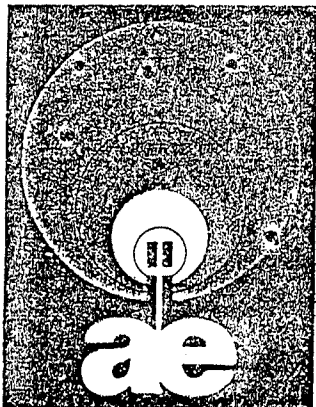


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ALASKAN ENERGY POTENTIAL AND CONSTRAINTS TO DEVELOPMENT

Edited by
Clarice R. Feldman
Bettina Silber



**AMERICANS
FOR ENERGY
INDEPENDENCE**

Energy Policy Series

Foreword

Recognizing the difficulties energy policy-makers—not to speak of the general public—have in trying to understand and assess all the conflicting, responsible points of view on key energy issues, Americans For Energy Independence decided to conduct a series of conferences drawing together experts and interested citizen representatives who could express in an open forum their diverse points of view.

The first such conference was held in January of 1979 and dealt with opportunities for expanding world oil production outside the areas where it currently is concentrated. Shortly thereafter, we decided the public interest would be well served if we could conduct a similar conference on Alaska's energy resources and the many—natural and man-made—constraints to the development of these resources. On May 4, 1979, this conference was held in Washington, D.C. This volume represents the edited version of that conference.

For the participants and the reader, the difficulty of "sifting and winnowing" through the conflicting assertions of fact and arguments best illustrates why rational deliberation, not rhetoric, must guide our energy choices. Simple solutions are not to be found.

The conference participants were not paid for their efforts. They came because they share our belief that the topic is important and studied debate critical to its sound resolution.

Others who did not participate contributed their insights and time in planning and organizing the conference that resulted in this volume. We gratefully acknowledge their contributions.

For her valuable support in managing the conference and preparing the proceedings for publication, we would like to single out Ms. Catherine Piper of the AFEI staff.

Clarice R. Feldman
Bettina Silber
Editors

Presentation by Arlon R. Tussing

Tom Kelly's talk earlier this morning imparted some welcome realism to today's discussion: Alaska is not a panacea for the nation's energy problem.

Alaska has about a fifth of the land area and about half the Continental Shelf of the United States, but promising areas for oil and gas are more limited than these statistics would suggest. Equally important, Alaska is an extremely high-cost area for hydrocarbon extraction—high-cost both in terms of drilling and other exploratory development activities, and in terms of transportation to Lower 48 or other industrial markets. These factors have two major implications: On the one hand, the flow of important new discoveries may be very modest, regardless of federal and state land classification, leasing and tax policies. On the other hand, prohibiting exploration or simply failing to lease land in any of the more promising areas of the state (such as the Beaufort Sea or the Arctic National Wildlife Range), limiting markets (through export restrictions; for example), or heavier taxation at the state or federal level, could well choke off much of the commercial energy potential that does exist in Alaska.

Today, I will deal chiefly with some of the transport handicaps to developing Alaska oil and gas, specifically the West Coast oil surplus, and the problem of financing an Alaskan natural gas transportation system. I shall conclude with a remark on the difficulty state government policies may create for development of Alaska as a national resource frontier.

The combination high costs of development activity *in* the Arctic and transportation *from* the Arctic means that an oil field probably has to have recoverable reserves in the vicinity of a billion barrels for

its development and production to be economic—at least at any distance from the existing pipeline. Only five fields of that magnitude have ever been discovered in the United States. For this reason, the economics of Alaska oil are extremely sensitive to factors such as transportation and export policy, the existence or nonexistence of transcontinental pipelines, and federal and state taxes.

You have all heard of the so-called oil surplus on the West Coast. That surplus appeared only in 1978, but it was created in the early 1970's by the North Slope producing companies and the Nixon Administration when they chose a pipeline to tidewater in Alaska, rather than across Canada to the Midwest, where all the Alaska oil could have been easily absorbed. The surplus is now perpetuated by a Congress that refuses to permit excess crude oil in the West to be exchanged—at substantial savings to the nation—for foreign oil delivered to the eastern United States.

The amount of crude oil produced in Alaska and California exceeds by several hundred thousand barrels per day the amount of crude oil consumed in PAD District V (the West Coast states). Thus, whatever the industry may do to adapt western refineries to the grade and quality of oil produced in the West, for a number of years there will be more oil produced in District V than its markets will absorb. That is only one part of the problem.

