



CRUDE OIL FORECAST, MARKETS & PIPELINE EXPANSIONS

JUNE 2008

EXECUTIVE SUMMARY

Canada's oil sands, located primarily in Alberta, are an immense resource of crude oil. In fact, the Alberta oil sands areas contain the second largest established reserves in the world at 173 billion barrels of crude bitumen. CAPP estimates industry will invest about \$20 billion this year to develop the oil sands. The technology used to produce these resources is dependent on the nature of the reserves. Eighteen percent of Alberta's oil sands reserves are close enough to the surface (less than 200 feet) to be mined. The remaining 82 percent are extracted through *in situ* recovery methods that use drilling technology to deploy steam or solvents into the reservoir in order to mobilize the bitumen so it can be pumped to the surface. The size of the resource has attracted oil companies from all over the world.



Canadian Crude Oil Production and Supply

Since the publication of CAPP's June 2007 forecast, there have been significant changes to government policy. These changes include the Federal Government's elimination of the Accelerated Capital Cost Allowance, the Alberta Government's introduction of a new framework to increase oil royalties, and both Federal and Provincial climate change initiatives. Nonetheless, more oil sands projects have been announced, which is indicative of industry's optimism regarding Canada's oil sands opportunities. However, with new opportunities come new challenges, including issues of environmental sustainability and impact, and increased time allotment for regulatory processes. In addition to addressing these emerging challenges, traditional challenges such as the limited availability of labour and materials and increasing costs have contributed to a lower forecast when compared to last year. CAPP has assumed that the current investment climate will generally remain unchanged throughout the forecast time-frame so, any new changes could conceivably impact the production levels anticipated in this report.

In early 2008, CAPP conducted its annual survey of oil sands producers to obtain their current and planned oil sands production through to 2020. CAPP adjusted the survey results to reflect, among other things, historical and projected performance trends. CAPP has prepared two production and supply cases – the Moderate Growth Case and the Pipeline Planning Case. The Moderate Growth Case represents the "expected" outlook while the more aggressive Pipeline Planning Case has been developed for pipeline planning purposes. In the Moderate Growth Case, total Canadian crude oil production is projected to increase from 2.7 million b/d in 2007 to almost 4.5 million b/d in 2020. In the Pipeline Planning Case, production rises to about 5.0 million b/d. In both cases, oil sands growth is significant.

Recent trends indicate the year-over-year decline rate for conventional crude oil production has slowed somewhat due to higher crude oil prices and, in fact, production has increased slightly in Manitoba and Saskatchewan. However, due to the maturity of the Western Canada Sedimentary Basin, conventional crude oil production will continue to decline through 2020.

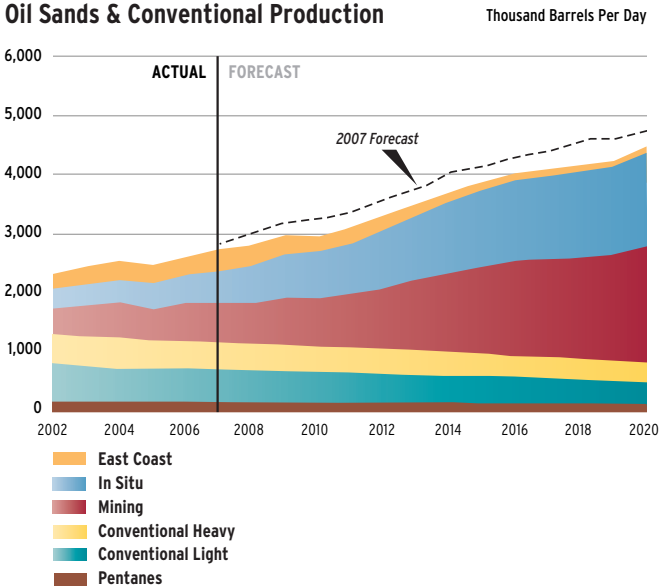
In 2007, production off the east coast of Canada was 369,000 b/d, which represents approximately 13 percent of total Canadian crude oil production. East coast crude oil production is forecast to begin declining this year.

Crude Oil Markets

Expected growth in western Canadian crude oil supply will require additional pipeline capacity to meet demand in existing and new markets. To assess this requirement, CAPP surveyed refineries in traditional and in some potential new markets. The survey results, which were not adjusted by CAPP, illustrate that demand for western Canadian crude oil by Canadian refineries (i.e. western Canada and Ontario) is expected to rise from about 825,000 b/d in 2007 to almost 1.1 million b/d in 2015, a 33 percent increase. Over the same period, the U.S. refinery demand for western Canadian crude oil, according to the survey, is projected to increase from about 1.6 million b/d to almost 3.5 million b/d, an increase of 120 percent. In both the U.S. and Canadian markets, demand for western Canadian heavy crude oil, including bitumen, increases dramatically.

The refinery survey results indicate that traditional markets (i.e. western Canada, Ontario, U.S. Midwest, Rocky Mountains and Washington State) will continue to process large volumes of western Canadian crude oil. There is, however, potential for expansion into new markets such as Québec, U.S. East Coast, U.S. Gulf Coast, California and potentially Asia.

Moderate Growth Case - Canadian Oil Sands & Conventional Production

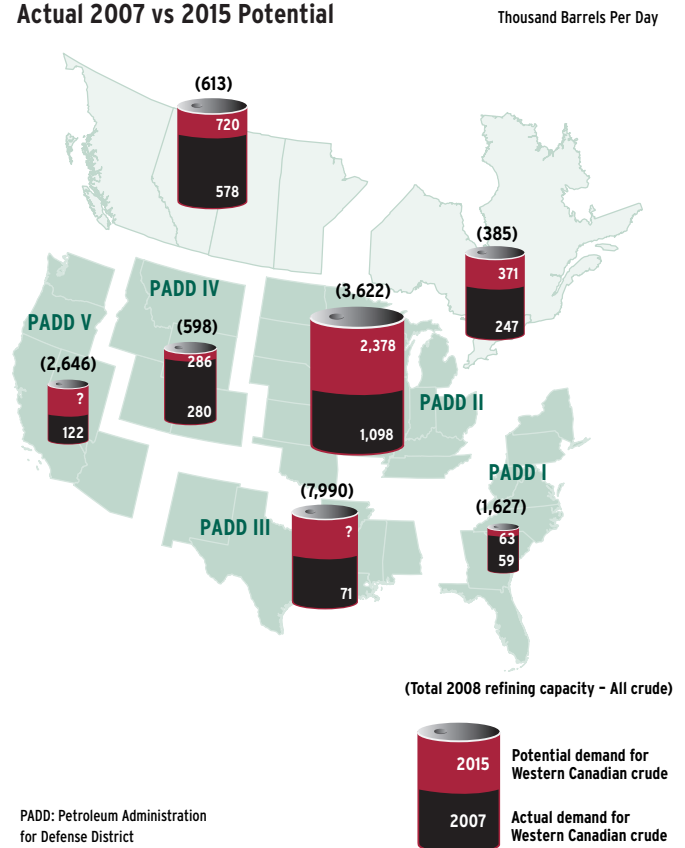


Crude Oil Pipelines and Expansions

Western Canadian crude oil pipelines are reaching the limits of their capacity and, therefore, additional capacity is required. Approximately 1.1 million b/d of new pipeline capacity is being added through the end of 2010 which should be sufficient until 2013. Subsequently, a significant amount of additional pipeline capacity will be required to meet expected oil sands growth. There are numerous pipeline proposals to new markets such as the U.S. Gulf Coast and East Coast which reflect the significant increases in heavy and light synthetic crude oil supply. It should be noted, however, that it generally takes four to five years for a new pipeline to be put into service.

With respect to potential new markets, there are a large number of either direct or indirect pipeline proposals to the U.S. Gulf Coast market. This reflects the availability of heavy crude oil conversion capacity in this market as well as projected growth in heavy crude oil supply from western Canada. Expected growth in supply could exceed demand in traditional markets. In the Pipeline

Market Demand for Western Canadian Crude Oil - Actual 2007 vs 2015 Potential

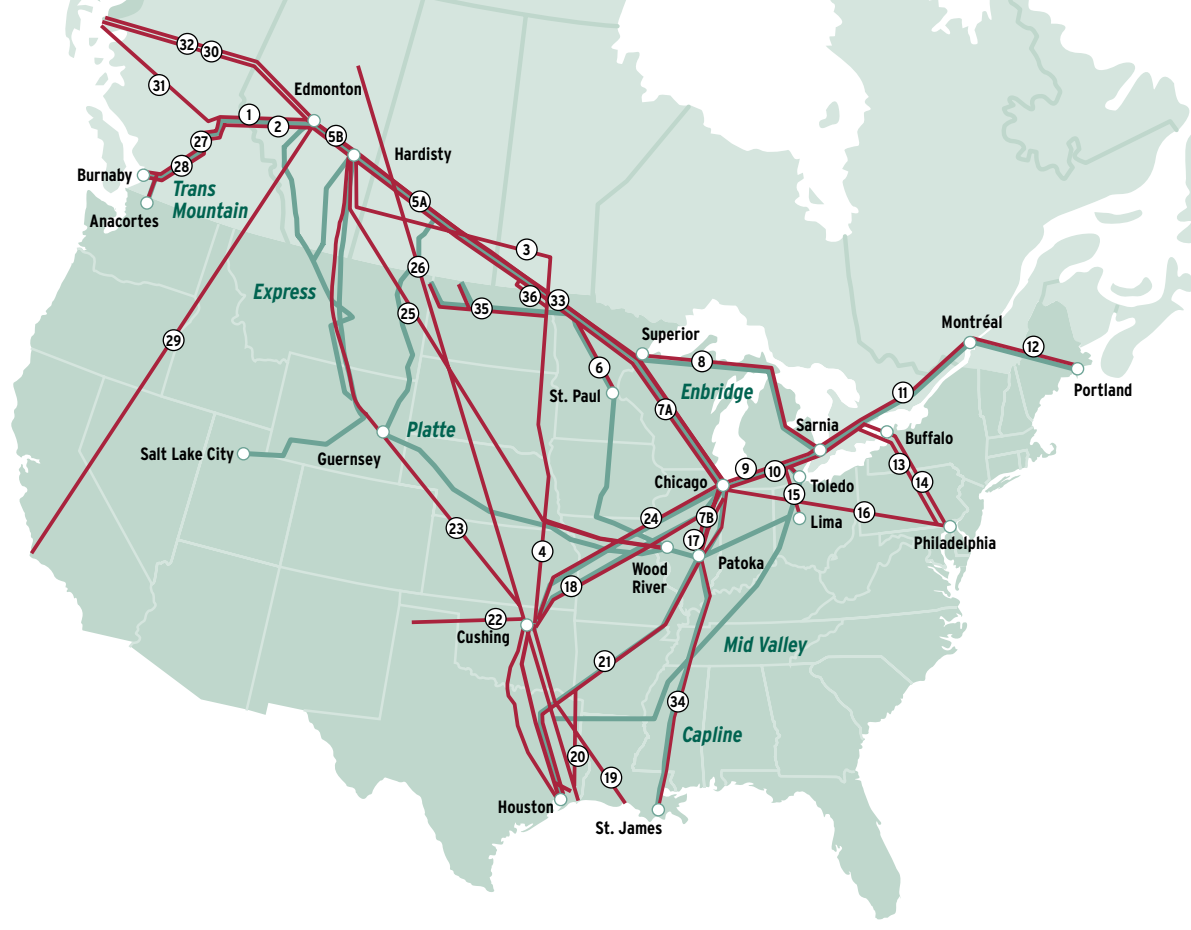


Planning Case, heavy crude oil supply is estimated to rise by almost 1.5 million b/d in 2020. It is interesting to note, as well, the number of pipeline proposals to the U.S. East Coast market, which is essentially a light crude oil market. In the Pipeline Planning Case, light crude oil supply is also projected to increase by 1.2 million b/d in 2020.

Conclusions

In order to accommodate the growth in oil sands supply, approximately 1.1 million b/d of pipeline capacity is being added from western Canada through the end of 2010, which should be sufficient until 2013 given the growth in the Pipeline Planning Case. Subsequently, additional pipeline capacity will be required to meet expected oil sands growth. There are pipeline proposals that will enable access to several markets in North America, including a pipeline reversal to extend access deeper into eastern Canada. Other notable markets, which have significant potential to process increasing volumes of Canadian crude oil, include new markets in the United States and potentially Asia. Producers are currently assessing these markets in order to decide which pipeline proposals to support. This report provides an assessment of the supply outlook, the market potential and the pipeline proposals to enable a more complete understanding of the current Canadian crude oil picture.

Canadian & US Crude Oil Pipelines - All Proposals



- | | | |
|--|--|---------------------------------------|
| 1 Kinder Morgan TMX1A Expansion | 12 Portland Pipeline Reversal | 25 TransCanada Keystone XL |
| 2 Kinder Morgan TMX1B Expansion | 13 Sunoco - to Philadelphia | 26 Altex Energy |
| 3 TransCanada Keystone | 14 Enbridge Pioneer (Opt2) | 27 Kinder Morgan TMX2 |
| 4 TransCanada Keystone Cushing Extension | 15 Enbridge Eastern PADD II | 28 Kinder Morgan TMX3 |
| 5A Enbridge Alberta Clipper | 16 Enbridge Pioneer (Opt 1) | 29 TransCanada Alberta-California |
| 5B Enbridge Line 4 Extension | 17 ExxonMobil Mustang Expansion | 30 Enbridge Northern Gateway |
| 6 Minnesota Pipeline Expansion | 18 Enbridge Spearhead Expansion (N/S) | 31 Kinder Morgan TMX Northern Leg |
| 7A Enbridge Southern Access Expansion | 19 Sunoco - to US Gulf Coast | 32 Enbridge Gateway Condensate Import |
| 7B Enbridge Southern Access Extension | 20 Enbridge/ExxonMobil Texas Access | 33 Enbridge Southern Lights |
| 8 Enbridge Line 5 Expansion | 21 ExxonMobil/Enbridge Pegasus Expansion | 34 Capline/Chicap |
| 9 Enbridge Line 6B Expansion | 22 Centurion Pipeline Reversal | 35 Enbridge North Dakota |
| 10 Enbridge Line 6C | 23 TEPPCO/Kinder Morgan Chinook - Maple Leaf | 36 Enbridge Light Sour Line |
| 11 Enbridge Line 9 Re-reversal | 24 BP No. 1 Pipeline | |

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1 CRUDE OIL PRODUCTION AND SUPPLY FORECAST

CAPP's crude oil forecast has been prepared to provide industry and the public with a long-term outlook of Canadian production trends and available supply to markets. In addition, CAPP's forecast is used to determine crude oil pipeline capacity requirements to accommodate the expected growth in western Canadian crude oil supply. To complete the Canadian oil outlook, CAPP has also prepared a forecast of offshore eastern Canadian crude oil supply.



1.1 Introduction

Since the publication of CAPP's June 2007 forecast, there have been some significant changes to government policy. These changes include the Alberta Government's introduction of a new royalty structure to increase royalties for all existing and future oil, gas and oil sands production, effective January 2009; the Federal Government's phased elimination of the accelerated capital cost allowance for oil sands projects; and both Federal and Provincial climate change initiatives. Nonetheless, more oil sands projects have been announced, which is indicative of industry's optimism surrounding Canada's oil sands opportunities. However, with new opportunities come many new challenges, such as environmental issues and increased time requirement for regulatory processes. In addition to addressing these emerging challenges, traditional challenges such as the limited availability of labour and materials and increasing costs have contributed to a lower forecast when compared to last year. CAPP has assumed that the current investment climate will remain relatively unchanged throughout the forecast time-frame so, any new changes could conceivably impact the production levels anticipated in this report.

1.2 Methodology

CAPP conducted a survey of oil sands producers in early 2008 to determine current and planned oil sands production of both bitumen and upgraded crude oil. However, additional adjustments to the survey results have been made to reflect historical performance trends of oil sands projects following start up. Also, some delays to the scheduled in service dates have been incorporated based on the status of the project. The majority of oil sands projects, particularly *in situ* operations, are executed in multiple phases. Historically, *in situ* projects require some time to ramp up to capacity while new mining projects typically require some fine tuning before capacity is maintained on a consistent basis.

From the survey data, CAPP established the amount of upgraded crude oil and bitumen that could potentially be available to the market. A list of all publicly announced oil sands projects is available at www.strategywest.com

The following assumptions have been used to determine available oil sands supply:

- a) All bitumen must be blended with either condensate or upgraded crude oil prior to being transported by pipeline.
- b) Condensate is the preferred diluent over upgraded crude oil.

- c) Prior to the in service of Enbridge's Southern Lights diluent import pipeline in July 2010, the amount of western Canadian condensate production plus railed imports is not sufficient to blend with expected bitumen production and, therefore, some producers will blend their bitumen with upgraded crude oil to meet pipeline specifications.
- d) Following 2010, Southern Lights imports will be capable of providing additional diluent to western Canadian producers; however, some producers may continue to use some upgraded crude oil to blend with bitumen.

The forecast for conventional production was based on historical trends and recent announcements. CAPP has not surveyed conventional crude oil producers.

CAPP has prepared two cases, the "Moderate Growth Case" and the "Pipeline Planning Case". The "Moderate Growth Case" represents the expected outlook. The more aggressive, "Pipeline Planning Case" has been developed for pipeline planning purposes, and accounts for higher production rates arising from operating experience and technology improvements.

1.3 Canadian Crude Oil Production

CAPP's forecast includes production from the Western Canada Sedimentary Basin (WCSB) and offshore eastern Canada. Overall, both light and heavy conventional production in the WCSB is declining, while development in the oil sands is escalating. Western Canadian crude oil production averaged 2.4 million b/d in 2007 and is projected to grow significantly over the forecast period due to the oil sands. East Coast crude oil production is forecast to begin declining this year and a steep decline, relative to the decline in conventional production, is expected in the long term. In 2007, East Coast production was 369,000 b/d, which equaled about 13 percent of total Canadian crude oil production of 2.8 million b/d. The forecast is lower than last year's forecast for East Coast production due to higher decline rates.

