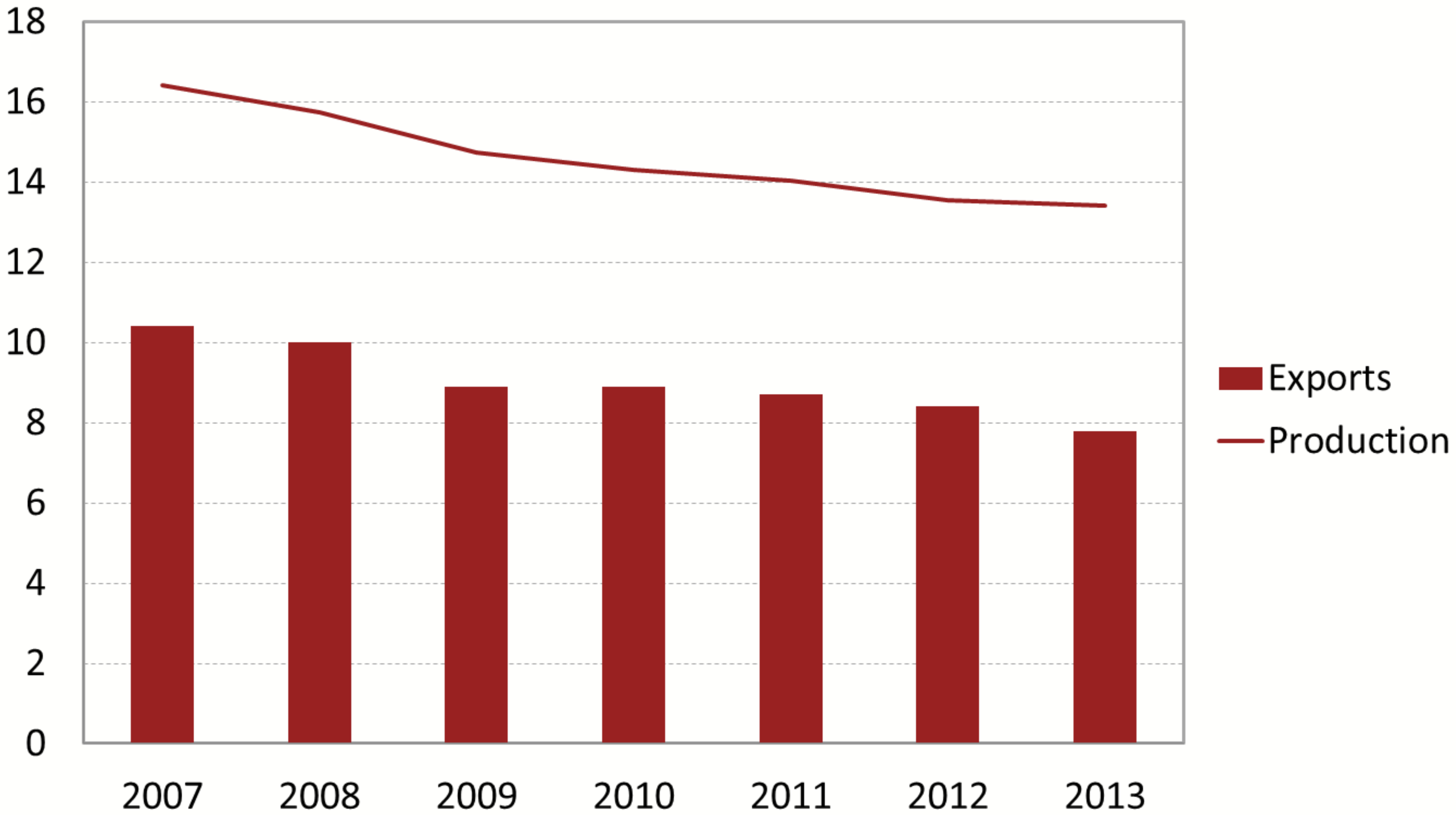
	Play	Reserves (Tcf)	Source
1.	Liard	42[1]	BCOGC
2.	Horn River	78	NEB
3.	Cordova Embayment	40[2]	BCOGC
4.	Montney	449	NEB
5.	Duvernay	89[3]	AER
	Total	698	

1: Based on 210 Tcf Potential Resource & 20% recovery rate
2: Based on 200 Tcf Potential Resource & 20% recovery rate
3. Based on 443 Tcf GIP & 20% recovery rate

Current Disposition of W. Canada's Natural Gas Production (2013)



Canadian Natural Gas Production & Exports to the U.S. (Bcf/d)

