I. EXECUTIVE SUMMARY

A. Introduction

This report covers the results of Phase III of a three-phase program initiated jointly by the Federal Energy Administration and the National Science Foundation, the primary objective of which has been to identify what incentives or set of incentives would be most effective in inducing private industries in the United States to enter or enlarge upon programs leading to the commercialization of certain synthetic fuels. Four synfuels were considered: low and high BTU coal gasification, coal liquefaction, and the extraction of oil from shale.

Phase I of the FEA/NSF program, undertaken under Contract C-856 by International Planning Management Corporation, was designed to elicit industry reaction to 14 incentives posed for their consideration by FEA/NSF and to collect other incentives suggested by the companies interviewed. The results of Phase I were incorporated in the final report, entitled "Synthetic Fuels Incentives Study" issued November 13, 1974.

From the set of 45 candidate incentives identified in Phase I, FEA/NSF selected 6 which were developed in detail via a mock industry/government negotiation undertaken under the auspices of the Graduate School of Business of the University of Texas at Austin with the assistance of Don Sowle Associates. The primary result of this second phase was the identification of certain hypothetical terms and conditions, as set forth in Appendix B of the Phase II report, entitled "Spurring Synthetic Fuel Production" published February 1975.

In a sense Phase III was intended to validate the conclusions of the Phase II mock industry/government negotiations.

More specifically, as detailed in the background material mailed to the various companies interviewed (c.f. Appendix B), the Phase III interviews were designed to elicit the following information:

- Specific comments and criticisms of 9 financial incentives proposed by FEA for industry consideration.

- Specific comments and criticisms of the "hypothetical terms and conditions" of the Phase II booklet (c.f. Appendix C for outline).

- Specific suggestions as to changes in the 9 incentives which would encourage the companies to accelerate the commercialization of those synthetic fuels of particular interest to them.

Individual internal trip reports were prepared by IPMC after each interview and recycled back to the particular companies for their approval and modification. The companies interviewed were offered the option of preserving their anonymity, or, with their permission, of forwarding their approved reports to FEA. Most preferred anonymity. The editing resulted in a number of significant modifications.

It will be noted from the foregoing interview objectives that the initial 6 incentives proposed for Phase II were expanded by 3 others, the first of which had 4 separate alternatives, and the second 2. If the various alternatives are considered as individual incentives, 13 separate incentives were finally prepared for consideration by the companies interviewed. Specific statements of the latter 3 additional incentives, with their various alternatives, are included in Appendix B, the backup material mailed to the various companies prior to the interviews.

IPMC was originally asked to interview 15 companies assigned by FEA. A sixteenth was added by FEA upon completion of the original 15. These 16 companies are identified in Table 1, categorized by industry. It will be observed that, of the 16 companies visited, 6 are gas companies, 6 are oil companies, 2 are utilities, and 2 are "others" (Dow and AMAX).

Dow was included because of its interest in the possible extraction of oil from low-grade oil shale, and AMAX was included because of its interest in coal mining and production.

As several of the oil companies interviewed were also interested in producing synthetic gas from coal, the information developed during the course of the IPMC interviews was preponderantly related to gasification, particularly so when it is appreciated that the 2 utilities interviewed were primarily interested in low BTU gasification for electric power generation.

A number of the larger oil companies were annoyed by the recent Congressional removal of their oil depletion allowance and foreign tax credits. A certain petulance in their responses resulted.

Table 1

Companies Interviewed

Gas Companies

American Natural Gas Company
Cities Service Gas Company
Columbia Coal Gasification Corporation
El Paso Natural Gas Company
Panhandle Eastern Pipeline
Texas Eastern Transmission

Oil Companies

Ashland Oil, Inc.
Marathon Oil Company
The Oil Shale Corporation
Standard Oil Company of California
Superior Oil Company
Texaco Inc.

Utilities

American Electric Power Company, Inc.
Commonwealth Edison Company

Others

AMAX, Inc.
Dow Chemical Company

[redacted]

Nevertheless, the overall sample of companies interviewed was sufficiently broad and cooperative to persuade IPMC that it understands the relative attractiveness of the 9 incentives discussed during the course of the Phase III interviews. IPMC believes its findings are representative of the nation's industries involved or potentially involved with high and low BTU gasification of coal, coal liquefaction, and extraction of oil from shale.

