Conversations for
Responsible
Economic Development



Assessing the risks of Kinder Morgan's proposed new Trans Mountain pipeline

Conversations for Responsible Economic Development

Building informed discussion about people, pipelines and purpose on Canada's West Coast

Revised version May 2013 (initially published Feb 2013)

About CRED

Conversations for Responsible Economic Development is a collaboration of business owners, academics, landowners and everyday residents of British Columbia who support responsible economic development.

We love and value the west coast of British Columbia for its creativity, innovation, quality of life and unparalleled natural beauty. This is why we live, work and own businesses here. We share a common concern around the impact the proposed new Kinder Morgan Trans Mountain pipeline would have on the province, and in particular the communities closest to it. The expansion of the Trans Mountain Pipeline, if it goes ahead, would be a rare development project that would inevitably influence the region's economic development path for at least the next 40 years. It would involve a new pipeline running underneath communities from Edmonton to Burnaby and an increased frequency of tanker traffic through the Burrard Inlet and the Salish Sea.

However, so far there has been a real lack of public information available about the project. We came together to respond to this concern - our goal is to conduct independent research about all aspects of the Kinder Morgan proposal and share the results with others. We believe that better decisions will be made if there is an open, robust and informed conversation about the project's risks and potential benefits before the approval process any further forward. We invite everyone to participate in the conversation to ensure we are getting all of the facts – before it's too late.

Our advisers

CRED was created and is guided by a team of advisers from a diverse range of sectors:



Meeru Dhalwala, restauranteur
Co-founder of Vij's and Rangoli restaurants, organizer of the Joy of Feeding international food festival and author of two cookbooks.



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Conversations for Responsible Economic Development



EXECUTIVE SUMMARY

Assessing the risks of Kinder Morgan's proposed new Trans Mountain pipeline

The west coast of Canada is a thriving region known for its natural beauty, quality of life and, increasingly, its spirit of innovation. The region is also currently charting the course of its economic future. In this context, projects like Kinder Morgan's proposed oil pipeline expansion should not be ignored or underestimated, as they will inevitably and significantly influence the direction we take.

All British Columbians who live, work and own businesses on the west coast will be directly impacted by the outcome of the decision whether to expand the pipeline. Now is the time – while approval of the project is still under consideration – to ask the right questions. What would it mean for people and businesses on Canada's west coast if Vancouver became a major oil exporting port? What would be the impact on Vancouver's reputation as one of the greenest cities in the world? Who will this project benefit and who will it put at risk? What risks are we willing to assume and which are unacceptable? This report aims to answer these questions, in particular the potential costs and benefits to our local economy. It also aims to generate more questions that need to be answered before a final decision is made.

The proposal: Kinder Morgan Canada is proposing a $5.4 billion project to build a new pipeline alongside its existing 1,150-kilometre Trans Mountain pipeline system between Edmonton, Alberta and Burnaby. Its goal is to increase pipeline capacity to at least 890,000 barrels per day, up from the current level of 300,000 barrels per day.

Our key findings:

- **Route:** There is significant uncertainty over the exact pipeline route and whether it will be routed around densely populated areas in the Fraser Valley.
- **Spills:** In 15 years of operations, Kinder Morgan has accrued a significant number of spills, largely the result of human error. This includes four along the Trans Mountain route since 2005.
- **Jobs:** The proposal would create 50 permanent jobs. An oil spill would put at risk industries that together employ over 200,000 people locally including tourism, film and TV, real estate, high tech, agriculture and coastal industries.
- **Tax revenues:** The expansion would not make a significant contribution to provincial tax revenues.
- **Liability:** In the case of a major tanker spill, taxpayers would likely be responsible for the burden of costs, as a company's liability is limited to $1.3 billion and a major spill could easily cost ten times this amount.
- **Local fuel needs:** The proposal is designed to export oil sands products to foreign markets. As a result, the pipeline is not required to meet domestic fuel needs.
- **Spill response:** Canada does not currently have the ability to respond effectively to a major spill in our waters.
- **Health risks:** There is a lack of consensus about the properties of diluted bitumen - the main substance that would travel through the pipeline - including its health impacts and how to effectively respond to a diluted bitumen spill.
- **Public opinion:** A recent survey found that 50% of BC residents oppose the proposal and 22% support it. Amongst those very familiar with the proposal's details, 70.9% are opposed.

Based on this report, we question whether there would be significant enough benefits for British Columbians to offset the risks. This report, however, is only a starting point. We look forward to an engaging conversation over the coming months about what the proposal means for responsible economic development on Canada's west coast.

1. Need to know facts: pipeline history and proposal details

History and background

The Trans Mountain pipeline was originally built in 1952 to ship Alberta light crude oil to refineries in the Vancouver area and Washington state. It was designed to meet the Pacific Northwest's energy needs.[1] Until 2005, the pipeline was owned by the BC Gas Company and it transported natural gas, jet fuel and oil.

In 2005 Kinder Morgan purchased the public BC Gas Company. In addition to other oil products, they now use the pipeline to ship diluted bitumen from Alberta's oil sands. Kinder Morgan has elected to treat diluted bitumen the same as other heavy oils - opting not to conduct any studies on its health impacts, how it reacts in a marine environment, or any other research specific to diluted bitumen. They have also relied on existing spill prevention and response plans and risk assessments for its transportation and storage.

Increasingly, the bitumen transported on the Trans Mountain pipeline is being reallocated from BC and Washington refineries for export by tanker to offshore markets.[2]

Over the past number of years, there has been incremental pipeline expansion activity, including new pump stations added in 2007 and the Anchor Loop Expansion through Jasper National Park and Mount Robson Provincial Park completed in 2008. The current capacity of the pipeline is 300,000 barrels per day.

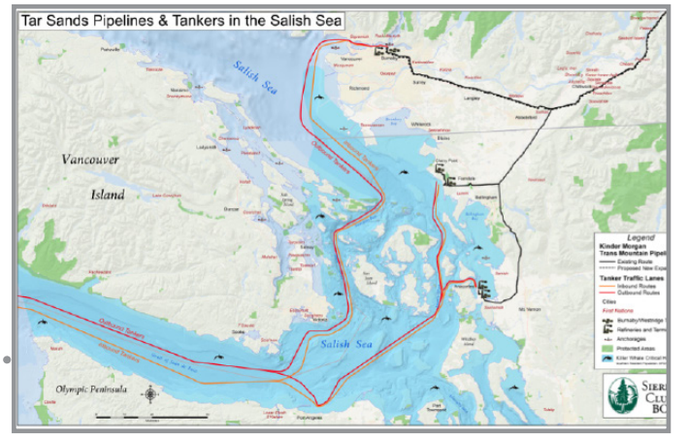
Expansion plans

Kinder Morgan Canada is now proposing a to build a new pipeline alongside its existing 1,150-kilometre Trans Mountain pipeline system between Edmonton, Alberta and Burnaby, British Columbia. The $5.4-billion project would increase the capacity of the system to at least 890,000 barrels per day.[3]

Details of construction

The expansion would create a dual-line pipeline. According to Kinder Morgan, the existing line would be used to carry refined products, synthetic crude oil and light crude oils, and the new 36-inch line would exclusively carry heavier oils such as diluted bitumen.

