

Appendix C: In-State Natural Gas Demand and Supply Issues

The Division of Oil and Gas has reviewed the final draft of the “Alaska Natural Gas In-State Demand Study” completed under contract for the Department of Natural Resources by Econ One Research. This report will be available by December 28, 2001. This Appendix is a summary of the study.

Baseline Conditions. The total in-state demand for natural gas was approximately 227 Bcf per year in 2000. This estimate is based on annual usage averaged over the period 1996-2000. It includes LNG exports (78 Bcf per year) and other industrial uses in Southcentral Alaska, as well as approximately 10 Bcf per year of industrial gas usage for TAPS pump station and other North Slope oil field operations (but excludes gas re-injection for enhance oil recovery). Industrial gas usage accounts for about 71 percent of the statewide total. The remainder is somewhat evenly divided between residential/commercial gas usage and gas for electric power generation in Southcentral Alaska. A modest quantity of natural gas (less than 2 Bcf per year) is consumed space heating and power in Barrow and for space heating in Fairbanks.¹

Potential for Growth in Gas Usage. In-state gas usage over the next two decades has the potential to increase by approximately 140 Bcf per year. The potential for growth in gas usage is may arise from several sources. The sources of growth and their estimated additional gas usage in 2020 are:

- Baseline economic growth (27 Bcf per year)
- Expanded residential/commercial gas service in Southcentral and Interior (7 Bcf per year)
- Expanded existing industrial usage at the Kenai Ammonia-Urea plant (4 Bcf per year)
- New plant expansion at the Kenai Ammonia-Urea plant (30 Bcf)
- New petrochemical plant (28 Bcf per year)
- Fuel switching for power generation in Interior communities (30 Bcf per year)
- Gas-by-Wire; central station power generation near Fairbanks (13 Bcf per year)

Three key assumptions underpin the preceding estimates for potential growth in gas usage: (1) relative energy prices in the future are consistent with levels observed today; (2) the state’s regional economy exhibits continued gradual economic expansion at rates comparable with the past five years (about a half percent per year in real dollars); and (3) in-state access to ANS gas from a high-pressure, dense-phase gas pipeline from the North Slope to Canadian and Lower-48 destinations is not cost prohibitive.

This latter assumption merits further consideration. The results in the division’s study of in-state natural gas demand and supply suggest that several factors may challenge the economics of in-state access to ANS gas. For example, under the assumptions: (1) 100 percent penetration for 11,000 residential customers, (2) a gas commodity price comparable to what ENSTAR currently pays for gas in Southcentral, and (3) a 12-year payback for the \$1,000 cost of home furnace and water heater conversion, expanded residential gas usage in the Interior region is approximately

¹ Barrow residents consume gas from local gas fields. Northern Eclipse, LLC ships daily truckloads of LNG from Southcentral Alaska to Fairbanks Natural Gas LLC, the local distribution company in Fairbanks.

competitive with electricity, the next least-cost alternative. But 100 percent penetration is not likely and a 12-year payback is not attractive.²

In effect, economies of scale for expansion of residential service to the Interior region do not appear to be sufficient to offset the levelized capital costs for gas transmission from the North Slope to Fairbanks (\$1.00 per Mcf), gasline tap and meter/stepdown (\$0.05 per Mcf) and the corresponding distribution system (\$2.29 per Mcf).

Industrial operations in Southcentral and the North Slope account for the bulk of current gas usage. The potential for increased gas usage by greater utilization of existing industrial capacity is limited to perhaps 3-to-4 Bcf per year at the Ammonia-Urea plant in Kenai, based on historic gas consumption rates. A moderately-sized Internet data center would consume modest quantities of gas (less than 1 Bcf per year). However, a relatively large Internet data center (one-million square feet) could consume as much as 4.3 Bcf per year. A polyethylene petrochemical plant similar to the facility under study by Williams could draw 300-400 Bcf per year for ethane extraction and possibly other natural gas liquid components. But most of this gas would be re-injected back into the gas pipeline in the form of methane, destined for other downstream markets. Net gas usage at the petrochemical probably would be less than 30 Bcf per year.

The in-state gas demand and supply study identified community power-generating facilities in the Interior region that could potentially switch their primary fuel to natural gas. Fuel oil and diesel facilities in the Interior region of the state were the most attractive candidates. There are approximately 200 MWs of capacity in this region that could shift from fuel oil to natural gas. This alternative appears to meet first-order economic criteria but at a very small scale (30 Bcf per year).

The study also considered using ANS gas for central-station electric power generation and transmission in the Interior region (gas-by-wire). The economics of a 250 MW combined cycle facility stack up favorably with the costs of existing generating units. However, the state does not have a potential capacity need until the year 2014.

In sum, the economics of supplying ANS gas for the applications outlined above as a whole do not appear to be favorable. Where the economics are close (fuel switching and gas-by-wire) additional, detailed engineering analysis of related transportation and distribution alternatives is required before conclusions can be reached.

The Cook Inlet Gas Demand and Supply Balance. Setting aside the potential for future increases in gas usage, the evidence regarding existing gas supply and demand in Cook Inlet suggests that, without access to additional gas reserves, annual gas deliverability in the ENSTAR system may fall short of potential demand (at current, relative energy prices) before 2010. This imbalance stems in part from a long-standing availability of relatively inexpensive gas to Southcentral users in all customer classifications. To some extent, gas producers and consumers have responded to the potential for future supply shortages. For example, the Regulatory Commission of Alaska recently approved a gas purchase agreement between ENSTAR and Unocal that ties gas price to a three-year moving average of the Henry Hub spot market price

² Penetration in areas currently served by ENSTAR in Southcentral Alaska is approximately 80 percent.

with a floor of \$2.75 per Mcf. The agreement also commits Unocal to an aggressive program of gas exploration in the Cook Inlet.³ The impact of rising gas prices is likely to result in curtailment of industrial gas usage. Also, a situation of acute supply shortage is likely to reduce the U.S. Department of Energy's willingness to renew an application to extend the license to export LNG to Japanese Utilities beyond the current expiration date of April 2009.

The division's investigation of in-state gas demand and supply evaluated the potential for ANS gas to serve the demand-supply imbalance in the Southcentral region. Preliminary findings indicate that a the levelized cost of a 16-to-20 inch spur pipeline linking Southcentral with the ANS gas pipeline at Fairbanks could be competitive with energy alternatives (such as fuel oil or LNG imports into Cook Inlet) if annual throughput exceeds 30-to-40 Bcf per year. For example, a 20-inch spur pipeline operating at an average of 40 Bcf per year for 30 years would imply meter-station step-down charges and levelized transmission charges of approximately \$1.00 per Mcf (excluding the toll to Fairbanks, as well as local distribution and gas commodity charges). In order to be competitive, the spur pipeline would be required to serve a segment of the existing Southcentral customer base now served by local gas reserves in the Cook Inlet Basin. This result could be favorably influence by scale economies from:

- Sharing spur pipeline transmission charges over a wider customer base along the energy belt;
- Higher rates of penetration than those observed among Southcentral users within the existing ENSTAR system;
- System-wide averaging of distribution charges; and
- Baseline growth in all customer classes including industrial users and expanded gas service.

³ Regulatory Commission of Alaska. Docket Number U-01-7, Order 8. *Order Conditionally Approving TA 117-4 (Gas Sales Agreement) and Requiring Filing*. October 25, 2001.