This problem is exacerbated by the mismatch between the kind of oil produced and the kind of oil required in the West: product demand is disproportionately for gasoline and jet fuel, and the Los Angeles area, the largest market in the region, has the nation's most difficult air quality problem. For this reason, the West Coast needs low-sulfur, light crude oil. North Slope crude, however, is of average sulfur content and average gravity, while California crudes are generally even less desirable in both respects. Thus, the West Coast oil surplus is greater than the difference between the West Coast production and West Coast demand by something on the order of 300,000 barrels per day. The difference has been made up by importing lighter, lower-sulfur crudes, chiefly from Indonesia.

Since the curtailment of Iranian production created a global shortage of crude oil, the West Coast refiners have done much more than they expected to be able to do in terms of moving North Slope crude into their existing plant, and they have been improving the mix as time goes by, but they are probably pretty close to the maximum. This progress is, however, not an unmixed blessing: it has been achieved at the price of reducing the rate of refinery utilization and

ultimately the total supply of gasoline and distillate oil on the Pacific Coast.

In other words, there is a limit to the amount of Alaska and California crude the West Coast can absorb, no matter what the industry does to modify its existing refinery stock. In addition, nobody knows how long the surplus will persist—conceivably it could be gone in five years—while West Coast gasoline demand is itself forecast to top out by 1984 or 1985 if scheduled automotive fuel efficiency standards are actually met. These factors alone probably make it unwise for companies to carry out refinery modifications unless they can be written off in two or three years; the attractiveness of such conversions is further aggravated by the fickleness of federal regulation with respect to air quality, and petroleum product allocations and price controls. Thus, the option of refinery conversions, Senator Jackson notwithstanding, is not "the answer" to the West Coast oil problem.

The other supposed solution to the West Coast surplus is to build transcontinental pipelines. The pipeline option is, however, a wasteful and uneconomic one. The projections of the sponsors of the various pipeline proposals show those systems used to capacity over a 15 to 20 year economic life, but assured throughput volumes just do not exist to make such an assumption valid. It is significant that in the case of the Northern Tier proposal, for example, no refiner and no oil producer have yet joined the project—none can be confident that they will have both a demand for and a supply of crude to be carried through the pipeline for 15 to 20 years. Thus, none of the proposed transportation systems is likely to be built without some kind of explicit federal subsidy or some way of forcing the companies to use facilities they would not otherwise be willing to support.

Members of Congress have waxed indignant over California's alleged role in killing the PACTEX proposal, and a number of supposedly liberal, environmentalist members have joined the clamor to force the completion of this project. Yet, under the leadership of the chairman of the Senate Appropriations Committee, the Congress itself killed, without hearings and without advance notice, the only pipeline system that probably made economic sense (the Cherry Point-TransMountain reversal project) because people in the State of Washington don't want an oil terminal in their own waters.

Hence, there is not much potential for any pipeline system that involves a great deal of new construction. We are left with the option of exports or exchanges which, as Senator Jackson indicated, make

the greatest economic sense, but whose politics are especially unpromising today.

Turning from Alaska oil to Alaska gas, new discoveries would not now be economic resources in much of Alaska even if they could be produced at a zero cost. However, a very large volume of gas has already been discovered associated with the oil in the Prudhoe Bay field. Some geologists believe that the entire Arctic Slope area, from the National Petroleum Reserve in the West through the vicinity of Prudhoe Bay and the Arctic National Wildlife Range, to MacKenzie Delta and further eastward in Canada, may well be a much more promising frontier for gas than for oil. Even disregarding the speculative potential for additional discoveries, the Prudhoe Bay field is probably the biggest single source of clear domestic energy that we know can be added to U.S. supply by conventional technology. Moreover, the Alaska Highway pipeline is the only major energy initiative I know of that has been supported by the Sierra Club, Friends of the Earth and the Wilderness Society. It is a relatively uncontroversial proposition from an environmental or social policy point of view.

Despite widespread (and justified) skepticism about whether Alaska gas would be marketable in the Lower 48—at least in its early years—if priced on a conventional public utility basis, there is little doubt that, over its lifetime, the Alaska Highway gas pipeline would more than pay for itself. Even under pessimistic assumptions, the levelized *net economic cost* (the value of labor, capital and materials needed to produce, condition and transport it) for Prudhoe Bay gas will be on the order of two 1979 dollars per million Btu, which is substantially less than the cost of alternative fuels today.