It should be noted that no two companies reacted in the same way, much less with the same words, to the same incentive. Therefore, in its analysis of the various company responses, IPMC has had to integrate the particular impressions generated by the various companies in their particular interviews into an overall analysis. Certain similarity judgments are demanded in this process, for which IPMC accepts full responsibility.

It must also be emphasized that the popularity of the various incentives differed among companies associated with the four different technologies, and even differed for the same technology among companies of different size.

One criticism of all the incentives frequently raised in the interviews was that the incentives emphasized financial aspects and did not incorporate many of the non-financial incentives identified or recommended during Phase I.[1] For example, it was frequently stated that, without a firm federal energy policy and commitment thereto and without changes in the approval procedures for environmental impact statements (among other constraints), none of the proposed incentives would be acceptable to industry.

A related criticism, primarily by the gas and utility companies, was that the incentives seemed more designed to encourage the production of shale oil and, to a lesser extent, the liquefaction of coal rather than the gasification of coal.

The companies interviewed also pointed out that the government should give greater attention to infrastructure requirements, particularly in the mining and transportation of coal and oil shale. An associated requirement is the need for assistance in community development in various of the proposed projects, as was identified in Phase I as a constraint to the rapid commercialization of certain synthetic fuels, particularly of shale oil.

---

[1] G. C. Sponsler et al., "Synthetic Fuels Incentives Study," NSF Contract C-856, November 13, 1974.

The companies uniformly recognized the need for resolution of five so-called "crucial roadblocks" identified in the course of Phase II.[2]

Perhaps primary among these roadblocks is the need for improved patent arrangements. The companies were loathe to give up any patent rights, foreground much less background ones. It was obvious from the interviews that all future incentives must pay close attention to their patent clauses, which will have to be negotiated much more carefully than was done in the Phase II mock negotiations.

The need to include the cost of capital as a direct cost in any synfuel incentive, recognized in Phase II as a crucial roadblock, was also emphasized by the companies, as was the need for better handling of environmental impact statement approvals.

The companies emphasized that, unless these crucial roadblocks were resolved, none of the proposed incentives would be effective.

To reiterate, this Phase III study is concerned only with selected financial incentives. Their effectiveness in accelerating the commercialization of synthetic fuels by private industry is subject to the various non-financial constraints and barriers identified in Phase I.[3]

---

[2] "Spurring Synthetic Fuel Production," University of Texas, February 1975, p. 23 et seq.

[3] Op. cit.

B. Incentives Statements

As noted in the preceding Introduction, the first six of the Phase III incentives were drawn from the Phase I work. Indeed, the particular wording employed in the Phase II booklet to describe the so-called "basic propositions" for each of those six incentives was taken from the precise incentives' statements employed in Phase I. The following first six incentive statements represent slight modifications of the wording of the original six.

Following that six, three other incentives are presented, the first of which is offered with four alternatives, and the second with two. The precise wording of these latter three (or seven, including the alternatives) incentives are presented verbatim in the supporting material to the interview arrangements letter incorporated in Appendix B. For convenience, abridged revisions are presented in this section to facilitate understanding of the various incentives, which are analyzed in the following Sections C and D.

In the same order in which they were discussed during the interviews, the nine (thirteen) incentives may be stated briefly as follows:

Incentive 1. Direct Grant (2/3—1/3) for Pilot Plant: The government would expand its cost-sharing programs for synthetic fuels development along the lines of those administered by the Office of Coal Research (OCR) of the Department of the Interior. Namely, the government would pay 2/3 of the cost of a pilot plant program. In return the government would require that licenses to foreground patents developed from those incentives would be made available to the public royalty-free, and that the contractors' final reports would contain enough information to enable a process or item of equipment to proceed to the next stage of development without further development work.