The project would also necessitate nine new pump stations, 18 additional storage tanks and the expansion of existing pump stations along the route. Finally, the project will require the expansion of the Westridge Marine Terminal in Burnaby.[4] If the application to the NEB is successful, construction would start in 2016 and the pipeline would be in operation by 2017.



What is diluted bitumen?

Bitumen has very different properties than conventional oil. It is a heavy and viscous oil that occurs mixed with sand, clay and water and is found underneath Canada's boreal forest. Rather than liquid like conventional oil, it has a sludgy consistency similar to sand mixed with molasses. As a result, it needs to be heated and diluted with powerful chemical solvents to be transportable.[11] This mixture of bitumen and up to 30% diluents is called diluted bitumen, or dilbit. Although the exact components of the diluents are a trade secret that companies are not required to reveal, they are widely understood to contain highly volatile substances such as benzene, a known carcinogen. There is debate over how diluted bitumen reacts in water - most industry officials claim that it floats on the top of water, similar to conventional oil, while many environmental groups claim that once the lighter oils in the dilbit evaporate, the remaining weathered heavy oil can submerge or sink.

What would the exact route be?

Current route: The existing Trans Mountain pipeline runs through the communities of Rearguard, Albreda, Chappel, Blue River, Finn, McMurphy, Blackpool, Darfield, Kamloops, Stump, Kingsvale, Hope, Wahleach, Sumas, Port Kells, and Burnaby. In addition, the pipeline traverses 15 First Nations communities and dozens of other towns.

What it runs underneath: It runs directly under several schools, including Stoney Creek Community School and Lyndhurst Elementary in Burnaby, and Watson Elementary in Chilliwack. Dozens of additional schools are within a couple kilometres of the pipe, including Forest Grove Elementary in Burnaby and twelve schools in Chilliwack. In addition, the pipeline runs underneath golf courses, shopping centres, residential neighbourhoods and the aquifers that supply drinking water to Abbotsford[5] and Chilliwack.[6]

New route: As Kinder Morgan has not put forward its proposal yet, there is significant uncertainty about the exact planned route. In some high population areas, like Burnaby, Langley and Chilliwack, communities have grown so much since the original pipeline was built in the 1950s that Kinder Morgan might propose diverting the expansion along a new route.

Why is it called a twinning?

The project is a twinning in the sense that it would create two pipelines where there is currently only one. However, the twinning project would actually triple pipeline capacity because the new 36-inch line would have more than double the volume of the existing 24-inch line. The two combined lines would have the potential volume of over 3 times the current line[7] and, as noted earlier, they would result in a fivefold increase in tanker traffic.

Tanker traffic

Increased traffic: Kinder Morgan has indicated that the required tanker traffic for an increased volume of exports is roughly 444 vessels per year[8] transiting Burrard Inlet, more than a fourfold increase from current levels. Kinder Morgan plans for each Aframax tanker, which is 245 metres long and 42 metres wide (longer than Vancouver's tallest building, the Shangri-La), to carry approximately 575,000 barrels of oil.

Dredging: There is a risk that future plans will include dredging the bottom of the Second Narrows Bridge to be able to accommodate the larger Suezmax tankers, which can hold up to 1 million barrels of oil.[9] Although Kinder Morgan's expansion plans do not depend on dredging the bottom of Burrard Inlet, the company has not ruled it out either. In 2008, Kinder Morgan dredged the waters around its Burnaby terminal to allow passage for Aframax vessels.[10]

The bigger picture: other proposed pipelines

The Trans Mountain Expansion Project is part of a larger oil sands expansion strategy. The proposed Enbridge Northern Gateway project is the other main proposal on the table in British Columbia. Both pipelines would allow oil sands products to reach the coast for export to foreign markets, and both would involve significant risk to local communities and BC's coastal waters. There are also pipelines proposed along routes through the US (Keystone XL) and to the east coast via Montreal (Line 9).



2. Who is Kinder Morgan and what is their safety and environmental track record?

Who is Kinder Morgan?

Kinder Morgan, Inc. is an U.S. energy transport company headquartered in Houston, Texas. Kinder Morgan was formed in 1997 when former Enron executives Richard Kinder and William Morgan bought Enron's liquid pipeline assets, Enron Liquids Pipeline, L.P. Its core business is to move fossil fuels such as coal, oil, natural gas, and, increasingly, diluted bitumen from mines and wellheads to utilities, refineries, and manufacturers. It is the 84th largest company in the world and the fourth largest energy company in the United States and owns or operates approximately 80,000 miles of pipelines with an enterprise value of $94 billion.[1]

Specific safety violations

- In the United States, in 2004, a Kinder Morgan pipeline ruptured, spilling some 1,500 barrels of diesel oil into California marshes. The company pleaded guilty to water pollution and failure to notify authorities, and was assessed $5.5 million in fines and penalties.[7]
- Again in 2004 in California, a pipeline struck by a municipal utility backhoe burst into flames, killing five workers and injuring four others. Investigators found that Kinder Morgan Energy Partners made an error in staking out the pipeline location. Kinder Morgan was fined by the state fire marshall, pled no contest to six felony charges and paid over $89 million in penalties and victim compensation.[8]
- A lawsuit launched by a Nevada mother in 2009 alleges that Kinder Morgan failed to adequately monitor and repair a pipeline that was leaking jet fuel into the ground beneath a school playground. The lawsuit alleges that this leak contributed to a number of childhood cancer cases, including the death of her 10 year-old son Ryan Brune.[9]

Safety track record

Carl Weimer, executive director of the Pipeline Safety Trust, a US-based non-profit organization, has noted that Kinder Morgan has a poor safety record since acquiring a huge network of pipelines in a short time period. The National Response Center, the the sole federal point of contact for reporting oil and chemical spills in the U.S. and its territorial waters, has found Kinder Morgan responsible for 1,800 violations since it was incorporated in 1997, nearly 500 of which are pipeline incidents.[2]

Trans Mountain spills

Since purchasing the Trans Mountain pipeline in 2005, Kinder Morgan has been responsible for four major spills:

Abbotsford 2005: A ruptured pipeline dumped a total of 210,000 litres of crude oil into the Abbotsford area and into Kilgard Creek. In a 2007 report from the Transportation Safety Board of Canada, Kinder Morgan was criticized for a delay in response time because the line between the Sumas tank farm and the Sumas pump station was not part of a leak detection system.[3]

Burnaby 2007: A road crew ruptured a pipeline, causing 250,000 litres of crude oil to flow into Burrard Inlet Bay via the Burnaby storm sewer system. Eleven houses were sprayed with oil, many residential properties required restoration and approximately 250 residents voluntarily left their homes. Cleanup took more than a year. The Transportation Safety Board ruled the accident was the fault of Kinder Morgan as it was responsible for ensuring the excavation crew knew the pipeline's exact location before they started digging.[4]

Burnaby 2009: 200,000 litres seeped from a storage tank into a surrounding containment bay at the Burnaby Mountain tank farm, causing strong fumes locally.[5]

Sumas 2012: 110,000 litres of oil leaked from a Sumas Mountain holding tank, caused by freezing water placing pressure on a gasket. The National Energy Board's investigation found that "the leak was detected later than it should have been," the company's management of procedures was "inadequate" and that the operator "failed to recognize the leak situation" on two occasions. It took three alarms and a shift change before someone was sent out to investigate.[6]

A History of Spills and Leaks

Along The Trans Mountain Pipeline



28 **Spills with undetermined locations, bringing total reportable spills since 1952 to 78**

The four spills highlighted above took place under Kinder Morgan's ownership. More details:

***Cleanup of the Burnaby spill took more than a year. The Transportation Safety Board ruled the accident was the fault of the company as it was responsible for ensuring the excavation crew knew exactly where the pipeline was before they were allowed to start digging.**

****The Transportation Safety Board of Canada criticized Kinder Morgan for a delay in response time because the line between the Sumas tank farm and pump station was not part of a leak detection system.**

*****In the case of the Sumas spill, the National Energy Board's investigation found that "the leak was detected later than it should have been," the company's management of procedures was "inadequate" and that the operator "failed to recognize the leak situation" on two occasions.**

3. What are the economic risks of the project? What are the economic benefits?

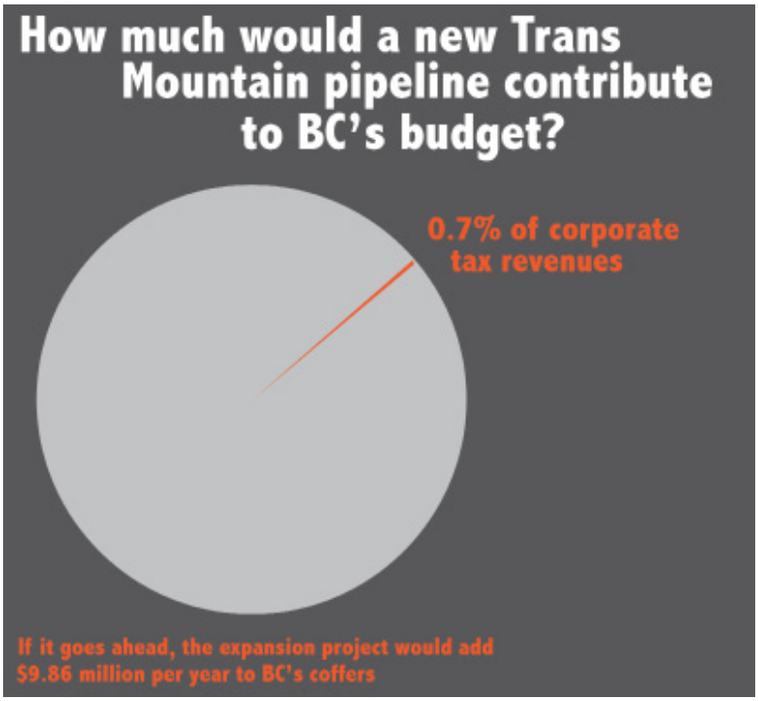
How many jobs will be created if this project goes ahead? What kind of jobs will they be?

According to Kinder Morgan, the expansion project will create 50 permanent jobs.[1] There will also be an unknown number of temporary jobs created during the construction phase, which is estimated by Kinder Morgan to last for less than two years. It is as yet unknown whether Kinder Morgan will choose to employ workers from BC or Canada or temporary foreign workers for these roles.

Tax revenues

The Trans Mountain website estimates that the project would create $355 million in increased provincial tax revenues and about $600 million in municipal tax revenues in BC over the project's six years of construction and 30 years of operations, for an average of $26.5M per year.

This is a strikingly small share of BC's overall tax revenues. The corporate taxes from the Trans Mountain expansion would make up only 0.7% of projected corporate provincial taxes for 2013/14 and 0.05% of overall provincial tax revenues for the year (projected to be $20.944 billion).[2]



What jobs would a spill put at risk?

Iconic Vancouver industries

Mountains and ocean are not only a core part of the lifestyle of residents of the Lower Mainland, in many ways, the landscape forms a significant part of the regional economy.

Whether it is real estate development, tourism, hospitality or coastal industries – or the burgeoning high tech and film sectors – many BC residents rely upon the natural environment to support their careers, families and lifestyles, and many businesses trade on Vancouver's 'greenest city' brand. As a result, some of the West Coast's most iconic industries could be significantly impacted by an oil spill. Taken together, these industries employ more than 320,000 people in the Lower Mainland.[3]

Although it's impossible to say how many of these 320,000 jobs would be directly affected in the case of a spill, a 2012 UBC study investigating the potential costs of a tanker spill along BC's north coast found that one large-scale incident could result in up to 43% job losses amongst coastal industries.

Tourism

Other areas impacted by oil spills have experienced significant job losses in the tourism sector. A paper published in the Canadian Journal of Fisheries and Aquatic Sciences estimates that the Deepwater Horizon spill could have an $8.7 billion impact on the Gulf of Mexico economy, including 22,000 job losses.[4] A report prepared by Oxford Economics for the U.S. Travel Association noted that tourism in the region was expected to fall by 10-20%[5] and, according to a report prepared for the Louisiana Office of Tourism, leisure spending is expected to be impacted through to the end of 2013.[6] BC's tourism industry employs 127,000 people,[7] a large proportion of whom could be affected depending on the size of a spill and the breadth of media coverage.