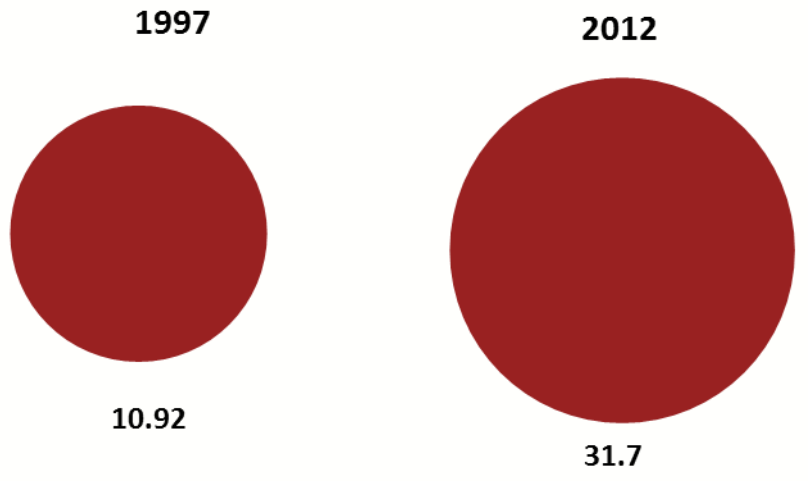


Source: NEB

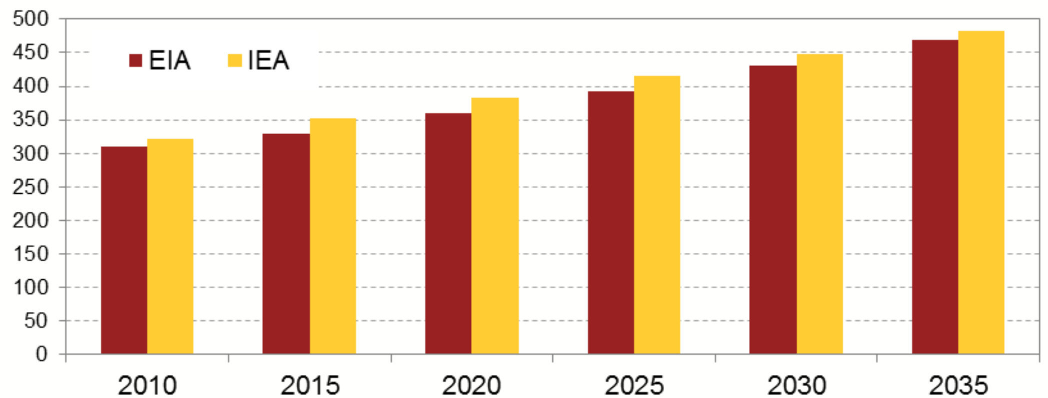
Outlook for World LNG Trade

- LNG trade has almost tripled since 1997
- Increases in world wide gas consumption will drive growth in world LNG trade
- Currently about 10% of all natural gas produced finds its way into the LNG market
- Widely expected that the LNG market will account for an increasing share of world natural gas trade as liquefaction capacity increases over the next 2 decades

World LNG Trade (Bcf/d) - Historical

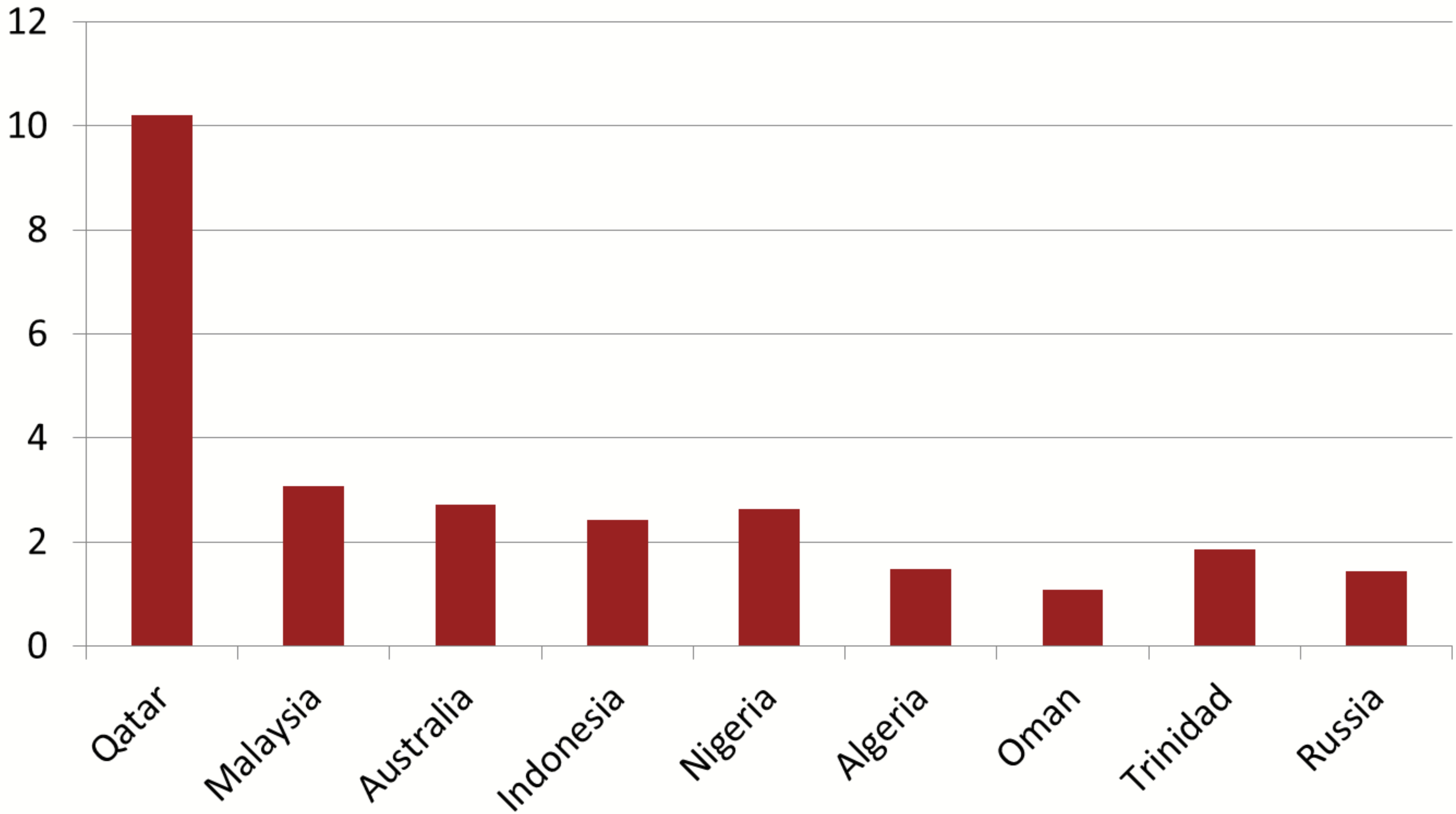


Projected World Natural Gas Consumption (Bcfd)



Source: EIA 2013 International Energy Outlook; IEA World Energy Outlook 2012

Major LNG Exporting Countries 2012 (Bcfd)