In the Moderate Growth Case, total Canadian crude oil production is projected to rise from 2.8 million b/d in 2007 to about 3.9 million b/d in 2015 and to 4.5 million b/d in 2020 (Figure 1.1). In the Pipeline Planning Case, total Canadian crude oil production is forecast to grow from 2.8 million b/d in 2007 to about 4.3 million b/d in 2015 and to over 5.0 million b/d in 2020 (Figure 1.2). The growth in the forecast is attributable to increasing production from the oil sands, which more than offsets the continued decline in conventional oil production.

Figure 1.1 Moderate Growth Case - Canadian Oil Sands & Conventional Production Thousand Barrels Per Day

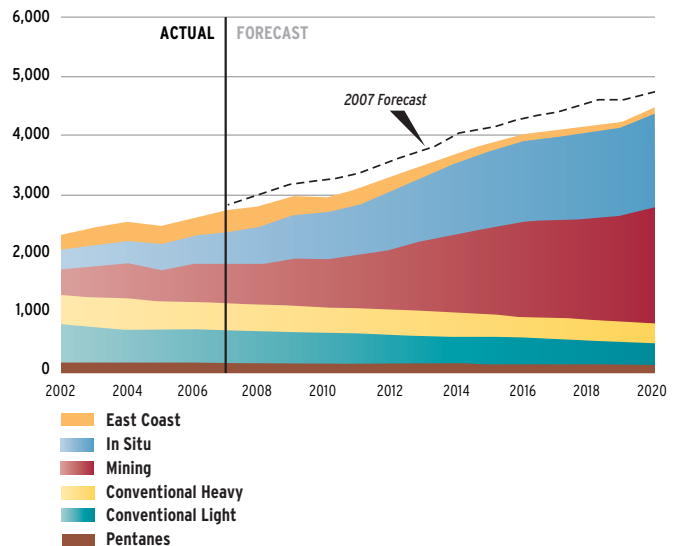
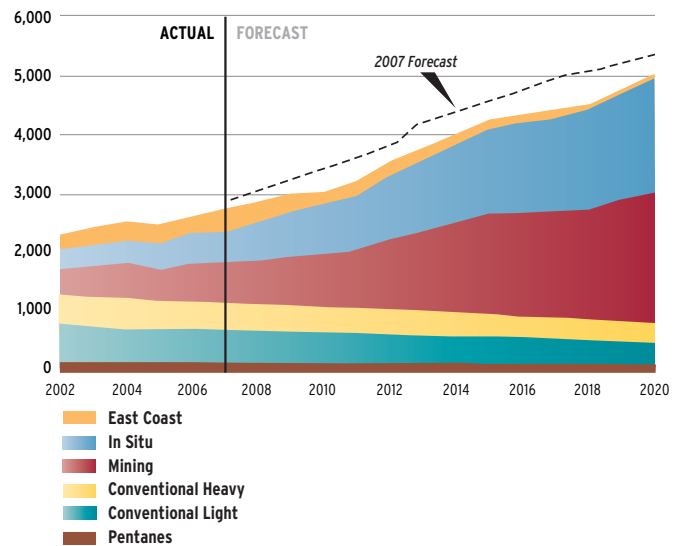


Figure 1.2 Pipeline Planning Case - Canadian Oil Sands & Conventional Production Thousand Barrels Per Day



1.4 Western Canadian Crude Oil Production

In 2007, almost 90 percent of all Canadian crude oil production came from western Canada.

Western Canadian crude oil production is comprised of conventional oil and oil sands production. Conventional crude oil production had exceeded oil sands production until 2006, at which time oil sands production reached over 1.1 million b/d and surpassed conventional production. Total western Canadian crude oil production in 2007 was almost 2.4 million b/d and is projected to increase to about 4.4 million b/d in 2020 in the Moderate Growth Case and to 5.0 million b/d in the Pipeline Planning Case as shown in Table 1.1.

Table 1.1 Western Canadian Crude Oil Production (million b/d)

	2007	2010	2015	2020
Moderate Growth Case	2.4	2.7	3.8	4.4
Pipeline Planning Case	2.4	2.8	4.1	5.0

1.4.1 Oil Sands

The three main oil sands deposits are located in the Peace River, Athabasca and Cold Lake areas in the province of Alberta (Figure 1.3). The Alberta Energy Resources and Conservation Board (ERCB) estimated that these areas contain an ultimately recoverable

Figure 1.3 Oil Sands Deposits



resource of 315 billion barrels, with remaining established reserves of 173 billion barrels as at year-end 2007. There are also smaller deposits in northwest Saskatchewan, next to the Athabasca oil sands deposit. The Saskatchewan Ministry of Energy and Resources has estimated 2.7 million hectares of potential land, but the resource base has not been officially determined. Bitumen is primarily extracted from the oil sands using either surface mining or *in situ* techniques. In areas where the oil is located near the surface, open pit mining is the most efficient method; however, to recover oil that is located further below the surface (i.e. more than 75 metres, according to Alberta Energy), *in situ* thermal extraction techniques such as Steam Assisted Gravity Drainage (SAGD) and Cyclic Steam Stimulation (CSS) are employed. Of the remaining established reserves, 141 billion barrels, or 82 percent, is considered recoverable by *in situ* methods and 31 billion barrels from surface mining.

Currently, all of the mined bitumen is upgraded as part of an overall integrated operation. This trend of upgrading mined bitumen is expected to continue throughout the forecast period for most of the projects. In contrast, the majority of *in situ* bitumen production is not upgraded prior to transporting it to market. This trend, however, will change as more *in situ* production will be coupled with upgrading projects. The first is OPTI-Nexen's Long Lake project, which is currently producing bitumen, but is scheduled to come on stream with synthetic production later this year. The production from integrated upgrading projects will be augmented by merchant upgrading projects of which there are several in various stages of planning and development. CAPP has included the contribution of merchant upgrading in its supply forecast, which is discussed in the Western Canadian Crude Oil Supply section.

Oil sands production currently makes up just over half of western Canada's total crude oil production, and is expected to grow from roughly 1.2 million b/d in 2007 to approximately 2.8 million b/d in 2015 and to about 3.5 million b/d in 2020 in the Moderate Growth Case. In 2007, about 666,000 b/d was recovered from mining, which is slightly more than half of the total oil sands production (Figure 1.4).

Figure 1.4 Moderate Growth Case - Western Canada Oil Sands & Conventional Production Thousand Barrels Per Day

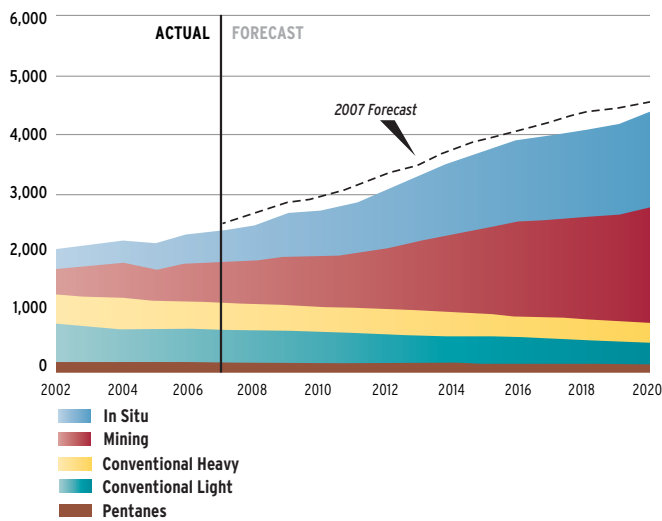
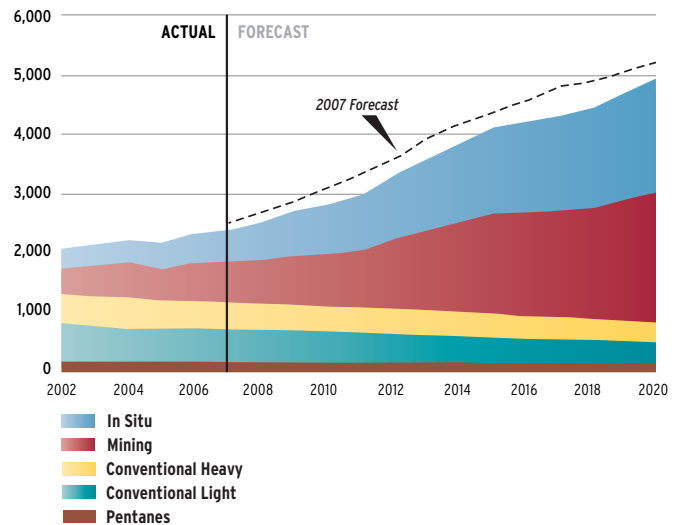


Figure 1.5 Pipeline Planning Case - Western Canada Oil Sands & Conventional Production Thousand Barrels Per Day



The Moderate Growth Case is based on the assumption that oil sands projects will be developed and brought into service at a gradual pace, which is expected based on historical and current trends. There are many other factors that could impact optimal performance such as cost increases and availability of labour and materials. The timing of resolving environmental issues also creates uncertainty. In the Pipeline Planning Case, oil sands production is expected to grow from roughly 1.2 million b/d in 2007 to approximately 3.1 million b/d in 2015 and to about 4.1 million b/d in 2020 (Figure 1.5). This case projects that the timing between phases will be less than the Moderate Growth Case.

1.4.2 Conventional Crude Oil Production

Conventional crude oil production in western Canada has been declining gradually since the late 1990s as a result of the maturity of the basin. By 2020, total conventional crude oil production declines to about 705,000 b/d, almost 30 percent less than the current level of over 1 million b/d. Recent trends indicate that the year-over-year decline rate for conventional crude oil production has slowed somewhat due to high crude oil prices and, in fact, has increased slightly in Manitoba and Saskatchewan.

In Manitoba, production rose 16 percent in 2007. However, it should be noted that the Sinclair field, which was designated in 2005, and the first major discovery in Manitoba in many years, accounted for 30 percent of that province's crude oil production. Production is, however, expected to start declining within the next 2 to 3 years as the basin matures.

Industry optimism over Saskatchewan's oil prospects appears strong as evidenced by the land sale revenue of \$463 million from January to April 2008 compared to \$99 million during the same period in 2007. Saskatchewan production of light crude oil is expected to continue increasing modestly for the next few years. The Bakken oil field in south east Saskatchewan, touted as the largest conventional oil discovery in Canada since 1957, continues to generate strong interest. The growth in Saskatchewan light crude oil production can be attributed to the high drilling and production from the Bakken field. The decline in heavy crude oil production in Saskatchewan has been offset somewhat by the production from the Lower Shaunavon field. The Shaunavon formation has been known since the 1950s and is difficult to extract oil from, but there has been renewed interest with continued high oil prices.

With no new discoveries in Alberta and British Columbia, conventional production continues to decline steadily in these provinces.

1.5 Western Canadian Crude Oil Supply

The general types of crude oil produced from oil sands bitumen are upgraded crude oil and bitumen blend. A typical example of an upgraded light crude oil would be Syncrude's Sweet Blend (SSB), which has a density of about 870 kg/m³ (31° API) and a sulphur content of 0.12 percent. Last year, the CAPP forecast separated the volume of bitumen diluted with upgraded light from the volumes of upgraded heavy and bitumen diluted with condensate. In this report, these crude types have been grouped together and are collectively referred to as "Bitumen Blend." This representation intends to present a more useful supply picture since it is not possible to accurately determine the volume of bitumen blended with upgraded light. Furthermore, these volumes are likely to be less significant than originally anticipated. Bitumen is generally blended with condensate such as pentanes plus, which is mainly recovered from processing natural gas. An example would be Cold Lake crude, which has a density of about 930 kg/m³ (21° API) and a sulphur content of 3.6 percent.

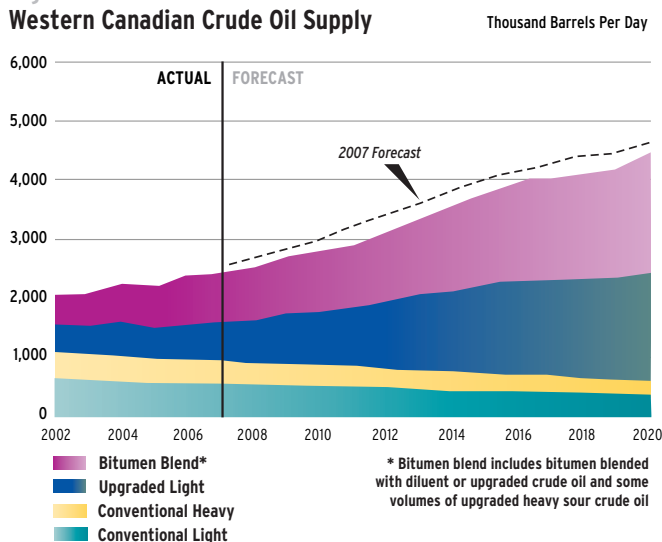
Heavy crude oil and bitumen must be blended with diluent to meet pipeline specifications for density and viscosity. Currently, the main source of diluent is natural gas condensates that are produced in western Canada. In the future, this diluent supply will not be sufficient to meet the needs of growing bitumen production. As a result, producers are considering imports of condensate or other diluents by pipeline as well as the use of upgraded crude oil. Blending with condensate requires three parts bitumen and one part condensate. With the use of upgraded light crude as the diluent, the ratio changes to roughly 50:50.

As noted earlier, locally produced condensate is no longer sufficient and, in fact, companies have imported up to 50,000 b/d of diluent into Alberta by rail in 2007. To meet growing diluent demand, Enbridge is planning to construct the Southern Lights diluent pipeline from Chicago to Alberta. It is expected to be in service in July 2010, and will have the potential to supply up to 180,000 b/d of diluent.

	2007	2010	2015	2020
Moderate Growth Case	2.4	2.8	3.8	4.5
Pipeline Planning Case	2.4	2.9	4.2	5.1

Table 1.2 shows the total western Canadian crude oil supply projections for both the Moderate Growth Case and the Pipeline Planning Case. In the Moderate Growth Case, upgraded light crude oil supply is projected to grow from about 650,000 b/d in 2007 to 1.5 million b/d in 2015 and 1.8 million b/d by 2020. The supply of upgraded light crude oil could increase in the event that additional amounts of diluent are imported which would result in less upgraded light crude oil used as a diluent. Bitumen Blend, which makes up the heavy crude oil supply from the oil sands, is forecast to increase from 830,000 b/d in 2007 to 1.6 million b/d in 2015 and up to 2.0 million b/d in 2020 (Figure 1.6).

Figure 1.6 Moderate Growth Case Western Canadian Crude Oil Supply

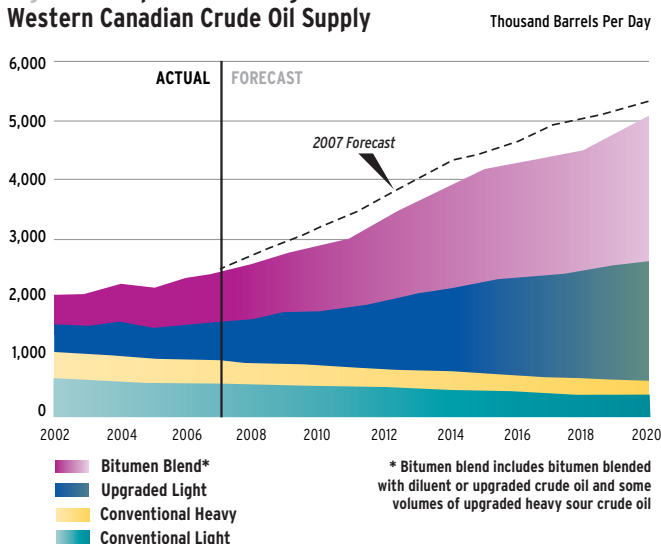


In the Pipeline Planning Case, there is more production of upgraded crude oil and bitumen, resulting in a higher Bitumen Blend volume than the Moderate Growth Case. The supply of upgraded light crude oil is forecast to grow from 650,000 b/d in 2007 to 1.6 million b/d by 2015 and to 2.0 million b/d by 2020.

Bitumen Blend grows from 830,000 b/d in 2007 to 1.9 million b/d in 2015 and up to 2.4 million b/d in 2020. It is assumed that growing bitumen production in this case will require additional diluent imports beyond pipeline capacity in 2017 (Figure 1.7).

In summary, western Canadian crude oil supply will increase from 2.4 million b/d in 2007 to 4.5 million b/d in 2020 in the Moderate Growth Case while in the Pipeline Planning Case, supply rises to 5.1 million b/d. The primary reason for the difference is the pace of ramp up of the projects and the variation in the delays between project phases. In other words, it takes longer for the projects to reach design capacity in the Moderate Growth Case. The outlook for western Canadian crude oil production remains promising.

**Figure 1.7 Pipeline Planning Case
Western Canadian Crude Oil Supply**



1.6 Summary

Eastern Canadian crude oil supply is expected to start declining starting in 2008. The decrease in supply is greater than in last year's report due to a higher decline rate.

In both cases, CAPP projects significant growth in oil sands supply, although at a slower pace than CAPP's 2007 forecast. In this year's Moderate Growth Case, oil sands supply of 1.5 million b/d in 2007 grows by 2.4 million b/d by 2020, while in the Pipeline Planning Case, supply increases by 3.0 million b/d. Although some growth is expected in the short-term in Manitoba and Saskatchewan, total conventional crude oil supply from 2007 to 2020 falls by 340,000 b/d in both Cases.

2 CRUDE OIL MARKETS

CAPP is of the view that it is necessary to review the market potential to process the expected growth in oil sands supply. This assessment will, as well, assist industry in the development of adequate pipeline infrastructure. In this context, CAPP surveyed the majority of North American refineries (western Canada, Ontario, PADDs II and IV, and Washington State) to obtain information on their ability or plans to process increasing volumes of western Canadian crude oil and, in particular, oil sands to 2015.



