February 22, 1983

EXPORTING ALASKA'S OIL AND GAS

INTRODUCTION

A huge resource of oil and gas is locked up in Alaska by federal legislation that prohibits its free commercial export. As a result, Alaskan oil is currently creating a glut and discouraging oil production in California. Half of Alaska's oil production therefore has to be shipped to the East Coast and Gulf Coast at considerable cost, ultimately borne by American consumers.

Removing export restrictions would gain the federal treasury about $1.5 billion per year and also increase Alaska's revenues substantially. It would reduce the nation's deficit trade balance with Japan and the Far East by up to $20 billion in potential oil and gas exports. Beyond these financial benefits, the action could help break the impasse in trade relations with Japan and ensure supplies of energy to close allies who are very vulnerable to interruptions in the flow of Middle East oil. In addition, it would render unnecessary the construction of a $2 billion pipeline from Puget Sound to the Midwest and eliminate the current costly and wasteful tanker traffic to the East Coast.

Most important, it would stimulate Alaskan producers to develop more oil for export, probably from 0.5 to 1 million barrels per day (mbd)--worth about $5 to $10 billion per year. And it would blaze the way for exports of natural gas in the form of liquid natural gas (LNG) or as raw materials for fertilizer, with great benefits to the economic development of Alaska. Gas exports of about 1 tcf (trillion cubic feet) would be worth about $5 billion per year and add the equivalent of another 0.5 mbd to the world oil market.

Changing the law that bans overseas sales of Alaskan oil will take a measure of political effort. That ban has a powerful constituency in the maritime unions. Under a 1920 law--the Jones

Act--all shipments between American ports must be made in American-flag ships, manned by American crews. All the oil that leaves the southern Alaska port of Valdez for terminals on the West and Gulf Coasts falls under the Jones Act. Even though only part of the 1.6 million barrels of oil that run through the Alaska pipeline each day might be involved in export to Japan, the maritime unions would fight to keep the law from being changed.

A second problem involves equity for the American companies engaged in northern Alaska oil production. Legally barred from selling this oil to foreign countries, Exxon, Standard Oil Company of Ohio, and Atlantic Richfield Corporation invested heavily in tankers to ship oil from Valdez to other U.S. ports. In addition, these companies are under a three-year contract to move some of the oil going to the Gulf Coast through a pipeline across Panama, offloading from tankers on the Pacific side, reloading to tankers on the Caribbean side. These investments, entered into in good faith, would have to be protected.

But on balance, more would be gained than lost if exports were permitted. Moreover, export of Alaskan hydrocarbons poses no threat whatsoever to U.S. security. On the contrary, putting another 1 mbd (or more) of non-OPEC hydrocarbons into the world market would enable the consumer nations to reduce the amount of oil imported from unreliable OPEC producers. Allowing export of Alaska oil and gas also could improve U.S. relations with Japan. Not only would it narrow the U.S.-Japan trade imbalance ($16 billion surplus for Japan in 1982), but it would go far to alleviate Japan's fears of energy dependence on unstable Middle East nations.

ALASKA'S HYDROCARBON POTENTIAL

In January 1968, roughly 19 billion barrels of oil and 26 trillion cubic feet (tcf) of natural gas were discovered at Prudhoe Bay, Alaska. In 1968-1969, Alaska sold the basic leases for about $900 million, reserving for itself a 12.5 percent royalty interest. Development of the Prudhoe Bay field and plans for an oil pipeline commenced almost immediately. Congress became involved in the decision-making process of selecting the best route for transporting Alaskan North Slope (ANS) oil to market because any oil pipeline would have to cross federal land.

While oil and natural gas have been produced at Cook Inlet since 1954--and successfully exported to Japan in the form of LNG by Phillips-Marathon--it was the 1977 opening of the Trans-Alaska Pipeline System (TAPS) to the Prudhoe Bay field that turned Alaska into a major energy supplier. Last year, Alaska averaged over 1.7 mbd of crude oil production, including over 1.6 mbd from the North Slope. Another 80,000 was added to the TAPS throughput with production from the new Kuparuk field just west of Prudhoe Bay. By the mid-1980s, the $3 billion Waterflood Project will keep up Prudhoe Bay's production by maintaining reservoir pressure

through seawater injection. At the same time, Kuparuk production is expected to be at least 0.2 mbd. So production from the North Slope will come near to TAPS' capacity of 2.0 mbd this decade, even if there are no new discoveries.