Source: BP Statistical Review

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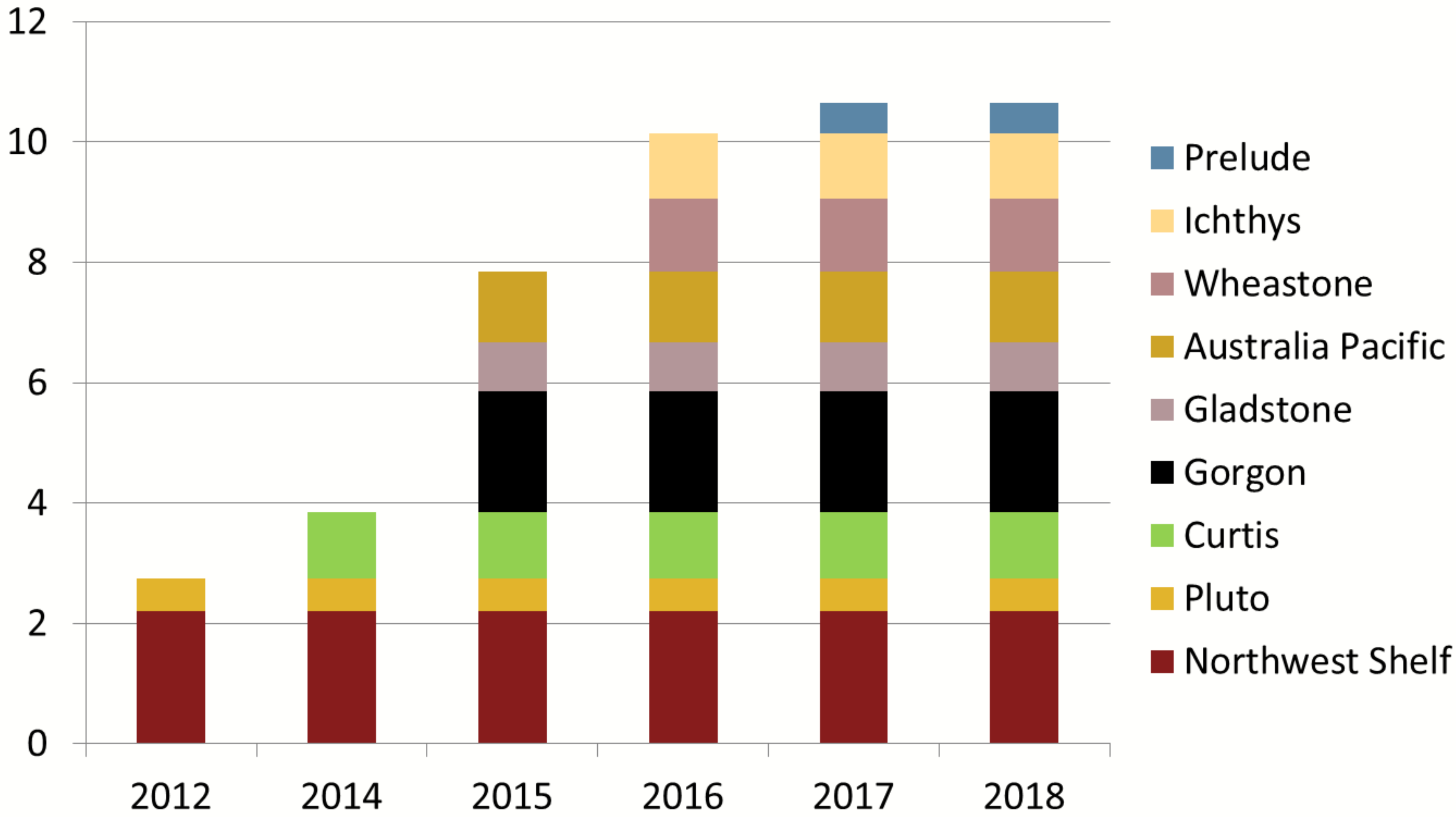
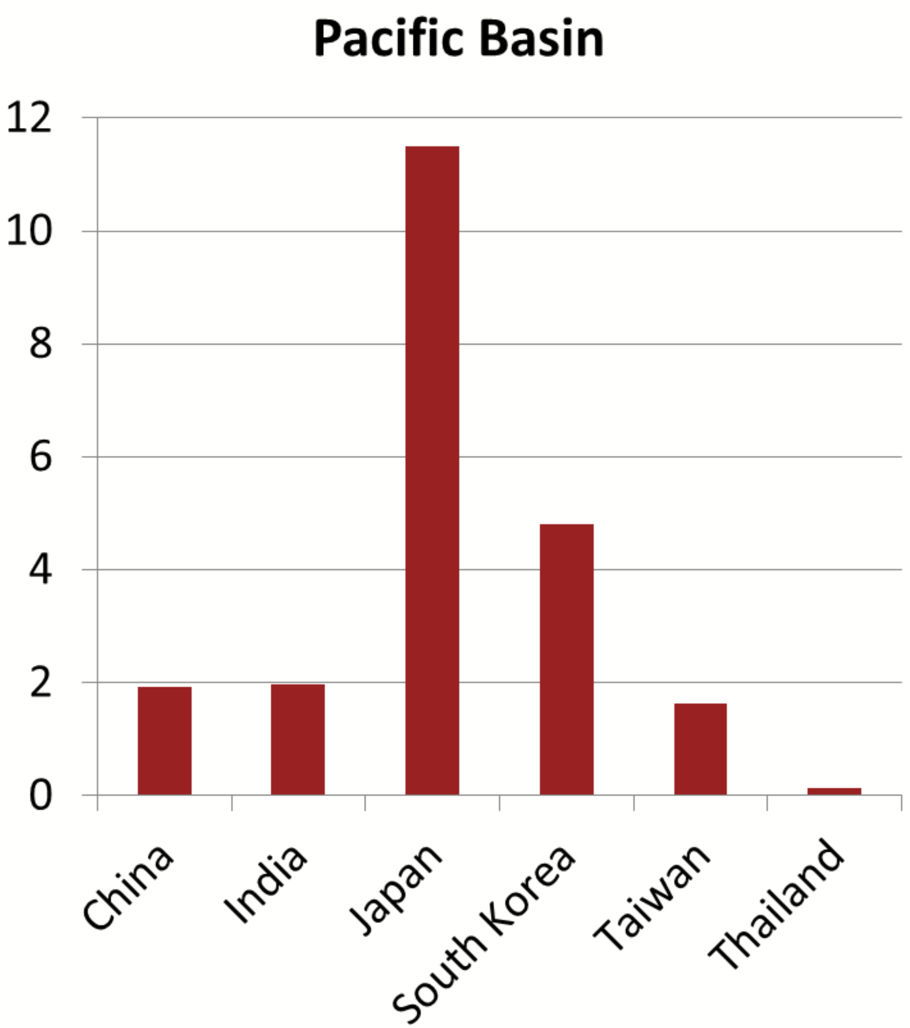
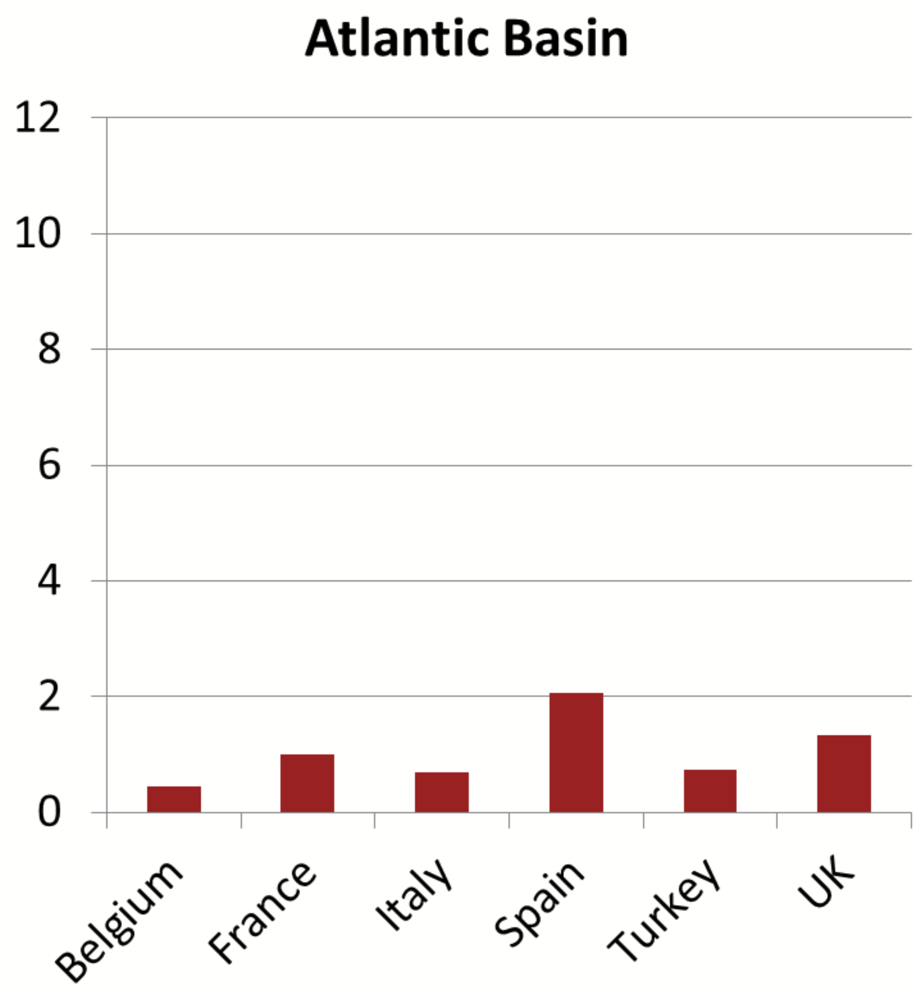
Australian LNG Capacity: Existing and Under Construction (Bcfd)



