

THE DIRECTOR OF
CENTRAL INTELLIGENCE

National Intelligence Council

20 August 1982

Danny J. Boggs
Senior Policy Advisor
Office of Policy Development
Room 234, Old EOB

Dear Danny:

After our exchange at the Fred Singer meeting the other day, I had the following data put together on the trends in flaring of natural gas worldwide. There still is a good deal of gas being flared but, as you can see, the trend is sharply downward.

Henry S. Rowen
Chairman

Attachment

19 August 1982

MEMORANDUM FOR: Henry S. Rowen
Chairman, National Intelligence Council

FROM : [Redacted]
Chief, Strategic Resource Division
Office of Global Issues

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SUBJECT : Free World Natural Gas Flared (U)

1. Based on partial data we estimate the amount of Free World natural gas flared approximated 5 trillion cubic feet in 1981. The volume probably will drop this year to about 4 trillion cubic feet reflecting in large part a sharp drop in the flaring of oil associated gas Saudi Arabia. (U)

2. Total Free World natural gas flared peaked in 1976 at 6.6 trillion cubic feet. OPEC countries account for about 70-80 percent of total gas flared. Four countries--Saudi Arabia, Nigeria, Iraq and Iran--alone accounted for half of total Free World gas flared in 1980. The flaring of oil associated gas has dropped sharply, particularly in OPEC contracts in recent years, reflecting lower oil output and Saudi Arabia's master gas system. (U)

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Free World Flaring of Natural Gas¹

(trillion cubic feet)

	<u>1979</u>	<u>1980</u>	<u>1981</u> ^E	<u>1982</u> ^E
OECD	.5	.4		
United States	.1	.1		
Canada	.1	.1		
Western Europe	.2	.2		
OPEC	4.9	4.5		
Saudi Arabia	1.4	1.4	.8	.2-.3
Nigeria	1.0	.9	.6	
Algeria	.4	.6		
Iraq	.4	.3	.1	
Iran	.6	.3	.3	
Others	1.2	1.0		
Non-OPEC LDC's	.9	1.0		
Mexico	.1	.2		
Argentina	.1	.1		
Others	.7	.6		
Free World Total	6.3	5.8	5	4

¹ Source Department of Energy and CEDIGAZ

Note: Communist countries flared about .5 trillion cubic feet in 1980 according to CEDIGAZ

This table is Unclassified.

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African-Middle East Gas Potential: A Western Alternative?

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Several African and Middle Eastern countries have the potential to sharply increase gas exports. Although little growth in exports is likely during the 1980s, sales could surge during the 1990s. Under the most favorable circumstances, new projects could yield gas exports of 2.5 million barrels per day oil equivalent (b/doe) by the mid-1990s. We think the best that can realistically be expected, however, is an increase in exports of 750,000 to 1 million b/doe. For even these levels to materialize, Western purchasers must be willing to pay prices at least 10 to 15 percent higher than the price of Soviet gas under recently negotiated contracts.

Incentives To Export

Declining oil production and the need to find alternative sources of revenue will be perhaps the greatest incentive for some Middle Eastern and African countries to proceed with gas export projects:

- Our analysis indicates that Algeria, Cameroon, Egypt, and Nigeria will see the most rapid decrease in oil export capacity—largely a result of limited reserves and rapidly rising consumption.
- Qatar, Iran, UAE, and Libya all have sufficient surplus oil productive capacity to maintain current rates of oil production through at least 1995. We believe investment in developing new oilfields or upgrading existing oil facilities will probably provide greater rates of return in these countries

¹ This article summarizes a forthcoming Intelligence Assessment of the same title

than the development of gas reserves. Nevertheless, by the early to mid-1990s these countries will likely have to consider gas exports as a supplement or alternative to declining oil exports. In addition, we believe that several politically and economically allied importing countries will actively seek to develop gas export projects to help meet their rising gas import needs. Italy, France, West Germany, and Japan will be in the forefront.

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The Gas Supply Potential

Middle Eastern and African gas reserves total about 25 trillion cubic meters (tcm) equal to 150 billion boe. Iran, Algeria, Qatar, Saudi Arabia, and Nigeria account for about 85 percent of the reserves. Roughly half of the total reserves are in fields not associated with oil production—the largest of which are Hassi R'Mel (Algeria), Pars (Iran), and North Dome (Qatar). Each of these fields has reserves close to 2.8 tcm (17 billion boe). Because nearly all of the associated gas will eventually be used domestically (either through reinjection or as a fuel or feedstock), most proposed gas export projects will utilize reserves in nonassociated fields.

