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Report to Sen. Robert P. Griffin; by Elmer B. Staats, Comptroller General.

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Congressional Relevance: Sen. Robert P. Griffin.
Authority: Department of Energy Organization Act (42 U.S.C. 7101). Natural Gas Act (15 U.S.C. 717). 46 U.S.C. 883. 42 Fed. Reg. 62419. 47 F.P.C. 1624.

Several issues concerning cargo preference for imported liquefied natural gas (LNG) were analyzed. There is no explicit statutory basis that provides the Department of Energy (DOE) with the authority to require cargo preference. Court decisions which held that the Natural Gas Act requires consideration of the public interest did not deal with the question of whether such a consideration would permit establishment of a cargo preference policy for LNG. DOE would have the burden of proof that such a policy was in the public interest and would have to consider the higher costs involved. The cost of cargo preference was estimated on the basis of a hypothetical 100% use of U.S. flag ships. Such a requirement for future LNG import projects should raise the shipping cost by 11 to 16 cents per 1,000 cubic feet of gas. The annual cost could range between $220 million and $630 million and the increase in the price of gas to consumers could range from 0.6% to 3.3%. If subsidies were used instead of cargo preference, costs would be about the same, but taxpayers would bear the cost of subsidies while consumers would bear the cost of cargo preference. (HTW)

6498

COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-178205

May 23, 1978

The Honorable Robert P. Griffin
United States Senate

Dear Senator Griffin:

In accordance with your request of January 9, 1978, we have analyzed several issues concerning cargo preference for imported liquefied natural gas. In particular, we have considered:

--Whether there is a statutory basis for the Department of Energy to invoke such a requirement.

--How much such a requirement would cost.

--Differences between cargo preference and subsidies as methods of support for our merchant fleet.

The details of our analysis are presented in enclosures I, II, and III.

STATUTORY BASIS

We have found no explicit statutory basis that provides the Department of Energy with the authority to require cargo preference and have examined both the Department of Energy Organization Act and the Natural Gas Act for implicit authority. The Federal Power Commission ruled in 1974 that cargo preference for liquefied natural gas was not within its jurisdiction under the Natural Gas Act. In 1977, an administrative law judge of the Federal Energy Regulatory Commission reaffirmed the 1974 decision that cargo preference cannot be required in the absence of applicable legislation.

Several court decisions have held that the Natural Gas Act requires consideration of all factors bearing on the public interest, including those outside direct regulatory jurisdiction, when matters of public interest are determined.

However, none of these cases has addressed the question of whether such a broad interpretation of the Department of Energy's public interest authority would permit the administrative establishment of a cargo preference policy for liquefied natural gas. Even if the public interest authority were interpreted to authorize establishment of a liquefied natural gas cargo preference, the Department of Energy would bear the burden of proof that such a requirement was clearly in the public interest. This burden would be substantial in light of the greater costs associated with U.S.-built ships; one provision of the Department of Energy Organization Act states that one purpose of the act is to promote consumers' interests by providing energy at the lowest reasonable cost. (See enc. I.)

ESTIMATED COST OF CARGO PREFERENCE

In analyzing the cost of cargo preference, we have considered hypothetical requirements of both 50-percent and 100-percent use of U.S.-flag ships. Because roughly one-half of the ships to be used in the liquefield natural gas projects studied will be U.S.-flag ships, we concluded that a 50-percent cargo requirement would not, in general, add to the transportation cost of imported liquefied natural gas. Therefore, we concentrated on the effects of a 100-percent cargo preference requirement.

We view our results as reasonable estimates of a very uncertain future. Although we can fairly accurately estimate current cost differentials between U.S.-flag and foreign-flag tankers, at least within a range, far less precision is possible in estimating future costs. The future level of liquefied natural gas imports is even more uncertain since it will depend on many presently unknowable factors.

The increases in cost due to U.S.-flag ship participation vary among projects but our best estimate is that a 100-percent cargo preference requirement for future liquefied natural gas import projects would raise the shipping cost by 11 to 16 cents per 1,000 cubic feet of gas. This is equivalent to an 8 to 11 percent increase in shipping cost and a 2.0 to 6.6 percent increase in total cost. Annual import levels may reach 2 to 3.5 trillion cubic feet in 10 to 15 years. This figure is highly conjectural, but if that level is reached the annual cost of 100-percent cargo preference might range between $220 million and $630 million. Some of that cost will be paid by the taxpayers if construction

differential subsidies are awarded for the additional U.S.-built tankers. Even if all of the cost is passed on to customers of gas distribution companies using imported liquefied natural gas as part of their supply, the more expensive liquefied natural gas is likely to be priced the same as gas from other sources. That is, the higher costs would be spread over all natural gas--imported and domestic. Therefore, the increase in the price of gas to these customers could range from 0.6 to 3.3 percent. (See enc. II.)