Estimates of North Slope reserves have been made for the wells and production in the Prudhoe Bay and Kuparuk fields. As of August 1980, Alaska estimated its "most likely" discovered resources at 10.2 billion barrels of oil and 35.4 trillion cubic feet (tcf) of gas. Under stricter definitions, the American Gas Association (AGA) estimated (in January 1982) proven gas reserves to be 26 tcf for the North Slope and 31.9 tcf for all of Alaska. These estimates are for known, existing fields. Though not confirmed by drilling, undiscovered reserves do exist. The AGA study estimated potential gas reserves for Alaska at 145 tcf. The National Petroleum Council issued estimates (December 1981) for the North Slope and the Bering Sea using averages of other studies. They put undiscovered recoverable resources at a mean of 24 billion barrels of oil (high of 55 billion barrels) and 109 tcf of natural gas (high of 246 tcf). These estimates were based on current energy market conditions. Using historical changes in prices and technology, Heritage Foundation analysts estimate Alaska's potential oil reserves at between 48 and 124 billion barrels, with commensurate increases in potential gas reserves. (For comparison, recent annual U.S. consumption was about 5.5 billion barrels (bb) of oil, and about 20 tcf of natural gas. Note that 1 tcf of gas has a heat content of 1 quad 1,000 trillion BTU's, and is equivalent to 0.17 bb of oil.)

RESTRICTIONS ON EXPORTS

The two primary alternatives for carrying the oil to the lower 48 states were a proposed Trans-Canada pipeline, which was to deliver the oil to Midwestern refineries, and the TAPS to deliver the oil to a tanker terminal at Valdez, Alaska, from where it would be shipped south. Certain groups vigorously opposed the Trans-Alaska route, arguing that it would result in serious ecological degradation of the tundra (they were wrong) and that the West Coast would not be able to absorb all of the Alaskan oil (they were right). There were also charges by consumer groups and representatives of Midwestern and Eastern states that the ultimate purpose was oil companies' desire to ship Alaskan North Slope oil to Japan.

When the TAPS bill was passed by Congress, two weeks after the beginning of the Arab oil embargo, concerns about domestic energy security resulted in inclusion within the Act of tight limitations on domestic oil exported to noncontiguous nations, such as Japan. The Act established two broad criteria to determine whether exports should be permitted: (1) The President must make a finding that the exports would "not diminish the total quantity or quality of petroleum available to the United States and are in the national interest and are in accord with the Export Adminis-

tration Act of 1967," and (2) upon such a finding, the President is required to publish and report it to Congress, which then has 60 days during which it can veto exports by passing a concurrent resolution.

Additional restrictions were put on the export of oil to noncontiguous nations by the 1977 and 1979 amendments to the Export Administration Act (EAA). The 1979 change required that both houses affirm a presidential export proposal. Restrictions on exports have become so tight that it is accurate to speak of an effective export ban for noncontiguous nations.

The reason for the increasing severity of export restrictions has been the continuing, though incorrect, assumption that exports would undermine national energy security. Clashes over the TAPS issue have only made the matter more complex and politically sensitive.

Primarily because oil prices have increased from $2.50 to over $30 per barrel, the demand for oil has not increased as much as both government and industry officials anticipated. As a result, there is an oil surplus on the West Coast. Of the 1.6 mbd of Alaskan oil leaving Valdez, only half is refined in California. The other half is carried by tankers through the Panama Canal (or trans-Panama pipeline) or around Cape Horn to refineries on the East Coast, the Gulf Coast, and the Caribbean.

The maritime industry has a vested interest in the transportation of Alaskan oil, because the Jones Act mandates that any cargo transported between U.S. ports be carried in U.S. bottoms and with U.S. seamen. Half of Jones Act traffic is devoted to Alaskan oil, and about one-quarter of Jones Act traffic would be affected if Alaskan oil were to be freely exported to other countries by cheaper foreign flag tankers.

Another development affecting the maritime industry is the longstanding effort to build a west-to-east oil pipeline. The Northern Tier Pipeline Company, for instance, proposes to construct a pipeline from Port Angeles, Washington, to Clearbrook, Minnesota. The project would cost an estimated $1.9 billion (1981 dollars). This 42" diameter line ultimately would carry .933 mbd. The original project was vetoed by Washington Governor John Spellman for environmental reasons. A new proposal would carry the oil around, rather than across, Puget Sound. Naturally, if such a line were to be constructed, the maritime industry would lose much of its Jones Act business.

Clearly, the time is right for Congress to consider all the options available for Alaskan oil and gas, including the removal of restrictions on exports.

THE SECURITY ISSUE

The maritime industry aside, the principal objection to Alaskan exports stems from security concerns. In case of an embargo or oil cut-off, the argument goes, the U.S. must be guaranteed sufficient Alaskan oil to meet American needs. This argument was born in the period of the first Arab oil embargo. It is no longer valid, if it ever was. The export of Alaskan oil would in no way compromise U.S. security. Indeed, it could enhance it, for the following reasons:

1) The Inconsistency of Oil Export Restrictions

There are no prohibitions regarding the export of oil products, such as gasoline and fuel oil. It seems strange, therefore, that there should be a prohibition against exporting crude oil. There also are no restrictions on exporting oil during emergencies to U.S. partners in the International Energy Agency. In fact, the U.S. has an agreement concerning the sharing of oil supplies during emergencies. It has never been tested, but all IEA members are bound to honor it. Why then should the U.S. not permit the export of Alaskan oil and gas during nonemergency periods?

