



Report

Canadian Natural Gas: Demand and
Production Forecast and Scenario
Modelling
February/2020

The Canadian Association of Petroleum Producers (CAPP) represents companies, large and small, that explore for, develop and produce natural gas and oil throughout Canada. CAPP's member companies produce about 80 per cent of Canada's natural gas and oil. CAPP's associate members provide a wide range of services that support the upstream oil and natural gas industry. Together CAPP's members and associate members are an important part of a national industry with revenues from oil and natural gas production of about \$101 billion a year. CAPP's mission, on behalf of the Canadian upstream oil and natural gas industry, is to advocate for and enable economic competitiveness and safe, environmentally and socially responsible performance.

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Overview

This document summarizes Canada's current natural gas resources, production and markets including domestic and export. Additionally, the document presents results of scenario modelling for demand and production undertaken by the Canadian Association of Petroleum Producers (CAPP) to demonstrate the potential effect of higher export demand, should Canadian natural gas (in the form of liquefied natural gas - LNG) be produced and exported to growing international markets.

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1 Development Scenarios: Production and Demand Modelling

CAPP has modelled two production outlook scenarios, a 'Market Constrained' case (essentially business as usual in the current demand and regulatory framework) and a 'Market Opportunity' case that envisions a more supportive regulatory system that would promote more timely development of infrastructure (pipelines and LNG facilities) to meet growing demand in North American and in the Asia-Pacific region.

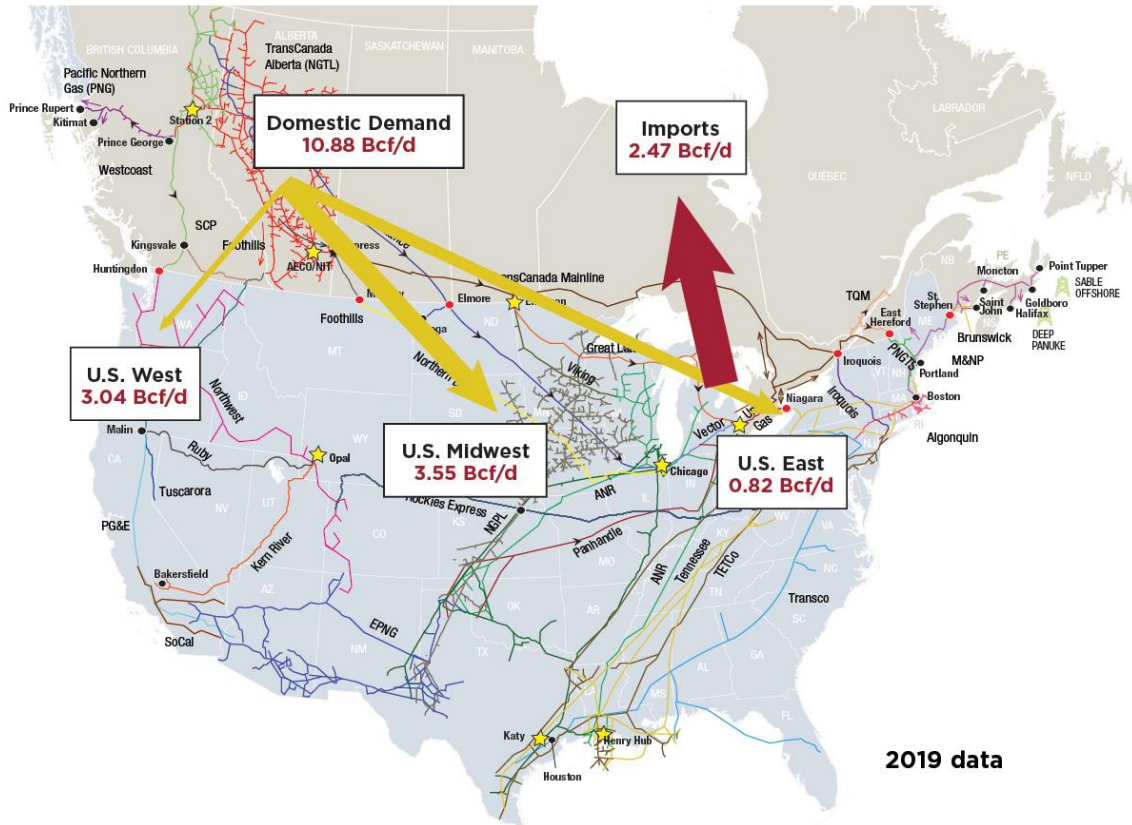
2 Framework for Modelling Canadian Natural Gas Production