CARGO PREFERENCE COMPARED TO ALTERNATIVES

Both subsidies (of various types) and cargo preference can be used to promote the use of U.S.-flag ships. Subsidies work by lowering the price which ship operators must pay to use American ships, thereby stimulating demand for them. Cargo preference works directly by requiring their use. In principle, both approaches should entail the same costs since they are meant to overcome the same transport cost differential between U.S.-flag and foreign-flag ships. The major difference is that taxpayers bear the cost of subsidies while consumers of imported goods bear the cost of cargo preference. (See enc. III.)

At your request, we have not sought to obtain comments from any agencies. As arranged with your office, we will make copies of this report available to the general public in 7 days.

If we can provide you with any more information, we would be happy to do so.

Sincerely yours,

Comptroller General
of the United States

Enclosures - 3

ENCLOSURE I

STATUTORY BASIS FOR CARGO PREFERENCE FOR LIQUEFIED NATURAL GAS (LNG)

Question 1. Is there a statutory basis for the Department of Energy (DOE) to establish a policy requiring that a particular number or percentage of U.S.-flag ships be used in the importation of LNG?

On December 12, 1977, DOE, on behalf of the Federal Government Interagency Task Force on LNG, gave notice of hearings to be held on a Federal Government policy on LNG imports (42 Fed. Reg. 62419 (1977)). The notice stated that in the area of costs and pricing, comments were invited regarding the principles that should be developed for shipping arrangements, including the number of ships which should be U.S.-flag ships.

Presently there are cargo preference laws requiring that not less than a stated fraction of Government cargoes must be carried in U.S. vessels. (See for example: 46 U.S.C. 883, 1241(b)(1) (1970).) No such law, however, pertains to LNG imports nor does any such law apply to transportation of cargo in commercial transactions.

Because an explicit statutory basis to impose administratively a policy of cargo preference does not exist, the issue then becomes whether such authority can be implied from the Department of Energy Organization Act (42 U.S.C. 7101 et. seq. (1977)), or the Natural Gas Act (15 U.S.C. 717 et. seq. (1970)).

Prior to the passage of the DOE Act, supra, the Federal Power Commission had jurisdiction over the importation of natural gas (15 U.S.C. 717b (1970)). In Columbia LNG Corporation, 47 FPC 1624, 1630 (1972), the Commission held:

> "* * * that LNG is natural gas within the meaning of the Act [Natural Gas Act], and that the Commission has jurisdiction over it to the same extent it has jurisdiction over natural gas in gaseous form."

ENCLOSURE I

Section 3 of the Natural Gas Act, 15 U.S.C. 717b (1970), provides in pertinent part, as follows:

> "[N]o person shall * * * import any natural gas from a foreign country without first having secured an order of the Commission [now DOE] authorizing it to do so. The Commission shall issue such order upon application, unless, * * * it finds that the proposed * * * importation will not be consistent with the public interest * * *." (emphasis added)

In Order No. 622, June 28, 1972, the Federal Power Commission overturned an Examiner's decision which had provided that six LNG tankers be constructed in the United States. The Commission stated that:

> "* * * while there was much to be gained in the public interest from such a requirement, tanker preference is clearly a matter that is not within our jurisdiction under the Gas Act, and we cannot appropriately condition our approval of the importation of gas on such a nonjurisdictional requirement."

Columbia LNG Corporation, supra, rev'd on other grounds, 491 F.2d 651 (5th Cir. 1974). In this same vein an administrative law judge of the Federal Energy Regulatory Commission reaffirmed the holding of Columbia LNG, supra, stating that the Commission "cannot require that the LNG, or any part of it, be carried in United States vessels, in the absence of any applicable cargo preference law." El Paso Eastern Company, No. CP77-330-at p. 62 (Oct. 25, 1977). 1/

Several court cases have interpreted the public interest language of 15 U.S.C. 717b as giving the Federal Power Commission (now the Secretary of Energy) the authority to consider

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1/The DOE Act transferred authority over the importation of natural gas to the Secretary of Energy. Other Natural Gas Act authority now is in the Federal Energy Regulatory Commission, an independent commission within DOE, which is the successor to the Federal Power Commission. The El Paso case was initiated while authority over natural gas importation was still vested in the Federal Power Commission even though the decision was not issued until after the Federal Energy Regulatory Commission was established.

ENCLOSURE I

all factors bearing on the public interest, including those outside its direct regulatory jurisdiction. However, none have addressed the question of whether such a broad interpretation of the statutory language would permit the administrative establishment of a cargo preference policy for LNG. See FPC v. Transcontinental Pipe Line Corp, 356 U.S. 1, 86 S. Ct. 435, 5 L. Ed. 2d 377 (1961); Henry v. FPC, 513 F. 2d 395 (D.C. Cir. 1975); Distrigas Corporation v. FPC, 495 F. 2d 1057 (D.C. Cir. 1974). Further, even if the public interest language of the statute were interpreted as authority for considering establishment of an LNG cargo preference, it is very doubtful whether DOE could establish that the public interest would be served by such a policy. This is so because of the added cost which would be involved in establishing a preference for U.S. tankers and the requirement of section 102(9) of the DOE Act that the interests of consumers be promoted by means of providing an adequate and reliable supply of energy at the lowest reasonable cost. Finally, opponents of an LNG cargo preference policy have raised antitrust and international law objections to the administrative establishment of such a policy. See testimony of Nevil M. E. Proes before the Federal Interagency Task Force on LNG Imports, January 5, 1978.