2) Ineffective Embargoes

There are two kinds of potential embargoes. The first is an embargo declared against the United States without a production cutback. The second is an embargo coupled with a production cutback. The level of production is the critical factor; the simple declaration of an embargo would make little difference to the U.S. except for psychological pressure.

An embargo against the United States cannot be effective--and has never been effective. Oil imported from overseas comes from a number of different sources. If any one of these, or even a combination of them, should embargo oil to the United States, one or both of the following scenarios might develop: (1) the oil companies would sell the oil to another customer, say France, but oil destined to France from, say, Africa, would be diverted and shipped to the United States; (2) oil from the countries involved in the boycott would come into a transshipping terminal, such as Rotterdam, and then be shifted to the U.S. under a swap arrangement. The point is that oil is a fungible substance. Its source matters little.

An embargo would be effective in one instance: if an adversary imposed a naval blockade against the United States along both coasts. Such action would be difficult for any power to mount. But if it were successful, it would interfere with the traffic from Alaska to California and certainly to the East Coast. Short of military actions by opponents, however, the U.S. is immune to any simple embargo.

3) Production Cuts and the Market Price

But what if the embargo were coupled with production cutbacks, such that simple swapping procedures would not be possible? In that case the market could take over and adjust the available supply--now reduced--to the demand. Any production cutback thus would raise the world price, whether the production cutback were coupled with an embargo, or caused by an accident or by third parties, such as a war or sabotage. Everyone would have to pay the higher price in these circumstances--not just the United States. Indeed, the Alaskan oil exported would also command the higher price (as would all domestic oil, in the absence of price controls).

There is often talk about countries "outbidding" each other during a supply crisis, but in a free market this would not be the case. As the price went up, those persons (not countries) wishing to buy the oil would have to pay the higher price, and oil use by others would fall. This redistribution of oil would be entirely automatic, in response to normal market forces, not to government allocation efforts.

Some time could elapse before the new supply relationships were established following an oil cutoff. During this time, there could be dislocations and shortages just as there are shortages in retail outlets when the inventory is low. To soften such short-term disruption, the United States and other industrialized countries have provided for strategic reserves of petroleum. The U.S. reserve is designed to replace 90 days of imports, sufficient for orderly adjustments to take place--even if all imports were cut off. (If, on the other hand, only imports from the Middle East were affected, then the stockpile could last well over six months). The release of oil from the U.S. stockpile (or from the stockpiles of other industrialized countries) would limit any price increase due to sudden interruptions in production levels. If the supply interruption persisted, the oil market would reach equilibrium at a higher price; if it were only temporary, there would be no long-term change in price--although, of course, stockpiles would be partly depleted.

4) Two Case Studies--1973 and 1979

What happened during past embargoes? In October 1973, producers on the Arabian peninsula declared an embargo and cut back their production. The declaration itself did little but scare people. The cutback in production, however, increased the price of oil, which eventually soared from about $3 to $12 per barrel.

There was considerable market disruption in the United States in Spring 1974, characterized chiefly by long lines at gasoline stations. These lines were caused by the exaggerated reaction of the federal government, which sought to allocate gasoline and other oil products to achieve a "fair distribution."

Yet federal bureaucrats had no more success than any other planners in trying to simulate the workings of the market, and misallocation inevitably followed. "Shortages" occurred widely in 1974 because well-meaning government interference with the market process was compounded by price controls on domestic oil. Without free movement of prices, there was no reason for demand to fall to the new, reduced level of supply--other than by the forced decline in consumption because of waiting in line. (The 1974 experience has been discussed and documented in some detail by a number of authors, for example, Professors Paul MacAvoy, H.A. Merklein, and others.) But nothing was learned. In 1979, the Department of Energy again put into effect an allocation system--with predictable results: long lines at gasoline stations.

Further proof that embargoes do not work is found in the events of November 1979. When the U.S. Embassy in Teheran was occupied, President Jimmy Carter declared that the U.S. would no longer buy Iranian oil. The action was, in effect, a self-imposed embargo--a boycott. Of course, nothing happened. The Iranian oil went elsewhere, and the U.S. bought oil from other sources. There was no psychological impact either--perhaps because the word "embargo" was never mentioned.

One of the first acts of the Reagan Administration was to remove price controls on oil. Congress still believed that an allocation system had to be instituted during emergencies and tried to force the White House to agree to such a system. In vetoing the bill, President Reagan explained why the market allocates more successfully than any bureaucrat or combination of bureaucrats. The U.S. Senate upheld the presidential veto.

