

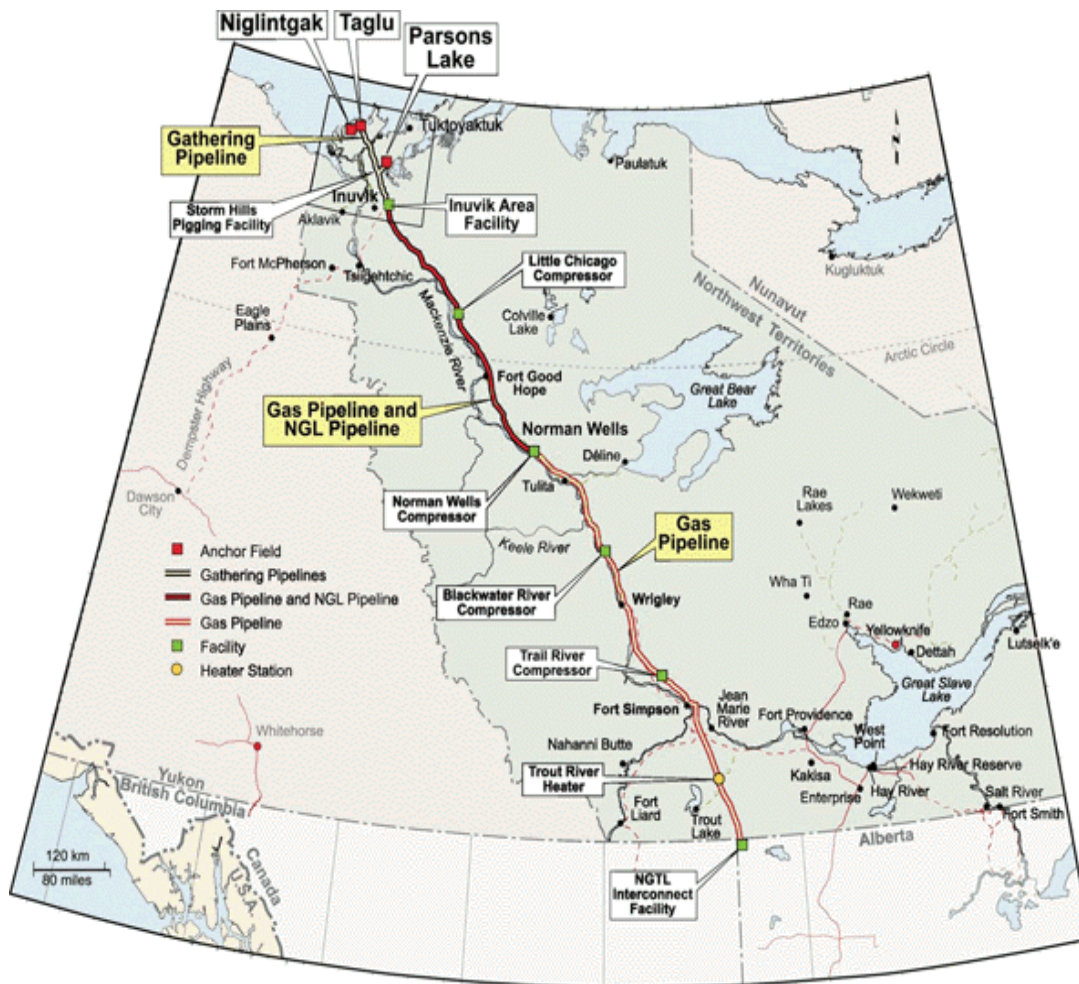
Mackenzie Valley Pipeline

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U N I V E R I S T Y O F A L B E R T A

Introduction

The Mackenzie Valley Pipeline is a network of pipelines slated for construction along the Mackenzie Valley throughout the Northwest Territories. The main driver behind the pipeline's construction is the gas fields which contain significant amounts of natural gas. The gas fields to be exploited are called Parsons Lake, Taglu and Niglintgak and are located in the Mackenzie Delta of the most northwestern part of the territories. These gas fields are called the anchor fields, as it is their proven reserves, which are driving the project's development. The pipeline, when complete will be 30" in diameter and approximately 1220 km in length.¹ It is hoped that eventually the construction of the pipeline will lead to more exploration, which in turn will lead to more production and delivery of natural gas.