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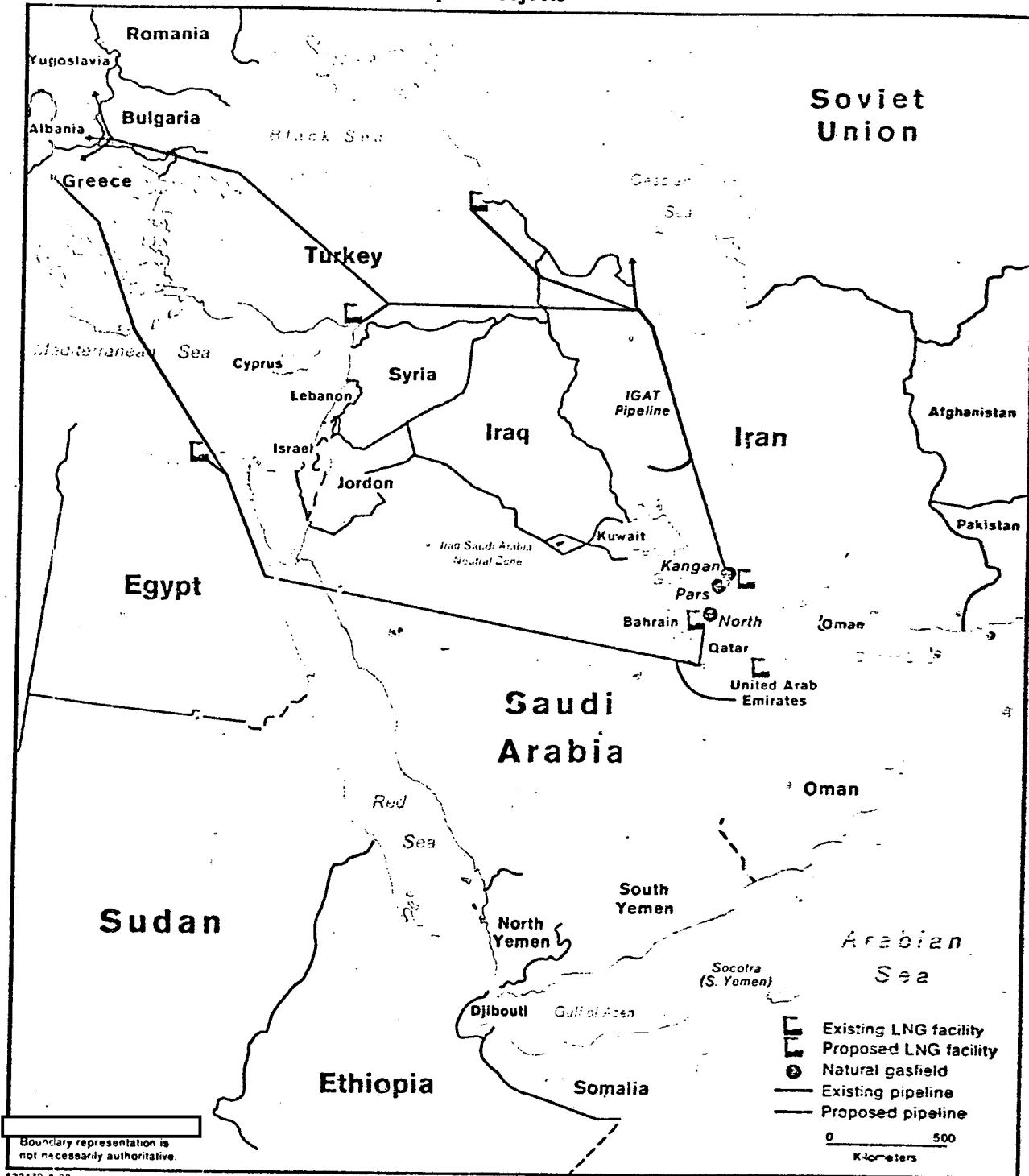
Industry reserve estimates and project proposals indicate that potential African suppliers—Algeria, Cameroon, Egypt, Libya, Nigeria, and the Ivory Coast—could deliver as much as 1.6 million b/doe annually of additional gas supplies to Western Europe by the early 1990s. Potential Middle Eastern suppliers—UAE, Qatar, and Iran—could deliver an additional 750,000 b/doe annually, mostly to Japan. Pricing policies and financial and technical