It should seem clear that embargoes and production cutbacks do not work, when oil prices are decontrolled and a large strategic stockpile keeps prices from moving too high. An embargo threat is little more than a psychological tool that is effective only if the victim thinks it might be harmful.[1]

Security Benefits from Alaskan Exports

There are certain security benefits that should be taken into account when contemplating export of Alaskan oil. If exports were to be permitted, the oil companies holding concessions on the North Slope would certainly increase production and put more oil into the world market. A conservative estimate is that the additional output could amount to 0.5 mbd (more optimistic estimates exceed 1 mbd), in addition to the 1.6 mbd now being supplied through the pipeline.[2] The liquid natural gas exports could exceed 0.5 mbd of oil equivalent.

---

[1] It should be noted that President Reagan ousted Libyan diplomats from Washington, and Libya made no effort to institute retaliatory action in the oil market against the United States; they also know that embargoes don't work.

[2] If production rises above 2 mbd, the pipeline's capacity can be increased at relatively little cost.

Putting more oil and gas onto the world market would be very beneficial to the United States. Not only would it improve the trade balance by about $15 billion per year, and make money for the Treasury, Alaska, and the stockholders of American oil companies, but it would weaken the power of OPEC. As American oil captured a share of the world market, it would decrease consumer dependence on OPEC oil. It would also put downward pressure on the world price by limiting what the OPEC cartel could sell.

If U.S. exports to Japan were increased by 1 mbd, for instance, Japan could reduce its imports from Mexico by a like amount, and the U.S. could replace 1 mbd of Middle East imports by more Mexican oil. Clearly U.S. security would be enhanced, Mexico would gain through lower transportation costs, and even more important, the world oil price would probably be lowered by approximately 5 percent. Since OPEC is currently earning about $200 billion a year in revenues, this would reduce the oil bill of the importing countries, including the United States, by about $10 billion a year.

ECONOMIC BENEFITS AND COSTS OF ALASKAN EXPORTS

The effective ban on exports has led to an established market of Alaskan North Slope (ANS) crude oil on the Gulf and West Coasts. About half of North Slope production is used on the West Coast; the rest is shipped to the Gulf and East Coasts on U.S. flag tankers. The exportation ban, the Jones Act, and the lack of a west-east U.S. oil pipeline mean there is no other marketing option--except not selling oil at all. Eliminating the export ban would open up other, more profitable markets for the surplus.

For an estimate of the scale of the export potential, market prices may be approximated using the price of Persian Gulf (i.e., Saudi Arabian) oil, plus the costs of its transportation to each market. The "wellhead" price which producers receive for their crude oil is the market price (say, in Houston) minus transportation costs. These costs vary with shipping distances, tanker size, and other factors.

Jones Act requirements set U.S. tanker rates well above world tanker rates. Table 1 gives some relevant tanker rates.

Table 1
CRUDE OIL TRANSPORTATION COSTS
($/barrel)

Departure Port	Destination Port	Tanker Costs
Alaska (Valdez)	West Coast	$1.47
	Gulf Coast	4.00
	Japan	.51
Persian Gulf	West Coast	1.50
	Gulf Coast	2.03
	Japan	.96

The different rates mean that ANS producers receive different wellhead prices for their oil, depending on its destination. Using market prices established by Persian Gulf oil, ANS producers would net back $2.00/barrel more for their West Coast shipments than for the Gulf Coast shipments. They could use such a price advantage to drive the West Coast price down and expand their market share by discounting. In fact, there is already increasing, although incomplete, evidence of some West Coast "discounting."

If the ban on exports were lifted, ANS producers could increase the wellhead prices of their currently Gulf Coast-bound shipments by $2.42 per barrel (i.e. $1.97 + 0.96-0.51) by changing the destination to Japan and taking advantage of lower shipping costs. At the same time, of course, a change in the destination of ANS crude would reduce the glut in the West Coast market, and West Coast crude oil prices could rise by as much as $2.00 per barrel. So there would be an increase in the netback to the ANS and to the local California producers, who were previously forced to lower their prices to match the ANS competition.

Another factor in the equation would be the reduced shipping costs associated with the Alaska-West Coast route. The reduction in the demand for U.S. tankers because of the reduced Alaska to West Coast trade and the absence of Jones Act requirements on exported oil would mean more competition along the American coastline--further raising the ANS netback. (For computation ease, it is assumed here that Alaska-West Coast shipping costs would fall by $.42 per barrel, from $1.47 to $1.05, although larger decreases have been forecast.) A summary of total possible increases in wellhead prices resulting from these factors is given in Table 2.