Accordingly, we agree with the holdings of Columbia LNG and El Paso Eastern Company, supra, that no statutory basis exists for the administrative establishment of an LNG cargo preference policy.

COST OF CARGO PREFERENCE FOR IMPORTED LNG

Question 2. If such a policy were to be established by DOE, kindly provide estimates of additional costs to the consuming public--based on a range of numbers or percentages which you may reasonably assume.

INTRODUCTION AND BACKGROUND

LNG is potentially a major source of fuel for the United States. Liquefaction reduces the volume of the fuel to 1/600 of its volume as a gas and therefore makes it feasible to transport it by ship. Plentiful supplies exist in several countries, most notably Algeria and Indonesia, and projects have been proposed to import LNG to the United States.

An important issue surrounding LNG projects is whether there are significant advantages in using U.S.-flag tankers to transport LNG headed for the United States. National security and job creation are reasons advanced in favor of encouraging the use of American flag ships. Inasmuch as American ships would not be competitive with foreign ones in free market competition, any program to encourage the use of American ships wil incur costs. These costs will accrue to either the taxpayer, through direct or indirect subsidies, or the consumer, in the form of higher prices, or both.

The particular methods of support used and the costs associated with them cannot be considered apart from the characteristics of the relevant market. One important aspect of LNG transportation is that the tankers are typically built for use in a designated project. Ships are placed under long-term contracts for the duration of the project, frequently 20 years. The decision to build a U.S. ship and the decision to use it are actually one joint decision. Clearly, an excess supply of U.S. tanker space is unlikely, in contrast to the situation that occurs sometimes in crude oil transportation.

Another factor which must be considered is the role of the exporting country in the shipping of LNG. While some countries are not interested in participating in the shipping, others, especially Algeria, are insisting on being involved. In both the Trunkline and El Paso II projects, Algeria has demanded the right to provide half the necessary ships, and it seems likely that this policy will apply to future projects also.

ENCLOSURE II

Typically, construction costs are higher for ships built in the United States, which include LNG tankers. The Maritime Administration (MarAd) awards construction differential subsidies (CDS) equal to the cost differential between building a ship in the United States and building it abroad in order to make American-built ships competitively priced. MarAd also provides loan guarantees for the construction of LNG tankers, as authorized by Title XI of the Merchant Marine Act. Operating costs are also generally higher for American-flag ships, and MarAd sometimes provides operating differential subsidies (ODS), but not for LNG tankers. 1/

These methods of supporting American shipbuilding and the American merchant marine are not specific to LNG tankers. That is, they are general programs which the Congress has legislated and which MarAd uses to provide incentives for importers to use American-flag ships in LNG projects. A different approach--known as "cargo preference"--would be to require that all or a specified percentage of imported LNG must travel on American-flag ships. No such requirement exists for LNG and a similar requirement for crude oil was defeated in the House in 1977. No formal proposals for cargo preference legislation for LNG have appeared in the Congress, and MarAd is on record as stating that cargo preference cannot be mandated adminstratively. Nevertheless, because many believe that American interests are served if American-flag ships participate in LNG projects, it is worthwhile to consider the cost of such a requirement.

Status of LNG projects

Until this year there was only one project operating to import LNG into the United States. That project, Distrigas, is very small compared to other projects that have been approved. Distrigas imports LNG to Everett, Massachusetts, using only one small, French-built, French-flag tanker. This project was approved prior to the availability of the financial incentives discussed above for American-built tankers.

1/MarAd also allows ship operators to place earnings in tax-deferred capital construction funds to be used to purchase new American ships. Although this program provides savings to ship operators in the form of interest on the tax-deferred funds, it does not affect the construction cost differential. This differential is assumed to be accurately measured in the calculation of CDS.

The first substantial project to be approved by the old Federal Power Commission, which had jurisdiction over the importation of LNG, was the El Paso I project, which calls for the importation of LNG from Algeria to Cove Point, Maryland, and Savannah, Georgia. This project was approved in 1972 and 1973, and the first shipment of LNG has recently arrived in Cove Point. When El Paso I is fully operational, 1 billion cubic feet per day (compared to .044 billion for Distrigas) of LNG will be imported.

Nine 125,000 cubic meter ships will be used in this project and it is expected that they will average 21 arrivals per year. Three tankers were built in France and will be operated under the Liberian flag. The other six are under construction at two U.S. shipyards and will be U.S.-flag ships. MarAd has authorized CDS and Title XI loan guarantees for these ships and those incentives led El Paso to use American ships in the project. Contracts had been made for the three French-built ships prior to MarAd's taking an active role in the process.