¹ <http://www.mackenziegasproject.com/theProject/projectDescription/pipelineSystem/index.html>

There are five major components to the project.

- 1) Development of natural gas fields – The 3 anchor gas fields in the region are located onshore and contain significant reserves. Any foliage in the area will have to be cleared for transportation of construction goods as well as setting up of wells.
- 2) A gathering pipeline system will have to be constructed from all the individual fields to the main transportation pipeline. This network will have to be expanded as needed as more fields and, hence production, come online.
- 3) A gas processing facility near Inuvik, which is a short distance from the gas fields, will be created that will separate all natural gas liquids in the pipeline.
- 4) A natural gas liquids pipeline will be built in order to move the NGLs from Inuvik to Norman Wells (500 km away from Inuvik).
- 5) The Mackenzie Valley Pipeline - From Norman Wells, the remaining pipeline (approximately 700 km in length) will transport all gases to northern Alberta where it will connect with the existing distribution pipeline infrastructure.

The projected cost of construction is expected to be in excess of \$7 billion² and will provide many benefits to both producers and local citizens, as well as the country as a whole. However, a project of this size has many hurdles to overcome including environmental, social and regulatory.

² <http://www.cbc.ca/money/story/2006/06/14/pipeline.html>

Stakeholders

There are many stakeholders in the Mackenzie Valley Pipeline Project, including two principal groups. First, there is the producers group, which is comprised of the future exploiters of the gas fields. These include Imperial Oil, ConocoPhillips, Shell Canada, and ExxonMobil Canada. The second group of stakeholders represent the Aboriginal people of the North West Territories and Alberta.

Imperial Oil owns and operates the Taglu natural gas field and will construct and operate it. The Mackenzie gathering system and the Mackenzie Valley pipeline will also be constructed and operated by Imperial. Two different companies own the Parsons Lake natural gas field. ConocoPhillips owns a 75 percent stake in the field and will construct and operate the production facilities. The remainder of the property is owned by Exxon Mobil Canada. Shell Canada will build and operate the production facilities on the Niglintgak natural gas field, which it owns the rights to.

Estimated Reserves of Anchor Fields³

Anchor Field	Estimated Natural Gas Reserves
Taglu	3 trillion cubic feet
Parsons Lake	1.8 trillion cubic feet
Niglongtak	1 trillion cubic feet

Members of the producers group will also own a system of pipelines that will gather gas from the producing gas fields. In addition, they will own a gas processing facility near Inuvik that will separate natural gas liquids from the gas. The liquids will then be transported via pipeline to Norman Wells.

A consortium of groups owns the Mackenzie Valley Pipeline. The ownership structure of the pipeline is diverse and complicated, and is as follows. The Aboriginal Pipeline group owns 33.3%,

³ <http://www.canadianencyclopedia.ca/index.cfm?PgNm=TCE&Params=M1ARTM0012208>

Imperial Oil owns 33.3%, Conoco Philips, 16.7%, Shell Canada 11.3%, and ExxonMobil Canada, 5.3%. At the start of construction, TransCanada Pipeline will have a 5% option on the pipeline, which will be taken from the producers share.

The Mackenzie Valley Aboriginal Pipeline Limited Partnership represents the Aboriginal Group. It is this partnership, which owns the APG's financial interest in the Mackenzie Valley Pipeline. The Partnership is owned by organizations, which are under the direction of the Deh Cho, Sahtu, Gwich'in and Inuvialuit. These groups are the principal aboriginal tribes, which reside in the area through which the pipeline is running. The other Northwest Territories Settlement areas (the Akaitcho, Dogrib, Salt River, North Slave Metis Alliance, and South Slave Metis Alliance) will be given an opportunity to participate in the partnership at the discretion of the Deh Cho, Sahtu, Gwich'in, and Inuvialuit.