Incentive 2. Direct Grant (1/2—1/2) for Demonstration Plant: The federal government would expand its cost-sharing program for synthetic fuel development, again along the lines of the present OCR program. The government would pay one-half of the cost of a demonstration plant project. In return, the government would require that licenses to foreground

patents resulting from this incentive be made available to the public royalty-free and that the contractors' final reports should contain enough information to enable a process or item of equipment to proceed to the next stage of development without further development work.

Incentive 3. Convertible Grant: The government would provide a grant for the portion of the cost of construction of either a pilot or demonstration plant for which it would receive an equity interest in proportion to its share of investment. The contractor could convert the grant to a loan by repaying the grant and thereby recapturing the government's equity.

Incentive 4. Loan Guarantee: The federal government would offer guarantees of loans to be used to finance 90 percent of the cost of synthetic fuel plants.

Incentive 5. Guaranteed Procurement/Fixed Price: The government would use emergency powers comparable to those of the Defense Production Act to enter into long-term contracts to purchase synthetic crude oil or synthetic gas on a fixed price basis. Financing would be entirely the responsibility of the contractor.

Incentive 6. Guaranteed Procurement/Cost Plus Fixed Fee: The government would guarantee to purchase a certain quantity of synthetic fuel on a cost plus fixed fee basis, negotiated independently with each supplier.

Incentive 7a. Guaranteed Price: The government would contract to purchase a fixed quantity of synthetic fuel at a predetermined price over a long term. Differences between future market price and contracted price would be paid by the government to the contractor or by the contractor to a government fund established for the project. Should the fund accumulate a positive balance, that balance would be divided 50/50 between the government and the contractor.

Incentive 7b. Guaranteed Price with Loan Guarantee: The proposition of Incentive 7a would be supplemented by a government guarantee of a loan, not to exceed 75 percent of the cost of the plant.

Incentive 7c. Guaranteed Price--Alternative: Rather than establishing a fund as proposed by Incentive 7a, in this alternative, for each month the contract price was higher than the market price, the government would pro-rate the resulting cost of the price support on the basis of the total refinery runs (in the particular month for which the calculation was made) by all U.S. refineries. The government would then assess the pro-rated cost per barrel to all U.S. refiners on the basis of their refinery runs for that month. Were the contract price lower than the market price, all U.S. refiners would receive a pro-rated credit.

Incentive 7d. Guaranteed Price--Alternative with Loan Guarantee: This incentive would supplement Incentive 7c by including a government guarantee of a loan, not to exceed 75 percent of the cost of the plant.

Incentive 8a. Limited Price and Loan Guarantee: The federal government would contract to purchase a quantity of synthetic fuel estimated to be the total output of the plant during its first ten years of operation. The government would agree to guarantee the purchase price on 50 percent of the contract quantity. The government would also agree to guarantee a loan in an amount equal to 50 percent of the cost of the project.

Incentive 8b. Limited Price Guarantee/Advance Payment: The government would enter into purchase contracts similar to Incentive 8a, but in addition would agree to make advance payments to the contractor for syncrude in an amount not to exceed 50 percent of the cost of the project.

Incentive 9. Sale of Options/Guaranteed Price: The government would offer non-transferable, non-

- refundable options for the privilege of selling a specified quantity of syncrude to the government at a contract price to be determined by the government. The contracted quantity would be large enough to cover the entire output of a synfuel plant for 20 years.

More detailed descriptions and discussion relating to the first six of the foregoing incentives may be found in the Phase II booklet.[4]

"Resolvable issues" for each incentive are also identified in that booklet, together with hypothetical terms and conditions (in Appendix B of the Phase II booklet) developed during the course of the mock negotiations of Phase II for the first six incentives of Phase III.

More detailed descriptions of Incentives 7, 8 and 9, in their various alternatives, are contained in the supporting material incorporated in the interview arrangement letter, as presented hereafter in Appendix B. For the purposes of the interview discussions with the companies, it was "assumed that the terms and conditions applicable to the (numbers 7, 8 and 9) incentives would be similar to those detailed in Appendix B of the (Phase II) booklet."

---

[4]See pp. 33-52.

C. Overview of Responses

The popularity ranking of the 9 incentives among the 16 companies interviewed is presented in the following Section D.