The Trunkline (sometimes known as Panhandle) project to import LNG from Algeria to Lake Charles, Louisiana, was approved in 1977 and is scheduled to become operational in 1980 or 1981. This project will use five 125,000 cubic meter tankers to carry a daily volume about half that of El Paso I. Due to the longer distance to be traveled, the tankers will average 13 arrivals per year. Algeria is providing three of the tankers to be used, and the other two will be U.S. built and U.S.-flag ships. CDS and Title XI loan guarantees for those ships have been authorized by MarAd.

Conditional approval has been given to the Pac-Indonesia project to import LNG from Indonesia to Oxnard, California, and final approval is pending. Although this project will use nine tankers, the same as El Paso I, the volume of gas to be delivered is only slightly more than half of that project because of the much greater distances to be traveled. Six tankers are scheduled to be American built, but contracts have not yet been let and therefore no subsidies have been awarded. The remaining tankers will be built in France. This project is expected to become operational 4 years after final approval is obtained.

The El Paso II project to import LNG from Algeria to Port O'Connor, Texas, has been awaiting approval for quite sometime. If it is approved, it will import 1 billion cubic feet per day of LNG, the same as El Paso I, but 12 tankers rather than 9

will be needed because of the longer distance traveled. Six tankers will be U.S. built and U.S.-flag ships, with Algeria supplying the other six. The project is expected to become operational in 1982 or 1983, but if approval is not obtained soon that target will not be reached.

ESTIMATING THE COST OF CARGO PREFERENCE

Cost differential of U.S.-flag ships

In reviewing applications for LNG projects, regulatory agencies determine the delivered price at which the gas can be sold to customers. Since shipping costs are a large share of the total costs of the project, their level influences the delivered price. Calculating the cost of shipping a specified amount of LNG in a given time period is a complex exercise, primarily because the major part of the cost consists of using a valuable asset for that period, rather than more visible out-of-pocket expenses. A common way to calculate the cost is to find the revenue which the shipper would need to cover all costs, including a specified return on the invested capital. Different assumptions about rates of return, debt structure, and taxes will yield different revenue requirements and, therefore, different shipping cost figures to be used to determine the appropriate delivered price of LNG.

In this section, we estimate the cost differential between U.S.- and foreign-flag ships, which is due to higher construction and operating costs (apart from fuel costs, which tend not to vary).

Construction costs

Our estimate of the construction cost differential is based upon estimates that MarAd used to determine CDS in several LNG projects. For the tankers to be used in Trunkline, MarAd found that construction costs were $115.5 million abroad and $155 million in the United States. MarAd therefore awarded CDS equal to $39.5 million per ship, a total of $79 million. These subsidies represent 25.5 percent of the construction cost. CDS were awarded in 1972 and 1973 for the six American-built ships to be used in El Paso I. For three ships, the subsidies were $17 million apiece (16.5 percent) and for the other three, the subsidies were $25.3 million apiece (25.7 percent); this amounts to a total of $127 million for El Paso I and $206 million for the two approved projects.

To determine how the construction cost differential affects transportation costs, we must first express that differential as a difference in annual capital cost. Annual capital cost is the sum of 1 year's depreciation--the difference between the economic value of the ship at the beginning and the end of the year--plus the expected return that could have been earned in 1 year if the captial had been invested elsewhere. The following assumptions will be made in order to calculate this differential.

Assumptions

1. Each ship is fully depreciated during the 20-year life of the project in which it is used.

2. The annual cost of capital is constant. (Since the expected return from alternate use, or opportunity cost, is greatest in early years of the project when the value of the tankers is greatest, before they have depreciated, this assumption implies that depreciation is greatest in later years. This may not be the most realistic assumption about the rate of depreciation, but the computation is vastly simplified with little loss of accuracy by assuming constant annual capital cost.)

3. The rate of return on alternate investment is between 10 and 15 percent. Therefore, those two values will be used to calculate lower and upper bounds for the differential.

4. No allowance is made for differences in taxes or debt structure that may require different gross rates of return to yield the same net rate. (To the extent that there is any difference in debt/equity ratios, American-built ships are likely to use more debt financing because of Title XI loan guarantees. Since debt financing is usually less expensive than equity, this assumption may overstate the true cost differential.)

With the assumptions made above, it will be a straightforward process to calculate an approximate range for the added cost of each project due to the use of U.S.-flag tankers. However, the percentage of total shipping costs that this differential represents will not be clear because the estimates used in setting delivered prices for imported LNG are based on assumptions about some of the issues not dealt with here, such as debt structure and taxes. Therefore, when these differentials are later expressed as fractions of total shipping costs, the results will be presented as very rough estimates rather than precise values.