Canada's natural gas industry is not resource-constrained but it is market-constrained. With current estimated remaining natural gas resources of approximately 1,220 trillion cubic feet (Tcf) and current annual domestic consumption of only four Tcf, Canadian natural gas producers require access to export markets if this resource base is to be developed to its full potential. Growing U.S. natural gas production has displaced some Canadian production from traditional export markets and consequently has increased the urgency for producers to find new markets. Although growing natural gas volumes used for industrial production and power generation in Western Canada have provided some market upside, Canadian producers are ultimately looking to participate in the global LNG market, which provides a much larger scale of opportunity. The superior environmental performance associated with Canadian LNG will provide an important contribution to efforts to reduce global GHG emissions.

The modelling framework used in this analysis reflects that fact that Canadian natural gas production is currently market-constrained. Canadian producers are assumed to produce the volumes of natural gas required to meet available market demand, both domestically and for export. With no LNG exports at this time, Canadian production will therefore be equal to Canadian natural gas demand, plus the difference between exports of Canadian natural gas to meet U.S. demand, and imports of U.S. natural gas to meet Canadian demand (i.e. Canadian demand plus net exports). Figure 1 illustrates the framework utilized in the analysis to determine Canadian natural gas production and also shows how highly integrated the North American natural gas market is. Over time, as Canadian LNG export facilities are developed, the net export component of the modelling framework includes exports to global markets as well as to the U.S.

Figure 1. Analytical Framework to Determine Canadian Natural Gas Production

$$\text{Canadian Natural Gas Production} = \text{Canadian Natural Gas Demand} + \text{Canadian Net Exports}$$



This outlook utilizes two scenarios:

- The 'Market Constrained' case - a lack of enabling policies that limits Canada's LNG exports to LNG Canada Phase 1 and the smaller-scale Woodfibre LNG facility; and a continued protracted regulatory structure continues to result in transportation bottlenecks, lower prices and lost revenues thereby reducing the industry's ability to finance new wells and other development opportunities.
- The 'Market Opportunity' case - a more efficient regulatory system that avoids protracted transportation bottlenecks that depress WCSB prices; and more LNG export facilities constructed as a result of the implementation of policies conducive to LNG export development.

3 Production Scenario Assumptions

Market Constrained

	Canadian Demand	Net Exports to U.S.	LNG	Production
2020	11.30	4.05	0.00	15.35
2025	11.80	2.92	2.05	16.77
2030	12.03	2.25	2.05	16.33
2035	12.39	1.47	2.05	15.91

Market Opportunity

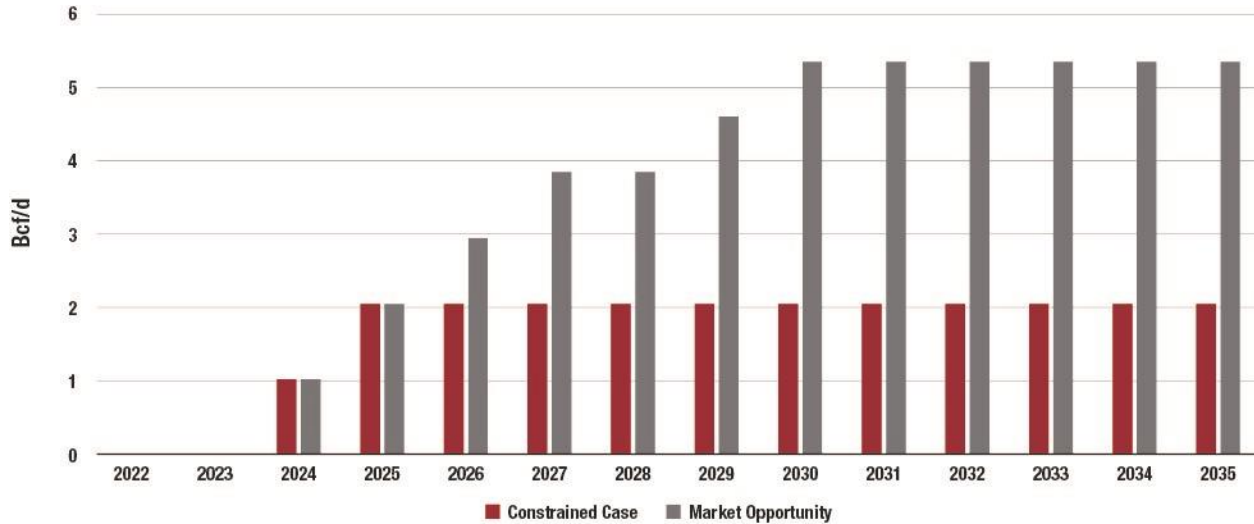
	Canadian Demand	Net Exports to U.S.	LNG	Production
2020	11.30	5.33	0.00	16.63
2025	11.80	5.68	2.05	19.53
2030	12.03	3.37	5.35	20.75
2035	12.39	3.42	5.35	21.17