Source: Petroleum Economist, IEA

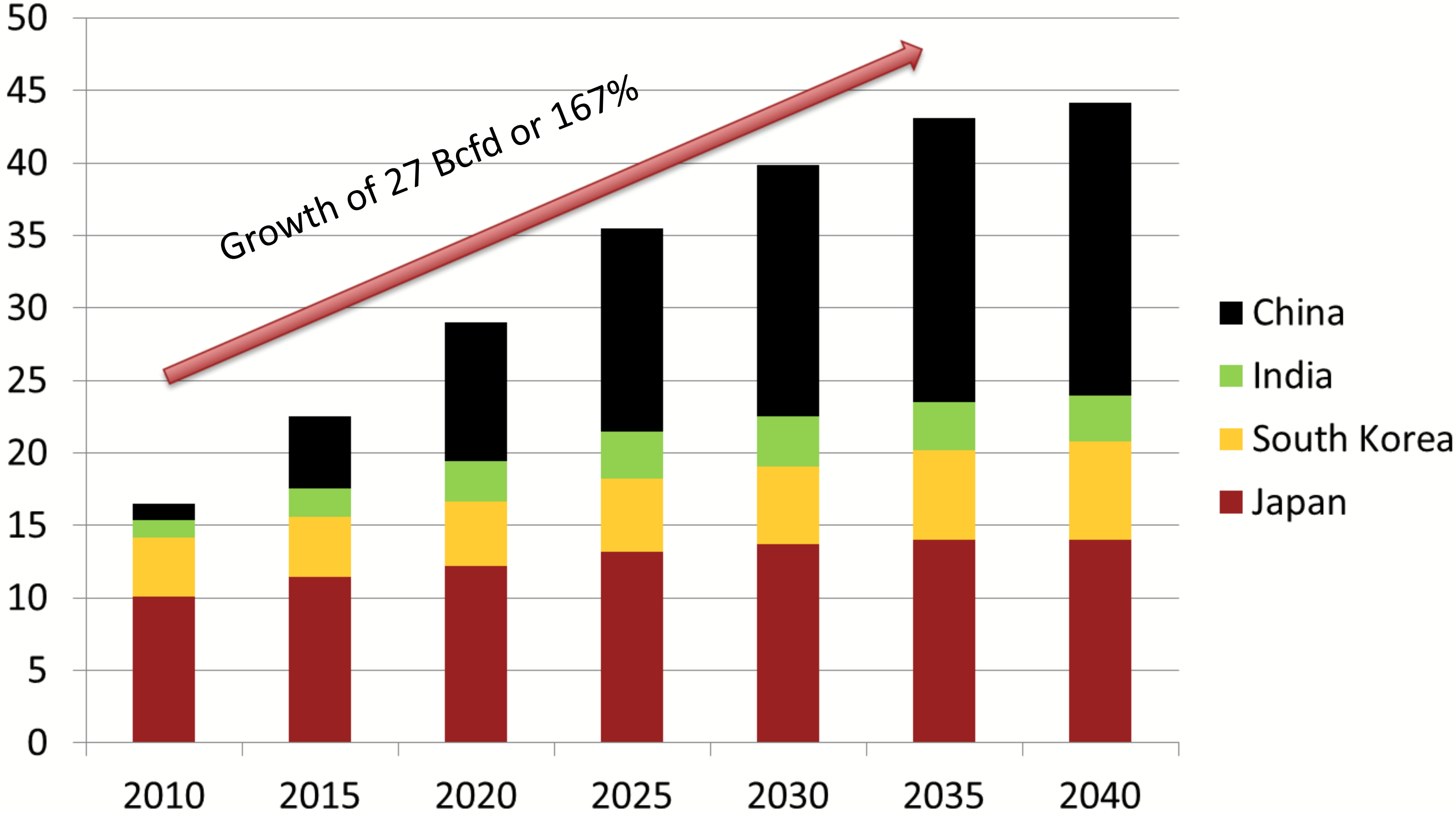
Major Importing LNG Countries in 2012 (Bcfd)