On the other hand, as a commercial venture and as a source of gas for U.S. consumers as such, the pipeline is still a marginal venture. The average 1979 dollar *price to consumers* (including rents to the producers, royalties and taxes), under the same assumptions, is somewhere in the vicinity of \$4.00 per million Btu delivered into existing systems in the Lower 48. This price (in contrast to the economic cost) exceeds today's price of residual oil, which is the relevant alternative fuel.* On this basis, some risk remains about the marketability of Alaska gas. Yet it is reasonable to expect that the real price of imported oil will exceed \$4.00 per million Btu within a very

*New gas supplies don't really go to high-priority users. Additional supply allows the nation to continue burning gas under industrial and utility boilers; thus, the value of additional gas such as gas from Alaska is the residual oil it displaces.

few years; thus Alaska gas is a *good gamble* both for U.S. consumers and for pipeline investors, but a gamble it remains.

The same assumptions that generate 1979 constant dollar economic costs of \$2.00 per million Btu, and consumer prices averaging about \$4.00, produce a *first year price in 1984 dollars* somewhere in the vicinity of \$8.00 per million Btu, a figure that creates a significant marketability risk under almost any assumption. In addition, the project is subject to other operating risks—production problems in the field, for example, that would have to be dealt with by innovative tariff procedures, imposing consumer risks precluded by the Presidential decision approving the pipeline and by the policies FERC has so far been willing to contemplate.

Even more important than marketability and other operating risks, the very size and complexity of the project create some uncertainty about its ultimate completion—a risk that major lenders, including the big insurance companies, are not going to accept. Ultimately, the project's construction financing and completion and probably its operating viability, will have to be guaranteed by the Federal Government if private financing is to be achieved.

Unfortunately, the Department of Energy, the Treasury Department, the President, and the principal sponsor, Northwest Energy Company, are all locked into promises they made to Congress in 1977 that the pipeline can be privately built without either consumers or the federal government accepting any financial risk. Yet, with the exception of Northwest and the federal Administration, almost all parties connected with the project agree that a transportation system for Arctic gas cannot be built without significant federal initiatives. Such initiatives will require a considerable amount of courage and ingenuity on the part of the President and Secretary Schlesinger, who have invested much of their credibility in advocating or defending an incredible financing plan.

I shall conclude with a few remarks on Alaska's economics and politics as they affect its potential as a national source of energy. One obstacle to development of the known and unknown energy resources of Alaska is the small size of Alaska's population and the large impact that the development of any of these resources has both on the state's economy as a whole and on the state's budget. The state legislature and the people of Alaska are torn between two seemingly contradictory motives. One is the desire to maximize revenues from royalties and taxes on *presently developed resources*, particularly the Prudhoe Bay field. The other is to limit and control the impact of this development and future development on the state's economy. These

two conflicting impulses cut across the developer-environmentalist battle line in Alaska, and they inevitably lead the state toward a policy of raising taxes to get the most out of presently developed reserves and, at the same time, moving very deliberately and cautiously in the development of additional resources. The present value to the state's economy of a higher tax on the Prudhoe Bay reserves may well exceed that of its interest in all future speculative oil and gas discoveries. Hence, increasing taxes may be a more attractive source of additional revenues than new leasing, despite their deterrent effect on future production, which, from the state's perspective, might well be ignored.

I don't know any way out of this dilemma. It is not unique to Alaska: we also see it in Norway, Saudi Arabia, Libya, and Kuwait, which have small populations and large oil resources. It is not irrational for these countries to keep much of their resource in the ground in anticipation of future price increases, yet to seek as much as they can currently get from the already-sunk investments of outside companies. What is rational for individual nations is not necessarily rational for the world as a whole, however, and the resource development strategy that is most reasonable for Alaska may be at some points at odds with national needs.

Alaskans are citizens of the United States—and they are not totally insensitive to national needs. Also many citizens of the state do believe they have a selfish interest in more rapid development (as you can judge from their vehemence on the "D-2" federal lands issue). Nevertheless, state policy toward energy exploitation is bound to be an ambivalent one, and pressure from the Federal Government or the energy industry to move faster with oil and gas exploration could well be counterproductive. Thus, Alaska in some ways will have to be wooed in the same way as Mexico or Norway if it is expected to encourage more rapid energy development than might seem prudent from a strictly local perspective.

