UPGRADER Alley

FACT SHEET

ENVIRONMENTAL IMPLICATIONS OF ALBERTA'S OIL SANDS RUSH

Oil Sands Fever Strikes Edmonton

Ten-fold growth in bitumen upgrading will have major impacts on air, land and water

Oil sands production in northern Alberta could triple by 2020, to four million barrels a day.

As a result of this increasing oil sands production, a major industrial expansion of bitumen upgraders is underway northeast of Edmonton. This so called "Upgrader Alley" is expected to handle nearly half the oil sands production, right on Edmonton's doorstep.

Upgraders are large scale industrial complexes similar to oil refineries. They take the tar-like bitumen from the oil sands and "upgrade" it to synthetic crude oil. The upgrading process uses intense heat and pressures, requires large amounts of energy and water, and increases air pollution.

In 2007 there was one upgrader northeast of Edmonton converting bitumen to synthetic crude oil. That upgrader is being expanded, and plans are in progress for another eight. Companies are attracted to the Edmonton area by the availability of labour, land and infrastructure.

Some of the synthetic crude oil will be piped elsewhere, but refining and petrochemical industries will also be attracted to the region to use both the oil and various byproducts.

All this development will transform the Edmonton area. Agricultural land and natural areas have been rezoned to create a 530-square-kilometre region called Alberta's Industrial Heartland, which is where Upgrader Alley will be located. The Industrial Heartland is three-quarters the size of the City of Edmonton.

▲ *Upgrader Alley will see industrial development comparable to this Suncor plant north of Fort McMurray (top). The Shell Scotford upgrader northeast of Edmonton is already being expanded (centre).*

PHOTOS: DAVID DODGE, THE PEMBINA INSTITUTE

◀ *The province disestablished the Astotin Natural Area in December 2007. Canadian Pacific will use the land for a new railway into Upgrader Alley.*

PHOTO: DAVID DODGE, THE PEMBINA INSTITUTE

THE HEAVY FOOTPRINT OF UPGRADERS

Nine upgraders are expected to be operating in Upgrader Alley between 2015 and 2020. When all phases are complete, each year they will

- process about 2 million barrels of bitumen a day
- consume about 10 times as much water as the City of Edmonton
- require twice as much natural gas as all the households in Edmonton
- use more electricity than is produced by the entire EPCOR Genesee operation
- produce about one sixth of Alberta's greenhouse gases

Some companies will gasify coke to provide heat and power. This process reduces their need for natural gas and electricity, but it produces even more greenhouse gases.

Upgraders will also considerably increase air emissions of sulphur dioxide and nitrogen oxides, as well as hydrogen sulphide and other air pollutants.

Oil SANDS Fever SERIES

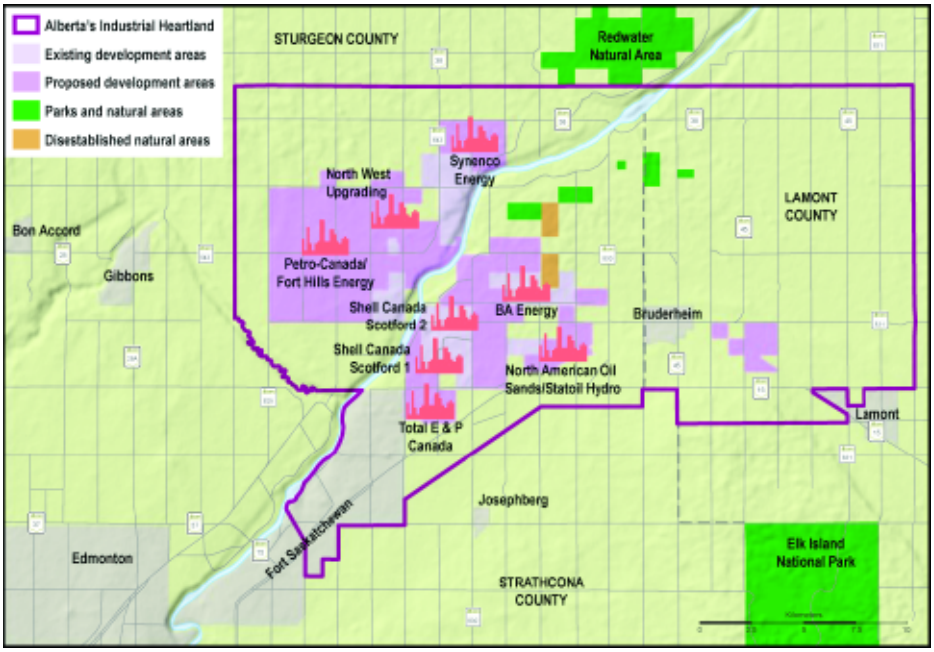
Transforming the Landscape

- Each upgrader will require hundreds of hectares of land. Good agricultural land and natural areas have already been rezoned.
- A new transmission line will bring in electricity from coal-fired power plants west of Edmonton.
- New railway lines and a new bridge across the North Saskatchewan River will bring trains to the heart of Upgrader Alley.
- Pipelines will carry in bitumen and natural gas and connect the upgraders to external markets.
- If greenhouse gases are captured to reduce emissions to the atmosphere, additional pipelines will be needed to take the greenhouse gases to an injection site.
- About 1 tonne of sulphur is produced for every 100 barrels of bitumen upgraded. Upgrader Alley will produce several million tonnes of sulphur each year when all the upgraders are in operation. If there is no market for it, this sulphur will have to be stored.