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Middle East: Proposed Natural Gas Export Projects



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Soviet versus Middle Eastern-African Gas: Competing on Prices

Several factors give the Soviets an advantage in pricing gas compared with competitors in the Middle East and Africa:

- *An ability to acquire pipeline right-of-way through their own territory and other Bloc countries at little cost.*
- *Subsidized interest rates on Western loans, including a grace period before payback is required.*
- *Availability of domestic labor, which does not require hard currency outlays.*

As a result, the Soviets can hold hard currency costs to a minimum. In the case of the Yamal pipeline, hard currency outlays could be as low as \$8 billion. More importantly, the Soviets are willing to accept low or even negative returns initially to ensure hard currency earnings.

Only North African producers can build relatively low cost pipelines with delivery costs competitive with Soviet prices, but these countries—like other African and Middle Eastern producers—have been unwilling to accept the lower wellhead value for gas needed to compete with the Soviets. Pipelines, such as those proposed from Qatar and Nigeria, must traverse long routes across several countries, incurring high right-of-way and transit costs. Since most of these countries do not have the required domestic skilled labor, the need for a large foreign labor force will add further to hard currency outlays. Although subsidized financing and other credits may be arranged for countries such as Nigeria and Cameroon, creditworthiness and political instability may prevent subsidized financing for other countries such as Iran.

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constraints, however, are likely to cause total gas deliveries from these countries to fall considerably below these levels. Indeed [redacted] some countries such as Egypt and the Ivory Coast have yet to find large enough reserves to support LNG export projects. [redacted]

Pricing Policy Constraints

Pricing policies of key producing countries will limit the amount of gas that Western purchasers will be willing to buy. This constraint alone could take several projects—such as those in Nigeria, Qatar, and Algeria—out of serious consideration or, at a minimum, limit their scope. In addition, Soviet willingness to compete aggressively on gas pricing to ensure hard currency earnings will give Moscow a considerable edge in capturing the West European gas market in the 1990s [redacted]

Several existing and potential gas contracts are bogged down in pricing disputes. Algeria has adopted a militant pricing stance which calls for gas prices to be based on the prices of premium fuels—currently \$5 to 5.50 per million BTU at the Algerian border. Over the past two years, the Algerians have suspended or refused to initiate gas deliveries to France, the United States, and Italy until the pricing demands were met. Of this group, only the French have acceded. Libya had maintained a similar tactic with Italy before pressing revenue needs forced Tripoli to drop its demands. [redacted]

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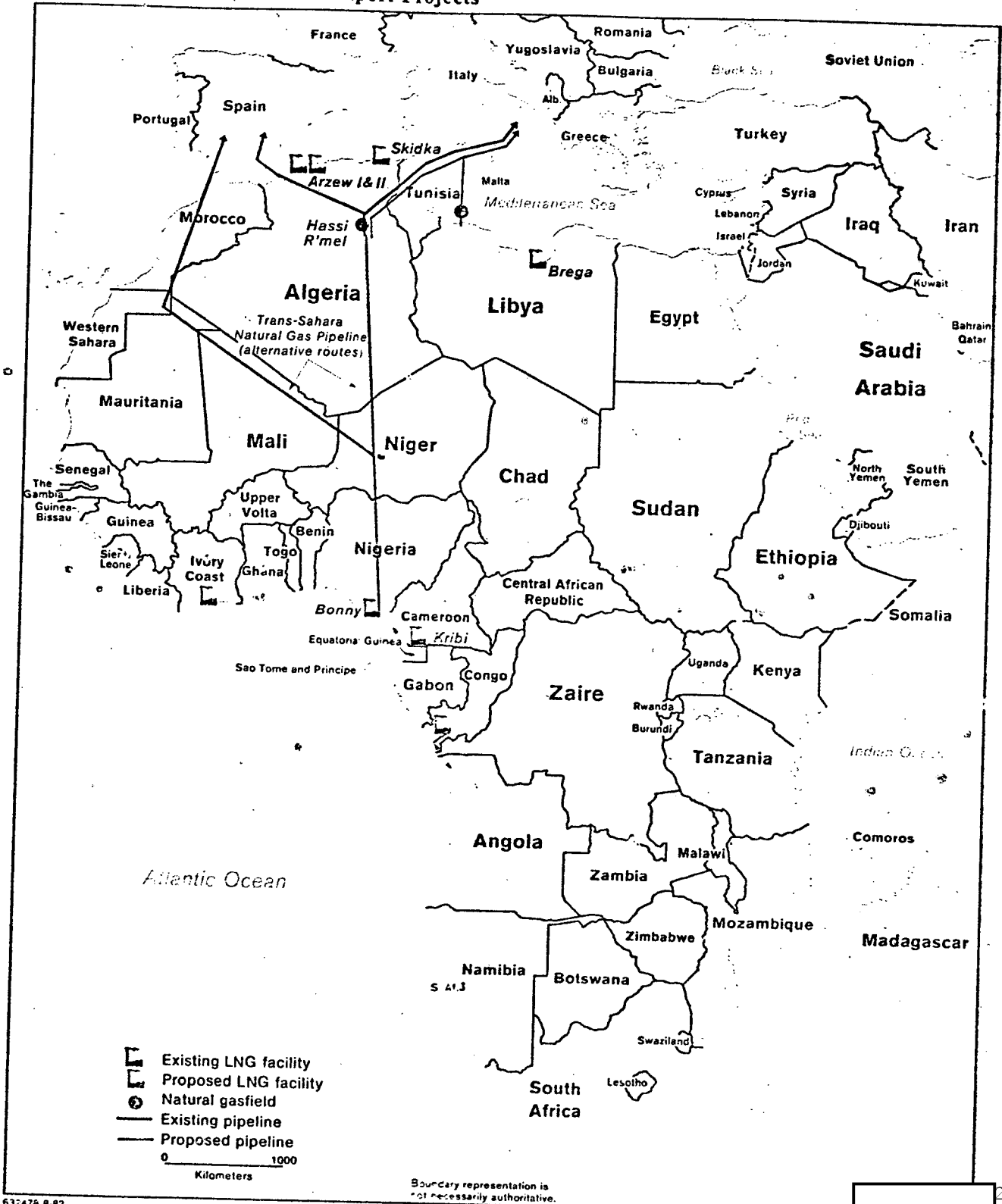
Capital Costs and Financial Constraints