Farming and agriculture

The Fraser Valley contains some of the more fertile farmland in the world, supplying a significant percentage of BC's food consumption.[11] Studies in other locations have found that crude oil spills impacted food production by increasing soil acidity and toxicity.[12]

Port trade and coastal industries

A tanker spill could close the Port of Vancouver, which trades $75 billion of goods each year,[8] for days, weeks or even months. It would also disrupt fishing, prawning and other related activities on the Fraser River, which makes up a significant part of the regional economy. Salmon fishing alone contributes $750 million a year to BC's GDP.[9] Although no economic analysis has been done to date focused on BC's south coast, the same 2012 UBC study mentioned earlier estimated that a single large-scale incident could cost local fishermen, the Port of Prince Rupert, BC Ferries and marine tourism operators roughly 4,000 full-time jobs.[10]

What would be the direct cost of a spill?

It is impossible to know how much an oil spill would cost. However, it is possible to estimate some of financial risks associated with a project like this based on historic major spill scenarios including the Exxon Valdez, Deepwater Horizon and the Enbridge Kalamazoo River spill.

Direct costs of historical oil spills
Adjusted for inflation

Enbridge Kalamazoo River[13] (2010)	$725m[1]
BP Deepwater Horizon[14] (2010)	$41.6b*
Exxon Valdez[16] (1989)	$6.3b
Amoco[16] (1978)	$3b

** Clean-up is still ongoing and total cost may remain unknown for several years*

In Washington State, the Department of Ecology conducted a 2004 study on the potential impacts of an oil spill. They concluded that a major spill could cost up to $10.8 billion USD and adversely affect 165,000 jobs within the state, in addition to direct clean-up costs.[17]

The UBC study mentioned above found that a medium-sized spill on BC's north coast could have a regional economic impact of up to $189 million with estimated direct clean-up costs of $2.4 billion and a large-scale spill could have a regional economic impact of up $308 million in output with estimated direct clean-up costs of $9.4 billion.

Who would pay?

In our initial report, we stated that Kinder Morgan held $1.3 billion insurance in the case of a spill on land. However, it now appears that this insurance does not apply to land-based spills. In actual fact, it is uncertain how much insurance, if any, Kinder Morgan holds to cover costs arising from a spill on land. If a major spill happened along the pipeline route, there is a high risk that costs would fall to the BC and Federal government, as the BC government's technical analysis on the conditions to support heavy oil pipelines has noted.[18]

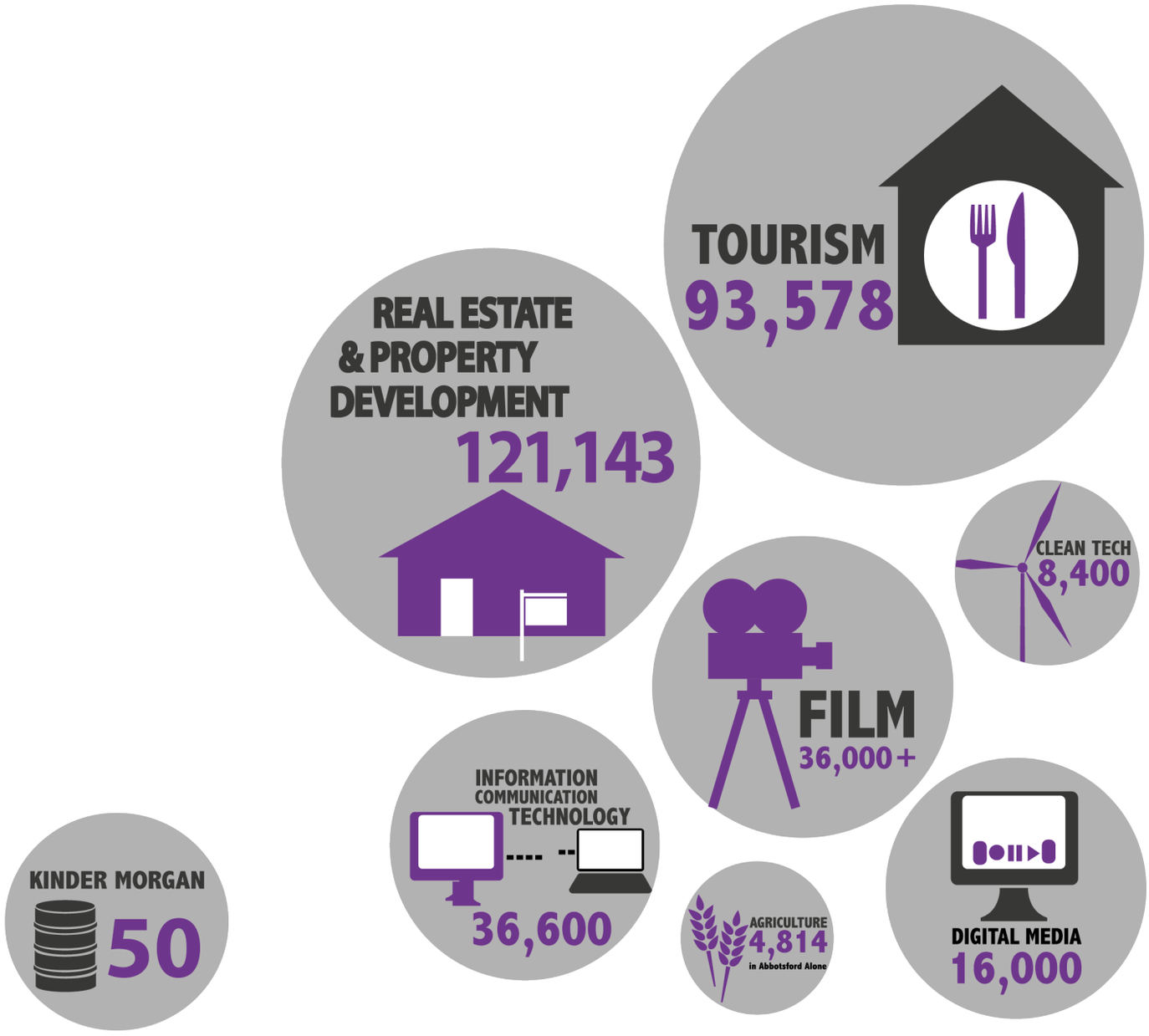
Kinder Morgan's Trans Mountain expansion is legally structured as a limited liability partnership (LLP). LLPs are not an unusual structure; since the Exxon Valdez spill, most oil companies have structured themselves in this way. However, the LLP structure means that there are real uncertainties about whether Kinder Morgan would provide any financial resources if a spill claim exceeded their insurance coverage. The City of Vancouver has proposed a bylaw that would force Kinder Morgan to carry enough insurance to cover the entire cost of a worst-case spill; however, this has not yet been passed.[19] UBC's University Neighbourhoods Association has also requested proof of insurance against direct and indirect local spill damage. It has not yet been provided.