Table 2
ESTIMATED INCREASES OF CRUDE OIL WELLHEAD PRICES
AFTER THE LIFTING OF THE OIL EXPORT BAN
($/barrel)

Market Conditions	Originating Port	Export Ban		No Export Ban		Wellhead Increases with Export Ban Removed
		Destination Port	Wellhead Price	Destination Port	Wellhead Price	
No Discounting	California	West Coast	PG* + 1.50	West Coast	PG + 1.50	.00
	Alaska	West Coast	PG + .03	West Coast	PG + .45	.42
	Alaska	Gulf Coast	PG + 1.97	Japan	PG + .45	2.42
Full Discounting (by Alaskan Producers in California)	California	West Coast	PG - .50	West Coast	PG + 1.50	2.00
	Alaska	West Coast	PG - 1.97	West Coast	PG + .45	2.42
	Alaska	Gulf Coast	PG - 1.97	Japan	PG + .45	2.42

*PG=Persian Gulf price

ANS oil shipments to the eastern U.S. amounted to more than 0.8 mbd in 1982. 0.82 mbd was used for calculations of gross wellhead revenue increases if the oil were exported to Japan, (and 1.1 mbd for California production). The wellhead increases would be between $804 million per year and $1,391 million per year for ANS production, and up to $803 million per year for California production. But the private producers would not receive all of these benefits. Alaskan royalty oil and severance and income taxes would take over 32 percent of ANS increases. The federal government would take 7 percent in corporate income taxes and 52 percent in windfall profit taxes for most current production. California oil producers' increases in revenue would also be taxed. Analysis suggests that the division would leave ANS producers with 8.27 percent of the increases or between $66 million and $115 million per year. The gross yearly wellhead revenue increases and its division are given in Table 3.

Table 3
ESTIMATES OF GROSS REVENUE INCREASES
AND ITS DIVISION
($ millions/year)

Market Conditions	Gross Wellhead Revenue	Yearly Increases		Gross Federal Taxes
		Producer	State Profits Taxes	
No Discount	804	66	262	475
Full Discount				
Alaska producers	1391	115	454	822
California producers	803	626		177
Total	2194			999

Increased revenue to oil producers and the governments does mean some costs to others. Initially the wellhead gains could come at the expense of the tanker owners and crews, the new Panama pipeline, and other groups involved in the transportation of the Alaskan oil to the Gulf Coast. The West Coast refiners and their consumers would also lose the present discount. And some tax revenue would be lost from those companies and individuals.[3] But these losses would occur in any event if the proposed

[3] Another cost to the federal government could be for the acquisition of U.S. tankers whose loans are guaranteed under Title XI. A U.S. Maritime Administration working paper put the one-time net government cost at $593.8 million. But this figure is based on the worst-case projection that all of the tanker tonnage is displaced permanently. This is unlikely, so the actual government cost would be less.

West-to-East oil pipeline were built. In any case, such losses would be surpassed by the savings in transportation, the new commercial opportunities of the export trade, and the long-run benefits of a freer and more efficient market.

ALASKA GAS TRANSPORTATION OPTIONS

Through the middle 1970s, the development of Alaska's hydrocarbon resources focused primarily on the state's enormous oil reserves. For nearly thirty years, a small amount of natural gas has been produced in the southern portion of the state for export to Japan in the form of LNG; but the huge gas reserves of the Alaskan North Slope remain untapped. The opening of the TAPS, which transports North Slope oil to the port of Valdez, gives the gas reserves associated with that oil a new importance. The gas has been reinjected into the formation from which it was drawn, but reinjection provides at best a temporary solution. After a time, this practice results in a reduction in oil field pressure, and an accompanying reduction in the amount of oil that would ultimately be recovered. Moreover, since up to one-third of the gas is consumed in the process of reinjection, the technique carries a high energy penalty. Still, absent a means of transporting the gas, the only other option was to burn it off, or "flare" it--as industry experts call the practice.

The Alaskan Natural Gas Transportation Act of 1976 also contains export limitations. Section 12 states that "the President must make and publish an express finding that such exports will not diminish the total quantity or quality, nor increase the total price of energy available to the United States."

The situation with respect to natural gas is somewhat similar to the oil case. The Prudhoe Bay field contains the largest discovered gas reserves on the North American continent; it represents 10 percent of proved reserves and more than a year's supply for U.S. consumers.[4] Several companies studied ways to move the natural gas to markets. Proposals were filed with the Federal Power Commission (now the Federal Energy Regulatory Commission), beginning in 1974. Of the various proposals, the one finally selected, the Alaska Natural Gas Transportation system (ANGTS) would move gas by pipeline from the North Slope to the Midwest through Canada. However, ultimately the very high cost of the pipeline, now estimated to be in excess of $40 billion, has made the proposal impractical. With higher wellhead prices for natural gas, and with a limited deregulation approaching in 1985, a great deal of gas has been developed in the lower 48 states. The various provisions of the Act can do nothing to make Alaskan gas competitive in price with gas from the lower 48.

---

[4] The appraisal of undiscovered probable ANS reserves is of the order of a 10-year supply.

One of the proposals submitted to the Federal Power Commission (FPC) was by the El Paso Alaska Company to transport natural gas from Prudhoe Bay through approximately 800 miles of 42" pipeline, to a gas liquefaction plant and terminal located on Prince William Sound at Point Gravina, Alaska. There the gas would be converted to LNG and shipped via cryogenic tankers to Point Conception near Santa Barbara, California. However, the LNG could be shipped just as easily to Japan, Korea, Taiwan, and other users in the Pacific Ocean basin--but more cheaply from the Kenai peninsula than from Point Gravina. The amount would be on the order of 2.8 billion cubic feet per day or approximately 1.0 tcf per year, worth approximately $6 billion per year.