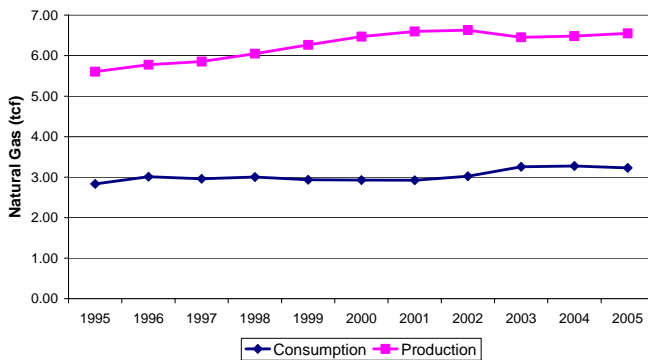
The Deh Cho First Nation is a tribal council representing 13 Dene and Metis communities in the Northwest Territories, with lands comprising roughly 40 percent of the land the proposed Mackenzie Valley pipeline would cross.⁴

The other key stakeholders in this project are the governments of Canada, and the Northwest territories government. These governments have and will have to set up regulatory boards and bodies for other services such as tax collection, environmental monitoring etc. The government of Alberta has some stake over this project as well as the pipeline will be tying into the existing natural gas pipeline in northern Alberta. However this project won't impact Alberta's government too much as its involvement is restricted to a small amount of pipeline and increased gas flow through its existing pipeline infrastructure.

⁴ <http://www.beg.utexas.edu/energyecon/thinkcorner/Mackenzie%20Valley%20Pipeline.pdf>

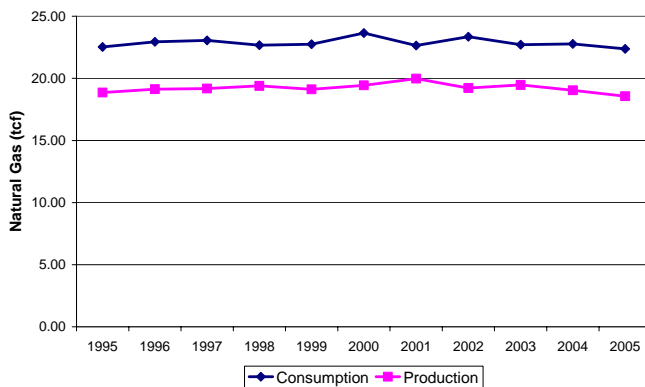
Benefits

Canada Natural Gas Consumption & Production



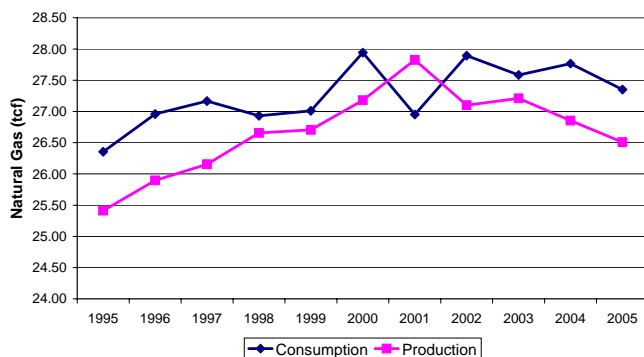
Over the past 10 years since 2005, Canada has been a net exporter of natural gas. Canada's production is forecasted to remain the same over the next 30 years by the US Department of Energy while its consumption will continue to rise.

USA Natural Gas Consumption & Production



Gas consumption in North America, particularly the United States has surpassed production for 9 of the last 10 years. In 2005, North America consumed approximately 884 billion cubic feet more than it produced.