Ship source spill liability

A study by the University of Victoria's Environmental Law Centre found that Canadian law would be highly inadequate in the event of a large oil spill at sea.[20] Once the bitumen or other product has been loaded onto a tanker, Kinder Morgan is no longer liable for any leaks or spills that may occur and the liability is transferred over to ship owners, where there are significant liability risks.[21] As many of these vessels are registered as international companies with secret boards, it is difficult to know much about their reputations.[22] Even if the ship owner was proven to be at fault and was asked to pay for the cost of the spill, the success of recovering amounts in excess of insurance limits is dependent on that person or corporation's assets. In some instances the only asset the ship owner will have is the ship. Although there are several funds available to cover the cost of marine spills, the maximum total funds available through all the compensation schemes combined would be capped at approximately $1.34 billion.[23]

Jobs Created and Jobs Risked

The Economics of Kinder Morgan's Proposed Trans Mountain Expansion



JOBS CREATED

(Plus temporary construction jobs)

JOBS RISKED

(Up to 43% of these jobs could be affected by a spill)

INFORMATION SOURCES

Film, digital, clean tech, ICT and accommodation/food: all from the Vancouver Economic Commission http://www.vancouvereconomic.com/
Agriculture: Fraser Valley Regional District report: Agricultural Economy http://www.fvrd.bc.ca/AboutUs/Pages/DistrictStatistics.aspx
Real Estate: Real Estate Board of Greater Vancouver and Fraser Valley Real Estate Board
Property Development: the Urban Devlopment Institute
Trans Mountain expansion: Kinder Morgan website http://www.transmountain.com/benefits-for-british-columbia

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4. Would the expanded pipeline serve local energy needs?

Energy versus fuel

When assessing local energy needs, it is important to note that crude oil and diluted bitumen travelling from the oil sands cannot contribute towards BC's electricity or heating needs (with the exception of remote rural or northern communities that may use diesel for heating). Oil sands products that are refined locally serve fuel needs for transportation, particularly cars, trucks and aviation.

Meeting local fuel demand

The original purpose of Trans Mountain pipeline was to supply oil for Lower Mainland use. Today, the pipeline supplies approximately 90% of BC's gasoline and diesel.[1] Some of this arrives through the pipeline as refined products, and the rest arrived as crude product and is processed by the region's one refinery, operated by Chevron and located in Burnaby, which produces approximately 50,000-55,000 barrels of gasoline and other fuels per day.[2]

Where the fuel goes: As the pipeline's capacity has increased incrementally under the ownership of Kinder Morgan, the proportion that is refined and used to meet domestic energy needs in BC has shrunk significantly, and today the majority of pipeline crude oil is exported for profit.

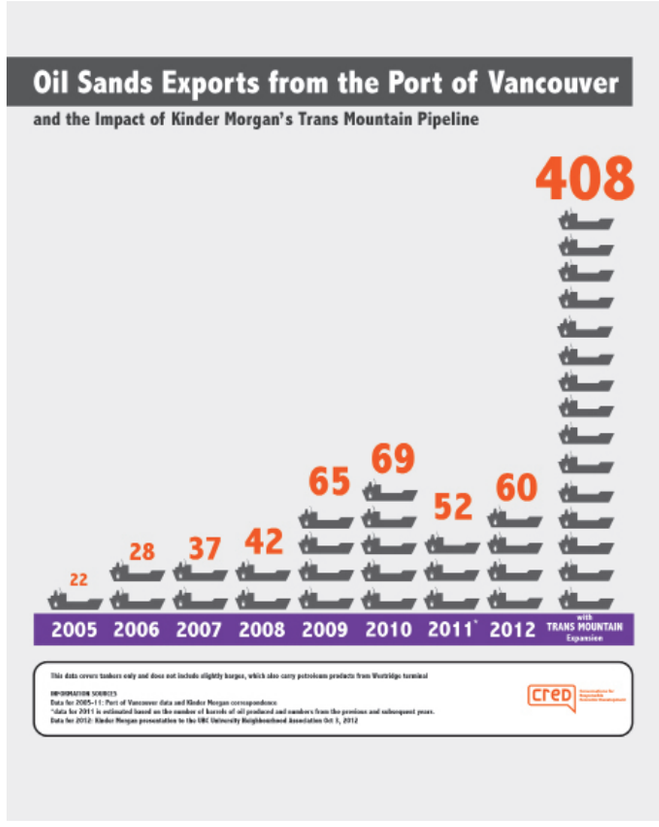
According to Kinder Morgan's data, in 2010:

- 25% of pipeline products were refined for use in the Lower Mainland
- 4% stayed in Kamloops
- 44% percent travelled via pipeline to Washington state
- 27% percent was loaded onto tankers for shipment.[3]

Oil for export

Between 2005 and 2012 marine traffic exporting Trans Mountain crude oil rose from 22 to 96 tankers per year, reflecting a growing demand from overseas markets beyond the US.[4] If the expansion is approved, Kinder Morgan intends to increase marine exports to at least 444 vessels per year - a full 78.6% of total pipeline capacity.[5] Some of these exports would likely go to California and the rest would be for new markets.

When exports to Washington are added into consideration, there is a high risk that Chevron's Burnaby refinery will be forced to continue to import crude oil using other transportation methods to meet local fuel demand. Kinder Morgan executives have confirmed that the Trans Mountain Expansion Project is an export strategy and is not focused on local energy security.[6]



5. If the project goes ahead, how likely is a leak or spill?

On land: along the pipeline route

Some spillage is inevitable and is counted by pipeline operators as a routine expense. In Canada, an average of 44 leaks per year are reported to the National Energy Board from pipeline systems at pumps, valves and other fixtures, and two ruptures per year are reported along pipelines. Each year, on average, there is one leak per 11,100 kilometres of pipeline.[1] Industry figures show that more than 3.4 million litres of fossil fuels have been accidentally released from pipelines every year in Alberta since 2006.[2]

The Trans Mountain line: Since reporting began in 1961, operators of the Trans Mountain pipeline have been responsible for 78 spills along the pipeline route.[3]

Risks from diluted bitumen: Diluted bitumen typically must be piped under higher temperatures and pressures - raising the risk of pipeline failures.[4] These leaks can have serious impacts, including toxic substances leaching into the ground. One litre of spilled oil can contaminate a million litres of groundwater.[5]

A history of local incidents

- In October 1978, the freighter Japan Erica crashed into the Second Narrows CN rail bridge, shutting down North Shore bulk terminals for three months.
- In August 2006, the Westwood Anette punctured a tank on a piling near Squamish and spilled 29,000 litres of fuel.[6]
- In March 2006, the Queen of the North ran aground and sank 130 km south of Prince Rupert, carrying 246,000 litres of fuel cargo. Ongoing oil discharges from the sunk vessel remain an environmental concern.[7]
- In December 2012, the coal freighter Cape Apricot collided with a conveyor at the Westshore Terminals port, spilling 35 tonnes of coal powder into the waters off Roberts Bank.[8]

At sea: tanker spills and leaks

There are no fail-safe methods to transport oil or diluted bitumen over water. While industry has made strides in lessening the frequency of oil spills, there are approximately four major oil tanker spills a year globally.[9]

In 1999, a Coast Guard analysis estimated that a major spill could be expected in Canadian waters every seven years.[10] Since then, safety technologies have improved but tanker traffic has also increased significantly, so the current risk is difficult to measure.