2.1 Introduction

CAPP did not put any constraints on the data submitted by refiners nor did it prepare any alternate cases. CAPP did not survey refineries located in Québec, eastern PADD I, PADD III or California; however, discussions with these refiners indicate that a significant potential exists, and this is supported by the numerous pipeline proposals.

The CAPP refinery survey assessed four types of western Canadian crude oil. They are:

1. Conventional Light Sweet (30° to 40° API, less than 0.5% S) including condensates and pentanes plus;
2. Heavy (equal to or less than 27° API) and includes synthetic sour, DiIBit, SynBit and DiSynBit);
3. Conventional Medium Sour (greater than 27° API and 0.5% S); and
4. Light Sweet Synthetic.

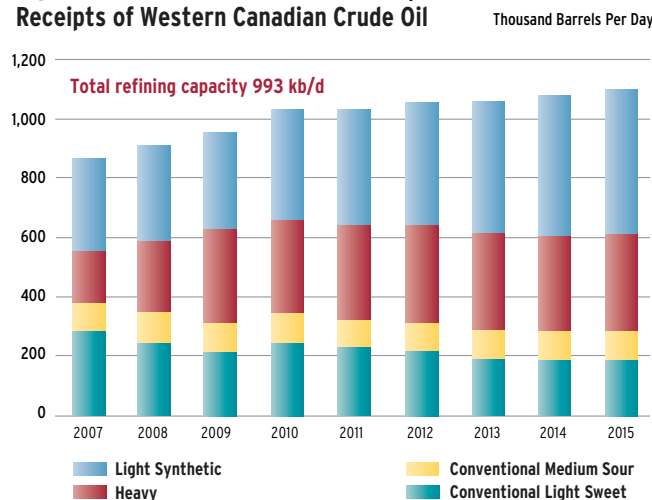
In 2007, available supply of crude oil from western Canada was over 2.4 million b/d. Domestic demand for western Canadian crude oil was approximately 825,000 b/d and the remaining supply of over 1.6 million or 65 percent was exported. The primary markets for western Canadian crude oil are: British Columbia; Alberta; Saskatchewan; Ontario; northern PADD II (i.e. Chicago, Twin Cities and Toledo); PADD IV; and Washington State. With the reversal of the Enbridge Spearhead pipeline

and the ExxonMobil (Pegasus) pipeline in early 2006, western Canadian crude oil is delivered to the Cushing, Oklahoma hub and the U.S. Gulf Coast, respectively.

2.2 Canada

Canadian refineries that have access to western Canadian crude oil have a refining capacity of almost 1 million b/d. In 2007, these refineries processed about 825,000 b/d of western Canadian crude oil. The survey results project that this will increase to approximately 1 million b/d in 2010 and with refinery expansions to almost 1.1 million b/d in 2014. (Figure 2.1)

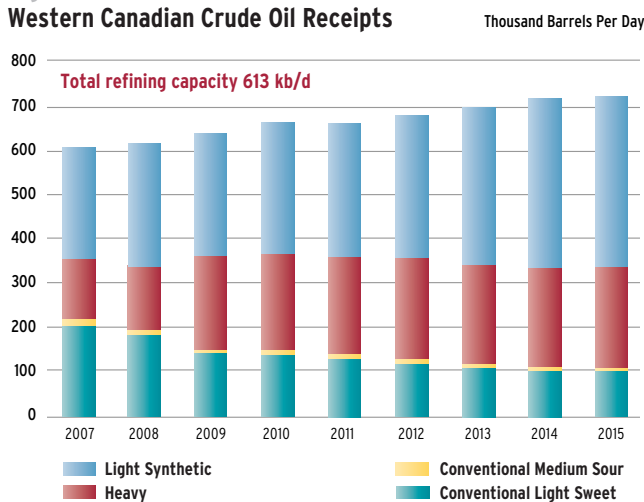
Figure 2.1 Forecast Canadian Refinery Receipts of Western Canadian Crude Oil



2.2.1 Western Canada

There are eight refineries located in western Canada with a total refining capacity of about 613,000 b/d, and they process exclusively western Canadian crude oil. The Moose Jaw asphalt plant in Moose Jaw, Saskatchewan produces only asphalt but the rest manufacture a wide range of petroleum products. In 2007, they refined about 578,000 b/d and this, according to the survey, is expected to increase to 665,000 b/d in 2010, and remain relatively flat through 2012. Subsequently, receipts are expected to rise to 695,000 b/d in 2013 and reach 720,000 b/d in 2015. (Figure 2.2)

**Figure 2.2 Western Canada Forecast
Western Canadian Crude Oil Receipts**

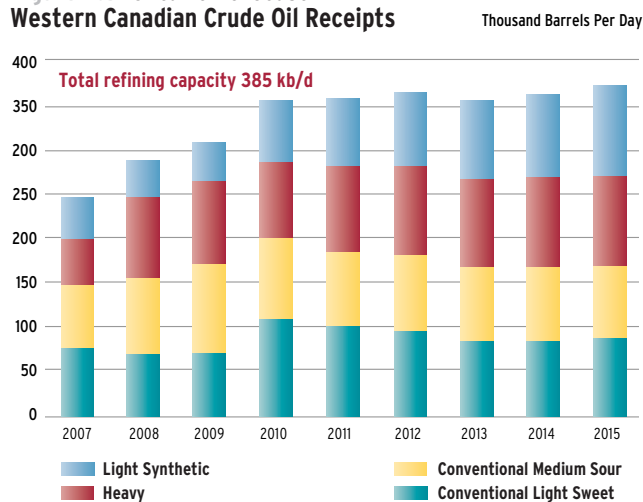


Receipts of conventional light sweet crude oil are expected to fall, in part, due to the maturity of the basin as well as refinery conversions; for example, the conversion of Petro-Canada's Edmonton refinery in the fourth quarter 2008 to process 100 percent oil sands feedstocks. Receipts of heavy and light synthetic crude oils are expected to increase throughout the forecast period. Consumers' Co-operatives is currently assessing a 30,000 b/d expansion of its Regina refinery that could start up in 2011 and would use upgraded light crude oil feedstock. There are proposals to upgrade bitumen at the mining projects as well as a number of merchant upgrader proposals located in Fort Saskatchewan, Alberta.

2.2.2 Ontario

There are four refineries (excludes Nova Chemicals' Sarnia facility) located in Ontario with a total refining capacity of almost 385,000 b/d. These refineries process both western Canadian crude oil as well as crude oil (imports and eastern Canadian crude oil production) that is received by tankers from the Portland-to-Montréal pipeline and, subsequently, the Enbridge Montréal-to-Sarnia pipeline (Line 9). Ontario refineries have, for a number of years, based their feedstock sourcing on both availability and pricing. (Figure 2.3)

**Figure 2.3 Ontario Forecast
Western Canadian Crude Oil Receipts**



In 2007, Ontario refineries processed almost 380,000 b/d of which 65 percent or about 247,000 b/d was from western Canada. Receipts of western Canadian crude oil are projected to rise to 365,000 b/d or 94 percent of refining capacity by 2010.

2.2.3 Québec

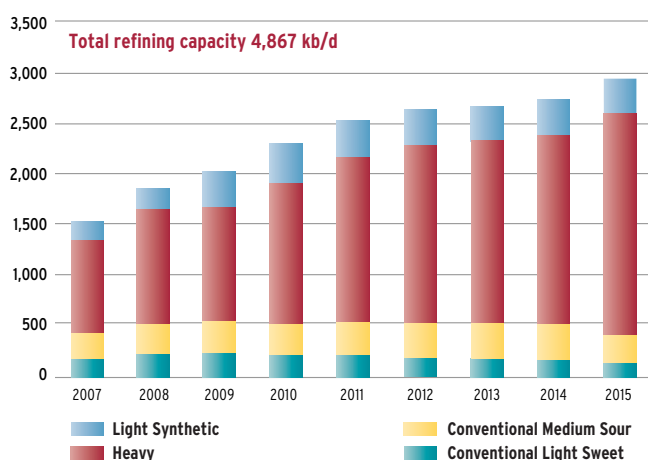
The two refineries located in Montréal have a total refining capacity of 260,000 b/d, and a refinery in Québec City has a capacity of 215,000 b/d. The Montréal refineries process both eastern Canadian and foreign crude oil, which is received from the Portland-to-Montréal pipeline. If Enbridge's Line 9 pipeline is re-reversed, the Montréal market would provide western Canadian crude oil producers with a new outlet for their

production. Petro-Canada is considering adding a 25,000 b/d coker to its refinery in Montréal, which would displace some light crude oil with heavy crude oil. A decision on installing a coker is expected in June 2008 with a potential in service date in 2010.

2.3 United States

The United States, with a refining capacity of approximately 17 million b/d, is Canada's largest market for crude oil exports. In 2007, Canada was the largest exporter of crude oil to the U.S, ahead of both Mexico and Saudi Arabia. Canada exported over 1.8 million b/d, which was equivalent to almost 19 percent of total U.S. demand; of this volume, 1.6 million b/d was sourced from western Canada. The refiner survey results show exports from western Canada to the U.S. growing to 2.5 million b/d in 2011 and to 2.9 million b/d in 2015 (Figure 2.4). The major growth is expected to be heavy crude oil. The rise in crude oil exports to the United States, in CAPP's view, reflects various drivers, such as; Canada's proximity to the United States; geopolitical stability; and security of supply for Canada and the United States.

Figure 2.4 Forecast Western Canadian Crude Oil Exports to the U.S. (includes Western PADD I, PADD II, PADD IV & Washington) Thousand Barrels Per Day

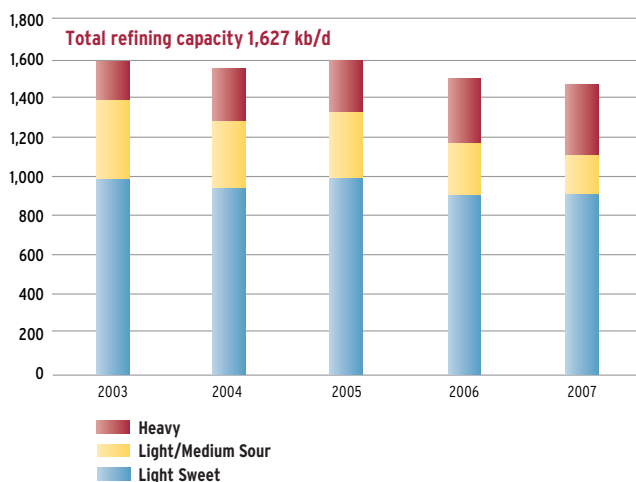


2.3.1 PADD I

PADD I is located along the east coast of the United States with refineries in Delaware, New Jersey, Pennsylvania, Virginia and West Virginia. There are 13 refineries with a total capacity of over 1.6 million b/d.

In 2007, refinery runs in this market consisted of 63 percent light sweet crude oil, 24 percent heavy crude oil and 13 percent medium sour crude oil (Figure 2.5).

Figure 2.5 PADD I Historical Imported Crude Oil 2003-2007 Thousand Barrels Per Day

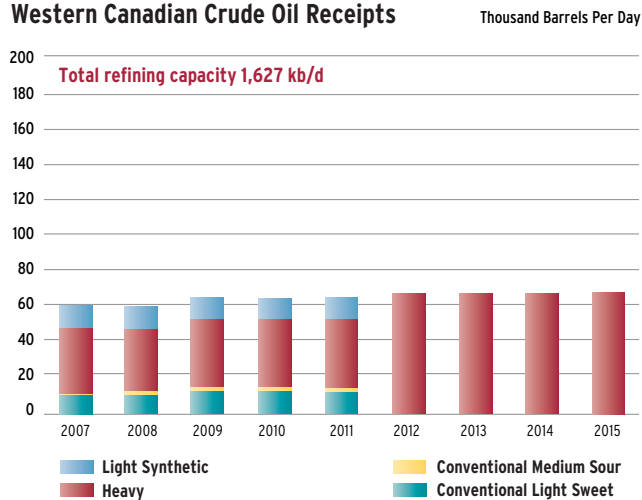


In 2007, 17 percent of refinery runs in PADD I were Canadian sourced crude oil. Receipts of Canadian crude oil, including offshore East Coast, were 256,000 b/d with just 24 percent or 60,000 b/d from western Canada. These receipts were delivered by pipeline to the United refinery in Warren, Pennsylvania with the bulk of it being heavy crude oil. There is a possibility that the existing market may convert to heavy crude oil in 2012 (Figure 2.6). Without additional access to this market, western Canadian crude oil deliveries are expected to remain relatively flat through 2015. PADD I refineries have a huge potential to process western Canadian crude oil by displacing imports of foreign crude oil, in particular, light sweet crude oil. There are, in fact, pipeline proposals to serve this market with western Canadian crude oil.

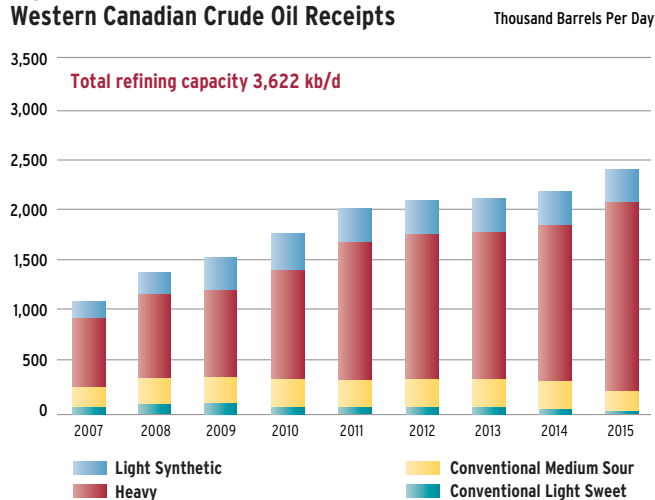
2.3.2 PADD II

PADD II, located in the U.S. Midwest, has historically been the largest market for western Canadian crude oil, and it has a refining capacity of 3.6 million b/d. In 2007, PADD II processed about 1.1 million b/d of western Canadian crude oil, and this is projected, according to the refiner survey, to grow to almost 2.4 million b/d in 2015, an increase of almost 120 percent. The forecasted receipts of western Canadian crude oil in 2015

**Figure 2.6 PADD I Forecast
Western Canadian Crude Oil Receipts**



**Figure 2.7 PADD II Forecast
Western Canadian Crude Oil Receipts**



equals about 67 percent of current refining capacity (Figure 2.7). As discussed later in the report, however, the anticipated large growth in western Canadian crude oil production means that producers have to look beyond the markets they have historically served and actively seek access to new markets. For purposes of this report, PADD II has been divided into north, east and south.

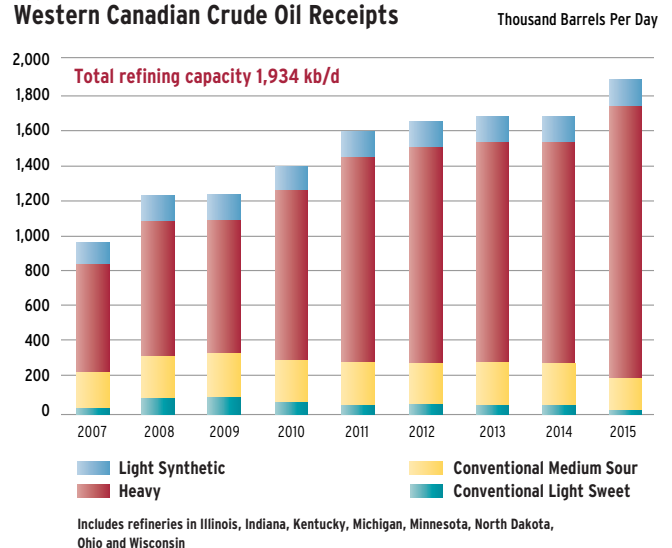
Northern PADD II

Northern PADD II has 11 refineries located in Illinois, Indiana, Minnesota, North Dakota, Ohio (Toledo) and Wisconsin and they run predominantly heavy crude oil which reflects their complexity. Total refining capacity in

northern PADD II is 1.9 million b/d, and the Illinois/Indiana area makes up 61 percent of the region's refining capacity followed by Minnesota with 19 percent.

In 2007, imports into northern PADD II were 1.0 million b/d and western Canadian crude oil accounted for 95 percent of those imports. Imports of western Canadian crude oil are expected to grow to almost 1.4 million b/d in 2010 and to about 1.9 million b/d in 2015, a 90 percent increase in comparison to 2007 (Figure 2.8). Historically, western Canadian heavy crude oil was the feedstock of choice; and, in 2007, it approximated 600,000 b/d or 62 percent of total western Canadian crude oil refined in that area. Receipts of heavy crude oil are projected to rise up to 1.5 million b/d in 2015. The large growth in heavy crude oil reflects certain refiners' expectations to add conversion capacity and, therefore, reduce receipts of U.S. domestic or imports from the U.S. Gulf Coast. Western Canadian conventional medium sour crude oil receipts are forecasted to rise slightly. Light synthetic crude oil is projected rise moderately and remain flat at about 137,000 b/d through 2015.

**Figure 2.8 PADD II (North) Forecast
Western Canadian Crude Oil Receipts**

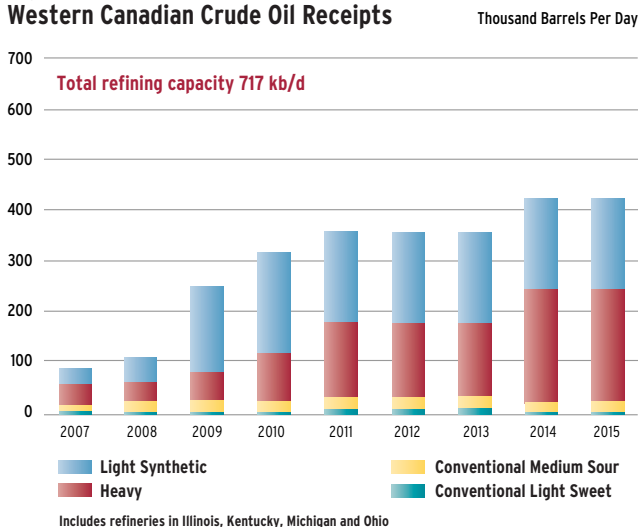


Eastern PADD II

Eastern PADD II is located east of Chicago and Patoka, but excludes Toledo, Ohio which is considered an existing market in northern PADD II. Eastern PADD II has a refining capacity of 717,000 b/d and, in 2007, western Canadian crude oil accounted for only 13 percent or 90,000 b/d of that capacity. Receipts of light synthetic

crude oil are expected to increase in 2009 and 2010 then decline. Heavy crude oil deliveries are expected to grow from 37,000 b/d in 2007 to 150,000 b/d in 2011, and then rise to 225,000 b/d in 2014. Proposed expansions and conversions, if they proceed, will result in higher runs of western Canadian heavy crude oil in the next several years (Figure 2.9).