Source: BP Statistical Review

Imports to Asian Economies with Growing Natural Gas Requirements (Bcf/d)



Source: EIA 2013 International Energy Outlook

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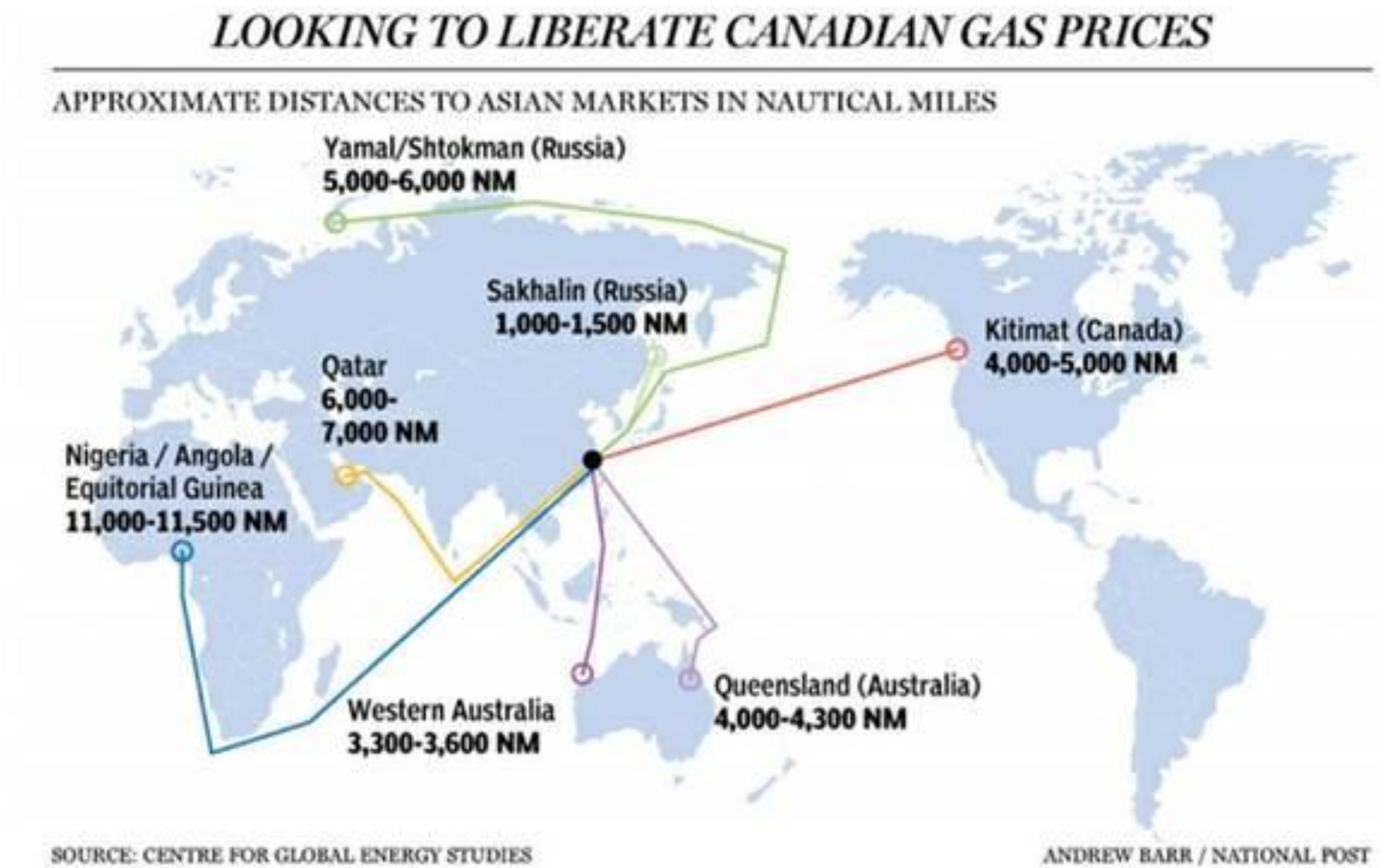
Distance to Market

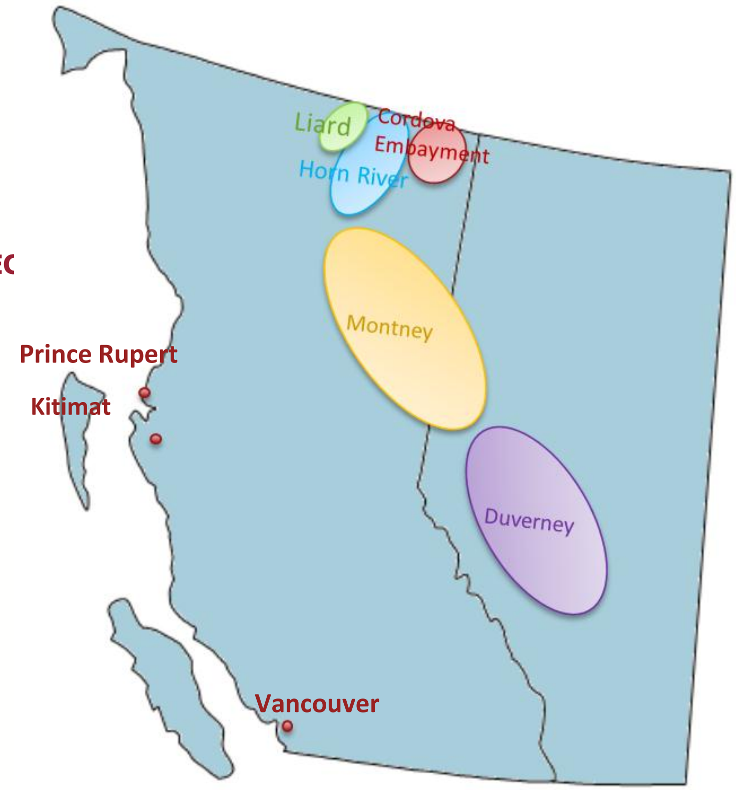


Asian Transactions: Canadian Shale Gas (2010 – YTD 2014)