The pricing problem is complicated by the high capital and delivery costs of some gas projects. [redacted]

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Africa: Proposed Natural Gas Export Projects



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Other Possible Supplies

The search for alternatives to Soviet gas has sparked a number of supply proposals

Although most are technically feasible, we believe that few are likely to come into fruition in the 1990s. Nevertheless, several of these projects in countries including Iran, Egypt, Libya, the Ivory Coast, and Qatar will continue to draw attention due to their potential for substantial supplies.



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We believe Iran could export gas to continental Western Europe or to Japan, but Tehran's low financial reserves, outstanding debts, and political instability under the current regime make financing of a major gas venture very risky in the near term. On balance we believe that until Tehran's political situation stabilizes, Iran's gas exports will be limited to Turkey—and if a pricing agreement is reached—to the USSR.



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Egypt, the Ivory Coast, and others will consider gas exports only if sizable new reserves are found.



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rising consumption will likely cut into existing export capacity during the next several years. The potential for rapidly rising consumption in Egypt and the Ivory Coast could prevent exports altogether.

supplies of Soviet gas, we believe producers from Africa and the Middle East could supply an additional 750,000 to 1 million b/doe by the mid-1990s:

- Algeria could provide the bulk of these supplies, perhaps up to an additional 600,000 b/doe above existing contracts, in the early-to-mid-1990s. Because current technical problems with its gas cycling program are likely to prevent Algiers from fully meeting existing contracts totaling 613,000 b/doe until the early 1990s, West European customers may be extremely reluctant to contract for large additional volumes from Algeria.

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Gas Supply Outlook

Development of African-Middle Eastern gas supplies will hinge on Western Europe's and Japan's desire to find alternatives to Soviet gas and willingness to pay prices probably 10 to 15 percent higher than for Soviet gas. Assuming full scale development of North Sea reserves and willingness of the West Europeans and Japanese to forgo additional

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- Cameroon will likely provide 75,000 b/doe of gas by 1990. A proposed LNG project has been scaled back recently because of insufficient reserves, but construction could begin by 1984 if pricing and marketing arrangements are settled.
- The UAE will likely expand LNG production by 30,000 b/doe from existing reserves by 1990. It could increase output another 150,000 b/doe by 1995 if recently discovered onshore reserves from the Khuff zone are proved to be as large as some believe. Most sales will probably continue to go to Japan.
- A decline in the amount of oil available for export will eventually force Nigeria to undertake a gas export project. Any new facility would likely be considerably smaller than the original Bonny LNG proposal and could total only 125,000 b/doe.

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