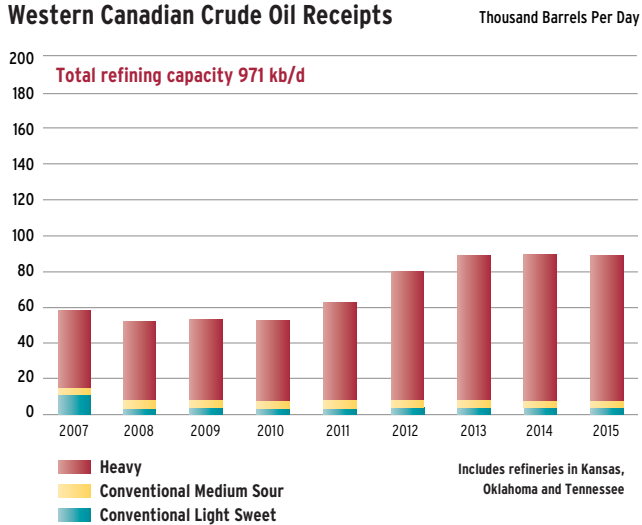
Figure 2.9 PADD II (East) Forecast Western Canadian Crude Oil Receipts



Southern PADD II

The nine refineries in southern PADD II are located in Kansas, Oklahoma and Tennessee, and have a total refining capacity of 971,000 b/d. With the reversal of the Enbridge Spearhead pipeline in March 2006, western Canadian producers are able to deliver up to 125,000 b/d of crude oil into Cushing, Oklahoma. Spearhead pipeline has been at capacity and, recently, Enbridge announced a successful open season to expand the capacity to 190,000 b/d in the third quarter 2009. Access to the Cushing market offers western Canadian crude oil producers opportunities to penetrate other markets (e.g. PADD III) through existing pipelines. According to the refiner survey, this market is not expected to be a large growth area for western Canadian crude oil. In 2007, this market processed about 60,000 b/d of western Canadian crude oil, and this is projected to rise to almost 90,000 b/d in 2013 (Figure 2.10).

Figure 2.10 PADD II (South) Forecast Western Canadian Crude Oil Receipts



2.3.3 PADD III

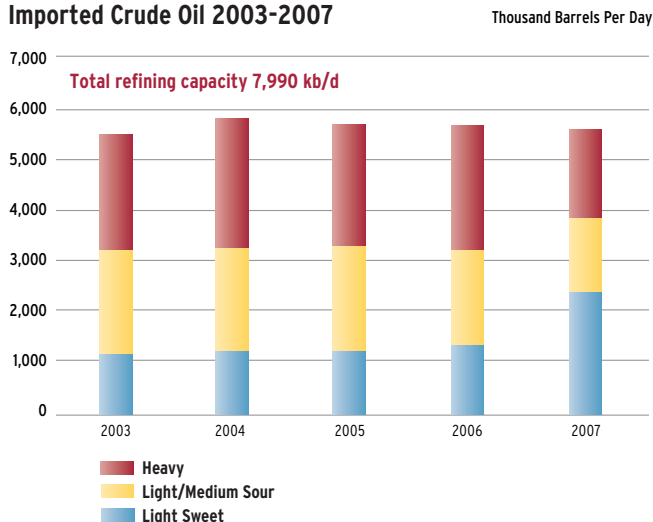
PADD III, comprising of Alabama, Arkansas, Louisiana, Mississippi, New Mexico and Texas, is the largest and most complex refining district in the United States and has 49 refineries. Total refining capacity approximates 8 million b/d, of which a significant portion has heavy crude oil processing capabilities. In recent years, PADD III refineries have added several new cokers. These additions allow refineries to run heavier and more sour grades of crude oil which are becoming increasingly more predominant in the world's oil production slate.

In 2007, PADD III imported 5.6 million b/d of crude oil, and over 2.4 million b/d of that was heavy crude oil. It imports crude oil from Mexico (24 percent), Venezuela (18 percent), Saudi Arabia (15 percent) and Nigeria (11 percent), and it also imported from 33 other countries. Deliveries of western Canadian crude oil commenced in April 2006 through the reversed ExxonMobil pipeline (Pegasus) from Patoka, Illinois to Corsicana, Texas. The pipeline is operating at its capacity of about 66,000 b/d.

Due to its size and ability to run heavy crude oil, PADD III is currently the largest untapped market for western Canadian crude oil producers. As a result, there are several pipeline proposals to access this market with western Canadian crude oil. Although a number of the cokers in PADD III were originally dedicated to specific

supply sources, such as Venezuela, these contracts are expected to expire in the near future providing western Canadian crude oil producers with a significant opportunity, particularly for heavier grades (Figure 2.11).

Figure 2.11 PADD III Historical Imported Crude Oil 2003-2007

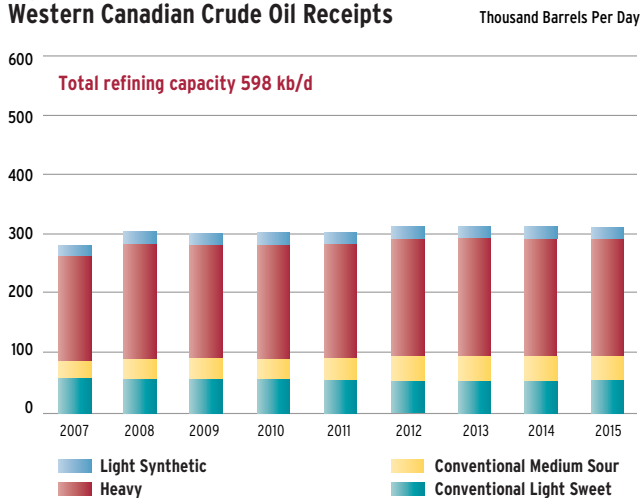


2.3.4 PADD IV

PADD IV which includes Colorado, Montana, Utah, Wyoming and Idaho is the smallest of the Districts, and accounts for about three percent of total crude oil consumption. It has 16 refineries located in four of the five states (there are no refineries in Idaho), and has a total refining capacity of 598,000 b/d. Although PADD IV is smaller than the other core markets, it has been a consistent market for western Canadian crude oil supply. Until recent crude oil production increases in certain areas of PADD IV, it has increasingly processed western Canadian crude oil.

In 2007, PADD IV processed 280,000 b/d of Canadian crude oil or 47 percent of its feedstock requirements. There are no other crude oil imports into this market, outside of Canadian, due to the lack of alternative crude oil accessibility. In 2008, western Canadian crude oil receipts are forecasted to increase to 300,000 b/d and remain at this level through 2011, and then increase to about 310,000 b/d for the remainder of the forecast period. The growth occurs in heavy crude oil receipts and increases from 177,000 b/d in 2007 to about 200,000 b/d in 2012 (Figure 2.12).

Figure 2.12 PADD IV Forecast Western Canadian Crude Oil Receipts



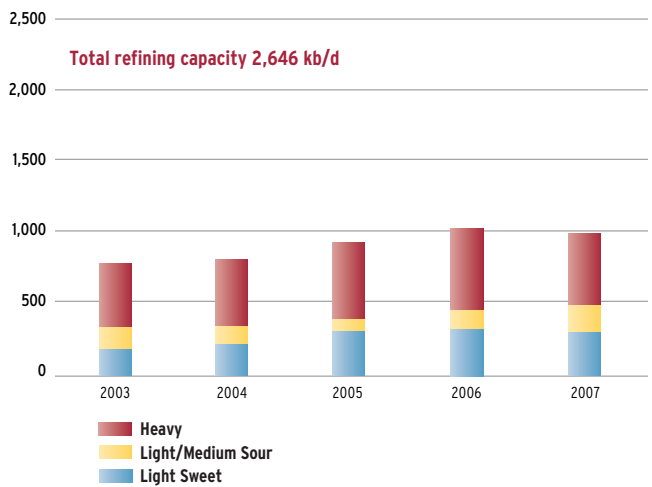
Although PADD IV has experienced some demand growth, the lack of expected population growth, combined with the dispersed nature of the population provides for limited opportunities to increase western Canadian crude oil deliveries. Future opportunities for western Canadian crude oil will rely on the replacement of declining domestic supply combined with backfilling any small growth in refinery capacity.

2.3.5 PADD V

PADD V includes Alaska, Washington, Oregon, California, Nevada, Arizona and Hawaii. The majority of PADD V is geographically divided from the rest of the United States by the Rocky Mountains, and has very good access to tanker traffic, including proximity to Alaskan and offshore California crude oil production. It, therefore, results in the region being relatively independent from the rest of the country for its sources of domestic crude oil supply, but it does import about 36 percent of its requirements.

For purposes of this report, PADD V has been divided into two market regions: Washington and California. These two states account for 83 percent of the 3.2 million b/d of refining capacity, and they represent both the current demand and future prospects for western Canadian crude oil (Figure 2.13).

Figure 2.13 PADD V (California & Washington) Historical Imported Crude Oil 2003-2007

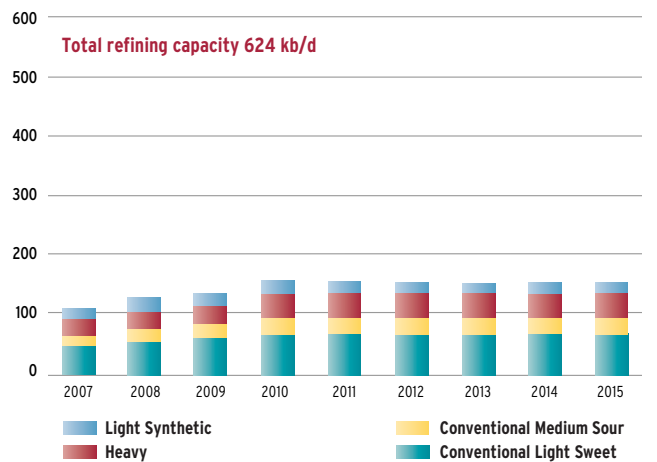


Washington

There are five refineries in Washington with a capacity of almost 624,000 b/d and they primarily process medium sour crude oil. These refineries have historically sourced their feedstocks from Alaska, and it currently accounts for approximately 70 percent of their runs. Washington has historically been a small but important niche market for western Canadian crude oil, particularly conventional light sweet. In 2007, western Canadian crude oil accounted for about 18 percent of imports into Washington while the remainder of its requirements is sourced primarily from the Persian Gulf.

Receipts of western Canadian crude oil are estimated to increase by over 15 percent from 110,000 b/d in 2007 to almost 126,000 b/d in 2008 or about 20 percent of refining capacity. Conventional light sweet crude oil will continue to be the predominant feedstock growing from about 45,000 b/d in 2007 to 66,000 b/d in 2010 and remaining flat thereafter. Heavy crude oil demand is estimated to increase marginally from 29,000 b/d in 2007 to about 43,000 b/d in 2010 and maintain that level through 2015 (Figure 2.14). Conventional medium sour crude oil is also expected to rise marginally over the next few years while light sweet synthetic crude oil receipts are expected to remain relatively flat.

Figure 2.14 PADD V (Washington) Forecast Western Canadian Crude Oil Receipts

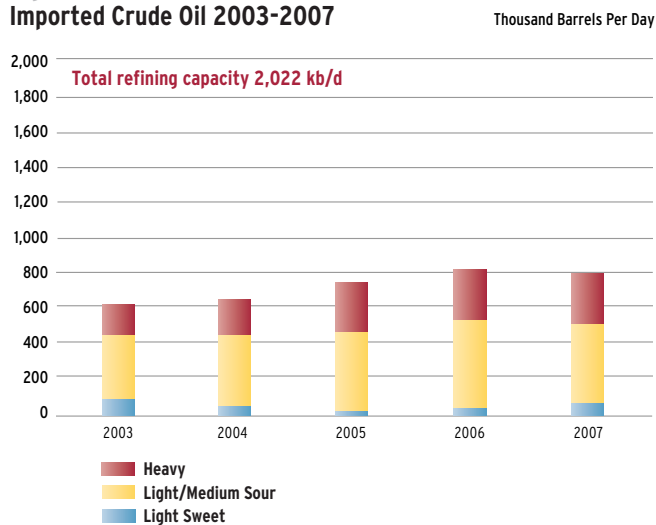


The Washington market has the potential to process additional volumes of western Canadian crude oil as result of the ongoing decline in Alaskan North Slope (ANS) crude oil production. Pipeline constraints may be an issue; however, Trans Mountain's TMX1 program will add about 40,000 b/d in November 2008.

California

California has 21 refineries with a refining capacity of over 2 million b/d. Most of the refineries are located in two regions (Los Angeles and San Francisco) and account for approximately 95 percent of the state's refining capacity. California's refineries are highly complex with extensive upgrading capabilities, in part, due to having the strictest environmental requirements in the United States for refined petroleum products (Figure 2.15).

Figure 2.15 PADD V (California) Historical Imported Crude Oil 2003-2007



Refineries in California have primarily processed medium sour and heavy crude oils. Last year, California refineries received almost two-thirds of their supply from domestic sources, and ANS accounted for approximately 85 percent. The remainder is sourced from Saudi Arabia (25 percent), Ecuador (19 percent), and Brazil (8 percent) while Canada accounted for two percent of imports.

California's traditional domestic crude oil supply sources are forecasted to fall by three to five percent per year and, as a result, it will become increasingly reliant on imports of foreign crude oil. Given Canada's proximity and forecasted growth in crude oil supply, this market represents a significant opportunity for western Canadian crude oil producers. Currently, however, pipeline capacity to the west coast of British Columbia is limited and there is no overland route available. However, there are pipeline proposals to serve this market.

2.4 Asia

The Asian market has attracted significant interest in the last few years because of its rising demand for energy and this is expected to continue. The U.S. Energy Information Administration (EIA) forecasts that demand will increase from 23.3 million b/d in 2004 to 32.7 million b/d in 2020, a 40 percent increase. It also projects that demand in China will grow from 6.4 million b/d in 2004 to 11.9 million b/d in 2020, a growth of over 85 percent.

Since May 2007, Canada's oil exports averaged 26,800 b/d to this market in 2007 and of this total, 21,300 b/d was sourced from western Canada. This market has the potential to process significant Canada's oil sands production. In fact, some of these countries are currently involved in oil sands development while others are considering acquisitions. In addition, some proponents are proposing pipelines to the west coast of British Columbia to serve this market.

2.5 Summary

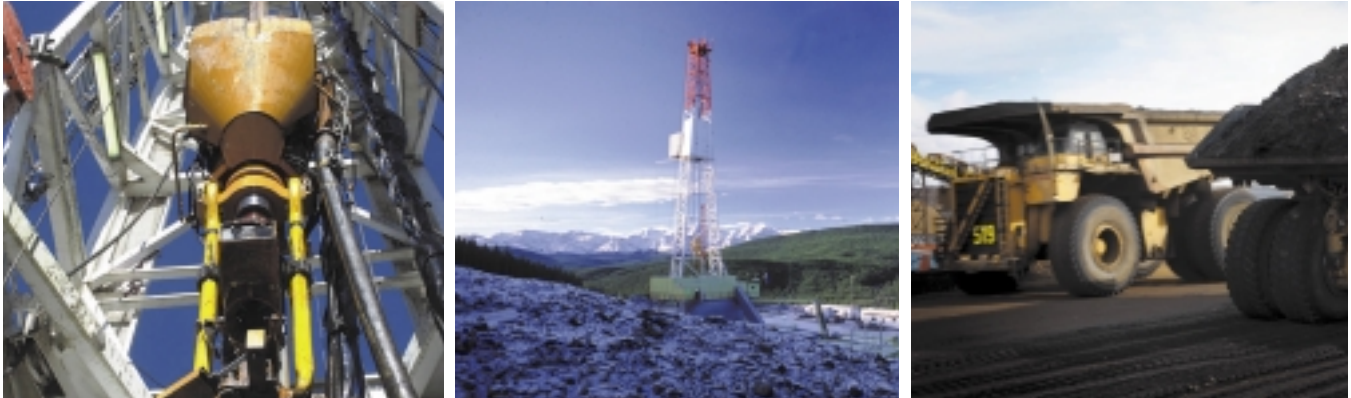
Demand according to the unadjusted refiner survey for western Canadian crude oil by Canadian refineries is expected to rise from 825,000 b/d in 2007 to almost 1.1 million b/d in 2015, a 29 percent increase. As expected, the majority of the growth will be heavy and light synthetic crude oils. Over the same period, demand by refiners in surveyed markets in the United States is projected to increase by over 80 percent from about 1.6 million b/d to over 2.9 million b/d.

Demand for heavy crude oil is by far the largest.

The refinery survey results indicate that traditional markets (i.e. western Canada, Ontario, upper PADD II, PADD IV and Washington State) will continue to process large volumes of western Canadian crude oil with the potential for expansions into new markets such as Québec, eastern PADD I, eastern PADD II, PADD III, California and the Far East.