Year	Buyer	Seller/JV	Project	Value $MM
2014	Indian Oil Corp. Ltd.	Progress Energy Canada	Montney assets, LNG plant & off-take agreement for LNG	
	Progress Energy Canada	Talisman Energy	Montney – Farrell Creek & Cypress	$1,500
	Progress Energy Canada	Talisman Energy	North Montney - Julienne	$130
2012	PetroChina/Phoenix Duvernay Gas	Encana Corp.	Duvernay land holdings 49.9% in 445,000 acres	C$2,180
	CNOOC Limited	Nexen Inc.	Company – Long Lake oil sands & shale	US$15,100
	PETRONAS Canada	Progress Energy	Company incl. shale gas	$6,000
	Mitsubishi Corp.	Encana	40% stake – Cutbank Ridge	$2,900
	Petro China	Shell Canada	20% Groundbirch	$1,000
2011	INPEX (82%) & JGC Corp. (18%)	Nexen Inc.	Shale gas – 40% working interest: Horn River, Cordova & Liard	C$700
	Shell Canada/Korean Gas/Mitsubishi/China National Petroleum Corp.	Cenovus	Kitimat Terminal Facilities	
	Korea Gas Corp.	Mitsubishi Corp.	JV - 5% of Canadian shale gas project (Penn West holds 50%)	
	PETRONAS	Progress Energy	50-50 JV Montney shale gas. Incl. LNG JV - 80% PETRONAS, 20% Progress	1 070
2010	Korea Gas Corporation	Encana	50% joint venture to develop Montney and Horn River	300
	Mitsubishi Corporation	Penn West	50/50 JV B.C. shale & conv. gas plays & facilities	850
	STX Energy	Encana	Maxhamish field	152
	China Investment Corp.	Penn West	5% of Penn West issued & outstanding units	435

Canadian West Coast LNG export projects in development

- **Kitimat LNG (Chevron, Apache)**
  - 1.4 Bcf/d
  - Permits received (including Export License); awaiting investment decision
- **BC LNG Export Co-operative**
  - 0.125 Bcf/d
  - Permits received (including Export License)
- **LNG Canada (Shell, KOGAS, Mitsubishi, PetroChina)**
  - 2.0 – 3.2 Bcf/d
  - Feasibility stage; applied for some permits; Export License granted
- **Pacific Northwest LNG (Petronas, Japex, Indian Oil Corp, Pet. Brunei, SINOPEC**
  - 2.6 Bcf/d (at full build out)
  - Applying for environmental permits, Export License granted,
- **Aurora LNG (Nexen/Inpex)**
  - Conducting feasibility; Export license granted
- **Prince Rupert LNG (BG Group)**
  - 3.0 Bcf/d
  - Advancing feasibility, Export License granted, applying for environmental permits
- **Triton LNG (AltaGas/Idemitsu Kosan)**
  - 0.3 Bcf/d
  - Conducting feasibility; Export license granted
- **ExxonMobil/Imperial Oil (WCC LNG Ltd)**
  - 4.0 Bcf/d
  - Granted Export license
- **Woodfibre LNG**
  - 0.3 Bcfd
  - Granted Export license
- **Woodside (Grassy Point LNG)**
  - 1.8 Bcfd
  - Conducting Feasibility



Total potential new demand ~ 15.0 Bcf/d

Note: Other announced projects include Kitsault LNG, Stewart LNG, Quicksilver

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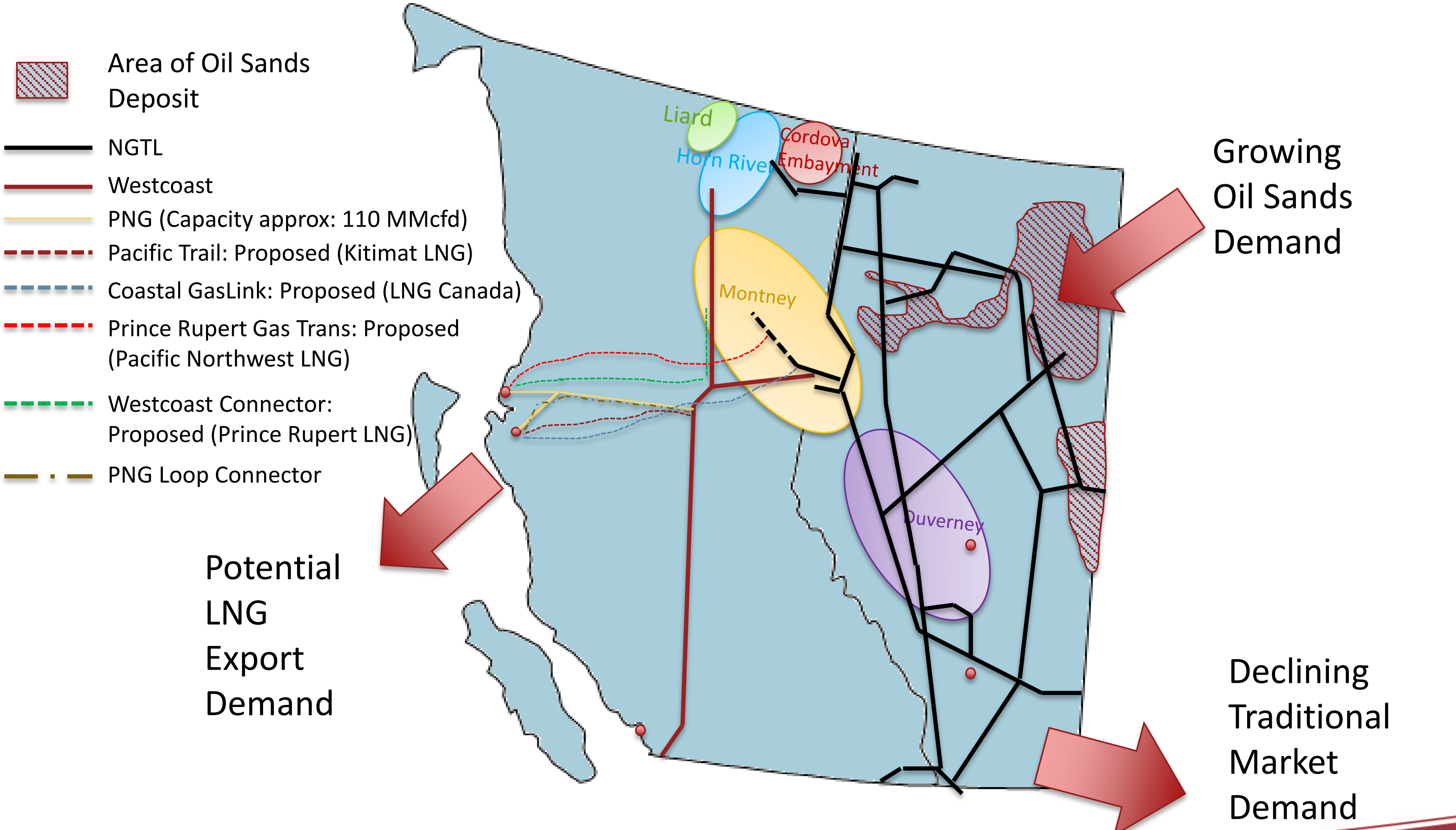
New Market Opportunities for W. Canadian Gas