The ‘Market Constrained’ case assumes that Canadian demand for natural gas, which is currently at 11 Bcf/d, will grow to nearly 12.5 Bcf/d by 2035. While overall annual demand growth is forecast to be 0.7 per cent, the growth in the oil sands and power generation sectors are expected to grow at significantly higher rates of 2.08 per cent and 3.34 per cent per year respectively. A pessimistic outlook for net exports is a result of this scenario’s assumption that a protracted regulatory structure remains in place in Canada. The consequence is transportation bottlenecks out of the basin resulting in lower prices that negatively impact producer revenues. This in turn reduces the ability of western Canadian producers to re-invest in their operations and hampers their ability to compete in traditional export markets. LNG exports in this case are limited to those large-scale LNG exports projects currently proceeding, i.e. LNG Canada Phase 1 (production trains 1 and 2) and the smaller scale Woodfibre LNG project.

The ‘Market Opportunity’ case utilizes the same outlook for Canadian natural gas demand but incorporates a higher level of net exports to the U.S., that results from a more efficient regulatory framework being implemented that avoids protracted transportation bottlenecks and depressed prices. As such the ability of producers to re-invest is enhanced and they are better able to effectively compete for market share in traditional export markets. LNG exports in the ‘Market Opportunity’ case are assumed to be higher than the market constrained case, reflecting a more supportive policy environment that recognizes and actively promotes the global environmental benefits of Canadian LNG.

The level of LNG exports assumed in each of the scenarios is shown in Figure 2. In total, four LNG export trains are assumed to be constructed, in addition to the trains that will be constructed in the LNG Canada Phase 1 and Woodfibre LNG projects, resulting in total LNG exports of 5.3 Bcf/d by 2030/31.

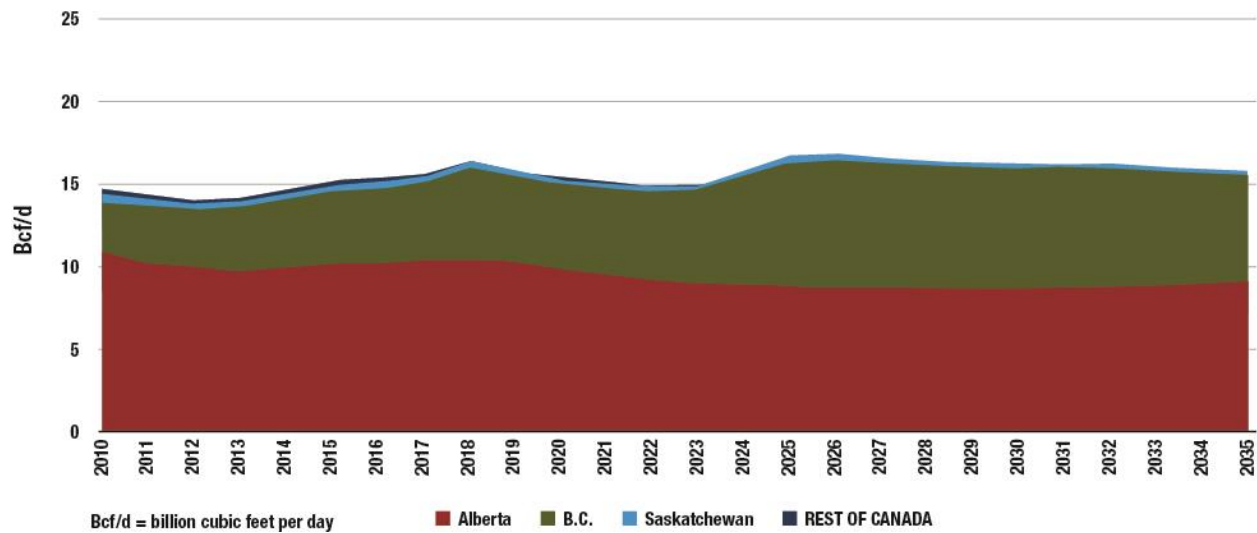
Figure 2. Canadian LNG Exports, Constrained and Opportunity Cases