Human error: Accidents such as collisions and grounding are the leading cause of large spills. So while the technology of tankers has improved, there are still people at the heart of tanker operation and human error is inevitable.

In Burrard Inlet: Between 1998 and 2008 there were 17 reportable marine incidents in the Second Narrows Movement Restricted Area.[11] Aframax tankers that pass through the Burrard Inlet leave just 1.5 metres of clearance between the ocean floor and the ship's keel. And while vessels are double hulled and escorted by tug, because of their weight and size, tankers navigating through the Inlet must wait until daylight high tide before passing through.

In 2010, the Auditor General recommended that a comprehensive risk analysis was needed, as Canada is unprepared to respond to a large ship source oil spill.[12] This analysis has yet to be carried out.

Spill prevention: regulation and monitoring

Traditionally, regulation and monitoring of oil and gas development projects have been the responsibility of the arms' length National Energy Board and the federal government. Recent sweeping changes have significantly reduced the federal government's role in monitoring and regulating development activities, and previously independent NEB decisions can now be overruled by the federal cabinet. More streamlined environmental approval processes, reduced consultation with First Nations governments, less research capacity and different communication protocols are all indicative of a significantly diminished role for the federal government.[13] Under these circumstances, it is important to decide if current oversight is sufficient to ensure the safety of Canadians.

6. What would the spill response process be?

Response process on land

Any spill over 1.5 cubic meters must be reported to the National Energy Board.[1] When oil is spilled at a pump station (i.e. Burnaby or Sumas), the company is often able to contain it. If a spill happened along the pipeline route, complete containment would be impossible. Instead, the strategy would be to recover as much as possible, what the BC Ministry of Environment terms "removal and remediation". At the moment, there is no requirement for responsible parties to carry out restoration of damaged species or habitats, or public spaces.[2]

Marine response process

Who leads the response: If the shipowner or another party accepts responsibility, they would set off an Incident Response Command chain of action. Ship owners are required to have contracts with the Western Canada Marine Response Corporation, which is able to respond to a spill within between six and 72 hours, depending on the spill size and location.[3] If the responsible party can't be found, the Coast Guard will lead clean-up efforts. The closest Coast Guard ship is located 30 minutes away in Richmond.

Clean-up techniques: Booms, skimmer and other techniques seen in the Deepwater Horizon and Kalamazoo River spills would be deployed. However, booms can only be used in calm waters so weather conditions would significantly affect spill response. In addition, if the heavy bitumen sinks to the bottom of the water, as it was found to do in the Kalamazoo River[4], these techniques would not be effective.

Recovery rates: In the case of a diluted bitumen spill, lighter oils in the mixture could evaporate, leaving behind the heavy viscous bitumen. Transport Canada has noted that responders to the Erika spill of the French coast in 1999 experienced a recovery rate of just 5% for viscous oils, since traditional recovery equipment either didn't function properly or quickly became clogged.[5] Even in the case of conventional oil, a 10-15% recovery rate is considered success.[6] This means that at least 85% of the spill would be likely to remain in Burrard Inlet or on the ocean floor.

Spill response preparedness

Government oversight: Both provincial and federal governments hold responsibility for hazardous spill response:

- The BC Ministry of Environment and federal government hold joint responsibility for land-based spills and those close to shore.
- The federal government is solely responsible for regulating shipping and navigation, as well as all environmental impacts at sea.
- The main federal bodies responsible are the Coast Guard and Transport Canada.

The International Maritime Organization, the Pacific Pilotage Authority and the Port Metro Vancouver are also responsible for the movement of oil at sea. The BC Oil & Gas Commission is responsible for oversight of land-based transport. Municipal and First Nations governments are responsible for conducting risk assessments and preparedness plans.

Serious concerns: Recent cuts to the Coast Guard will have an impact on the ability to respond to spills in a timely and efficient fashion, as the number of regional offices is reduced from five to three,[7] and the Kitsilano and Vancouver stations are closed. Environment Canada has also said it will close its Vancouver oil spill response offices and hand responsibility for federal response to a consolidated Montreal office.[8]

A 2010 report from the Office of the Auditor General found that Canada is under-prepared to respond to a large ship source oil spill.[9] According to the report, the Coast Guard:

- Has a national emergency management plan that is 10 years out-of-date.
- Does not verify the readiness of private sector response organizations to respond to spills.
- Lacks a reliable system to track the number, size or environmental impacts of spills.

The BC Government's Technical Analysis carried out in 2012 concludes that "*enhancing spill management on Canada's west coast is critical; existing capacity is insufficient for future tanker traffic.*" In the same report, the government noted that companies are often unwilling or unable to respond effectively to spills on land.[10]

7. What are the health and environmental risks of a spill?

Health risks

Uncertainties and conflicting opinions: Because the large-scale transportation of diluted bitumen is relatively new, many of the health and environmental impacts of a spill are uncertain. There is conflicting information on the health impacts of exposure to crude oil and bitumen - while some studies claim that all oil exposure is toxic, other sources refute this, claiming instead that while refined light oils (i.e. gasoline and jet fuel) are indeed highly toxic, heavy crude oils do not pose a threat to human health.[1] There is also debate over whether diluted bitumen is more abrasive, corrosive and acidic than conventional crude.

Airborne contamination: What is certain is that diluted bitumen has added solvents that evaporate into the air in the case of a spill. Many of the solvent's components are a trade secret that companies are not required to divulge; however, benzene (a known carcinogen that is highly toxic through either short or long-term exposure)[2] and other neuro-toxins with proven health risks are widely understood to be included. In the case of a major spill, airborne contamination and resulting evacuation would be likely.

Health impacts in Kalamazoo, Michigan

In the case of the Kalamazoo River spill, the only major diluted bitumen spill to date, local residents and EPA responders discovered bitumen and diluent do not stay together once released into the environment.

