Potential CO2 Emissions of the Susitna-Beluga Coalfield

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The Susitna-Beluga Coal Leases

The Susitna-Beluga coal field is a large coal field located on the west side of Cook Inlet. The mining company PacRim holds leases in Susitna-Beluga, and has proposed a massive coal mine dubbed the Chuitna Coal Project in its LMU1 lease. Further information on the field and project can be found in our dedicated article (/Issues/AlaskaCoal/ChuitnaCoalMine.html). The Barrick leases are another set of large leases in the Susitna-Beluga, near the PacRim leases.

Carbon Dioxide Potential of Susitna-Beluga Coal

This article uses precise coal terminology. (/Issues/AlaskaCoal/CoalTerminology.html)

Burning the proven coal reserves in the PacRim coal leases (including the proposed location of the Chuitna Coal Project, in the LMU1 lease) would release 1.6 billion tons of carbon

dioxide - roughly equal to the annual emissions of Russia, the world's 5th most carbon-intensive nation. It would also be equal to the carbon emissions of all U.S. transportation activities in a typical year.

Comparison of Carbon Dioxide Emissions (Metric Tons)

Mine / Proposal | Coal Stocks (tons | CO2 Potential (tons
Usibelli Mine Reserves | 700 million (Reserves (http://www.usibelli.com/coal-energy.php)) | 1,440 million
Wishbone Hill Proposal | 14.4 million (Reserves (http://www.usibelli.com/Coal-Wishbone-Hill.php)) | 30 million
Susitna-Beluga Coalfield: PacRim LMU1 Lease | 300 million (Reserves) | 615 million
Susitna-Beluga Coalfield: Other Pacrim Leases | 471 million (Reserves) | 966 million
Barrick Leases | 655 million (Est. Reserves)* | 1,340 million
Total Susitna-Beluga Identified Resource | 10,000 million (Resource (http://pubs.usgs.gov/dds/dds-077/dds77text.html)) | 20,500 million
Total Sustina-Beluga Hypothetical Resource | 31,500 million (Resource (http://pubs.usgs.gov/dds/dds-077/dds77text.html)) | 64,500 million
Total Sustina-Beluga Coal Field | 42,000 million (Reserves + Resource) | 86,000 million
*See Methods section for an explanation of the Barrick reserves estimation.

Emissions Potential of Mined Coal ("Production")

Actual annual emissions would depend on the rate at which Chuitna's coal was mined and burned. If mine production reached 12 million tons per year (as PacRim has proposed for the Chuitna Coal Project, in the LMU1 portion of their leases), this coal would release 25 million tons of carbon dioxide per, roughly equivalent to Alaska's statewide annual emissions.

Annual Coal Production & Carbon Emissions

Mine/ Carbon Source | Annual Production | Carbon Dioxide Emissions | Data Source
Usibelli Coal Mine (Active) | 2 million tons* | 4 million tons | Usibelli (http://www.usibelli.com/coal-energy.php)
Wishbone Hill Coal Mine (Proposed) | 0.5 million tons | 1 million tons | Usibelli (http://www.usibelli.com/Coal-Wishbone-Hill.php)
Chuitna Coal Project (Proposed | 12 million tons | 25 million tons | DRven (http://www.wtcak.org/PDF/Stiles-WTCAK.pdf)
Prudhoe Bay Oil | 200,000 barrels | 0.09 million tons | EIA (http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=MCRFPAK1&f=A)
Alaska Yearly State Emissions | N/A | 38 million tons | EIA (http://www.eia.gov/state/rankings/?sid=AK#series/226)
Keystone XL incremental** | N/A | 1.3 to 27.4 million tons | Report (http://keystonepipeline-xl.state.gov/documents/organization/221135.pdf)
1 years' worth of oil sands through Keystone XL | 303 million barrels | 160 million | Report (http://keystonepipeline-

xl.state.gov/documents/organization/221135.pdf)
*Usibelli Mine's production varies year-to-year, and is approximated to 2 million tons.
**Incremental emissions are those which would not be produced, if denial of building the Keystone XL pipeline reduced total oil sands production by the amount Keystone XL would transport (~830,000 barrels per day). State department analysis suggests this would not occur, and this volume of oil sands product would instead be moved by rail or other transport projects.

Method for Estimating Carbon Emissions

Estimating coal production and carbon emissions from proposed coal mines is difficult because coal exploration in Alaska is very incomplete. For these estimates, we have taken proven reserves numbers, and extrapolated to Barrick using PacRim's plausible identified resource.Carbon dioxide emissions per short ton of coal are estimated using the EPA's universal CO2-to-coal ratio (http://www.epa.gov/cleanenergy/energy-resources/refs.html) of 2.05:1.

In actuality, emissions/ton will vary with coal composition, as will consumption rate of coal to produce a given amount of energy. Both ratios move together, since carbon dioxide output and energy output are both a function of coal carbon content. Lower-grade, more moist coal (which is characteristic of Alaska) must be burned in larger volumes to achieve the same

energy outputs as higher-grade coal, absorbs a greater amount of energy evaporating its own water content, and thus produces more carbon dioxide per unit of energy produced.

There is large uncertainty about how much coal is contained within active leases in the Susitna-Beluga Coalfield. Outside of the well-studied LMU1 lease, PacRim and DNR statements about the coal potential of the leases are of uncertain accuracy.

Non-Susitna-Beluga Coal

Usibelli Mine: Usibelli Mine is provided as a benchmark for carbon potential of the proposed mines. Usibelli is Alaska's only active coal mine. Usbelli's reserves are taken from Usibelli Coal Mine, Inc.'s website (http://www.usibelli.com/coal-energy.php).

Wishbone Hill: Usibelli Coal Mine, Inc.'s statement (http://www.usibelli.com/Coal-Wishbone-Hill.php) of Wishbone Hill's reserves is used.

Susitna-Beluga Coal

PacRim LMU1: LMU1 is a subsection of the PacRim leases in the Susitna-Beluga coalfield. It is well-studied, and has an estimated 300 million tons (http://www.wtcak.org/PDF/Stiles-WTCAK.pdf) of proven reserves. LMU1 is the proposed site of the Chuitna open pit coal mine.

PacRim Other Leases: An additional 471 million tons of reserves are proven in PacRim ’s leases surrounding LMU1. This is derived by subtracting PacRim’s LMU1 reserves from their total reported lease reserves (http://137.229.113.30/webpubs/dggs/ic/text/ic057.pdf). PacRim further estimates (http://www.wtcak.org/PDF/Stiles-WTCAK.pdf) a total of 1,000 million tons of “resource position” in its Chuitna leases. The term “resource position” does not conform to standard coal terminology, and therefore is difficult to interpret. Based on local geology and the size of the LMU1 reserves (300 million tons), we interpret the “resource position” estimate as the identified resource in PacRim’s total Susitna-Beluga leases.

Barrick: Very little is known about the Barrick (http://chuitna.org/chuitna-coal-strip-mine/) coal. We estimated the Barrick resource by applying the same proportion of coal/acre as in the adjoining PacRim lease, based on PacRim’s “resource position” there. Our estimate of 850 million tons is therefore speculative, but plausible.

The carbon potential of Alaska’s state-wide coal resources is located in our article on Alaska Coal and Carbon Dioxide Emissions (/Issues/AlaskaCoal/AK-Coal-carbon-dioxide-emissions.html)