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Atlantic Canada LNG Export Opportunity

Area of Shale Gas Potential

McCully Gas Field

Maritimes & North East Pipeline

Goldboro LNG – Proposal for export terminal By 2020, exporting up to 1.3 Bcfd. Obtained Environmental Permit from NS Ministry of Environment. Gas sales agreement in place to serve markets in Western Europe

Canaport LNG – Currently operating as an Import terminal with 1.1 Bcfd capacity. Potential to convert to export terminal In the longer term given existing Infrastructure & relative location to prospective gas supplies.

Environmental Approvals

- **These projects trigger rigorous environmental assessments at a provincial and federal level**
    - Canadian Environmental Assessment Act
    - BC Environmental Assessment Act
- **New Natural Processing Plant Facilities that process more than 200 mmcfd require a provincial EA**
- **facility for the liquefaction of 3 000 t/day or more, or storage of LNG, with a capacity of 55 000 t or more are "designated projects" under CEAA & may be subject to full review**
- **Most projects likely subject to both Federal & Provincial Review**
- **Option to apply to have BCEAA process substitute for CEAA process in order to reduce duplication (LNG Canada)**
    - Federal & Provincial Ministers then make independent decisions based on single report
- **Co-ordinated reviews for the PNW LNG and Prince Rupert LNG, both located on Federal Lands (CEAA is lead agency)**

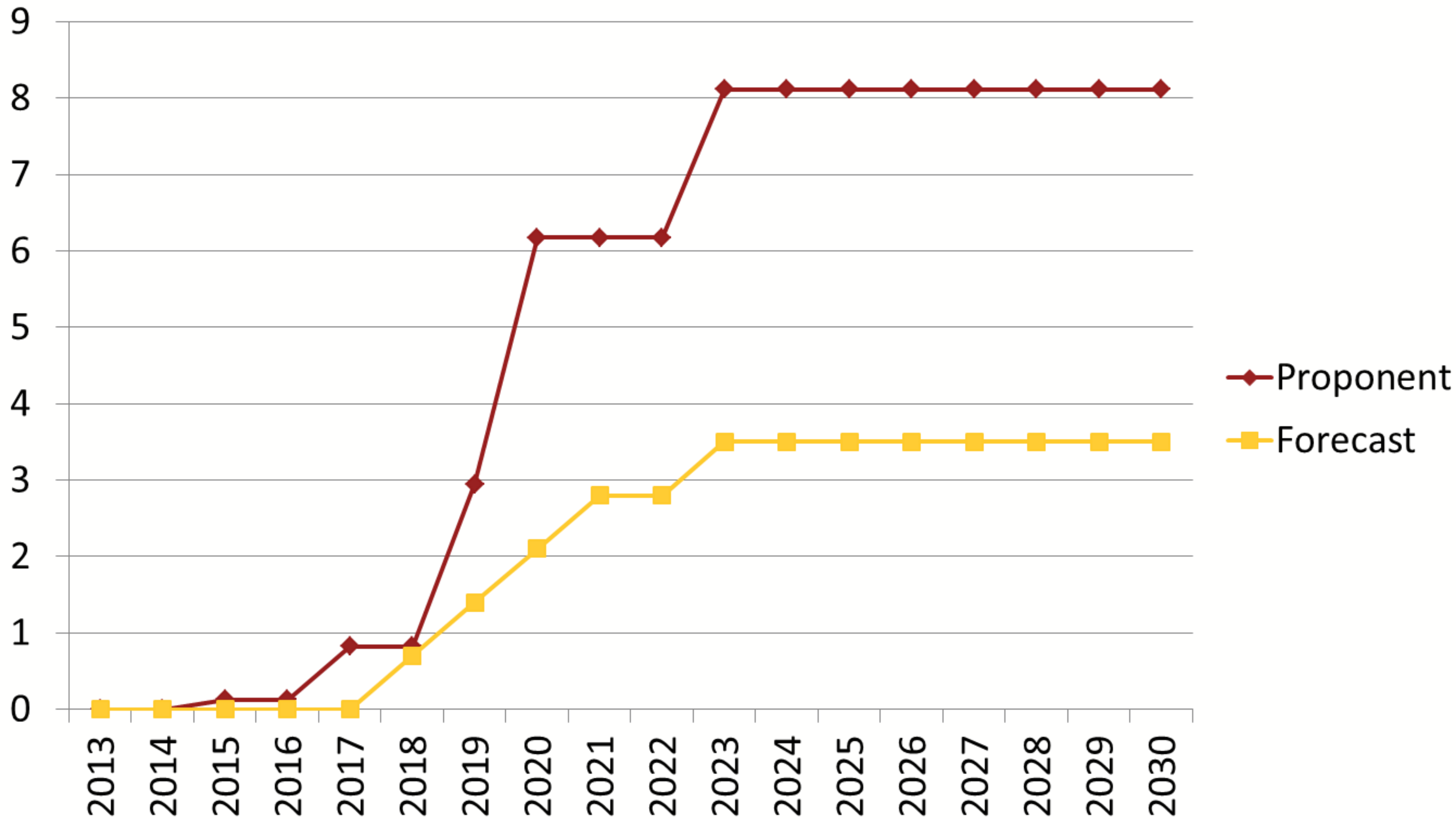
Projects Currently Undergoing Environmental Assessments