North America Natural Gas Consumption & Production



The 884 billion cubic feet is made up via overseas produced liquefied natural gas (LGNs). The USA consumes approximately 3.81 trillion cubic feet more per year than they produce.⁵

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http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2006/STAGING/local_assets/downloads/pdf/table_of_natural_gas_consumption_2006.pdf

The construction of the Mackenzie Valley Pipeline will allow for initial production of approximately 800 mcf/day with potential to increase rates to 1.2 bcf/day (292 bcf/year and 438 bcf/year respectively)

Natural Gas Reserves (trillion cubic feet)⁶

	1985	1995	2004	2005
USA	191.05	163.15	192.46	192.46
Canada	98.17	68.16	56.15	56.15
North America	366.21	299.11	263.45	263.45

The natural gas reserves in North America currently stand at 263.45 trillion cubic feet, down 64 trillion from 10 years ago, and more than 100 trillion when compared to data taken 20 years ago. There has been a steady decline in reserves in North America, Canada's being most significant, as current reserves have been depleted and new resources not found. Access to the three key development properties tied to the Mackenzie Valley Pipeline would increase reserves by 9 trillion cubic feet, an increase to Canada's reserves by more than 10%. The opening of further gas fields in the area has the potential to add another 55 trillion cubic feet to Canada's reserves, which would double the current listed resources. Though the initial production is small compared to total North American production, the estimated reserves and resources are significant for future development.

The Aboriginal groups stand to be rewarded monetarily for their commitment to the project. The Aboriginal groups will initially have a 1/3 ownership of the pipeline and receive 1/3 of the tolls for the gas passing through the pipeline. During peak construction periods, it is expected that 2600 jobs will be created. Pipeline backers have recently committed to fund half of the \$21 Million needed to fund training of northern residents, with government funding the rest.⁷ As well, commitments are in place to hire 800 NWT residents during construction with 140 of those jobs permanent after construction.

The governments of Canada and the North West Territories are expected to experience tax and royalty revenues of approximately \$87 billion over 45 years in addition to increased employment and

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http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2006/STAGING/local_assets/downloads/pdf/table_of_proved_natural_gas_reserves_2006.pdf

⁷ http://ca.news.yahoo.com/s/capress/070122/business/northern_pipeline_3

economic self sufficiency for Canada's North which is almost \$2 billion average per year. In 2005, the Government of Canada spent approximately \$2 billion more in the Northwest Territories than it collected.⁸ This excess revenue can either be put to other uses or back into the North West Territories. To spend it elsewhere, however, provides less incentive for the NWT to move ahead with the project, as they will see no net monetary benefit, although it will provide greater independence from the federal government.

The Mackenzie valley project is projected to cost at least \$7 billion.⁹ This will be a huge benefit to Canada's economy, and will be a boon to both local and national construction companies. The producing companies stand to see a substantial benefit from the opening of the Mackenzie Valley for pipeline use. The expected return on investment for the producing companies is over 20% even if capital costs were to increase by over 30%. With an initial pipeline flow of over 800 mcf per day and a price of 7.781/MMBTU (quoted Feb 7, 2007), that equates to revenue of \$6.2 million per day or \$2.2 billion per year. Again, this is revenue and does not take into account the costs of producing and shipping the gas.

The people of Alberta will see an increase to supply of natural gas, but as this gas is being introduced into existing pipeline infrastructure, and with more oil sands operations coming online, it is difficult to estimate what effect this will have on the gas price. However, effects on gas prices will affect royalties paid to the Alberta government.

⁸ Stats Canada

⁹ <http://www.cbc.ca/money/story/2006/06/14/pipeline.html>

Risks

With a project size of this undertaking, there is bound to be as many risks as there are benefits. There are many threats associated with the successful implementation of the Mackenzie Natural Gas Pipeline Project. These threats encompass a variety of concerns including economic environmental, economic, social and legal. As usually happens with a construction project of this magnitude, a lot of environmental concerns surface.