The Alaska Gas Transportation System (ANGTS) faces problems with financing, cost overruns, and doubts over the marketability of the relatively expensive Alaskan gas in the lower 48 states, which are awash with far less expensive conventional gas. As a result, Alaskans have begun to reexamine the alternatives available to them to determine if some other approach to the problem of marketing their oil and gas might be more sensible. The principal options currently under consideration include:

* To continue to pursue financing for the ANGTS project, in hopes that the use of innovative rate structuring and the decline of interest expense might make Alaskan gas more competitive at some future date.

* To select an alternative means of transporting North Slope gas in hopes that it will prove less expensive, again making the gas more competitive in the lower 48 states.

* To determine whether Alaskan producers should abandon the notion of marketing the gas in the lower 48 and instead focus on the export market.

* To examine ways of using the gas within the state to establish some sort of manufacturing base.

Determining the best solution for the North Slope gas is doubly difficult because the oil and gas market, both in the U.S. and internationally, is undergoing a period of rapid and dramatic change. As the patterns of this change become clearer, it is evident that the traditional view of the gas market is no longer valid. The policymakers currently examining Alaska's options must thoroughly understand the evolution that is taking place, as it will affect fundamentally the economics of those options.

THE CHANGING NATURAL GAS MARKET

"Shortage" into Surplus

It is easy to forget that, as recently as five years ago, the conventional wisdom held that the United States would soon

run out of natural gas. Throughout the first half of the 1970s, interruptions in natural gas deliveries on the interstate market increased, and gas reserves committed to that market diminished. By the winter of 1976-77, the situation had reached crisis proportions, as regions of the Northeast and Midwest faced massive gas shortages that threatened economic chaos. Policymakers were quick to point to these shortages as evidence that the exhaustion of America's natural gas reserves was imminent. This view was embraced with particular enthusiasm by officials of the past Administration, many of whom were convinced that all of the world's resources were on the verge of exhaustion.

Against this background, Alaska's enormous North Slope gas reserves were very tempting to policymakers who believed the United States faced the prospect of running out of oil and gas. The high cost of utilizing these reserves seemed of little consequence.

As early as 1979, however, evidence began to appear that the dire assessment of gas reserves, widely taken as axiomatic, was grossly overstated. The first sign was the appearance of a so-called gas bubble--a large volume of gas that "found" its way into the market. According to the prevailing view of reserves, it should not have appeared. Analysts tried to explain it as merely a temporary "market anomaly" that would soon be absorbed, leaving the U.S. once again with the shortage. The bubble, however, did not disappear; the shortage did. In fact, in 1981, for the first time in more than a decade, the U.S. added more new natural gas to its reserve base than it used. In 1982, instead of a shortage, there was a surplus of natural gas estimated at fully 15 percent. The surplus is currently so great that gas companies, which once could not serve all of their existing customers, are now seeking new ones. But more important, the unexpected availability of natural gas has taken place at prices far below those needed to make North Slope gas economic. Should natural gas prices be decontrolled this year, even greater volumes of gas priced below an economic level for Alaskan production under current circumstances are expected to find their way into the market.

Growing Competition

Competition from natural gas produced in the lower 48 states is not the only factor limiting the marketability of Alaskan gas in the United States. The import of large volumes of natural gas from Canada and Mexico will also provide stiff competition. Both Mexico and Canada are experiencing great economic pressure to move their gas into the U.S. market. Until recently, both countries had priced gas at levels that limited its attractiveness to U.S. consumers. But these pricing policies--which seemed strangely similar--were simply the product of the seller's market for energy existing in the middle to late 1970s. With the crumbling of OPEC, the steady decline of world oil prices, and energy conservation, both Canada and Mexico have had to rethink their

policies. As a result, both nations are now willing to make price concessions. Canadian gas, for instance, sells in the United States at only 65 percent of its authorized price. Despite this reduction, the volume taken is down from just a few years ago.

For Mexico, whose gas reserves far outstrip those of either the United States or Canada, increased sales of both oil and natural gas are critically important. The country's financial collapse was only a warning signal. The need to feed and find employment for its burgeoning population makes it imperative for Mexico to expand sales of its oil and gas. The United States is its most logical market, and so competition from Mexico seems likely to be an even greater barrier to the marketing of Alaskan gas in the lower 48 states than competition from domestic or Canadian gas producers.

Competition from conventional sources of natural gas, whether domestic or foreign, is not the only factor affecting the marketability of Alaskan gas to lower 48 consumers. Of equal importance will be competition from other fuels, and especially from residual fuel oil, or "resid" as it is commonly termed. Since the largest share of natural gas is consumed in the industrial boiler market, industrial consumers effectively determine the price at which gas is sold. Part of their ability to influence gas prices stems from the fact that most industrial boilers were modified to accommodate a variety of fuels during the 1970s, when natural gas supplies were subject to the federal regulators. Many of these boilers can burn either natural gas or resid. As a result, the latter's price effectively caps the price at which natural gas can be sold. At present, resid sells for roughly the equivalent of gas priced at between $4 and $4.50 per thousand cubic feet (mcf). But residual fuel oil prices are expected to decline further in the future because of oversupply.