LNG Project (Location)	Proponent	BC Environmental Assessment Office	Canadian Environmental Assessment Agency
Kitimat LNG (Kitimat)	Apache & Chevron	Certificate Issues	n/a
LNG Canada (Kitimat)	Shell, Kogas, Mitsubishi & PetroChina	Substituted EA Pre-application Stage	
Pacific Northwest LNG (Port Edward)	Petronas, Japex, Petroleum Brunei, Indian Oil Corp, SINOPEC	Coordinated EA Under Review	
Prince Rupert LNG (Port of Prince Rupert)	BG Group	Coordinated EA Pre-application Stage	
Woodfibre LNG (Squamish)	Pacific Oil & Gas	Substituted EA Pre-application Stage	

Canadian Natural Gas Outlook 2013 to 2030

- **Canada's natural gas production less constrained by resource base more constrained by market**
- **Growing US gas production means more competition for traditional markets (less US Exports & Greater US Imports)**
- **Canadian gas production projected under two scenarios**
- **Scenario 1: Market Constrained**
  - No LNG Export Development
  - Little New Gas-Fired Power Generation added in Ontario post 2012
  - Limited Growth in NGV market
- **Scenario 2: New Market Opportunities**
  - LNG Exports – 1 train of 5 mtpa in 2018, 5 such trains by 2023
  - Natural Gas replaces some Nuclear Power Refurbishment in Ontario Power Generation
  - Higher Growth in NGV Market

LNG Exports – Forecast vs Proponent Announcements (Bcf/d)



Note: Proponent only includes the five projects that filed for Environmental Assessments

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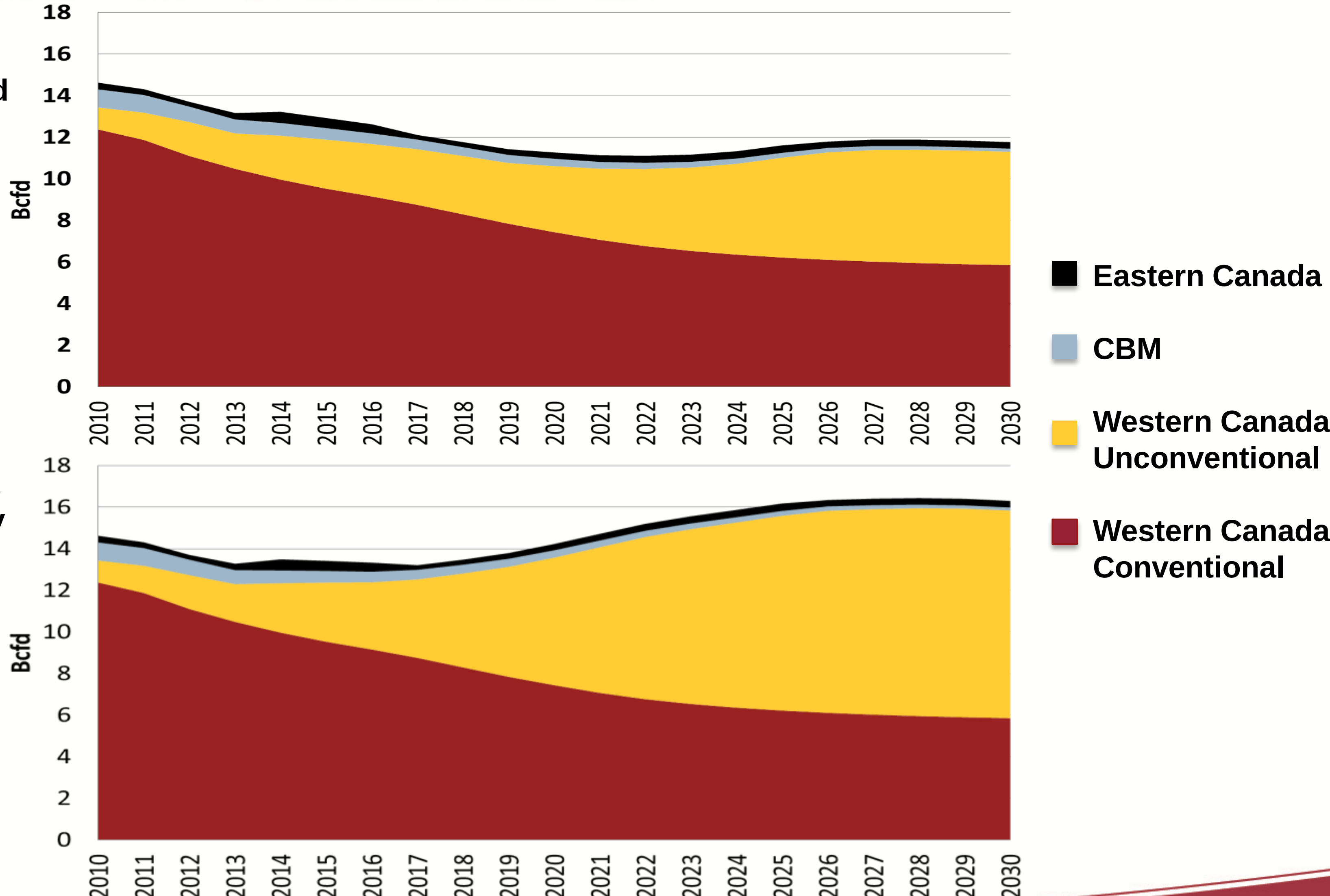
Canadian Production – Market Constrained Case and New Market Opportunity Case

Market Constrained Case

New Market Opportunity Case



Conclusion

- Canada’s enormous resource potential will not be realized without increased market access
- LNG is a rapidly growing market but global competition likely to be intense
- Canada is well positioned to serve the growing markets of SE Asia given geographical proximity and direct ocean access

- CAPP Publication – “An Overview of the World LNG Market and Canada’s Potential for Exports of LNG” Updated January 2014

END

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