"Overall growth pressures

in the Industrial Heartland are creating competition for land resources, resulting in known and potential impacts to wetlands, groundwater, soils, habitats and landscapes in general."

– ALBERTA ENVIRONMENT



Upgrader Alley will form the core of Alberta's Industrial Heartland (in the counties of Strathcona, Sturgeon and Lamont). One upgrader is currently operating, two are under construction, five have submitted applications and land has been acquired for a ninth.

MAP: ROLAND LINES, THE PEMBINA INSTITUTE

Upgrading bitumen, degrading the environment

The upgraders, associated industries and increased traffic are expected to reduce air quality.

Alberta Environment is proposing limits on the emissions of sulphur dioxide and nitrogen oxides from current and new industrial plants in the Industrial Heartland, but their plan will still allow the concentration of sulphur dioxide and nitrogen oxides in the region's air to increase by 30-40% above current levels. These new measures will help limit the creation of fine particulate matter and ground level ozone, which can affect human health, but there are no specific plans to reduce emissions of hydrogen sulphide or volatile organic compounds.

Company/Upgrader	Scheduled start-up	Bitumen (barrels/day)
Athabasca Oil Sands (Shell) – Scotford #1 and expansion	2003-10	290,000
BA Energy/Value Creation – Heartland	2008-13	163,000
North American Oilsands Corp/ StatoilHydro – Strathcona	2016-20	243,000
North West Upgrading	2010-16	150,000
Petro-Canada/Fort Hills – Sturgeon	2011-15	340,000
Shell – Scotford #2	2013-22	400,000
Synenco – Northern Lights	on hold	115,000
Total E&P Upgrader	2013-19	245,000
Total for 8 upgraders		**1,946,000**
Suncor (land holdings for upgrader, no details available)	?	?

Local residents worry they could face air emissions and sulphur storage problems similar to those at this Syncrude plant north of Fort McMurray.

PHOTO: DAVID DODGE, THE PEMBINA INSTITUTE

Summary of Recommendations

The Pembina Institute is asking for a pause on new approvals for oil sands production and upgrading.

There will still be substantial growth — projects already approved will continue — but a pause would give time to plan new projects to reduce the cumulative effects.

Address Cumulative Impacts: The Capital Regional Integrated Growth Management Plan should be completed to ensure that infrastructure is in place before further projects proceed. The Cumulative Effects Management Framework should be strengthened to further limit impacts on air, land and water.

Limit Environmental Impacts to Protect Human Health and the Environment:

- Require all upgrader projects to be carbon neutral by preventing or offsetting their greenhouse gas emissions.
- Ensure flows in the North Saskatchewan River are adequate to protect aquatic life.
- Set protective limits for air pollutants, not adequately addressed in current plans.
- Compensate for the amount of land used for industrial development by protecting appropriate, additional lands elsewhere.

Focus on Quality of Life: The rate of growth must be managed to protect the quality of life, to maximize the benefits to those living in the region and to ensure that social services and infrastructure can keep pace.

Want more information?

For more information and a complete list of recommendations, download the full report, *Upgrader Alley: Oil Sands Fever Strikes Edmonton*. It is available from www.oilsandswatch.org, where you will also find more photographs and reports, videos and other information about the oil sands.

This report was prepared by Mary Griffiths and Simon Dyer of the Pembina Institute (www.pembina.org).

▲ *The North Saskatchewan River will supply the water for the upgraders. Alberta's new Water Management Framework for the North Saskatchewan River will limit withdrawals when water levels are low, but it will not stop them, even during critically low flow conditions.* PHOTO: DAVID DODGE, THE PEMBINA INSTITUTE

It's Time to Get It Right

The Alberta government has selected Alberta's Industrial Heartland, which includes Upgrader Alley, as a pilot area for its Cumulative Effects Management Framework.

Its approach will limit somewhat the increases in air pollution and withdrawals from the North Saskatchewan River, but it will not prevent the loss of good quality agricultural land. Provincial plans to address greenhouse gas emissions impose intensity limits, but they will allow an absolute growth in emissions from upgraders. The Capital Region Integrated Growth Management Plan will not be complete until 2010.

Impacts on land, air and water can be considerably reduced by integrating several industrial activities. But that requires careful planning. Given the fact that projects are likely to be approved before detailed plans and infrastructure are in place, some of the problems associated with rapid and uncontrolled growth in the Fort McMurray region could reoccur in Upgrader Alley.

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