Environmental Concerns

The Boreal Forest Conservation Framework is a strategy that has been created with a vision to protect at least 50% of the 600,000 square kilometres of boreal forest in Canada's north, which the Mackenzie Valley is part of. At present, only five of the sixteen distinct natural regions in the Mackenzie Valley are reasonably represented by protected areas.

In particular, environmental groups such as Sierra Canada have raised concerns regarding fragmentation of intact boreal forests along the Mackenzie River. There is the possibility that the project will cause damage to habitat for species such as the woodland caribou and grizzly bear, with a heightened risk present during construction activities. This would be caused by clear-cutting of trees, the presence of heavy machinery, and the deposit of sediment in the River.

The development planned in the Taglu and Niglintgak gas fields will interfere with the breeding grounds of more than 100 bird species (including some endangered species) in the Kendall Island Migratory Bird Sanctuary.

Pipelines can potentially rupture and leak gas and natural gas liquids, causing environmental damage and possible explosions. This risk is promoted since pipelines will be built across permafrost, and may shift if the global warming trend or radiant heat from the pipeline causes these permafrost layers to degrade.

Another criticism of the project raised by the Sierra Club¹⁰ is that the suggestion that the natural gas produced from the Mackenzie Valley project will not necessarily be used to offset more carbon-intensive fuel sources currently in use, but instead, will be used to support activities and encourage further development in the Athabasca Oil Sands. They point to high resource intensity of oil sands crude production, as well as high GHG and other emissions, as further evidence countering Mackenzie Valley development. Other environmental advocates do not necessarily support this idea. They point to the fact that natural gas can offer a cleaner burning fuel than coke for energy production. However, this argument has some merit as natural gas consumption is expected to equal approximately 1000 cf per barrel of synthetic crude oil produced. It is expected that in 2017, with energy input/barrel remaining the same, there will be approximately be an oil sands natural gas consumption of 1.5 Bcf/day, which is much higher than can be supplied through the Mackenzie Valley Pipeline Project.

Social Concerns

The project will likely result in large influxes of non-local workers to support the required construction activity, with a risk of minimizing the employment benefit to local residents and resulting in a huge strain on the infrastructure needed to handle the exponential growth in northern areas. There is also a risk to existing, traditional lifestyles in areas that have not previously experienced industrial development. To mitigate this, several funding initiatives have been developed that are aimed at training northern residents for job opportunities that will be available, and preparing northern communities to develop infrastructure. Finances are also available to allow northern stakeholders to assess impacts before pipeline construction begins. To that extent, a \$500 million fund set up by the Canadian government to deal with socio-economic effects (money management, etc)¹¹

Furthermore, there is still the question of gaining access to the proper workforce. There is approximately 100 billion dollars tagged to be invested in northern Alberta for the development of the

¹⁰ <http://www.sierraclub.ca/national/programs/atmosphere-energy/energy-onslaught/campaign.shtml?x=307>

¹¹ http://ca.news.yahoo.com/s/capress/070122/business/northern_pipeline_3

Oil Sands over the next 10 years. Resources, skilled labour and materials of construction will be more difficult to obtain and secure the longer the project is in construction.

Economic Concerns

The recent boom in Western Canada has also increased capital costs of most projects due to scarcity of materials and skilled workforce. The Mackenzie Valley Pipeline project can still return an ROI greater than 20% even if capital costs increase by 30%. The project is also sensitive to natural gas prices, and its revenue will rise and fall in direct proportion to the natural gas price. With more and more oil sands projects coming online, and with natural gas demand in North America continuing to outpace supply, there is confidence that the natural gas price will not fall to the point that the project becomes uneconomical.