As the diluent separated from the bitumen, toxic fumes of benzene and toluene began spreading through the air. In total, almost 60 per cent of the local community experienced adverse symptoms including nausea, dizziness, headaches, coughing and fatigue.[3] Health officials recommended evacuation of those living close to the spill and clean-up crews were given respirators to protect them from toxic fumes.[4] Sections of river were closed immediately and only began reopening almost two years after the spill.[5]

Environmental risks

Impacts of a land-based spill: The environmental impacts of an oil spill on land are generally localized, and therefore carry less risk than water-based spills. However, there would still be local impacts to habitats, wildlife and recreational areas. In addition, studies have shown that land-based spills can contaminate groundwater for many years and at distances up to thousands of meters from the spill source.[6]

Impacts of a marine spill: Diluted bitumen is toxic to marine life, difficult to clean up and likely to persist for decades in water, beaches, sediment, and entire marine environments. Put simply, the environmental impacts of a large oil spill in Burrard Inlet or anywhere in the Salish Sea would be catastrophic, far-reaching and long-lasting.

The BC Government's technical analysis noted that: "*The legacy of a spill and cleanup can last for decades. Indeed, the impacts from the Exxon Valdez spill have still not been completely addressed.*" It goes on to note that ongoing chronic impacts have been noted in many species, and some were still continuing to decline as of 2004.[7]

The west coast's vulnerable ecosystem: The Burrard Inlet is one of Canada's most productive marine and terrestrial ecosystems. A spill of any size would impact many different species of fish and wildlife at various life stages.[8] A spill would also put one of the west coast's most iconic mammals at risk: orcas are shown to be impacted by oil exposure and are unlikely to be able to detect and avoid spills.[9]

Persistence: Scientists have just started studying the impacts of oil spills over time, painting a more complex portrait of what happens. On land, it appears that although the bulk of the damage happens quickly, the oil then moves underground and continues to do low-level damage to wildlife over many years. A study of marshlands affected by a 1969 oil spill in West Falmouth, Massachusetts discovered similar concentrations of soil contamination 30 years later.[10] At sea, the persistence of impacts is similar: some scientists have even suggested that impacts of the Exxon Valdez spill may persist for centuries.[11]

8. What is the global significance of this project?

For a full picture of the project's risks, it is important to understand the connections between the Trans Mountain pipeline, the Canadian oil sands and global climate change.

Trans Mountain and the Alberta oil sands

Building the Trans Mountain pipeline will only make economic sense if the oil sands undergo significant expansion. Therefore, the risks of oil sands expansion should also be considered when making an informed choice about this particular pipeline.

In 2011, the Alberta oil sands exported approximately 1.74 million barrels of crude or modified crude oil per day, mostly through existing pipelines, demonstrating that this level of export capacity already exists.[1] However, companies operating in the oil sands have approvals to produce over 5.2 million barrels of oil per day, with another four million barrels per day of permits in progress.[2]

The main justification for expansion of the Trans Mountain route (as well as other proposed pipelines from the oil sands to the coast) is to accommodate this expanded production.[3]

Risks of oil sands expansion

Building the pipeline not only commits BC's west coast to a specific economic development path, but it will also set us on a global path where we need to prepare for a warming world.

A recent PWC report demonstrates that in order to maintain a likelihood of keeping climate change within 2 degrees celsius of warming (widely understood to be a 'safe' threshold beyond which serious climate tipping points will happen) the global rate of decarbonization needs to increase sixfold every single year for the next 39 years, a feat never before achieved.[4]

The oil sands are the fastest growing source of emissions in Canada.[5] Many studies show that if fully developed, they will likely release enough carbon to send the world over some significant climate tipping points. NASA climate scientist James Hansen has estimated that there are 250 gigatons of carbon locked in the tar sands - almost half of the entire global emissions budget.[6]

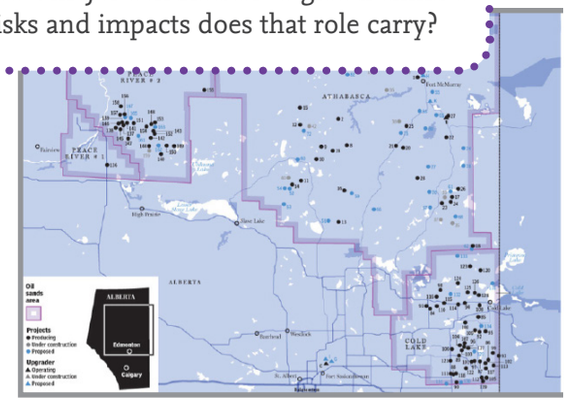
Canada in a warming world

A recent National Round Table on the Economy and Environment (NRTEE) report warns that by failing to develop a low-carbon economy, Canada might be risking its competitiveness as carbon-intensive products become subject to trade restrictions, harming its international reputation and losing out on a first-mover advantage in the rapidly growing international market for low-carbon goods and services.[7] The report concludes that Canada is well placed to build upon existing strengths and innovate in other areas, from low-emission mining to electric car manufacturing, but in order to build these industries we need to act fast.

Past NRTEE reports in addition to the 2006 Stern Review make a strong business case for addressing climate change on the basis of cost-benefit analysis. Simply put, it will cost far more to deal with the impacts of climate change than it will cost to build a low-carbon economy.[8]

In addition, Canada will be impacted by a warming world. The 2012 Degrees of Change report maps out the most likely impacts Canadians will face at different levels of warming, including different agricultural patterns, altered rainfall, reduced winter seasons, a rapidly melting arctic and change in sea levels.[9]

There is a direct link between building the infrastructure for significant oil sands expansion and global climate impacts. Which begs the question: are we prepared to be a major contributor to global climate change? What risks and impacts does that role carry?



9. Who else is concerned about the pipeline?

First Nations

Many First Nations governments in BC are concerned about new oil pipelines and the resulting increase in coastal tanker traffic. To date, 133 nations have signed the Save the Fraser Declaration, which opposes all tar sands projects in the Fraser River watershed and migrating salmon routes, and asserts their title and rights under Indigenous Peoples' laws.[1] The declaration expresses concern about the significant risk to watersheds and the plants, animals, fish and people who depend on them. Any oil spill would impact their ability to practice their way of life, including the ability to hunt, fish and practice cultural and spiritual traditions.

The Squamish and Tsleil-Waututh Nations have also formally declared opposition to Trans Mountain expansion in a Save the Salish Sea declaration.[2]

Municipal governments

The Cities of Burnaby, Vancouver and West Vancouver[3] have all passed resolutions against the Kinder Morgan pipeline. The UBC University Neighbourhoods Association has expressed serious concerns and in September 2012 the Union of BC Municipalities passed a resolution opposing any pipeline projects that would result in an increase in tanker traffic in coastal waters.[4] They are particularly concerned that BC communities will bear most of the project's risks without accruing many of the benefits.