4 Market Constrained Case Production Outlook

In the ‘Market Constrained’ case (Figure 3), natural gas production enters a period of decline over the next few years as a result of low drilling levels due to depressed prices. The inability to effectively compete in the U.S. export market results in a loss of export volumes, which more than offsets the growth in demand from Canadian power generation and oil sands sectors. Production starts to recover just prior to the LNG exports commencing in mid-2024 and breaches the 16 Bcf/d threshold by 2025 as these facilities reach full capability of 2.1 Bcf/d. Thereafter, production stagnates as no further LNG export opportunities are realized. The impact of LNG exports in 2024 is to stabilize production declines in Alberta and increase natural gas production in B.C. The reason for the more dramatic impact on B.C. production is because each of the owners of the LNG Canada project or their affiliates (Shell - 40%; Petronas - 25%; PetroChina - 15%; Mitsubishi - 15%; and Korea Gas Corporation - 5%) have large reserve holdings in B.C. that have been identified as sources of supply for this facility.

Figure 3. Market Constrained Case Production Outlook



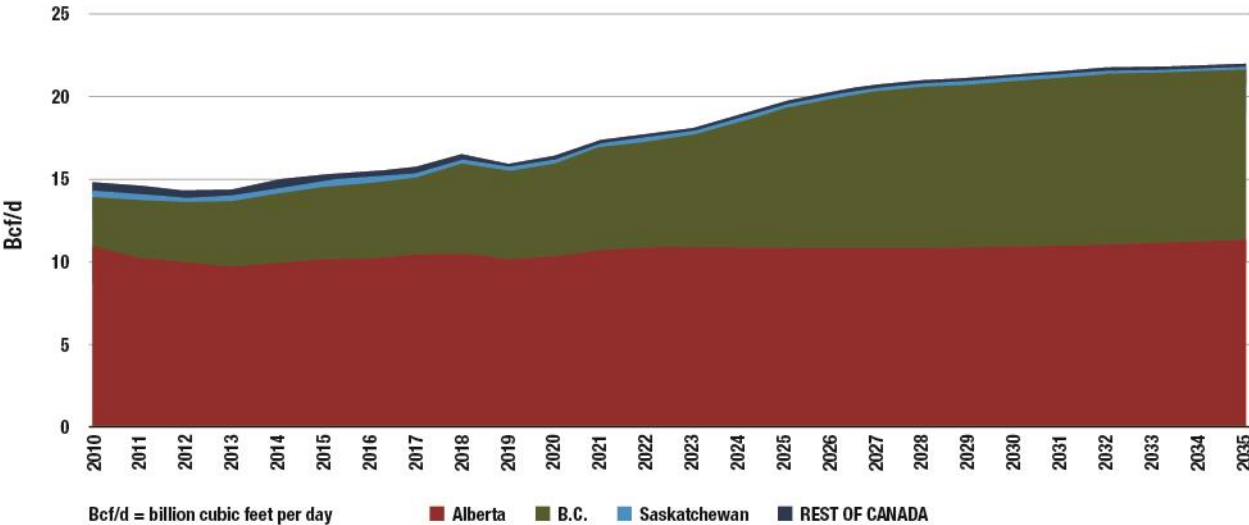
5 Market Opportunity Case Production Outlook

In the 'Market Opportunity' case (Figure 4), natural gas production recovers in the next few years as a more efficient regulatory system facilitates more rapid development of export infrastructure. This prevents prices in Western Canada becoming disconnected from market prices and falling to depressed levels as occurs when there are transportation constraints. With more revenue accruing to producers they are able to sustain a higher level of drilling activity. In addition, the level of net exports to the U.S. is assumed to be higher as producers are able to take full advantage of discounted service offerings on the TC Energy Mainline and more effectively compete in the North American marketplace.