Given the intense competition, and the probable future price trends in the natural gas market of the lower 48 states, it seems unlikely that North Slope natural gas will be competitive. Therefore, the current price structure must be modified, or an alternative market sought, if Alaska's hydrocarbon resource is to be utilized and further developed.

Reshaping the ANGTS Project

One of the reasons Alaskan gas will be so expensive in the first few years after Alaska Natural Gas Transportation System (ANGTS) comes into service is that loans made for its construction must be repaid. If the repayment schedule can be renegotiated to stretch the payments over a longer period, the selling price of the gas might be reduced. The effectiveness of this approach will hinge on two major factors.

The first is the interest rate. Since most plans to restructure the pipeline's financing call for the payment of interest,

the interest rate and capital repayment schedule (even if deferred) will have to be such that the final price of Alaska gas is competitive.

The second factor, of course, is the prevailing price the lower 48 gas market. Just what this might be in the future is hard to say, but one thing is certain: if Alaskan gas expects to compete, its current projected cost of $10 per mcf (in 1982 dollars, equivalent to $60 oil) must be reduced. Recent attempts to market deep gas at a similar price have failed. In fact, several pipeline companies recently informed a group of deep gas producers that the lines would pay no more than $5 to $6 per mcf for deep gas. This seems to be compelling evidence that Alaskan gas will have to sell in the $5 range if it is to compete with alternative sources of gas.

POSSIBLE ALTERNATE ROUTES

One possible solution to the North Slope gas dilemma would be an alternate means of transportation. Everything from huge atomic submarines to a variety of pipeline routes has been suggested, but the best alternative to the ANGTS appears to be the so-called All-Alaska Pipeline, proposed several years ago by the El Paso Company, which would be built parallel to the existing oil pipeline. At the time the proposal was first put forward, estimates of its cost included funds to build a California LNG terminal and purchase eleven LNG tankers. Adjusted to current dollars, the original cost estimates for the All-America route compare favorably with the $23 billion estimate for the Alaskan segment of the ANGTS pipeline.

A simple inflation escalation of the original estimates for the All-America route, however, does not give an accurate probable cost figure for the project. There are numerous LNG tankers available on the present world market. Some have been sold just for their scrap value. Others have been converted for bulk commodities such as grain. So the current low cost of LNG tankers should be built into revised cost estimates. This factor alone would imply that the All-Alaska route should be supported, if financing for ANGTS fails to materialize. But the All-Alaska route has another, possibly more important, advantage over ANGTS: it does not restrict Alaskan gas to the domestic market, and thereby opens the prospect of Alaskan gas exports.

A committee appointed by the Governor of Alaska in January 1983 has recommended the construction of such a 820-mile pipeline to carry natural gas from Prudhoe Bay to the coast, where it would be liquefied and shipped to Japan. The scheme is a viable alternative to ANGTS.

The committee proposes that the 36-inch line follow the route of the Trans-Alaskan oil pipeline as far as Fairbanks,

where it would continue west to the Kenai Penisula.[5] Cost of the line is estimated at $14.6 billion (as-spent dollars). The liquids would be removed at a $2.5 billion conditioning plant on the coast. The liquefaction plant would cost an estimated $8.3 billion. Total costs would be $25.4 billion in current dollars, $14.3 billion in 1982 dollars--a far cry from the $43 billion total anticipated for ANGTS.

The committee suggests that the project be built in three phases, with revenue from the first phase providing the cash flow for financing the rest of the project. The line's initial capacity, beginning in 1988, would be 950 million CF/day of gas, permitting export of 4.8 million tons/year of LNG. In the second phase, starting in 1990, the line would carry 1.75 billion CF/day of gas, and LNG production would be 8.9 million tons. In the third phase, set for 1992, the levels would be 2.8 BCF/day of gas and 14.5 million tons of LNG. Natural gas liquids production is projected to exceed 110,000 bbl/day by 1992.

ALASKAN NATURAL GAS AND THE EXPORT MARKET

A worldwide trend toward greater use of natural gas has been well established. The most logical export markets for Alaskan gas are the nations of the Pacific Rim, especially Japan. The Japanese already import small amounts of LNG from Alaska. Significantly, Japan is moving aggressively to make use of LNG, and recently contracted with Indonesia for major purchases of the fuel. As a result of this policy, Japan has the necessary LNG terminals in place, and already owns LNG tankers. Hence a pipeline, processing facilities, and liquefaction plant would be the only U.S. infrastructure necessary to market LNG to Japan. Japan might even be willing to help finance the project. However, the decision would have to be made quickly; otherwise Japan might find supplies elsewhere.

