Energy, Minerals, and Infrastructure in Support of a Petrochemical Industry in Interior Alaska

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Sources of data

1. Dow-Shell Group, 1981, Alaska Petrochemical Industry Feasibility Study
2. Information Insights, 1999, Economic impact of the Fort Knox Mine on the FNSB
3. Information Insights, 1999, Economic impact of the Petroleum Industry on the FNSB

Prerequisites

1. Development of North Slope Natural Gas
2. Competitively Priced Ethane
3. Concurrence of community
4. Minimization of Risk to Health and Safety

North Slope Natural Gas

	Resource (TCF)	Production Life in Years (@ 4 BCF/D)
Proven Reserves	**35**	**23**
Other State Land	**110**	**70**
ANWR	**65**	**43**
CBM (Barrow)	**44**	**29**
Gas Hydrates	**590**	**388**
Total	**844**	**553**

Infrastructure

1. **Electrical energy**
2. **Thermal Energy**
3. **Railroad**
4. **Port Facilities**
5. **Water Supply Systems**
6. **Shipping Capacity**
7. Fire Protection
8. Communications
9. Housing
10. Medical Facilities
11. Support Service Industries

Products

1. Methanol
2. Ethylene
3. Polyethylene
4. Ethylene Glycol
5. Ethylbenzene
6. Styrofoam
7. Alpha Olefins
8. Ethylene Dichloride
9. Ammonia
10. Urea
11. Caustic Soda

Markets

1. Japan (1981)
2. Gulf Coast (1981)
3. China (2004)

Gas Line @2.7 BCF/D

1. Water 25,000,000 gpd
2. Power 245 megawatts
3. Steam 1,230,000 lbs/hr

Total 6.3 billion Btu/hr

*Healy Coal Equiv.(7500 Btu) = 6,200,000 tons per year

* Co-generation plant at 60% Efficiency

Gas Line @4.0 BCF/D

1. Water 38,000,000 gpd
2. Power 368 megawatts
3. Steam 1,850,000lbs/hr

Total 9.5 billion Btu/hr

*Healy Coal Equiv.(7500 Btu) = 9,300,000 tons per year

* Co-generation plant at 60% Efficiency

Gas Line @2.7 BCF/D

1. Rail Freight - Products = 8,820,000 tons/year
2. Rail Freight – Coal = 6,200,000 tons/year
3. Total = 15,020,000 tons per year
4. Ship Moorings = 300 per year

Gas Line @4.0 BCF/D

1. Rail Freight - Products = 13,320,000 tons/year
2. Rail Freight - Coal = 9,300,000 tons/year
3. Total = 22,530,000 tons per year
4. Ship Moorings = 450 per year

Competitive Advantages of Fairbanks/North Pole Site Selection

- Proximity to all proposed pipeline routes.
- Proximity to source of benzene at North Pole Refinery.
- Proximity to large coal reserves at Healy for cogeneration of electrical power and steam.
- Proximity to abundant fresh water from Tanana Flood Plain.
- Proximity to Alaska Railroad.
- Limited distance to tidewater and Asian markets.
- Proximity to population center with trained work force.
- Proximity to medical and other emergency services.
- Proximity to major airport facilities.
- Limited risk from geologic hazards such as earthquakes, landslides, floods, coastal storms, and tsunamis compared to other potential locations.

Gas Line @2.7 BCF/D	Gas Line @4.0 BCF/D
Capital Requirements	Capital Requirements
$4.5 – 5.0 Billion	$6.7 – 7.5 Billion
Employment	Employment
6,800	10,200

Gas Line @2.7 BCF/D	Gas Line @4.0 BCF/D
Annual Contribution to the Economy of the FNSB (not including coal, benzene, and railroad revenues	Annual Contribution to the Economy of the FNSB including coal, benzene, and railroad revenues
$700 million	**$1,050 million**

Required Railroad Re-Alignments and Extensions

Moose Creek to Blair Lakes

1. 37 miles
2. $165,000,000 (incl.major bridges)

Blair Lakes to Brown Station

1. 48 miles
2. $151,000,000 (incl. minor bridges)

Note: (Rail line from Wasilla to Pt. MacKenzie and port facilities need to be incorporated in design in addition to capital investments in interior Alaska)

Summary

1. For Alaska to maximize its benefits from the production of North Slope Natural Gas there must be major investments in infrastructure in interior Alaska including railroad re-alignments and extensions and electrical energy generating capacity
2. Coal can provide the source of energy for both the generation of electricity and steam for a petrochemical complex.
3. The economics of the complex were sufficient for a production decision in 1981 and have improved due changes in markets over the last 25 years.