Capital recovery factors (CRF) can be found to calculate a constant average capital cost differential. These CRFs depend on the expected return on alternate investment and the economic life of the asset. The annual differential in capital cost can be found by multiplying the CRF by the construction cost differential. With the assumed economic life of 20 years for a tanker, the CRF associated with a 10-percent return is 11.75 percent and the CRF associated with a 15-percent return is 15.98 percent.

For Trunkline, the construction cost differential is $39.5 million for each of two ships, a total of $79 million. The annual capital cost differential due to using two American-built ships is therefore between $9.28 million and $12.62 million. Trunkline is scheduled to import 179 billion cubic feet per year, so the capital cost differential is between 5.2 and 7.1 cents per 1,000 cublic feet. For El Paso I, the construction cost differential of $127 million leads to an average capital cost differential between $14.92 million and $20.29 million; this is equivalent to 4.1 to 5.6 cents per 1,000 cublic feet. 1/ The capital cost differential per 1,000 cubic feet is less for El Paso I even though that project will use more U.S.-built ships because the construction cost differential for each ship was smaller when those ships were contracted for and because of the shorter distance to be traveled: more LNG can be imported per ship during the course of a year.

It is not possible to estimate precisely the additional capital cost incurred in using six U.S.-built ships in both the El Paso II and Pac-Indonesia projects because the size of the construction cost differential at the time CDS will be awarded (assuming they obtain final approval) is not known. However, it is not likely that the differential will be less than the $39.5 million that was found to exist last year when Trunkline was approved. Therefore, that figure can be used to calculate a lower bound for this estimate.

For each project, the subsidy for six ships will be $237 million at current CDS rates, and perhaps more. If the expected return on alternate invertment is still between 10 and 15 percent and the economic life of the ships is 20 years, then the same capital recovery factors of 11.75 and 15.98 percent can be used. Therefore, the annual capital cost

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1/ These figures for El Paso I are based on the valuation of the tankers at the time CDS was awarded (1972-73) and have not been adjusted upward for inflation.

differential due to using six U.S.-flag ships is at least $27.84 million to $37.87 million. El Paso II is planned to import 365 billion cubic feet per year, so the additional capital cost is at least 7.6 to 10.4 cents per 1,000 cubic feet. Pac-Indonesia is planned to import 200 billion cubic feet per year over a much longer distance and the additional capital cost is at least 13.9 to 18.9 cents per 1,000 cubic feet.

Operating costs

Operating costs, particularly crew costs, are generally believed to be higher for American-flag ships than for foreign-flag ships, but there is some disagreement about the size of the difference. This difference is likely to be quite small when the cost of an American crew is compared to that of a European crew, but may be substantial if the alternative is an Algerian crew. Based on a consideration of several estimates, we will use $1.1 million to $2.1 million in this analysis as an approximate range for the annual operating cost differential per tanker.

The total annual operating cost differential for partial American-flag ships' participation for each project is as follows: Trunkline (2 ships)--$2.2 million to $4.2 million; and El Paso I, El Paso II, Pac-Indonesia (6 ships each)--$6.6 million to $12.6 million. When this is expressed as cost per 1,000 cubic feet of gas the results are: Trunkline--1.2 to 2.3 cents; El Paso I and El Paso II--1.8 to 3.5 cents; and Pac-Indonesia--3.3 to 6.3 cents.

Table I on the following page presents our best estimate of the annual incremental cost of the scheduled U.S.-flag tanker participation in each LNG project. Cost is expressed both as the additional cost for the project as a whole and as the additional cost per 1,000 cubic feet of gas. In calculating these point estimates we have used the mid-points of the ranges for capital and operating costs; the actual values, therefore, may differ somewhat from our estimates. Furthermore, for El Paso II and Pac-Indonesia the construction cost differential may be larger than for Trunkline, which would mean that the incremental cost for those two projects is greater than indicated in table 1.

ENCLOSURE II

Table 1

Annual Incremental Cost of U.S.-flag Tanker Participation

	Cost/1,000 cubic feet	Cost of project
	(cents)	(million)
Trunkline	7.9	$14.1
El Paso I	7.5	27.2
El Paso II	11.7	42.5
Pac-Indonesia	21.2	42.5

The estimates presented here and in table 2 in the next section can be compared with the estimated total shipping costs shown in table 3. These latter estimates are presented as intervals rather than values, and their mid-point range from $0.99 to $1.32 per 1,000 cubic feet.

Effect of cargo preference on shipping cost

Now that it has been determined by how much the cost of transporting LNG goes up due to the use of American-flag ships, the question of the effect of cargo preference on shipping cost can be considered directly. Two levels of cargo preference will be considered, 50 percent and 100 percent. For now, it will be assumed that neither the construction cost of a U.S.-built tanker nor the operating cost of such a ship is affected by the imposition of cargo preference, but that assumption will be relaxed later on.