3 CRUDE OIL SUPPLY FORECAST AND MARKET DEMAND

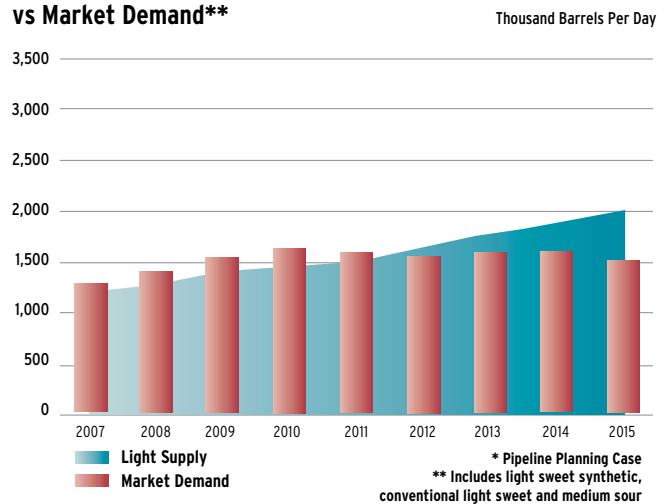
The following three graphs illustrate CAPP's western Canadian crude oil supply forecast in the Pipeline Planning Case in comparison to the unadjusted CAPP refiner survey.



3.1 Light Crude Oil Supply versus Market Demand

During the period from 2007 to 2011, inclusive demand, based on the unadjusted refiner survey, for western Canadian light crude oil exceeds supply slightly while post-2012 supply continues to rise while demand is relatively flat (Figure 3.1).

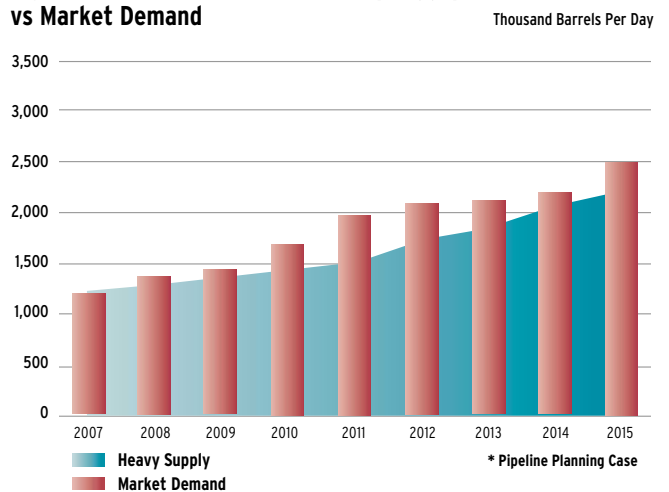
Figure 3.1 Western Canadian Light Supply* vs Market Demand**



3.2 Heavy Crude Oil Supply versus Market Demand

Demand for western Canadian heavy crude oil is essentially balanced with supply to 2009 and then demand exceeds supply. The growing demand for heavy crude oil reflects the number of refinery conversions that are announced in markets that were surveyed. CAPP understands that some of these conversion proposals are in the concept phase and, therefore, may not proceed (Figure 3.2).

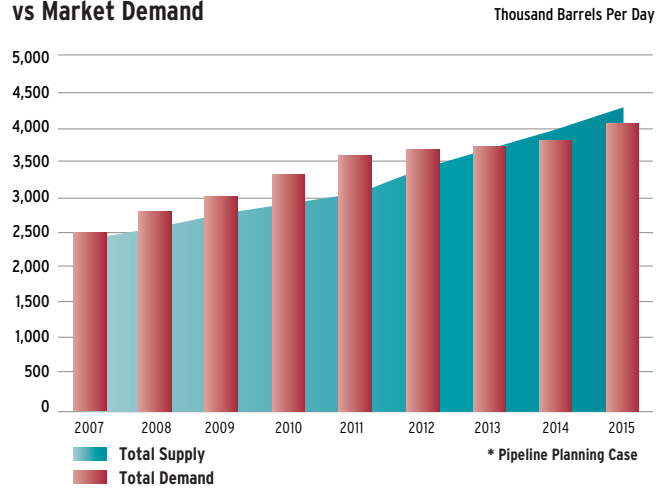
Figure 3.2 Western Canadian Heavy Supply* vs Market Demand



3.3 Western Canadian Crude Oil Supply versus Market Demand

In total, the aggregated results of the unadjusted CAPP refiner survey are above CAPP's western Canadian crude oil supply forecast in the Pipeline Planning Case through 2013, and then slightly below the supply forecast (Figure 3.3).

Figure 3.3 Western Canadian Crude Oil Supply* vs Market Demand



4 CRUDE OIL PIPELINES

The Crude Oil Production and Supply section discusses the significant growth in the oil sands that is expected through 2020 while the Oil Markets section illustrates that additional pipeline infrastructure will be required to meet increasing refinery demand. This section will focus on current pipeline infrastructure and proposed expansions to meet growing oil sands supply and increasing market demand.



4.1 Major Crude Oil Pipelines

Historically, major Canadian crude oil pipelines such as Enbridge Pipelines and Kinder Morgan's Trans Mountain pipeline operated as common carriers. The exceptions are Kinder Morgan's Express pipeline and Enbridge's Line 9 (Montréal, Québec to Sarnia, Ontario) that operate as contract carriers (i.e. require long-term take-or-pay commitments). On common carrier pipelines, shippers nominate monthly for space, without a contract. In the future, the TransCanada Keystone pipeline will be a contract carrier while Enbridge Northern Gateway, Enbridge/ExxonMobil Texas Access, Altex Energy Ltd. and the Kinder Morgan/TEPPCO Chinook/Maple Leaf projects are proposing contract carriage in order to determine that there is sufficient long-term support. As well, some pipelines are offering equity positions in their pipelines.

4.1.1 Existing Major Crude Oil Pipelines

Western Canadian crude oil is delivered to markets or other pipelines by three major Canadian trunklines – Enbridge, Kinder Morgan's Trans Mountain and Express pipelines.

Table 4.1 shows the estimated current crude oil capacity of these trunklines.

Table 4.1 Estimated Capacity of Major Canadian Trunk Lines

Pipeline	Crude Quality	Estimated Annual Capacity (thousand b/d)
Enbridge	light	580
	heavy	1,153
Express	light/heavy (35/65)	282
Trans Mountain	light/heavy (80/20)	285
TOTAL		2,300

Enbridge Pipelines

The Enbridge system which operates in Canada and the U.S. is the world's longest crude oil pipeline. It can deliver more than 2 million b/d of crude oil and other commodities from western Canada to other markets in western Canada, the U.S. upper Midwest and Ontario. In addition, it connects to various pipelines in the U.S. such as Spearhead and Mustang. It also receives crude oil from U.S. pipelines for deliveries to markets in the U.S. Midwest and Ontario.

In 2007, Enbridge added about 45,000 b/d of capacity downstream of Superior, Wisconsin while no additional capacity was added upstream of Superior. In April 2008, Enbridge completed Stage 1 of the Southern Access program (Line 61) from Superior to Delavan adding about 46,000 b/d of capacity, while the remainder of Line 61 to Flanagan is expected to be completed in the second quarter 2009 with a capacity of 400,000 b/d.

Kinder Morgan Trans Mountain Pipeline

The Trans Mountain system originates in Edmonton, Alberta and transports crude oil to the Vancouver area, including its Westridge dock for vessel or barge loadings, and by pipeline to refineries in Washington State. The system also ships refined petroleum products from the Edmonton refineries to Kamloops, British Columbia and Vancouver.

It can currently transport about 285,000 b/d with 20 percent heavy crude oil. The capacity, however, varies depending on the amount of heavy crude oil transported, and it is currently shipping about 25 percent heavy crude oil. In April 2007, it completed the Pump Station Expansion (PSE) which added about 35,000 b/d of capacity. In May 2008, the first phase of the Anchor Loop Expansion (ALE) was put in service adding 25,000 b/d of new capacity. In November 2008, the final 15,000 b/d of the Anchor Loop Expansion will be completed.

Kinder Morgan Express-Platte Pipelines

The Express pipeline ships crude oil from Hardisty, Alberta to PADD IV and has a capacity of 282,000 b/d. The pipeline is underpinned by contracts totaling 231,000 b/d with the remaining space for spot shippers.

Express is connected to Platte pipeline at Casper, Wyoming which extends to Guernsey, Wyoming and then to Wood River, Illinois. Capacity from Guernsey to Wood River is about 143,000 b/d and because of strong demand, it has been allocating line space since January 2007. Therefore, Express is not operating at capacity due to insufficient capacity on the Platte system.

Enbridge Spearhead Pipeline

The Spearhead pipeline is connected to the Enbridge Lakehead system at the Enbridge Griffith terminal (near Chicago), and delivers crude oil to Cushing, Oklahoma. The pipeline was reversed in March 2006 with an initial capacity of 130,000 b/d, and has the capability to move light and heavy crude oil.

ExxonMobil/Enbridge Mustang Pipeline

The Mustang pipeline is jointly owned by Enbridge Pipelines and ExxonMobil. Mustang connects to the Enbridge Lakehead system at Lockport, Illinois and extends to the Patoka, Illinois terminal. It has a heavy crude oil capacity of about 100,000 b/d and a committed capacity of 88,000 b/d. Nominations have exceeded capacity since December 2005 and this is expected to continue.

ExxonMobil/Enbridge Pegasus Pipeline

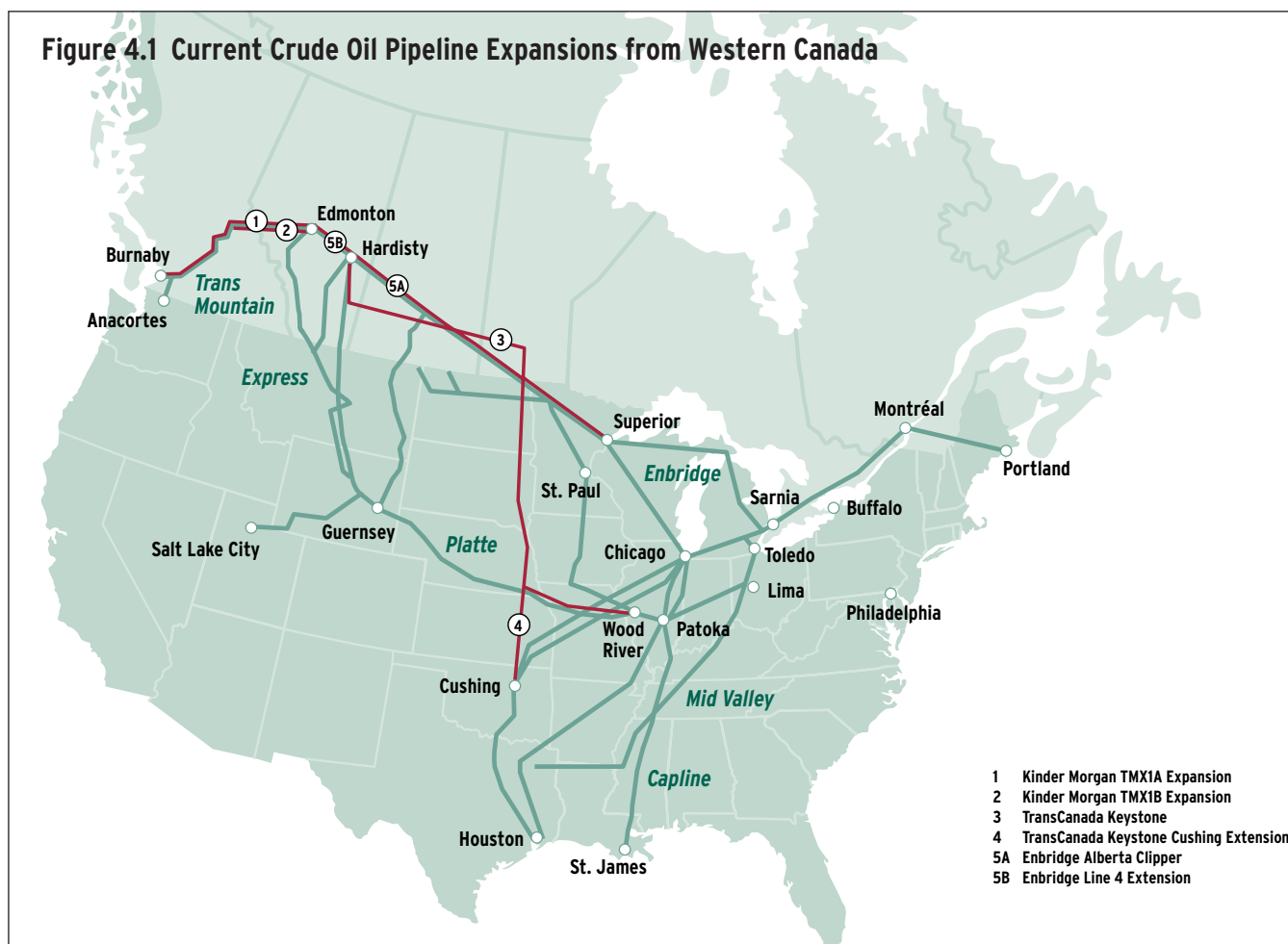
The Pegasus pipeline was reversed in March 2006 and runs from Patoka, Illinois to Nederland, Texas providing western Canadian crude oil producers with pipeline access to the U.S. Gulf Coast. It has a heavy crude oil capacity of 66,000 b/d, of which 50,000 b/d is committed capacity. Nominations have exceeded capacity since it was reversed.

4.2 Crude Oil Transportation Requirements

As mentioned previously, CAPP has prepared a western Canadian crude oil supply forecast entitled the Pipeline Planning Case to assist industry in determining adequate pipeline capacity.

The supply of western Canadian crude oil is expected to grow from 2.4 million b/d in 2007 to 4.2 million b/d in 2015 in the Pipeline Planning Case while, according to the CAPP refiner survey, demand will grow from 2.5 million b/d in 2007 to 4.0 million b/d in 2015. The results of the refiner survey indicate very little growth in demand by western Canadian refiners. Since western Canadian refiners generally receive the bulk of their supplies from feeder pipelines, additional pipeline capacity from western Canada will be required to ship the expected growth in crude oil supply to the various markets.

Figure 4.1 Current Crude Oil Pipeline Expansions from Western Canada



The three major trunklines (Enbridge, Express and Trans Mountain) from western Canada have a current crude oil capacity of about 2.3 million b/d (excludes refined petroleum products on Enbridge and Trans Mountain as well as Natural Gas Liquids on Enbridge). The throughputs on these pipelines have occasionally been subject to capacity limitations either directly, in the case of Enbridge and Trans Mountain, through nominations exceeding capacity or indirectly due to downstream bottlenecks such as Platte Pipeline. Western Canadian crude oil pipelines are reaching the limits of their capacity, and therefore additional capacity is required.

The incremental growth in crude oil supply employing CAPP’s Pipeline Planning Case using 2007 as the base year is shown in Table 4.2.

Table 4.2 Incremental Western Canadian Crude Oil Supply to Market from 2007-Pipeline Planning Case (thousand b/d)

2010	2011	2012	2013	2015	2020
449	605	941	1,190	1,765	2,656

Currently, there are some crude oil pipeline expansions in various stages of construction from western Canada (Figure 4.1). As set out in Table 4.3, approximately 1.1 million b/d of pipeline capacity is being added through the end of 2010 which should be sufficient until 2013. It should be noted, however, that it generally takes four to five years for a new pipeline to be put into service.

Figure 4.2 Crude Oil Pipeline Expansions/Proposals to the US Midwest, Ontario, Québec & the US East Coast

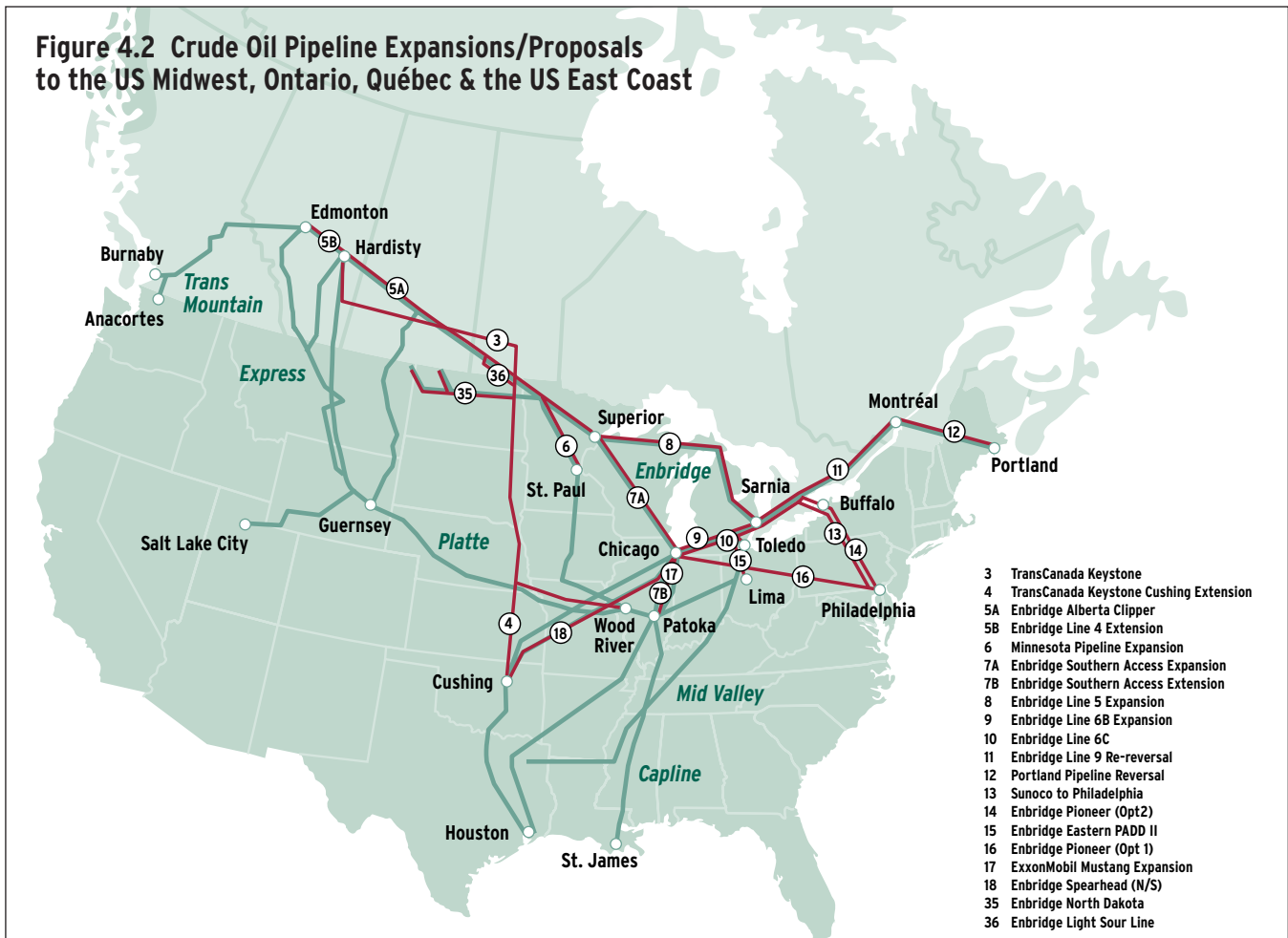


Table 4.3 Current Oil Pipeline Expansions from Western Canada

Pipeline	Proposed In Service Date	Capacity (thousand b/d)	Cumulative Capacity (thousand b/d)
Kinder Morgan TMX1A	May 2008	25	25
Kinder Morgan TMX1B	Nov 2008	15	40
TransCanada Keystone	Dec 2009	435	475
Enbridge Alberta Clipper	Jul 2010	450	925
TransCanada Keystone Extension	4Q 2010	155	1,080

4.3 Canadian and U.S. Crude Oil Pipeline Expansions and Proposals

The remainder of this section focuses on pipeline expansions and proposals to ship western Canadian crude oil to the various markets and is divided into three areas: U.S. Midwest, Ontario, Québec, U.S. East Coast; the U.S. Gulf Coast; and the West Coast.