As in the 'Market Constrained' case, commissioning the LNG Canada facility provides an impetus to production growth. The level of production growth in the WCSB related to LNG exports is more pronounced in the 'Market Opportunity' scenario, as the volume of LNG exports reaches 5.3 Bcf/d and therefore generates significantly higher feedstock demand.

Natural gas production in both B.C. and Alberta will increase as a result of higher LNG exports. At this scale of LNG export development, it is expected that these projects will be more reliant on reserves located throughout the WCSB to supply their needs, not only B.C. For example, Chevron has identified its reserves in the Duverney play in Alberta as one of the sources of supply to serve the proposed Kitimat LNG export facility.

Figure 4. Market Opportunity Case Production Outlook



Appendix A. Source Data for Scenarios

Table 1. Source Data for Figure 3 Market Constrained Case Production Outlook, production in billion cubic feet per day.

	Alberta	BC	Saskatchewan	Rest of Canada
2010	10.96941	2.9734994	0.428064	0.359026
2011	10.208094	3.5388708	0.461801	0.203235
2012	9.9422205	3.5355053	0.463192	0.066082
2013	9.7373402	3.9132567	0.43824	0.050163
2014	9.9566234	4.1505298	0.436837	0.174009
2015	10.184658	4.3692461	0.430872	0.225049
2016	10.183209	4.570537	0.409794	0.244612
2017	10.437393	4.6599217	0.403428	0.144041
2018	10.4929	5.443849	0.398093	0.088394
2019	10.3	5.115	0.393	0.025
2020	9.8794168	5.0853129	0.36107	0.025
2021	9.5462061	5.2317386	0.342232	0.025
2022	9.238348	5.2909943	0.333454	0.025
2023	9.0464711	5.5860978	0.332765	0.025
2024	8.9173499	6.540909	0.333642	0.025
2025	8.8182444	7.5992706	0.331609	0.025
2026	8.7468144	7.8259262	0.328177	0.025
2027	8.7004101	7.5973017	0.323226	0.025
2028	8.6806068	7.4490087	0.317793	0.025
2029	8.666442	7.3372691	0.311715	0.025
2030	8.7103609	7.2855824	0.306957	0.025
2031	8.754239	7.2499206	0.301971	0.025
2032	8.8149752	7.1753424	0.297383	0.025
2033	8.870032	6.9370557	0.292674	0.025
2034	8.9812756	6.7005172	0.289604	0.025
2035	9.0835186	6.5206885	0.284554	0.025

Table 2. Source Data for Figure 4 Market Opportunity Case Production Outlook, production in billion cubic feet per day.

	Alberta	BC	Saskatchewan	Rest of Canada
2010	10.96941	2.9734994	0.428064	0.359026
2011	10.208094	3.5388708	0.461801	0.203235
2012	9.9422205	3.5355053	0.463192	0.066082
2013	9.7373402	3.9132567	0.43824	0.050163
2014	9.9566234	4.1505298	0.436837	0.174009
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2017	10.437393	4.6599217	0.403428	0.144041
2018	10.4929	5.443849	0.398093	0.088394
2019	10.3	5.115	0.393	0.025
2020	10.347544	5.5806738	0.36107	0.025
2021	10.719499	6.2016278	0.342232	0.025
2022	10.879684	6.410405	0.333454	0.025
2023	10.905958	6.7626558	0.332765	0.025
2024	10.892351	7.5809786	0.333642	0.025
2025	10.911502	8.3631126	0.331609	0.025
2026	10.892782	8.9523389	0.328177	0.025
2027	10.864322	9.4357949	0.323226	0.025
2028	10.872434	9.7138269	0.317793	0.025
2029	10.877315	9.8336245	0.311715	0.025
2030	10.94736	10.00511	0.306957	0.025
2031	11.007093	10.146599	0.301971	0.025
2032	11.080354	10.27923	0.297383	0.025
2033	11.13909	10.257896	0.292674	0.025
2034	11.264367	10.220741	0.289604	0.025
2035	11.372785	10.207368	0.284554	0.025