It is evident from the previous sections that except for the small Distrigas project, all LNG import projects that have been approved or are near approval call for substantial participation of U.S.-flag ships. The exact level of that participation varies among the projects due to particular circumstances involving the negotiating process and the availability of tankers at the appropriate time. But with the exception of Trunkline, each project will use at least 50-percent U.S.-flag tankers. This result may be due solely to the CDS and Title XI loan guarantees available for American-built ships or it may be due in part to de facto cargo preference. That is, there may be an understanding that projects will not be approved unless they include U.S.-flag ships. Either way, a 50-percent cargo preference requirement would not cause any changes in importers' choices

of ships and therefore would not, in general, add to the transportation cost of imported LNG beyond the additional cost of using U.S.-flag ships due to the availability of subsidies and loans.

If an enforceable 100-percent cargo preference requirement were imposed, the cost of importing LNG to the United States would rise. If MarAd awards CDS for the additional tankers built in the United States, then the increased capital cost would be borne by taxpayers rather than LNG consumers, but it is a cost nonetheless. Analysis similar to that in the last section can be performed to find the annual incremental cost of each project from a 100-percent cargo preference requirement, compared to both the cost with the presently scheduled level of U.S.-flag ship participation and the cost of using foreign-flag tankers exclusively. Results are presented in table 2. For El Paso I, the subsidy rates used are an average of the two rates used for the six tankers constructed in the United States. As in table 1, mid-points of the estimated ranges in capital and operating cost differentials have been used to prepare these estimates.

Table 2

Annual Incremental Shipping Cost of 100-Percent Cargo Preference Compared to

	Presently scheduled levels of U.S.-flag participation		Exclusively foreign-flag participation	
	Cost/1,000 cu. ft.	Project	Cost/1,000 cu. ft.	Project
	(cents)	(million)	(cents)	(million)
Trunkline	11.9	$21.3	19.8	$35.4
El Paso I	3.7	13.6	11.3	40.3
El Paso II	11.7	42.5	23.4	85.0
Pac-Indonesia	10.6	21.3	31.8	63.8

Variations in the incremental cost per 1,000 cubic feet of using U.S.-flag tankers are primarily due to variations in the amount of CDS awarded per ship and the distance traveled to import LNG. For instance, the incremental cost is lowest for El Paso because CDS awards were smaller in 1972-73 and because the distance to be traveled is the shortest of the projects studied. In the future, projects that come under consideration are almost certainly going to

require transportation of LNG over longer distances than in El Paso I. A reasonable estimate is that if 50 percent of imported LNG would travel on U.S.-flag tankers in the absence of cargo preference, then the additional shipping cost due to 100-percent cargo preference would be 11 to 16 cents per 1,000 cubic feet of gas. Gas industry sources estimate that within the next 10 to 15 years, the United States may import as much as 2 to 3.5 trillion cubic feet per year. At 11 to 16 cents per 1,000 cubic feet, the annual cost of 100-percent cargo preference would be $220 million to $560 million. 1/

Two caveats to this conclusion must be added. One is that 100-percent cargo preference is very unlikely because some exporting nations are demanding control over 50 percent of the shipping. The second is that it has been assumed to this point that a cargo preference requirement would not affect the cost of constructing or operating an American-built ship. But this assumption may not be valid because an increase in demand for American-built ships might cause the cost to rise, depending on whether additional inputs can be obtained at the current market prices. It is not possible to know the amount of any such increase but if 100-percent cargo preference is assumed to cause a 10-percent increase in both capital and operating costs for American-flag ships and all other assumptions remain unchanged, then the annual cost of 100-percent cargo perference would be $300 million to $630 million.

EFFECT OF CARGO PREFERENCE ON THE PRICE OF LNG

In the previous section, it was estimated that a 100-percent cargo preference policy would lead to an annual shipping cost increase of at least $220 million and perhaps as much as $630 million if imports rise to the level of 2 to 3.5 trillion cubic feet per year. In order to calculate the effect of such a policy on the price of LNG it will be necessary first to determine the effect which this increase will have on the cost of imported LNG and then to examine the way in which gas is priced to customers in the United States.

1/ These estimates are reached by multiplying the current differential per 1,000 cubic feet of gas between 100 percent and 50 percent U.S.-flag ship participation by the project import levels for 1988-1993. Therefore, the total annual cost should be interpreted with respect to 1978 prices.

ENCLOSURE II

It is difficult to determine the percentage by which total shipping costs rise due to the use of U.S.-flag ships because without making certain assumptions about taxes, debt structure, and other items it is impossible to calculate with much accuracy the share of shipping costs that is affected by the national origin and registry of the tankers. Therefore, the results presented here should be accepted as tentative judgments based on estimates of the total shipping costs for each project. In table 3 below, the low-, high-, and mid-point estimates of the shipping cost per 1,000 cubic feet of gas are presented. These estimates are based on scheduled participation of U.S.-flag tankers.