MR. JERRY BRADY (Office of Senator Kennedy): Mr. Tussing, you commented on the rest of the pipelines but didn't comment on the Skagway Foothills Mr. Edwards discussed. Do you have any thoughts about that?

MR. TUSSING: First, I have some problems with the Energy Department's comparisons because I don't think that they correctly compare new facilities with existing systems. It is an axiom of benefit-cost analysis that sunk costs are not relevant—yet the DOE tables compare *economic costs* of new pipelines with the *tariffs* of existing ones. Some of the existing pipelines are fully depreciated, and their cost of transportation is far below the projected tariffs even in an accounting sense. In the past, the majority of oil pipelines in the United States have operated at tariffs considerably less than the maximum rates permitted by the ICC. Hence, the tariffs on many existing pipeline segments could be negotiated downward in order to make them competitive.

Second, these comparisons are not fair to tanker routes as opposed to new pipelines. With tankers, the amount of capacity can be scaled to the exact amount of oil that has to be moved at any particular time, while a pipeline will almost always be of the wrong size. If it is too big there will be excess capacity which is expensive, and if it is too small there will be overflow or high costs from greater than optimum operating expense.

So tanker transportation, whether it serves Japan or the U.S. Gulf via the Panama Canal, will probably continue to be more appealing from the point of view of real expected costs than it appears in the DOE study, particularly compared to new pipeline systems.

Third, comparisons using regulated "cost-of-service" tariffs are too favorable to U.S. pipeline segments as compared to those in Canada, because tariffs on the latter are based on original cost less depreciation, and hence fall over time, while U.S. pipeline tariffs tend to rise because their rate base depends on replacement cost.

Foothills is probably the most cost-effective pipeline proposed, second to the original TransMountain proposal that Congress killed with its 1977 amendments to the Marine Mammals Act. Nonetheless, I still don't see where the Foothills pipeline is going to get throughput guarantees sufficient to support its financing.

Incidentally, the Southern terminal of the Foothills system is now Keg River, about 200 miles north of Edmonton. The Skagway alternative requires only about 720 miles of new pipe.

Foothills has proposed another alternative, connecting with TAPS at Big Delta. This system may not be economic without production on the North Slope that is not now in sight, but it is certainly the most attractive of all the proposed systems environmentally and

politically. It is, of course, the pipeline that should have been built rather than TAPS in the first place, and would have eliminated the need for any West Coast oil port, whether it be at Skagway, Kitimat, Port Angeles, Cherry Point, or Long Beach.

MR. EDWARDS: The numbers used in our comparisons of the relative economic attractiveness of the various West-to-East transportation alternatives come from either third party sources or the project sponsors. They are all documented in the draft report "Petroleum Supply Alternatives for the Northern Tier and Inland States Through the Year 2000" published by the U.S. Department of Energy, February 21, 1979.

We would agree that there is a low likelihood that any of the systems will be built. It is very likely the economic comparisons overstate the attractiveness of the projects because of the high probability that events such as construction cost overruns will occur. The purpose of our representation was to show the relative attractiveness of the various projects and not their absolute worth.

If you will recall, I suggested, based on the simplified comparison, that only two of the projects, Kitimat and Trans-Mountain, appeared to be compatible with real-world markets because of sizing and cost.

I also want to reemphasize the fact that only one of those systems is in existence and that is the relatively small Four Corners pipeline. We know what its costs are and know the magnitude of its netback at the wellhead. If inflation and delay takes place, as it is likely to, then the cost of those other systems will increase relative to Four Corners.

In addition, I would suggest that nobody will willingly set the tariffs to a level where a rate-of-return isn't equal to that of other potential investments. The tariffs used in our comparison represented the kind of rate-of-return that any prudent investor would have to get on his money. To that extent, they represent the real world.

MR. BRUCE NETSCHERT (National Economic Research Associates): What world-market price is assumed in all of those comparisons?

MR. EDWARDS: All the prices are based on the current Persian Gulf posted price of \$14.55 per barrel. The market prices used in our comparisons are based on what the \$14.55 crude would sell for in Chicago and on the U.S. Gulf Coast, taking into account transportation costs from the Persian Gulf. Any changes in world crude prices will not affect the relative comparison of alternatives but only the absolute values.