4.3.1 Crude Oil Pipeline Expansions and Proposals to the U.S. Midwest, Ontario, Québec and the U.S. East Coast

There are currently two major crude oil pipeline expansions in various stages of construction from western Canada to the U.S. Midwest: Enbridge Alberta Clipper/Line 4 Extension and TransCanada Keystone totaling over 1 million b/d. Keystone is expected to add 435,000 b/d in late 2009, followed by Alberta Clipper

adding 450,000 b/d in mid-2010, and then the TransCanada Keystone Cushing Extension with another 155,000 b/d in the fourth quarter 2010.

There are many other expansions or proposals that will connect to these two pipelines to deliver western Canadian crude oil to markets outside the U.S. Midwest such as, Ontario, Québec, PADD I and the U.S. Gulf Coast (Figure 4.2). These projects are summarized in Appendix C.1

TransCanada Keystone and Extension 3, 4

The Keystone pipeline will run from Hardisty, Alberta to terminals in Wood River and Patoka, and is scheduled to be in service in December 2009 with an initial capacity of 435,000 b/d. The pipeline will include both new construction and the conversion of existing pipe that is currently in natural gas service.

Keystone pipeline is proposing an extension to Cushing, Oklahoma and would connect at the Nebraska/Kansas border. The extension would increase capacity by 155,000 b/d to an ultimate capacity of 590,000 b/d with an in service date of the fourth quarter 2010.

Enbridge Alberta Clipper and Line 4 Extension 5A, 5B

The 36-inch Clipper pipeline is an expansion of Enbridge's existing mainline system and will extend from Hardisty, Alberta to Superior, Wisconsin with a connection to the Minnesota pipeline at Clearbrook. The initial capacity would be 450,000 b/d and could be expanded to 800,000 b/d based on 100 percent heavy crude oil. It is scheduled to be in service in July 2010.

Enbridge will extend Line 4 back to Edmonton by connecting to currently deactivated 48-inch segments with a new 36-inch pipeline. It will have an initial capacity of 450,000 b/d and an ultimate capacity of 880,000 b/d, and the targeted in service date is March 2009. The extension back to Edmonton is required for Enbridge Clipper to ensure heavy crude oil capacity is available.

Minnesota Pipeline Expansion 6

The MinnCan project adds 165,000 b/d of capacity by constructing a new line, parallel to the existing system, from the Enbridge terminal at Clearbrook, Minnesota to

the Flint Hills and Marathon refineries located near Minneapolis/St. Paul, Minnesota. It is scheduled to be in service in the third quarter 2008. This could be expanded up to 350,000 b/d if pump stations are added. The current capacity of the existing pipeline is about 300,000 b/d.

Enbridge Light Sour Line 36

As part of its Southern Lights diluent project, Enbridge is constructing a 20-inch 185,000 b/d light sour crude oil pipeline from Cromer, Manitoba to Clearbrook, Minnesota with an in service date of December 2008. This expansion will provide access to growing crude oil deliveries into the Enbridge Cromer terminal from south east Saskatchewan.

Enbridge Southern Access Expansion and Extension 7A, 7B

Enbridge is completing construction of its Southern Access expansion program. The program starting at Superior, Wisconsin includes a new 42-inch pipeline to Delevan, Wisconsin, and then to Flanagan, Illinois where it will connect with the Enbridge Spearhead pipeline. The first phase to Delevan of Southern Access was completed in April 2008 and the second phase to Flanagan will be completed by April 2009 adding about 400,000 b/d of capacity. Further expansions to 600,000 b/d and 800,000 b/d can be achieved by adding pump stations. Enbridge is also proposing to extend the Southern Access pipeline to the Patoka, Illinois hub from Flanagan with a 36-inch line that would have an initial capacity of 400,000 b/d, and an in service date in the second quarter 2009.

Enbridge Spearhead 18

The Southern Access pipeline will connect with Spearhead at Flanagan in May 2009. At that time, Spearhead will have a north and south section. The north section will be reversed to flow north to Chicago and will maintain its current capacity of 130,000 b/d.

Enbridge will increase the capacity of the south portion by 65,000 b/d to 190,000 b/d, with a completion date of third quarter 2009. Of the 65,000 b/d increase, 30,000 b/d is allocated to committed shippers.

Enbridge Line 5 Expansion 8

Line 5 extends from Superior, Wisconsin to Sarnia, Ontario. The expansion consists of adding Drag Reducing Agent (DRA), and is expected to add 50,000 b/d of new light crude oil capacity by the first quarter 2009. Total capacity will then approximate 540,000 b/d.

Enbridge Line 6B Debottleneck and Expansion 9

Enbridge is exploring various options to expand Line 6B from its current capacity of 190,000 b/d which extends from Chicago, Illinois to Sarnia. Tank constraints are currently reducing useable capacity from 290,000 b/d to 190,000 b/d. In addition to adding two tanks, proposals include adding pump stations and new tanks which could add 235,000 b/d of capacity. Total new capacity would approximate 425,000 b/d and the projected in service date is first quarter 2010. This new capacity would be required should Enbridge's Line 9 be reversed.

Enbridge Montréal-to-Sarnia (Line 9) and Portland Pipeline Reversal 11, 12

Enbridge is currently discussing with industry the re-reversal of Line 9 to flow from Sarnia to Montréal. The discussions also include a reversal of one line on the Portland Pipeline system. If re-reversed, Line 9 could ship about 215,000 b/d of crude to the Montréal refineries of Petro-Canada and Shell Canada or on the reversed 200,000 b/d Portland Pipeline where it would be loaded on tankers. These projects could be in service by the second quarter 2010.

Enbridge North Dakota 35

The North Dakota pipeline connects to the Enbridge Lakehead pipeline at Clearbrook, Minnesota, and provides producers in Montana and North Dakota with access to markets in PADD II and Ontario. Increased production in these areas has resulted in a need for additional pipeline capacity and, as a result, Enbridge added 30,000 b/d of capacity to the North Dakota system in January 2007, and is planning another 52,000 b/d by January 2010. Total system capacity in 2010 will be 162,000 b/d.

ExxonMobil Mustang Pipeline and Enbridge Line 14 Extension 17

Enbridge is reviewing an extension (seven miles) of Line 14 to connect with the Mustang pipeline at Lockport, Illinois to ship light crude oil. The capacity would range between 130,000 and 180,000 b/d, and could be in service in 2010.

The Mustang expansion proposal includes a connection to Enbridge's Line 14 and, assuming light crude oil service only, would provide a dedicated light crude oil line from Hardisty to Patoka, Illinois and could be in service by mid-2010. If used for light crude oil only, the capacity is 130,000 b/d and could be expanded to 180,000 b/d.

Enbridge Line 6C 10

Enbridge is considering a new 36-inch line from its Griffith/Hartsdale terminal to Stockbridge, Michigan that would parallel Line 6B. The intent is to supply additional demand by Michigan and Ohio refineries. The estimated capacity would be 400,000 b/d with an in service date of 2012. If needed, the line could be extended to Sarnia, Ontario.

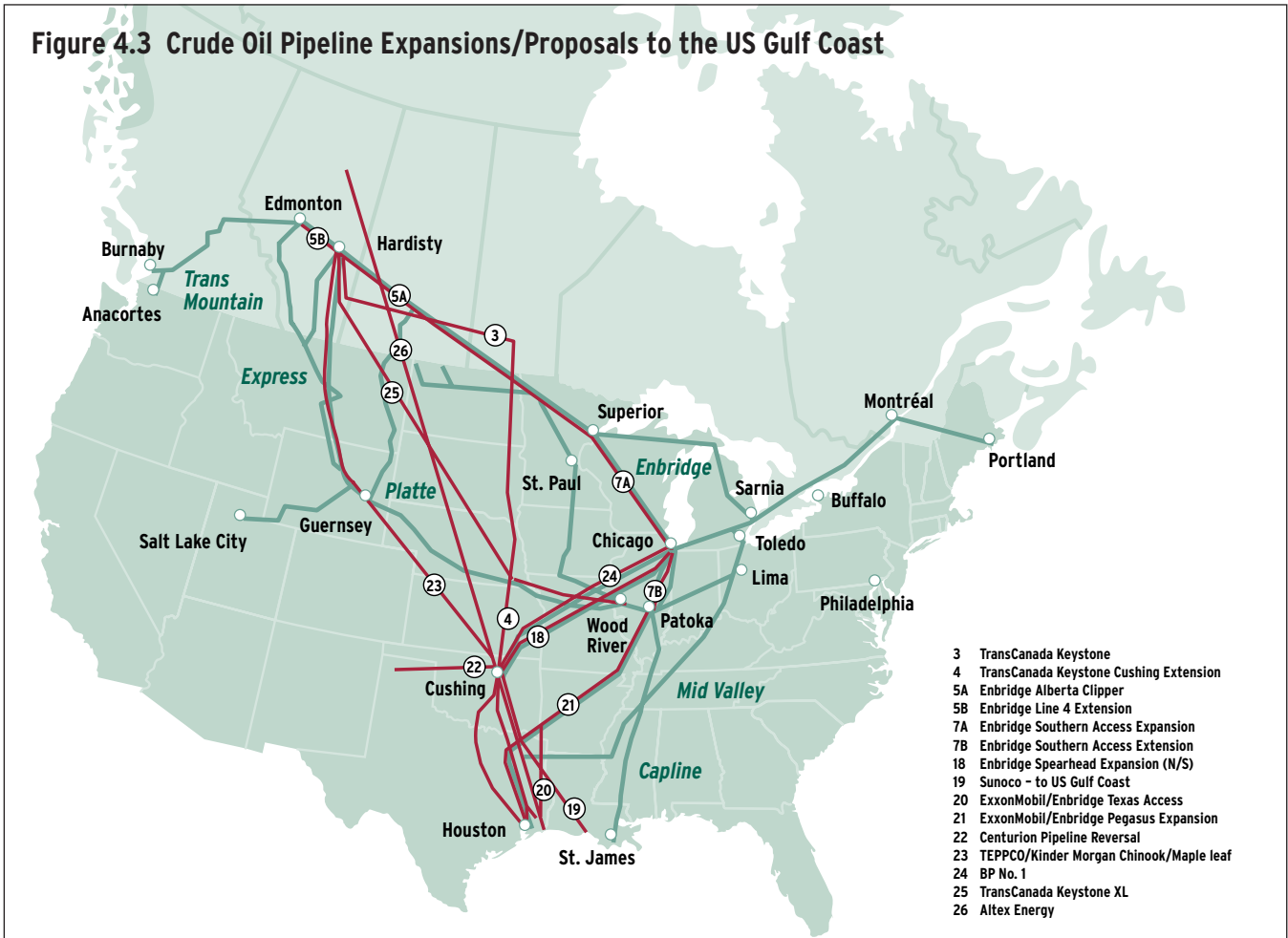
Sunoco Pipeline - to Philadelphia 13

Sunoco is considering a light sweet crude oil pipeline to refineries in the Philadelphia area, including its Marcus Hook, Pennsylvania refinery in the 2012 timeframe. The project includes connecting to Enbridge and then using the existing Sunoco right-of-way to build a new 24-inch pipeline from Buffalo to Philadelphia. The capacity would be about 400,000 b/d.

Enbridge Pioneer PADD I – Two Options 14, 16

Enbridge is considering two options to access refineries in the Philadelphia market with western Canadian light sweet synthetic crude oil in 2013 to 2015. Pioneer Option 1 is a new 30-inch bullet line from Chicago to Philadelphia while Option 2 is a new 30-inch bullet line from Westover, Ontario to Philadelphia. Both lines are designed to ship 400,000 b/d and industry will determine which option proceeds.

Figure 4.3 Crude Oil Pipeline Expansions/Proposals to the US Gulf Coast



Enbridge Eastern PADD II 15

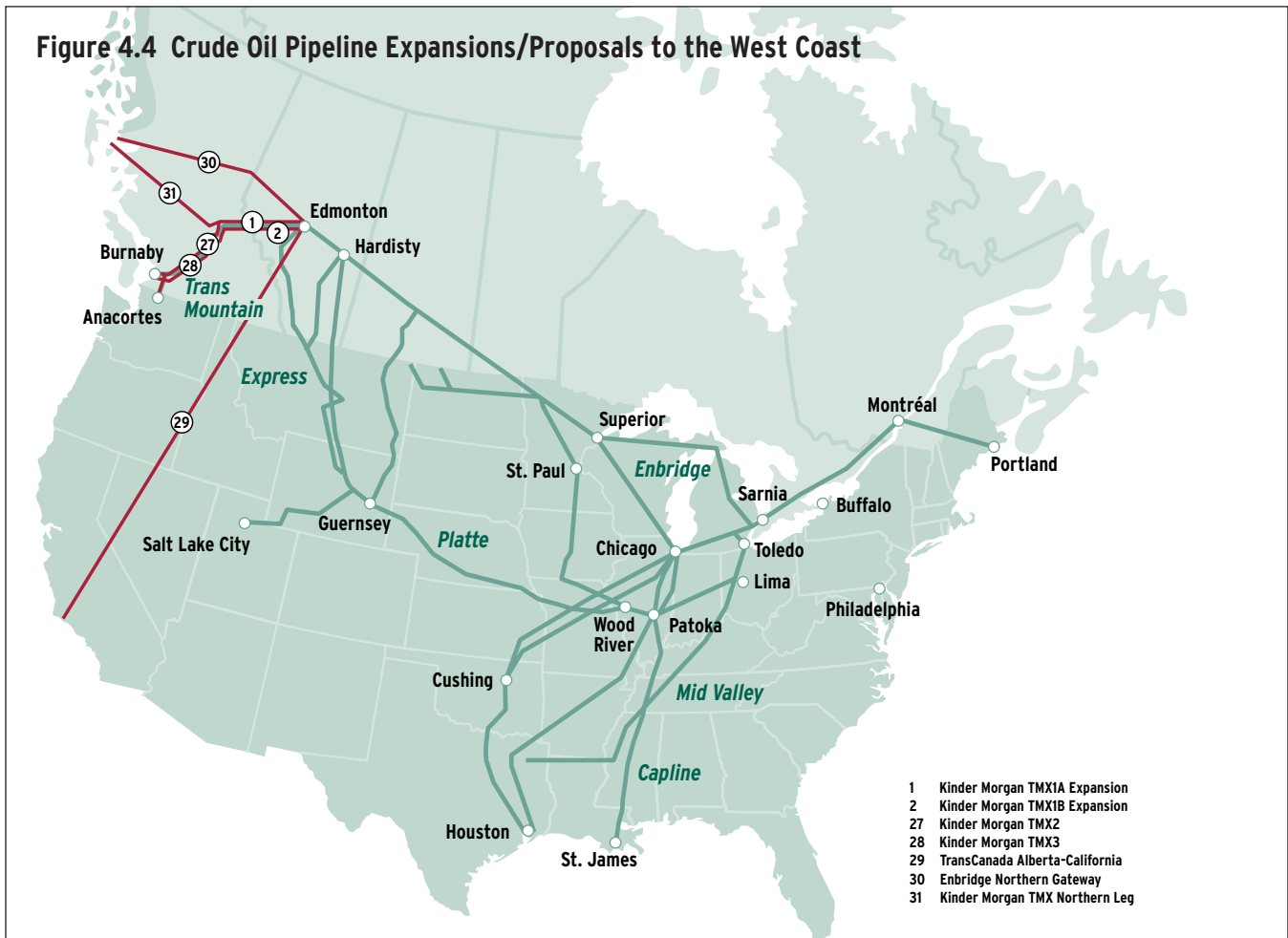
Enbridge is proposing a two-phase program to increase deliveries of western Canadian crude oil to eastern PADD II refineries. Phase 1 would increase capacity by 20,000 b/d to 120,000 b/d in the fourth quarter 2010 to serve increased demand by Marathon’s Detroit refinery. Phase 2 would increase pipeline capacity from 120,000 b/d to 430,000 b/d to serve the Toledo and Lima, Ohio refineries. Phase 2 includes a new 36-inch line from Stockbridge to Samaria and then 20-inch laterals to Toledo and Lima. This phase could be in service by 2013 to 2015.