In a recent poll of British Columbians:

- 50% of respondents oppose the proposed new Trans Mountain pipeline
- 22% support the proposal
- 70.9% of respondents who know a great deal about the proposal oppose it
- People living along the pipeline route rank pipelines and tankers as a top issue facing BC, just slightly behind the economy / financial crisis

BC residents

Local communities: In Burnaby[5] and the Fraser Valley[6], local residents concerned about the risk of pipeline spills in their communities have formed groups to oppose Kinder Morgan.

Wider opposition: There has also been more widespread citizen opposition to the project. In September 2012, thousands of people came together in Victoria and in communities across BC to protest pipeline expansion as part of the Defend Our Coast campaign.

Public opinion: Surveys show that the majority of general public sentiment is opposed to the project. A Stratcom poll carried out for the Living Oceans Society in August 2012 showed that 50% of all BC residents and 52% of those living along the pipeline route oppose the project, compared to only 22% who support it. In addition, the more people were informed about the proposal, the more likely they were to strongly oppose it. Amongst residents who had heard a great deal about expanding oil pipelines and tanker traffic in BC, 70.9% were opposed to expanding the Trans Mountain pipeline.[7]

Environmental organizations

Many environmental organizations actively campaign against oil sands expansion because of concerns about climate change, environmental degradation, water contamination, and the detrimental impact on communities living in northern Alberta who have been negatively impacted by oil and gas development, in particular First Nations. A few organizations are also actively campaigning against the Kinder Morgan pipeline, including the Wilderness Committee, the Council of Canadians, Tanker Free BC, the Living Oceans Society, the Georgia Straight Alliance, West Coast Environmental Law and Forest Ethics Advocacy.

10. What happens next?

The application process

Kinder Morgan has not yet filed a formal application with the National Energy Board (NEB). Their target date for this step in the process is early 2014.

If Kinder Morgan decides to put forward a full proposal, the NEB will then carry out a regulatory review, assessing proposal details, environmental and socio-economic impacts. Consultation with members of the public and First Nations governments will occur at some point in this process. Impacted parties, including local residents, government officials and other individuals, may be granted the ability to intervene in the NEB hearings. During the review process, Kinder Morgan will be required to set out a detailed pipeline route.

At the end of the regulatory review, the NEB will recommend whether the project should go forward. Lastly, the federal government will have the option of overriding the NEB's recommendation.[1]

If the project is approved, Kinder Morgan aims to start construction in 2016 and complete the new pipelines in 2017.

Kinder Morgan's timeline

Major project milestones as represented on the Kinder Morgan Trans Mountain website:[2]

- **LATE SPRING/EARLY SUMMER 2012**
  Meetings & discussions
- **SUMMER 2012**
  Continued engagement and tolling application
- **JUNE 2012 TO SPRING 2014**
  Continued engagement, studies and assessments
  - Continue open and transparent engagement
  - Undertake comprehensive pipeline routing studies, traditional knowledge studies and socio-economic assessments
- **LATE 2013**
  Filing of comprehensive facilities application
- **2014 TO 2015**
  Regulatory review
- **2016 to 2017**
  Proposed construction dates
- **2017**
  Proposed start date for operations

SOURCES AND END NOTES

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2. In 2006, 2008 and 2011 Kinder Morgan applied for and received permission from the National Energy Board to reallocate crude oil from BC and Washington refineries for export by tanker to offshore markets

3. Economist Robyn Allan notes that the capacity could be much larger than 890,000 barrels per day. If Kinder Morgan could expand capacity by upgrading the pipeline's pumping power similar to Northern Gateway, the daily supply reaching Burnaby could be 1.1 million barrels a day. This could significantly raise the volume of tanker traffic in Burrard Inlet up to 475 crude oil tankers a year

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8. Here 'vessels' refers to both Aframax tankers and slightly smaller oil barges. Kinder Morgan does not include barges in their tanker statistics.

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Who is Kinder Morgan and what is their safety and environmental track record?

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2. The Pembina Institute "Oilsands emissions lie at the heart of Canada's climate challenge" http://www.pembina.org/blog/668

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4. PWC Low-Carbon Economy Index 2012: Too late for two degrees? http://www.pwc.com/gx/en/sustainability/publications/low-carbon-economy-index/index.jhtml

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6. New York Times "Game Over for the Climate", James Hansen May 2012 http://www.nytimes.com/2012/05/10/opinion/game-over-for-the-climate.html

7. NRTEE report "Framing the Future: Embracing the low carbon economy"", 2012 http://nrtee-trnee.ca/framing-the-future-embracing-the-low-carbon-economy-3 and Vancouver Sun article "Canada urged into booming green market", October 2012 http://www.vancouversun.com/business/Canada+urged+into+booming+green+market/7407901/story.html

8. National Archives, Stern Review on the Economics of Climate Change, 2006 http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm

9. NRTREE report "Degrees of Change: Climate warming and the stakes for Canada", 2010 http://nrtee-trnee.ca/climate/climate-prosperity/degrees-of-change

Image source: Financial Post "Who Owns the Oil Sands?" October 2012 http://business.financialpost.com/2012/10/31/who-owns-the-oil-sands

Who else is concerned about the pipeline?

1. Save the Fraser Declaration http://savethefraser.ca/

2. Tsleil-Waututh First Nation website http://www.twnation.ca/~/media/Files/Press%20Releases/FINALMedia_Release_SEP1_Canoe_Journey_FINAL%20(2).ashx

3. West Vancouver Council Report July 6, 2012 http://www.westvancouver.ca/uploadedFiles/Your_Government/Agendas_and_Minutes/2012/July/12jul23-11.PDF
Vancouver motion from Mayor Gregor Robertson to the Standing Committee on Planning, Transportation and Environment May 2012 http://former.vancouver.ca/ctyclerk/cclerk//20120502/ptec20120502ag.htm
Burnaby Civic Web minutes from Environment Committee March 2012 https://burnaby.civicweb.net/Documents/DocumentDisplay.aspx?Id=12542

4. Union of British Columbia Municipalities http://www.ubcm.ca/EN/main/resolutions/resolutions/resolutions-responses.html

5. Burnaby Residents Opposed to PIpeline Expansion (BROKE) http://www.burnabypipelinewatch.ca/

6. PIPE-UP http://pipe-up.net/

7. Stratcom phone polls of 1,162 adults. Correct +/- 3.5% 19 times out of 20 http://stratcomca.wordpress.com/2012/11/07/survey-says-bc-opposition-to-kinder-morgans-expansion-proposal-growing-not-just-enbridges-northern-gateway/

What happens next?

1. Bill C-38 Section 54 of the National Energy Board Act http://parl.gc.ca/HousePublications/Publication.aspx?Language=E&Mode=1&DocId=5524772&File=128#1

2. Trans Mountain website www.transmountain.com/timeline

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