Energy Options for Fairbanks

Research by Alaska Center for Energy and Power and Antony Scott (UAF)

1/15/2013
What’s Unique about the Study

• First to compare, on an apples to apples basis, alternatives for reducing Fairbanks energy costs
  – Trucking LNG off North Slope
  – ASAP project(s) (500MMcf, but also 250MMcf and 1Bcf)
  – Spur line off a Major Gas Sale (LNG to Asia)
  – 12”, fit-for-purpose pipeline from North Slope to Interior
  – Beluga to Fairbanks pipeline
  – Susitna-Watana
  – HVDC (heat and power for Fairbanks)
  – Coal to liquids
A Usual Way of Modeling Projects: “Assumed Net-forward pricing”

Supply Cost = X (assumed)

Infrastructure costs = Y (calculated)

“Delivered Cost” = X + Y

- Focuses on the “easy” part of engineering costs, utility rate making
Private Ownership, Full Projects

Delivered Cost of Energy ($/MMBtu in 2023) As Function of Real ANS Oil Prices
State Ownership, Full Projects

Delivered Cost of Energy, $/MMBtu (MOD 2023), As Function of Real ANS Oil Prices

- Fairbanks Trucking Project
- ASAP 500 MMcf/d project
- Beluga to Fairbanks
- MGS LNG to Valdez
- Heating Oil
- ASAP 250 MMcf/d project
- ASAP 1000 MMcf/d project
- Small Diameter Fit for Purpose PL to FBX
- CTL
- HVDC Fairbanks Heat and Power
Private Ownership, Ramp-up Risk

Ramp-up Risk at $100/Bbl Oil:
Cost of Delivered Energy to Fairbanks
during infrastructure build-out and adoption

Year 1  Year 2  Year 3  Year 4  Year 5  Year 6

- Fairbanks Trucking Project
- ASAP 500 MMcfd project
- Beluga to Fairbanks
- Small Diameter Fit for Purpose PL to FBX
- MGS LNG to Valdez
- HVDC Fairbanks Heat and Power
- Heating Oil

Cost of Delivered Energy to Fairbanks during infrastructure build-out and adoption
State Ownership, Ramp-up Risk

Ramp-up Risk at $100/Bbl Oil:
Cost of Delivered Energy to Fairbanks
during infrastructure build-out and adoption

- Fairbanks Trucking Project
- ASAP 500 MMcfd project
- Small Diameter Fit for Purpose PL to FBX
- MGS LNG to Valdez
- HVDC Fairbanks Heat and Power
- Heating Oil
Effect of FBX Demand Uncertainty
Local Distribution Infrastructure Costs

Heating Demand Uncertainty and Start-up risk (State ownership case)
We can’t do everything...

Project Total CapEx, Millions $2012

$53+ billion
(not to scale)
Some LNG trucking issues

• Gas contract terms are key!
  – *Duration* of favorable pricing may matter a lot

• How big are ramp up risks, really?
  – Better estimate Fairbanks demand
  – Better understand timing of first sales and construction
  – Better understand cost structure of distribution utility

• How to mitigate ramp up risks?
  – Revolving loan fund may be insufficient
  – Build ramp-up costs into initial rates; equity partners; “carrots” for early adoptors
Backup Materials

• Key drivers of results:
  – Focus on commodity prices, not just transportation costs
  – Commodity prices modeled supported by data, not just assumptions
  – Prices to Alaskans won’t be “fair”, they’ll be market driven
  – Almost all non-fuel costs assumed to be fixed
Alaska Markets (simplified)

- “Stranded” ANS gas generally priced off DNR Gas Royalty Settlement Agreement
  \[ Price/\text{MMBtu} = 0.0464 \times (\text{ANS WC } \$/\text{Bbl}) \]

- Gas from long term contracts placed in Asian Pacific LNG market priced off oil, roughly:
  \[ Price/\text{MMBtu} = 0.90 + 0.1485 \times (\text{ANS WC } \$/\text{Bbl}) \]

- FBX Heating oil
  \[ Price/\text{MMBtu} = 4.20 + 0.225 \times (\text{ANS WC } \$/\text{Bbl}) \]
Illustrative Commodity Price Volatility as Function of Historical ANS Crude Prices

- Historical ANS crude oil prices
- Fairbanks retail heating oil, regression model
- LNG-based gas, South Korea
- North Slope gas at PBU, RSA Formula Value