As an introduction to that section, it is useful to have in mind an overview of the general reaction to each of the incentives described in the preceding Section B. Particular comments on each incentive by the companies interviewed are incorporated in Section II of this report. It is, of course, difficult to develop an overall response when, as will be seen in Section II, the individual reasponses were so diverse in wording. Nevertheless, the IPMC interviewers were able to discern common or central responses to each incentive. In a sense these central responses summarize the overall reaction to the individual incentives. They are presented in the following paragraphs in the same order in which the incentives were discussed with the companies interviewed.

Incentive 1. Direct Grant (2/3—1/3) for Pilot Plant: This incentive is in essence the same as that currently offered by the Office of Coal Research of the Department of the Interior; it met with mixed reactions. In general it is considered desirable for the early R&D stages of commercial synfuel development; however, the patent rights restrictions, as set forth in the Phase II booklet. were unpopular. The companies preferred to relinquish neither foreground nor background positions. It was also felt that a better definition of "costs" to be covered is required.

Incentive 2. Direct Grant (1/2—1/2) for Demonstration Plant: This incentive again is based on the current OCR program. It was, however, less popular than the pilot plant grant, primarily because of the lower (i.e., 50 rather than 66-2/3) percent grant coverage. Most companies would prefer a 75 percent or greater government contribution. Again, patent right clause revision is desired by prospective participants, together with a better definition of "costs" covered.

Incentive 3. Convertible Grant: This was one of the more popular incentives, under the assumptions that: it could be extended to include first commercial stage plants as well as pilot and demonstrator plants, the background patent right clause were

eliminated. more favorable foreground rights negotiated, and the percentage coverage was 90 percent or better. Once again, a better definition of "costs" is desired. Government equity ownership under this incentive (which probably would necessitate new legislation and would certainly cause delays and other problems) is not popular.

Incentive 4. Loan Guarantee: Taken in conjunction with the guaranteed procurement (preferably CPFF), this was the most popular incentive of the 9 offered for consideration. It was, indeed, popular in its own right; however, it was thought that the risks attendant upon plant operation required the addition of the guaranteed purchase incentive. The industry respondents would particularly recommend improved change-of-scope clauses to give greater flexibility and lower risk to industry during the course of plant construction.

Incentive 5. Guaranteed Procurement/Fixed Price: The general view was that this incentive is really intended for a commercially proven technical process in which relevant costs and prices may be determined with assurance. Because of the difficulty of projecting those costs and prices for the actual synfuels processes considered. the incentive generally is not popular, except possibly with smaller oil shale companies and then only in combination with the loan guarantee.

Incentive 6. Guaranteed Procurement/Cost Plus Fixed Fee: Again, this incentive was considered to be more appropriate for a commercially proven process. However, in combination with the loan guarantee it offers protection both for risks incurred in the operation as well as construction phases of a new synfuel production plant. It is. therefore, a popular incentive in combination with the 90 percent loan guarantee. The five-year period (c.f. Appendix C) is considered too short and the permitted fee should be greater than 10 percent.

Incentive 7. Guaranteed Price (and alternatives): As noted in Section B, this one incentive really com-

prises four alternatives. Incentive 7b would be popular if the loan covered 90 percent of the cost (rather than 50 percent, as stipulated by the actual incentive) and the CPFF guaranteed purchase were extended to the entire production (again, rather than 50 percent). The actual 50 percent coverages proposed are considered to be too low and the precise terms of the incentive are considered to be unclear by the companies interviewed. The other three alternatives are not as popular, as they are considered to cover too small a proportion of the risks and the precise terms are not considered to be well defined.

Incentive 8. Limited Price and Loan Guarantee (and alternatives): Once again, the precise terms of the two alternative versions of this incentive are considered unclear, and the limited nature of the price and loan guarantees are not popular. However, the advance payment feature of Incentive 8b is attractive to most companies.

Incentive 9. Sale of Options/Guaranteed Price: This incentive was considered applicable only to commercially proven technologies where product prices could be adequately forecast. Its terms are considered unclear and overly complicated. The incentive meets with almost uniform disfavor.