Legal/ Regulatory Concerns

The public hearings with the National Energy Board (NEB) concluded in late summer 2006, however many issues remain outstanding before the Board can issue a ruling. Items include¹²:

- A cost review by Imperial Oil Ltd – the project’s costs, originally estimated at \$6 billion, may now be as high as \$10 billion. There is some risk that Imperial could walk if regulatory delays continue to increase the cost (with each additional month of delays adding millions to the budget). Imperial’s review is expected in March 2007
- A joint review panel (JRP) report addressing environmental concerns, currently scheduled for release in April 2007. The joint review panel is an independent group of 7 members charged with evaluating these concerns and their impact on the lives of people affected by the project.¹³
- Resolution of outstanding native issues with respect to land claims, including the issues relating to the Dene Tha’ in northern Alberta. There is disagreement with the Dene Tha’, a first nation’s group with seven reserves spread across northern Alberta and the southern Northwest

¹² <http://www.canada.com/topics/finance/story.html?id=6295c8da-44f5-405b-ae5d-d0ba92fd108a&k=23316>

¹³ <http://www.jointreviewpanel.ca/index.html>

Territories. They were not involved in any of the hearings and are arguing that they should have been since the pipeline is useless without the connecting facility, which resides in their area. The argument from the other side is that the connecting pipeline falls under the jurisdiction of Alberta. Federal Justice Phelan sided with the Dene Tha' in November 2006, but has allowed the Joint Panel Review to continue its evaluation.¹⁴

The regulator process is expected to continue until mid-2008.

Other regulatory bodies include:

Mackenzie Valley Environmental Impact Review Board – conducts environmental assessments in Mackenzie Valley

Minister of Indian and Northern Affairs – responsible for adoption or rejection of recommendations made by Mackenzie Valley Environmental Impact Review Board

Gwich'in, Sahtu, and Mackenzie Valley land and water boards – oversee regulation of land and water use in Mackenzie Valley

Gwich'in and Sahtu land use planning boards – responsible for preparing land use plans and overseeing land use in Gwich'in and Sahtu areas

¹⁴ <http://www.cbc.ca/canada/north/story/2007/01/31/pipeline-mackenzie.html>

Current Status¹⁵

There are two groups of issues left to resolve in the project.

The first issue encompasses engineering and economics – in particular the feasibility of the project and its cost. These issues will be taken up in hearings under the authority of the National Energy Board.

The second set of hearings will look at the project's environmental and social consequences. The hearings will focus on land use and impacts on the people and wildlife in the area. These hearings will be held under a body called the Joint Review Panel, mentioned above.

After the hearings are completed, both parties will list their recommendations and write their reports. The Joint Panel Review won't be able to issue its report until the National Energy Board deals with issues brought forward by the Dene Tha'. The federal cabinet will then go over these reports and make a decision on whether to move the project forward. That decision should come sometime in 2007. Imperial Oil is doing its own evaluation as to whether they will proceed or not. Their report will come out in March 2007.

Conclusion

Completing the Mackenzie Valley Pipeline project will see benefits for all parties involved. Not only will the producers receive a positive return on investment pushing the project forward, both the governments of Canada and NWT stand to see benefits through increased job creation, taxation and royalty sharing. The aboriginals also stand to benefit from this project through the tolls that they will receive as gas is transported through the pipeline. To date, the producers have done an excellent job consulting regulatory bodies, aboriginal groups and stakeholders. This is evidenced by the peaceful negotiations that have taken place thus far. The one exception is the exclusion of the Dene Tha' in consultation.

North America is still heavily dependant on hydrocarbon based energy. Natural gas is used

¹⁵ www.cbc.ca/news/background/mackenzievalley_pipeline/faqs.html

both for residential, commercial and industrial uses. Not only is natural gas used as an energy source in itself, it is used as a commodity in procuring more energy sources (oil sands as an example). The Mackenzie Valley Pipeline Project is needed to fulfill future demand of natural resources. There are still risks and hurdles to overcome which are environmental, social and regulatory in nature. There is also the risk that projected costs will rise due to the recent boom in Western Canada. There are currently many factors, which could affect the construction from proceeding. However, despite these factors, it does appear that the project will go ahead at some point in the near future.

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