Table 3

Estimates of Shipping Cost for Imported LNG

	Low	Mid-point	High
	(cost per 1,000 cubic feet)		
Trunkline	$0.82	$1.18	$1.54
El Paso I	0.62	0.95	1.27
El Paso II	0.82	1.13	1.44
Pac-Indonesia	1.23	1.32	1.44

The estimates from table 3 can be combined with the estimates (from the first column of table 2) of the increase in shipping costs due to 100-percent cargo preference, compared to the costs at scheduled levels of U.S.-flag ship participation, to estimate the percentage increase in shipping costs from such a requirement. Low-, high-, and mid-point estimates are presented in table 4.

ENCLOSURE II

Table 4

Estimates of Percentage Increase in Shipping Costs of Imported LNG Due to Imposition of Cargo Preference Requirement (note a)

	Low	Mid-point	High
	(percent)		
Trunkline	7.7	10.1	14.5
El Paso I	2.9	3.9	6.0
El Paso II	8.1	10.4	14.3
Pac-Indonesia	7.4	8.0	8.6

a/Compared to shipping cost with scheduled levels of U.S.-flag ship participation.

The final step in determining the effect of a 100-percent cargo preference requirement on the cost of imported LNG is to consider the share of the total cost that shipping costs comprise. Then, the estimates from table 4 can be used to estimate the percentage increase in the total cost of importing LNG. These figures are presented below in table 5. The expected increases in cost range from 2.0 to 4.2 percent for El Paso I to 3.5 to 6.6 percent for Trunkline.

Table 5

Estimates of Percentage Increase in Total Costs of Imported LNG Due to Imposition of Cargo Preference Requirement (note a)

	Shipping cost/ total cost	Increase in total cost
	(percent)	
Trunkline	45.7	3.5-6.6
El Paso I	70.2	2.0-4.2
El Paso II	40.1	3.2-5.7
Pac-Indonesia	35.1	2.6-3.0

a/Compared to total cost with scheduled levels of U.S.-flag ship participation.

Imported LNG will represent only 10 to 20 percent of the gas that is used in the United States even if import levels reach 2 to 3.5 trillion cubic feet per year. Since the cost of acquiring foreign LNG is much higher than the maximum price at which domestic gas can be sold interstate (or the likley free-market price if natural gas prices are deregulated), there is some dispute about whether the cost of more expensive LNG should be borne only by those who use the newly acquired supplies or by all natural gas consumers. Essentially, this is the conflict between rolled-in and incremental pricing and its resolution greatly influences the increase in price to the LNG consumer due to 100-percent cargo preference.

Incremental pricing would require that users of high-cost gas from supplemental sources--such as imported LNG--pay the full cost of obtaining the gas. Rolled-in pricing, on the other hand, assigns one price to all consumers that is based on a weighted average of the cost of acquiring gas from all sources. Most economists favor incremental pricing on efficiency grounds: inefficient use of costly supplies can be avoided only if customers see the true replacement cost. If imported LNG were priced incrementally, then it is likely that a 2.0 to 6.6 percent increase in the cost of acquiring the gas due to 100-percent cargo preference would lead to an increase of that size in the cost to the consumer, unless that cost increase was offset by increased subsidies, such as CDS awards for additional U.S.-built tankers.

However, in order for incremental pricing to be effective, gas must be priced incrementally at all stages of the distribution path, all the way to the burner tip. Existing statutes give the Federal Government the power to regulate natural gas prices only on interstate sales. It is doubtful that the Federal Government can order State regulatory authorities to insist that LNG be priced incrementally; if they had that authority they could accomplish indirectly what they are not allowed to do directly. States tend to favor rolled-in pricing, primarily because they are in competition with each other to attract new industry. Therefore, rolled-in pricing at some stage seems inevitable. In fact, the Federal regulatory authorities have not yet attempted to require incremental pricing at the sale points they can control.

If rolled-in pricing is used, the effect of a cost increase in imported LNG due to 100-percent cargo preference or any other source is diluted. Since the price of gas is based on a weighted average of the costs of acquiring gas

from all sources, the effect of a cost increase for LNG on consumer prices depends on the share of the supply that is imported LNG. On a national level, the four projects analyzed here would import about 1.1 trillion cubic feet per year, or about 5 to 6 percent of the Nation's consumption. It is possible that in 10 to 15 years the annual level of imports may reach 2 to 3.5 trillion cubic feet, or about 10 to 20 percent of the Nation's consumption. The imported LNG will not, however, be evenly distributed throughout the country. Instead, it will be concentrated in a few States in which it may represent a large share of annual gas consumption, perhaps as much as 30 percent. For customers in such a State, a 2.0 to 6.6 percent increase in the cost of acquiring LNG might lead to an 0.6 to 2.0 percent increase in the price they pay for natural gas. Imported LNG may represent as much as 50 percent of consumption for individual gas distribution companies. If the price charged is based on a weighted average of that company's gas, then the price of natural gas might rise as much as 3.3 percent. An increase of this size would appear to be the largest likley increase in cost to the consumer of a 100-percent cargo preference requirement for imported LNG.