A number of economic advantages, beyond the obvious revenues, would be associated with the export of Alaskan gas to Japan. First, such trade would go a long way toward reducing the current U.S./Japan trade imbalance. Secondly, it would reduce Japan's dependence on fuel imported from the politically unstable Persian Gulf, and thereby greatly enhance the world's energy security. Most important, by directly reducing the world's oil consumption, Alaskan gas exports could also help to keep world oil prices down.

It would seem, therefore, that exporting Alaskan gas to foreign markets would be advantageous--for Alaska and for the world in general. These advantages would not materialize if the

---

[5] This location would incur less environmental risk than Point Gravina (which would have cut through the Chugach range). It would also shorten the travel time to Japan.

gas were marketed only within the U.S. Alaskan gas sold in the lower 48 would not displace foreign oil; domestic usage would have no effect on the U.S. balance of payments; and building a pipeline to transport gas domestically would be a far more expensive proposition than building a pipeline to transport gas for foreign markets. Exporting Alaskan gas would therefore appear to be the optimum solution to the North Slope gas dilemma, from a national standpoint.

DEVELOPING AN ALASKAN EXPORT STRATEGY

Gas exports could provide the catalyst for establishing a stable industrial base in the 49th state. Throughout its history, Alaska's economy has been characterized by sharp cycles. The primary reason for the erratic behavior of the Alaskan economy has been its dependence on the extraction and export of raw materials. Whether the Klondike Gold Rush or the Prudhoe Bay oil find, Alaskan resources went to the lower 48 for finishing, along with potential jobs and revenues from further processing.

In many respects, the removal of raw materials for processing has been unavoidable. Alaska's total population numbers less than half a million, and roughly half of its residents live in small communities scattered across a vast expense of wilderness. Construction costs can often range as much as 50 percent above those in more temperate climates. Nonetheless, modern technology could make local processing of some portion of the state's hydrocarbon resources a realistic possibility. If processing operations proved to be economic, an industrial base to supply continuing employment, and economic stability would finally materialize. But the shape of such a processing industry must be tailored to the state's limitations and advantages. Although Alaska's climate and small population are obvious limitations, its remoteness from America's industrial heartland is a drawback only if the U.S. domestic market is the export goal. If Korea, China, Japan, and the rest of the Pacific Rim became the principal market, Alaska's position would actually be advantageous. Furthermore, by using gas exports as a means of underwriting the cost of a pipeline to bring natural gas down from the North Slope, the other products produced from the fuel could more than offset the competitive disadvantage caused by the state's higher construction costs.

Urea and ammonia rank high on the list of products that might lend themselves to in-state fabrication for the export market. These commodities are the basic components of the fertilizers needed so desparately in the People's Republic of China. Whereas any attempt to market fertilizers produced in Alaska in the lower 48 would be doomed to failure because of the enormous cost of transporting the products to market, shipment to the Far East would entail a relatively easy haul. Moreover, the commodities could be moved in bulk, further reducing their cost. Most important of all, they could be produced in automated plants using highly skilled, well-paid workers. In sum, the production

of fertilizer components would seem ideally suited to the state's unique charactertistics.

LNG is also well suited to Alaska. Like fertilizer production, modern LNG facilities are highly automated and employ a small number of skilled workers. Moreover, a pool of experienced LNG workers already exists in the state because of the LNG facility in operation on the Kenai peninsula.

CONCLUSION

The legislative restrictions on Alaskan oil exports had their origin in the fear of an oil cutoff by overseas producers. It is now clear that oil, as a fungible substance, cannot be embargoed from the United States. Any supply shortfall must be shared by all consumers through the world oil market, which will raise the world price of oil. Now that its price has been freed in the U.S., oil will be imported at the higher price in case of a supply shortfall, but Alaskan oil also will be sold at the same higher price.

Blocking the export of Alaskan oil imposes great costs, ultimately borne by the U.S. taxpayer. Shipping Alaskan oil to the East Coast leads to great economic waste, as would the construction of a special pipeline to the lower 48 states.

The optimum solution for North Slope gas appears to be its export as LNG, using a pipeline paralleling TAPS. The construction of such a system would also encourage the use and manufacture in Alaska of urea and ammonia fertilizer (for export to the Far East). The sensible option for Congress would be to remove restrictions, so that Alaskan oil and gas can be freely exported. This makes sense economically and from a foreign policy perspective as well. U.S.-Japan relations would be enhanced considerably by increased American energy sales to the Japanese.

The possibility of exports of additional oil, bringing a higher return for producers, will act as a powerful incentive for Alaskan oil producers to develop more production. By putting more oil and gas on the world market, such exports would reduce the need for OPEC oil and apply downward pressure on the world oil price--to the benefit of industrialized countries and oil-importing developing nations alike.

S. Fred Singer
Senior Fellow

Milton Copulos
Policy Analyst

David J. Watkins
Research Economist