4.3.2 Crude Oil Pipeline Expansions/Proposals to the U.S. Gulf Coast

The U.S. Gulf Coast began receiving western Canadian crude oil by pipeline in April 2006 through the reversed ExxonMobil Pegasus pipeline, and it has been at capacity (66,000 b/d) since that time. Prior to this, there were and continues to be spot vessel movements of western Canadian crude oil from Trans Mountain’s Westridge dock. Due to the large refining capacity (about 8 million b/d) of the PADD III market, western Canadian producers have been assessing various pipeline proposals to the Gulf Coast (Figure 4.3). Appendix C.2 is a summary of the crude oil pipeline proposals to the U.S. Gulf Coast

There are three pipelines proposing bullet lines from Alberta to the U.S. Gulf Coast – TEPPCO/Kinder Morgan, TransCanada Keystone XL and Altex Energy – with total

Figure 4.4 Crude Oil Pipeline Expansions/Proposals to the West Coast



capacity of about 1,565,000 b/d in the 2011 to 2014 time-frame. Four pipeline companies – ExxonMobil/Enbridge, Sunoco, ExxonMobil and Centurion – are proposing new pipelines, expansions or reversal of existing lines to ship western Canadian crude oil from the U.S. Midwest to the Gulf Coast. Total proposed pipeline capacity from the Midwest approximates 835,000 b/d and in service dates range from 2009 for the smaller expansions to 2011 for the major expansions. (Figure 4.3)

ExxonMobil Pipeline – Enbridge Pipelines Texas Access Joint Initiative 20

ExxonMobil and Enbridge are proposing the Texas Access pipeline which consists of a new 30-inch crude oil pipeline from Patoka, Illinois to Beaumont, Texas with a capacity of 445,000 b/d, and a connecting lateral to Houston with an in service date of mid-2011. With horsepower additions, the pipeline could expand to more than 550,000 b/d.

Sunoco Pipeline - to Gulf Coast 19

Sunoco has a proposal to construct a 24 or 26-inch line from Cushing, Oklahoma to its Wortham, Texas terminal, and then reverse a 26-inch pipeline to Nederland, Texas. The Cushing portion would have an initial capacity of 300,000 b/d with a potential in service date of 2011, and it could have an ultimate capacity of 400,000 b/d.

TEPPCO/Kinder Morgan - Chinook/Maple Leaf Pipeline 23

The TEPPCO and Kinder Morgan proposal would ship crude oil from Hardisty to the U.S. Gulf Coast. The Chinook-Maple Leaf pipeline would primarily utilize existing Kinder Morgan and TEPPCO right-of-way. It would consist of 36-inch pipeline with a capacity of 440,000 b/d from Hardisty and 550,000 b/d from Cushing, and both would have expansion capabilities. They project an in service date of late 2011 or early 2012. The companies are offering an equity position for foundation shippers.

BP Pipelines (North America) 24

BP is proposing a redeployment of existing pipeline infrastructure from Chicago. It is considering the reversal of its Cushing to Chicago pipeline (BP No. 1), which would provide 100,000 b/d of light crude oil capacity. No information is available with respect to in service date.

TransCanada Keystone XL 25

TransCanada is currently proposing a 700,000 b/d 36-inch pipeline from Hardisty where it would connect with the proposed Cushing Extension at the Nebraska/Kansas border, and then to Port Arthur and Houston, Texas. The intent is to have a bullet pipeline from Hardisty to the U.S. Gulf Coast in 2011 or 2012.

Altex Energy 26

Altex is currently working with five parties to develop a 36-inch pipeline to ship heavy crude oil/bitumen from various locations in Alberta to the Port Arthur/Beaumont, Texas area. It will have an initial capacity of 425,000 b/d and can expand to 1 million b/d with pumping additions. Altex will employ proprietary technologies that will use less diluent per barrel of bitumen than is required by other pipelines. The system will employ 100,000 barrel batches and no break out tanks which will enhance batch integrity. It would be a contract carrier with some capacity for spot shippers, and could be in service in 2013/14.

ExxonMobil/Enbridge Pegasus Pipeline 21

The Pegasus expansion would increase capacity by 30,000 b/d from Patoka, Illinois to Nederland, Texas with a start up date of early 2009.

Centurion Pipeline Reversal 22

Centurion Pipeline, owned by Occidental Petroleum, is considering the reversal of an existing 16-inch common carrier pipeline to deliver western Canadian heavy crude oil from Cushing to Slaughter, Texas. If the binding open season is successful, it could ship 60,000 b/d and be in service by the fourth quarter 2009.

4.3.3 Crude Oil Pipeline Expansions and Proposals to the West Coast

The map in Figure 4.4 illustrates crude oil pipeline expansions from western Canada to the West Coast. By 2014, there are proposals to add 1.6 million b/d of crude oil pipeline capacity from Alberta to the west coast of British Columbia, Washington State and California. Appendix C.3 summarizes the pipeline expansions and proposals to the West Coast.

Kinder Morgan TMX 1 1, 2

TMX1A and TMX1B will add 25,000 and 15,000 b/d, respectively, of capacity by November 2008. At that time, capacity will increase to 300,000 b/d with about 20 percent of this capacity consisting of heavy crude oil.

Kinder Morgan TMX2, TMX3 and Northern Leg 27, 28, 31

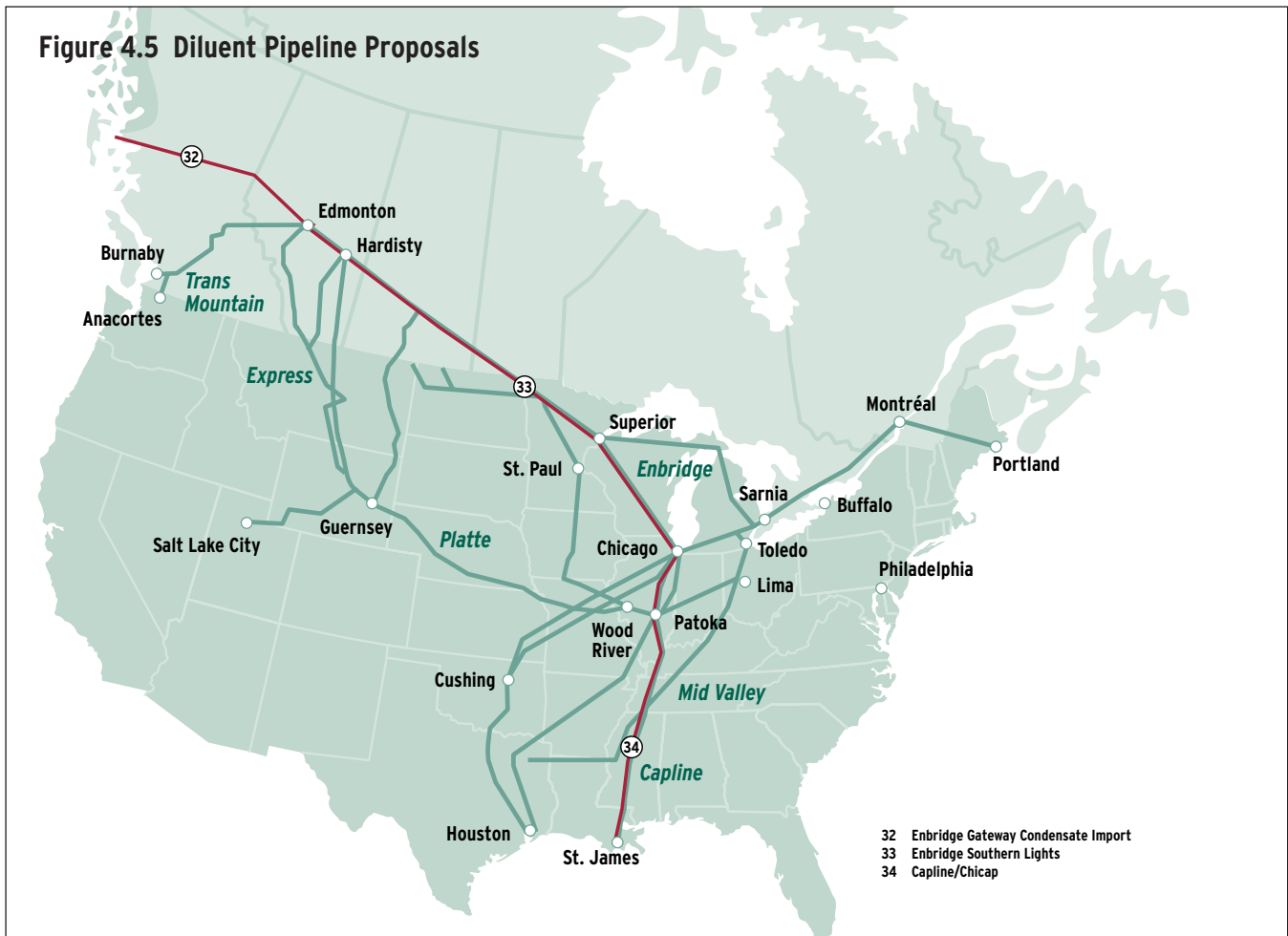
A scope change from its 2007 proposal has shifted some capacity and capital costs from TMX2 to TMX3. TMX2 is now projected to increase capacity by at least 80,000 b/d to 380,000 b/d by 2011. TMX2 will be a new line from Edmonton to Kamloops, British Columbia. TMX3 is a new line to the Washington State refineries and a second Westridge dock berth. TMX 3 adds 300,000 b/d of new capacity resulting in a total capacity of 680,000 b/d by 2011. These expansions would provide additional access to Vancouver, Washington State and other markets served by oil tankers and barges which load at its Westridge dock.

TMX Northern Leg is a proposed 400,000 b/d pipeline extending from its existing system near Rearguard, British Columbia to a deep water port facility at Kitimat, British Columbia that would accommodate Very Large Crude Carriers (VLCC) for delivery to PADD V or the Far East. Depending on industry support, the pipeline could be in service by 2012. This option allows companies to ship on the north or south line.

Enbridge Northern Gateway 30

The Northern Gateway project includes the construction of a new 30-inch pipeline from Edmonton, Alberta to a deep water port at Kitimat, British Columbia and is being designed to provide 400,000 b/d of crude oil export capacity. Crude oil would be loaded on tankers for

Figure 4.5 Diluent Pipeline Proposals



delivery to PADD V and the Far East. Enbridge is, depending on industry support, anticipating an in service date between 2012 and 2014.

TransCanada Alberta - California 29

TransCanada is in discussion with parties to ship 400,000 b/d of western Canadian crude oil by pipeline to California. The estimated in service date is 2014.

4.3.4 Diluent Pipeline Proposals

Enbridge Southern Lights 33

The project is in response to demand by western Canadian heavy crude oil producers for additional diluent supply from various sources in the U.S. Midwest. The project includes a new 16-inch diluent line from Flanagan, Illinois (near Chicago) to Clearbrook, Minnesota, and the reversal of its Line 13 from Clearbrook to Edmonton, Alberta.

The capacity of the diluent import line is 180,000 b/d, of which 77,000 b/d is for committed shippers, and can be expanded to 300,000 b/d. The in service date of July 2010 will coincide with crude oil expansions on the Enbridge mainline system (i.e. Alberta Clipper/Line 4 extension) in order that eastbound capacity is unaffected.

Joint Capline/Chicap Industry Initiative 34

Both pipelines have recently announced that they will commence shipping a limited amount of diluent from the U.S. Gulf Coast to Chicago by the second quarter 2009 and expand their capabilities in the first half 2010. They are intending to connect to the Enbridge Southern Lights pipeline. Capline extends from St. James, Louisiana to Patoka and has a capacity of more than 1 million b/d while Chicap runs from Patoka to Mokena, Illinois with a capacity of about 300,000 b/d. The level of diluent deliveries is not known at this time.

Enbridge Gateway Condensate Import 32

As part of its Northern Gateway crude oil pipeline project, Enbridge is proposing a 150,000 b/d diluent import pipeline that would extend from Kitimat, British Columbia to Edmonton, Alberta. It would supply diluent to western Canadian heavy crude oil producers, and the in service date will coincide with the crude oil export pipeline - between 2012 and 2014.

4.4 Summary

In total, the aggregated results of the unadjusted CAPP refiner survey are above CAPP's western Canadian crude oil supply forecast in the Pipeline Planning Case through 2013, and then slightly below the supply forecast. Approximately 1.1 million b/d of pipeline capacity from western Canada is being added through the end of 2010 which should be sufficient until 2013 in comparison to the growth in the Pipeline Planning Case.

There is, however, potential for expansions into new markets such as Québec, PADD I, eastern PADD II, PADD III, California and Asia. In particular, with respect to PADDs I and III, this is demonstrated by the number of pipeline proposals to both of these new markets. Producers are currently assessing which proposals to support based on their specific production plans.

5 CONCLUSIONS



CAPP's annual oil supply forecast has two cases, both looking out to 2020. The Moderate Growth Case represents the "expected" outlook while the more aggressive Pipeline Planning Case has been developed for pipeline planning purposes. In the Moderate Growth Case, western Canadian crude oil supply is projected to increase from 2.4 million b/d in 2007 to almost 4.5 million b/d in 2020. In the Pipeline Planning Case, supply rises to about 5.1 million b/d. Compared to last year the forecast is about 200,000 to 400,000 b/d lower. The growth in oil sands remains significant; the potential for oil sands projects to reach capacity is unchanged but this will be accomplished over a longer period due to continuing and new challenges.

In order to accommodate this growth, approximately 1.1 million b/d of pipeline capacity is being added from western Canada through the end of 2010, which should be sufficient until 2013 given the growth in the Pipeline Planning Case. Subsequently, additional pipeline capacity will be required to meet expected oil sands growth. There are pipeline proposals that will enable access to several markets in North America, including a pipeline reversal to extend access deeper into eastern Canada. The other notable markets, which have significant potential to process increasing volumes of Canadian crude oil, include new markets in the United States and potentially Asia. Producers are currently assessing these markets in order to decide which pipeline proposals to support. This report provides the current state of the supply outlook, the market potential and the pipelines proposals to enable a more complete understanding of the current Canadian crude oil picture.

APPENDIX A ACRONYMS, ABBREVIATIONS, UNITS & CONVERSION FACTORS

ANS	Alaska North Slope
API	American Petroleum Institute
CAPP	Canadian Association of Petroleum Producers
CSS	Cyclic Steam Stimulation
DRA	Drag Reducing Agent
ERCB	(Alberta) Energy & Resources Conservation Board
PADD	Petroleum Administration for Defense District
S	Sulphur
SAGD	Steam Assisted Gravity Drainage
SSB	Syncrude Sweet Blend
U.S.	United States
EIA	Energy Information Administration
WCSB	Western Canada Sedimentary Basin

Canadian Provincial Abbreviations

AB	Alberta
BC	British Columbia
MB	Manitoba
NWT	Northwest Territories
ON	Ontario
QC	Québec

U.S. State Abbreviations

CA	California
ID	Indiana
IL	Illinois
KS	Kansas
ME	Maine
MI	Michigan
MN	Minnesota
NE	Nebraska
NY	New York
OK	Oklahoma
PA	Pennsylvania
TX	Texas
WI	Wisconsin

Units

b/d	barrels per day
kb/d	thousand barrels per day

Conversion Factor

1 cubic metre = 6.293 barrels (oil)

APPENDIX B.1 CAPP CANADIAN CRUDE OIL PRODUCTION FORECAST 2008-2020

**MODERATE GROWTH
JUNE 2008**

Thousand barrels per day	Actuals							Forecast												
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
CONVENTIONAL																				
Light & Medium																				
Alberta	481	438	414	389	374	360	347	333	320	307	295	283	272	261	250	240	231	221	213	204
B.C.	43	42	37	35	30	29	26	25	24	23	21	20	19	18	17	17	16	15	14	14
Saskatchewan ^{1,2}	143	139	138	137	148	155	162	166	169	167	165	164	161	156	151	147	142	138	134	130
Manitoba	11	11	11	11	14	19	22	22	21	21	21	20	20	19	19	19	18	18	18	17
N.W.T.	25	24	22	21	19	19	18	17	16	16	15	14	14	13	13	12	12	11	11	10
Total Conv. Light and Medium	704	653	622	593	585	581	575	562	550	533	517	502	485	467	451	434	419	403	389	375
Heavy																				
Alberta Conv. Heavy	240	222	216	211	197	183	178	171	165	160	154	149	143	138	134	129	124	120	116	112
Saskatchewan Conv. Heavy ^{1,2}	283	282	282	286	271	273	264	262	259	256	254	251	249	246	241	236	232	227	223	218
Total Conventional Heavy	523	504	498	497	468	456	442	433	424	416	408	400	392	385	375	365	356	347	338	330
TOTAL CONVENTIONAL	1,226	1,157	1,120	1,089	1,053	1,037	1,017	995	974	949	925	902	877	852	825	800	775	751	727	705
PENTANES/CONDENSATE	186	163	164	162	160	166	165	165	164	163	162	161	160	160	159	158	157	157	156	155
OIL SANDS																				
Oil Sands Mining	349	441	513	601	536	631	666	701	814	838	920	1,043	1,193	1,326	1,467	1,594	1,649	1,706	1,779	1,961
Oil Sands In-Situ	310	303	349	384	439	494	536	608	712	781	849	973	1,079	1,224	1,302	1,368	1,413	1,471	1,508	1,578
TOTAL OIL SANDS	659	744	862	985	975	1,125	1,202	1,310	1,526	1,619	1,769	2,017	2,272	2,550	2,769	2,962	3,062	3,177	3,287	3,539
WESTERN CANADA OIL PRODUCTION	2,071	2,065	2,146	2,236	2,188	2,328	2,385	2,470	2,664	2,732	2,856	3,080	3,310	3,562	3,754	3,920	3,994	4,084	4,170	4,399
EASTERN CANADA OIL PRODUCTION	149	286	337	314	305	304	369	365	310	235	250	245	200	165	140	120	105	90	80	75
TOTAL CANADIAN OIL PRODUCTION	2,220	2,351	2,483	2,550	2,493	2,632	2,753	2,835	2,974	2,967	3,106	3,325	3,510	3,727	3,894	4,040	4,099	4,174	4,250	4,474

Notes:

1. CAPP allocates Saskatchewan Area III Medium crude as heavy crude. Also 17% of Area IV is > 900 kg/m³.
2. CAPP has revised from June 2007 report historical light/heavy ratio for Saskatchewan starting in 2005.
3. Eastern Canada production only includes Newfoundland production.