SUMMARY

LNG import projects that either have been approved or are likely to be approved in the near future are scheduled to include substantial participation by U.S.-flag tankers. Therefore, a 50-percent cargo perference requirement for imported LNG would be unlikely to have any noticeable effect on these projects or on the cost of acquiring LNG. A 100-percent cargo preference requirement is not likely to be feasible because some exporting nations are demanding control of part of the shipping. That reservation notwithstanding, such a requirement would lead to increased costs of acquiring LNG because of the higher capital and operating costs of U.S.-flag ships. These costs may be borne either by taxpayers as greater subsidies or by consumers as higher prices.

At presently scheduled levels of U.S.-flag ship participation, the use of those ships raises the cost of shipping LNG by 7.6 to 21.2 cents per 1,000 cubic feet, depending upon the distance the LNG is shipped. With 100-percent cargo preference, shipping costs would probably rise an additional 11 to 16 cents per 1,000 cubic feet on future projects. If imports of LNG grow to 2 to 3.5 trillion cubic per year, a figure which is highly conjectural, the annual cost of cargo

preference will be $200 million to $630 million. Expressed as a percentage of the total cost of acquiring imported LNG, 100-percent cargo preference would raise the cost by 2.0 to 6.6 percent. If this increased cost is not absorbed by increased subsidies (and at least some of it will be), then it will raise the cost of gas to consumers. Most likely, imported LNG will be priced on a rolled-in basis so that the burden of any increase in cost will fall on all gas consumers in markets in which LNG is sold. In some States, imported LNG may be the source for as much as 30 percent of natural consumption and for individual gas distribution companies, this figure may be a high as 50 percent, so that 100-percent cargo preference might cause an increase in price of gas ranging from 0.6 to 3.3 percent. This is probably the maximum possible effect.

CARGO PREFERENCE VERSUS SUBSIDIES

Question 3. If, as a matter of public policy, the United States needs a stronger or larger merchant fleet, are there better (less expensive) means of achieving such an objective? If so, what are those means and how much would they cost?

In a free-market situation, most of America's imports and exports would travel on foreign-flag ships. U.S. ships cost more and in most cases can compete only if they are granted some form of preferential treatment. There are two basic types of assistance:

--Cargo preference: the requirement that a certain fraction of imports must use U.S.-flag ships.

--Subsidies: direct payments or loans at favorable terms to ship builders or operators.

Cargo preference directly restricts the use of foreign-flag ships; therefore importers must either import commodities on U.S.-flag ships or not at all. Subsidies work indirectly; they lower the apparent cost of using U.S.-flag ships to or below that of their foreign competition, thus encouraging demand.

Both methods result in greater use of U.S.-flag ships. The main difference lies in who pays the cost. Cargo preference, since it raises the cost of shipping, raises the price to consumers of imported goods. With subsidies, taxpayers bear the cost. This difference means:

1. The cost of cargo preference is more concentrated, since it shows up mainly in the price of the commodity (e.g., LNG) to which the legislation applies. A subsidy paid out of general revenues would be spread more evenly and would have no noticeable impact on any particular imported commodity. If the support program is construed to be in the public interest (e.g., national security), then it might be argued that taxpayers should support it so the burden would be spread equitably.

ENCLOSURE III

2. Since cargo preference drives up the price of an imported good, it serves to "protect" domestic producers of that good, much like a tariff. Departure from free trade is an inefficiency long recognized by economists, though in a world economy beset by countless other trade barriers, it is questionable how significant such inefficiency might be.

3. With subsidies, it is clear in advance how much the program will cost, since subsidies are direct expenditures. 1/ The costs of cargo preference are much harder to predict; doing so requires estimating the difference between future costs of U.S.- and foreign-flag ships. In addition, with cargo preference it is hard to determine in advance how many U.S. ships will be built, because cargo preference requirements are usually legislated as a percent of total imports, which are of uncertain magnitude.

4. Since cargo preference legislation does not require budget outlays, it does not have to wend its way through the budget process and it does not enlarge the budget deficit. Cargo preference legislation might be less subject to annual review than a subsidy program.

In spite of these differences, it is not clear whether subsidies or cargo preference entail greater cost per ton of U.S.-flag shipping. That is, we cannot say which is a more "efficient" policy instrument. Since both methods are meant to overcome the same transport cost differential, they should, in principle, cost the same.

In any specific case, however, costs might differ, especially since there are many forms of subsidy that can be proposed, some of which are more efficient than others. To take one example, if an operating subsidy program paid the difference between actual costs and some competitive cost level, then some of the incentives to operate efficiently would be lost, and the subsidy outlays would be higher than necessary. In practice, there are many pitfalls in program design and administration that can increase costs.

1/Guaranteed loans are not on the budget, but techniques are available to estimate their cost to Government.

ENCLOSURE III

Cargo preference is also subject to administrative problems. Basically, cargo preference awards to domestic shipping monopoly power which entails large potential profits. Domestic ships must be limited to "fair and reasonable" rates--a complicated task for regulators.