APPENDIX B.2 CAPP CANADIAN CRUDE OIL PRODUCTION FORECAST 2008-2020

PIPELINE PLANNING
JUNE 2008

Thousand barrels per day	Actuals							Forecast												
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
CONVENTIONAL																				
Light & Medium																				
Alberta	481	438	414	389	374	360	347	333	320	307	295	283	272	261	250	240	231	221	213	204
B.C.	43	42	37	35	30	29	26	25	24	23	21	20	19	18	17	17	16	15	14	14
Saskatchewan ^{1,2}	143	139	138	137	148	155	162	166	169	167	165	164	161	156	151	147	142	138	134	130
Manitoba	11	11	11	11	14	19	22	22	21	21	21	20	20	19	19	19	18	18	18	17
N.W.T.	25	24	22	21	19	19	18	17	16	16	15	14	14	13	13	12	12	11	11	10
Total Conv. Light and Medium	704	653	622	593	585	581	575	562	550	533	517	502	485	467	451	434	419	403	389	375
Heavy																				
Alberta Conv. Heavy	240	222	216	211	197	183	178	171	165	160	154	149	143	138	134	129	124	120	116	112
Saskatchewan Conv. Heavy ^{1,2}	283	282	282	286	271	273	264	262	259	256	254	251	249	246	241	236	232	227	223	218
Total Conventional Heavy	523	504	498	497	468	456	442	433	424	416	408	400	392	385	375	365	356	347	338	330
TOTAL CONVENTIONAL	1,226	1,157	1,120	1,089	1,053	1,037	1,017	995	974	949	925	902	877	852	825	800	775	751	727	705
PENTANES/CONDENSATE	186	163	164	162	160	166	165	165	164	163	162	161	160	160	159	158	157	157	156	155
OIL SANDS																				
Oil Sands Mining	349	441	513	601	536	631	666	733	830	876	988	1,181	1,342	1,514	1,692	1,741	1,782	1,857	2,043	2,179
Oil Sands In-Situ	310	303	349	384	439	494	536	626	742	833	902	1,070	1,186	1,329	1,444	1,530	1,592	1,682	1,783	1,919
TOTAL OIL SANDS	659	744	862	985	975	1,125	1,202	1,359	1,572	1,710	1,890	2,251	2,528	2,843	3,135	3,270	3,373	3,539	3,825	4,097
WESTERN CANADA OIL PRODUCTION	2,071	2,065	2,146	2,236	2,188	2,328	2,385	2,518	2,710	2,822	2,977	3,314	3,566	3,855	4,120	4,228	4,305	4,447	4,709	4,957
EASTERN CANADA OIL PRODUCTION	149	286	337	314	305	304	369	365	310	235	250	245	200	165	140	120	105	90	80	75
TOTAL CANADIAN OIL PRODUCTION	2,220	2,351	2,483	2,550	2,493	2,632	2,753	2,883	3,020	3,057	3,227	3,559	3,766	4,020	4,260	4,348	4,410	4,537	4,789	5,032

Notes:

1. CAPP allocates Saskatchewan Area III Medium crude as heavy crude. Also 17% of Area IV is > 900 kg/m³.
2. CAPP has revised from June 2007 report historical light/heavy ratio for Saskatchewan starting in 2005.
3. Eastern Canada production only includes Newfoundland production.

APPENDIX B.3 CAPP CANADIAN CRUDE OIL SUPPLY FORECAST 2008-2020

**MODERATE GROWTH
JUNE 2008**

Thousand barrels per day	Actuals							Forecast												
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
CONVENTIONAL																				
Total Light and Medium	700	649	618	589	581	577	571	558	546	529	513	498	481	463	447	430	415	399	385	371
Net Conventional Heavy to Market	465	444	437	436	405	386	382	358	348	339	330	321	312	304	293	282	272	262	252	243
TOTAL CONVENTIONAL	1,165	1,094	1,055	1,025	985	963	954	916	894	868	843	818	793	767	739	713	687	662	637	614
OIL SANDS																				
Upgraded Light ¹	377	465	492	569	527	583	649	695	845	885	990	1,121	1,255	1,348	1,482	1,585	1,625	1,677	1,705	1,812
Bitumen Blend ²	441	451	536	661	671	827	829	906	973	1,034	1,074	1,207	1,321	1,464	1,562	1,662	1,722	1,784	1,871	2,048
TOTAL OIL SANDS AND UPGRADERS	818	917	1,030	1,230	1,199	1,410	1,478	1,600	1,818	1,919	2,064	2,327	2,576	2,812	3,045	3,247	3,347	3,461	3,576	3,860
Total Light Supply	1,077	1,114	1,110	1,157	1,108	1,160	1,220	1,253	1,391	1,414	1,503	1,618	1,736	1,812	1,929	2,015	2,040	2,077	2,089	2,183
Total Heavy Supply	906	896	973	1,097	1,076	1,213	1,211	1,263	1,321	1,372	1,404	1,527	1,634	1,768	1,855	1,944	1,994	2,046	2,123	2,291
WESTERN CANADA OIL SUPPLY	1,983	2,010	2,083	2,255	2,184	2,373	2,431	2,516	2,712	2,786	2,906	3,146	3,372	3,580	3,785	3,961	4,034	4,124	4,214	4,474

Notes:

1 Includes upgraded conventional

2 Includes: a) imported condensate b) manufactured diluent from upgraders and c) upgraded heavy volumes coming from upgraders

APPENDIX B.4 CAPP CANADIAN CRUDE OIL SUPPLY FORECAST 2008-2020

PIPELINE PLANNING
JUNE 2008

Thousand barrels per day	Actuals								Forecast											
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
CONVENTIONAL																				
Total Light and Medium	700	649	618	589	581	577	571	558	546	529	513	498	481	463	447	430	415	399	385	371
Net Conventional Heavy to Market	465	444	437	436	405	386	382	358	348	339	330	321	312	304	293	282	272	262	252	243
TOTAL CONVENTIONAL	1,165	1,094	1,055	1,025	985	963	954	916	894	868	843	818	793	767	739	713	687	662	637	614
OIL SANDS																				
Upgraded Light ¹	377	465	492	569	527	583	649	737	871	919	1,016	1,155	1,304	1,412	1,567	1,670	1,705	1,771	1,921	2,045
Bitumen Blend ²	441	451	536	661	671	827	829	914	997	1,093	1,178	1,399	1,524	1,743	1,889	1,914	1,983	2,095	2,245	2,428
TOTAL OIL SANDS AND UPGRADERS	818	917	1,030	1,230	1,199	1,410	1,478	1,652	1,868	2,012	2,194	2,554	2,828	3,156	3,456	3,584	3,688	3,867	4,165	4,473
Total Light Supply	1,077	1,114	1,110	1,157	1,108	1,160	1,220	1,296	1,417	1,449	1,529	1,653	1,785	1,876	2,014	2,101	2,120	2,171	2,305	2,416
Total Heavy Supply	906	896	973	1,097	1,076	1,213	1,211	1,272	1,345	1,431	1,508	1,719	1,836	2,047	2,182	2,196	2,255	2,357	2,497	2,671
WESTERN CANADA OIL SUPPLY	1,983	2,010	2,083	2,255	2,184	2,373	2,431	2,567	2,762	2,880	3,036	3,372	3,621	3,923	4,196	4,297	4,375	4,528	4,802	5,087

Notes:

1 Includes upgraded conventional

2 Includes: a) imported condensate b) manufactured diluent from upgraders and c) upgraded heavy volumes coming from upgraders

APPENDIX C CANADIAN & U.S. CRUDE OIL PIPELINE EXPANSIONS AND PROPOSALS

Appendix C.1

Crude Oil Pipeline Expansions and Proposals to the U.S. Midwest, Ontario, Québec and the U.S. East Coast

Pipeline	Origin	End Point	Proposed In Service Date	Capacity (thousand b/d)
TransCanada Keystone	Hardisty, AB	Patoka, IL	December 2009	435
Enbridge Alberta Clipper/Line 4 Extension	Edmonton, AB	Superior, WI	July 2010	450
TransCanada Keystone Cushing Extension	KS/NE border	Cushing, OK	4Q 2010	155
Minnesota Pipeline Expansion	Clearbrook, MN	St. Paul, MN	3Q 2008	165
Enbridge Light Sour Line	Cromer, MB	Clearbrook, MN	December 2008	185
Enbridge Southern Access Expansion	Superior, WI	Flanagan, IL	April 2009	400
Enbridge Southern Access Extension	Flanagan, IL	Patoka, IL	2Q 2009	400
Enbridge Spearhead - South	Flanagan, IL	Cushing, OK	2Q 2009	65
Enbridge Spearhead - North	Flanagan, IL	Chicago, IL	2Q 2009	65
Enbridge Line 5 Expansion	Superior, WI	Sarnia, ON	1Q 2009	50
Enbridge Line 6B Expansion	Chicago, IL	Sarnia, ON	1Q 2010	235
Enbridge North Dakota	North Dakota	Clearbrook, MN	January 2010	52
Enbridge Line 14 Extension	Lockport, IL	Mustang Pipeline	2010	130
Enbridge Line 6C	Griffith/Hartsdale, ID	Stockbridge, MI	2012	400
Sunoco Pipeline - to Philadelphia	Buffalo, NY	Philadelphia, PA	2012	400
Enbridge Pioneer - Option 1	Chicago, IL	Philadelphia, PA	2013/15	400
Enbridge Pioneer - Option 2	Westover, ON	Philadelphia, PA	2013/15	400
Enbridge Eastern PADD II - 2 Phases	Stockbridge, MI	Toledo, OH	2013/15	430
Redeployment of Existing Infrastructure				
ExxonMobil Mustang conversion to light service	Lockport, IL	Patoka, IL	Mid 2010	50
BP Pipelines #1 reversal	Chicago, IL	Cushing, OK	TBD	100
Enbridge Line 9 re-reversal	Sarnia, ON	Montréal, QC	2Q 2010	215
Portland reversal	Montréal, QC	Portland, ME	2Q 2010	200

Appendix C.2 Crude Oil Pipeline Proposals to the U.S. Gulf Coast

Pipeline	Origin	End Point	Proposed In Service Date	Capacity (thousand b/d)	Cumulative Capacity (thousand b/d)
ExxonMobil/Enbridge Texas Access	Patoka, IL	Beaumont, TX	2011	445	445
Sunoco Pipelines to US Gulf Coast	Cushing, OK	U.S. Gulf Coast	2011	300	745
TEPPCO/Kinder Morgan Chinook-Maple Leaf	Hardisty, AB	U.S. Gulf Coast	2011/2012	440	1,185
TransCanada Keystone XL	Hardisty, AB	U.S. Gulf Coast	2011/2012	700	1,885
Altex Energy	Fort McMurray/ Hardisty, AB	Beaumont/Port Arthur, TX	2013/2014	425	2,310
ExxonMobil Pegasus	Patoka, IL	U.S. Gulf Coast	1Q 2009	30	2,340
Redeployment of Existing Infrastructure					
Centurion Pipeline - reversal	Cushing, OK	Slaughter, TX	4Q 2009	60	

Appendix C.3 Current Oil Pipeline Expansions and Proposals to the West Coast

Pipeline	Origin	End Point	Proposed In Service Date	Capacity (thousand b/d)	Cumulative Capacity (thousand b/d)
Kinder Morgan TMX1A	Edmonton, AB		May 2008	25	25
Kinder Morgan TMX1B	Edmonton, AB	Kamloops, BC	November 2008	15	40
Kinder Morgan TMX2	Edmonton, AB	Kamloops, BC	2011	80	120
Kinder Morgan TMX3	Kamloops, BC	Sumas, BC	2011	300	420
Kinder Morgan TMX Northern Leg	Rearguard/Edmonton, AB	Kitimat, BC	2012	400	820
Enbridge Northern Gateway	Edmonton, AB	Kitimat, BC	2012-2014	400	1,220
TransCanada AB-CA	AB	CA	2014	400	1,620

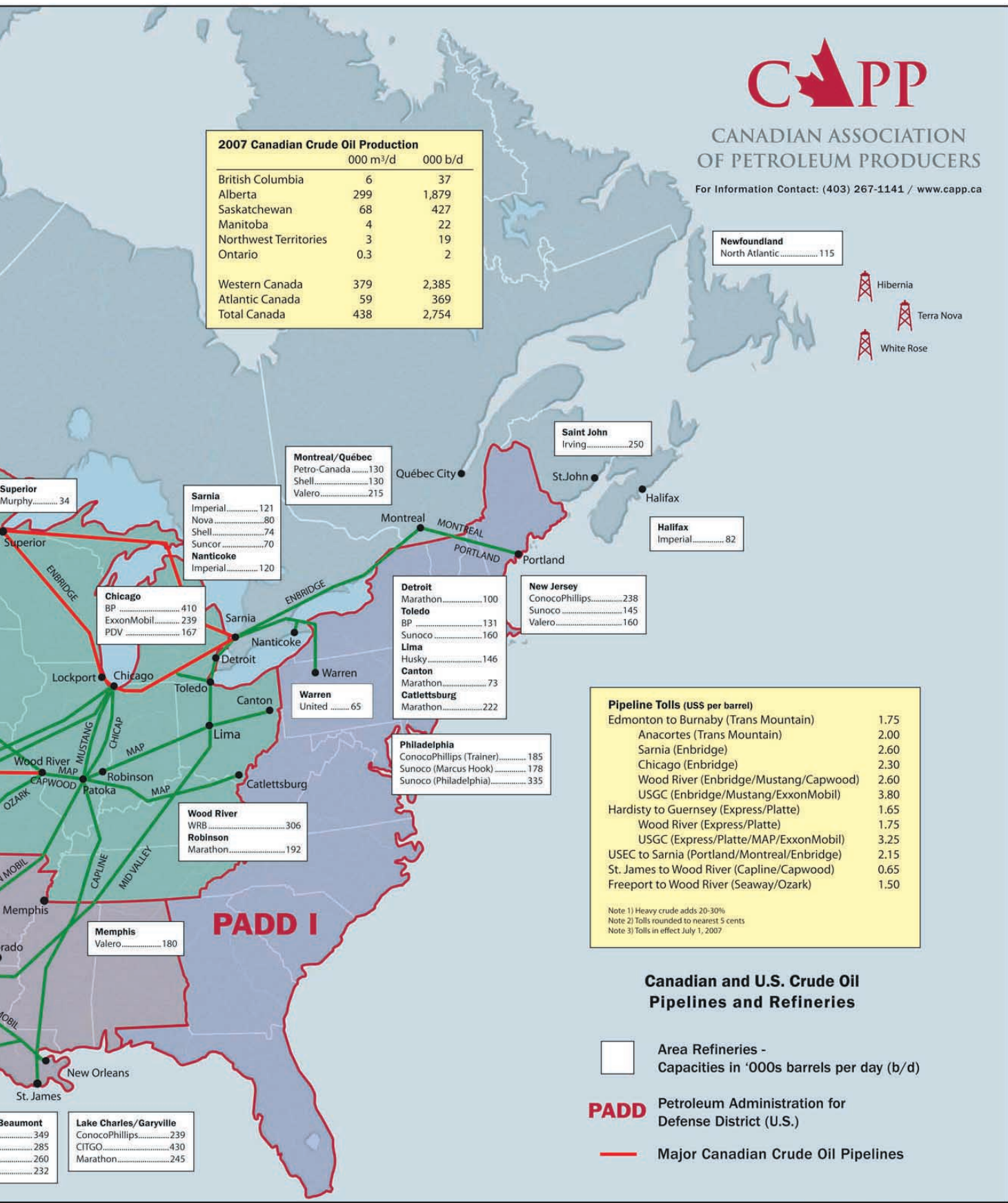


CANADIAN ASSOCIATION OF PETROLEUM PRODUCERS

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2007 Canadian Crude Oil Production		
	000 m ³ /d	000 b/d
British Columbia	6	37
Alberta	299	1,879
Saskatchewan	68	427
Manitoba	4	22
Northwest Territories	3	19
Ontario	0.3	2
Western Canada	379	2,385
Atlantic Canada	59	369
Total Canada	438	2,754

Newfoundland	
North Atlantic	115



Pipeline Tolls (US\$ per barrel)	
Edmonton to Burnaby (Trans Mountain)	1.75
Anacortes (Trans Mountain)	2.00
Sarnia (Enbridge)	2.60
Chicago (Enbridge)	2.30
Wood River (Enbridge/Mustang/Capwood)	2.60
USGC (Enbridge/Mustang/ExxonMobil)	3.80
Hardisty to Guernsey (Express/Platte)	1.65
Wood River (Express/Platte)	1.75
USGC (Express/Platte/MAP/ExxonMobil)	3.25
USEC to Sarnia (Portland/Montreal/Enbridge)	2.15
St. James to Wood River (Capline/Capwood)	0.65
Freeport to Wood River (Seaway/Ozark)	1.50

Note 1) Heavy crude adds 20-30%
 Note 2) Tolls rounded to nearest 5 cents
 Note 3) Tolls in effect July 1, 2007

Canadian and U.S. Crude Oil Pipelines and Refineries

- Area Refineries - Capacities in '000s barrels per day (b/d)
- PADD** Petroleum Administration for Defense District (U.S.)
- Major Canadian Crude Oil Pipelines

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NOTES

The Canadian Association of Petroleum Producers (CAPP) represents 140 companies that explore for, develop and produce natural gas, natural gas liquids, crude oil, oil sands, and elemental sulphur throughout Canada. CAPP member companies produce more than 95 per cent of Canada's natural gas and crude oil. CAPP also has 135 associate members that provide a wide range of services that support the upstream crude oil and natural gas industry. Together, these members and associate members are an important part of a \$100-billion-a-year national industry that affects the livelihoods of more than half a million Canadians.

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June 2008 • 2008-1028

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