D. Incentive Popularity

In Phase I various constraints or disincentives were identified which could act as barriers to the commercial development of synfuels. During the course of the Phase III interviews, five of those disincentives were again raised by the companies as major obstacles to such commercialization. These were:

1. The enormous amounts of capital required even to approach the planning for and construction of synthetic fuels facilities appear unobtainable in the current economy and the present capital market. Construction and production costs, plus transportation costs, have become astronomical. Very few, if any, private entrepreneurs have the financial capacity required, even with substantial government assistance in whatever form.

2. The risk factor is unprecedented. Unless private enterprise can see an acceptable profit or rate of return within reasonable risk it cannot undertake any of the desired synfuel programs. Irrespective of any incentive, such profit or return within reasonable risk is not visible in the present economic climate nor under current government policy.

3. Such contrary actions on the part of the government as (1) recent tax legislation, with its virtual elimination of the oil depletion allowance and the foreign tax credit, (2) the programs of the Federal Energy Administration with respect to allocation of oil and the entitlements program, (3) the restraints imposed by the Environmental Protection Agency and the opposition of non-governmental environmental groups, (4) the restricted availability of resources--the lands under restricted government ownership from which resources for synfuels production may be obtained, and (5) the lack of a clear and definite policy on the part of the government, all represent disincentives of the highest order. Unless most of them are removed, cooperation and action by private enterprise will be very difficult, regardless of the proposed incentives.

4. The opinion is almost unanimously shared that, with such obstacles and restraints as the foregoing removed, current capacity for the production of conventional fuels can be vastly increased, at additional cost to be sure, but by no means to the stratospheric level required for synthetic fuel production. The production of conventional fuels is far more attractive to private industry than is the commercialization of synthetic fuels with uncertain technologies.

5. In essence, all the proposed incentives would deprive private enterprise of the right to principal or exclusive ownership of foreground technology. The compulsory licensing aspects of the proposed incentives are unacceptable to the majority of private enterprise. The principle involved conflicts with the utilization of "private" enterprise in the process or thereafter.

The foregoing disincentives were almost unanimously identified by the companies interviewed as invalidating the effectiveness of the incentives proposed in Phase III. Although analyses of each of the incentives were made, in practical terms the conclusion is inescapable: with perhaps one exception (a combined loan guarantee and guaranteed purchase) they will not spur private enterprise to the significant planning for or production of synthetic fuels without correlative programs designed to overcome these five disincentives.

Even assuming these "crucial roadblocks" were overcome satisfactorily, most of the Phase III incentives were unpopular with a majority of the companies interviewed, as will be seen from Table 2. It will be observed from column 3 of Table 2, the net "for" minus "against," that, with the exception of the first three preferred incentives, none of the remaining ten were preferred by a majority of companies expressing satisfaction or dissatisfaction with a particular incentive. This is a way of saying that most of the incentives were unpopular with a majority of the companies.

Table 2 employs a ranking methodology which assigns a weight of +1, 0, or -1 to each company response to each incentive, reflecting whether that particular response was primarily in favor, undecided, or opposed to the particular incentive for whatever reason. A number of the company preferences hinged on certain provisos or interpretations which were not specified or stipulated as such by the other companies. Therefore, it was necessary for IPMC to interpret, so to speak, its impressions of the various company responses and related provisos for each particular incentive in order to be able to assign a favorable, no opinion, or unfavorable weight. Where necessary, IPMC has also made judgments as to whether or not certain provisos would be reasonable in the eyes of the government. The weights "for," "undecided," and "against" for each incentive were then added for all companies interviewed, with the results set forth in the fourth column of Table 2. Thus, in the case of the most popular incentive, the 90 percent loan guarantee, there were 9 companies of the 16 interviewed which favored that incentive, 5 which were opposed, and 2 companies which were either undecided or had no opinion regarding it.

Table 2

Overall Preference Ranking

Rank	Incentive Number and Title	"For" Minus "Against" (Net)*	+/0/-*
**1	#4 - Loan Guarantee	+4	(9,2,5)
2≀	#3 - Convertible Grant	+2	(8,2,6)
**3≀	#6 - Guaranteed Purchase/CPFF	+2	(8,2,6)
4	#7b - Guaranteed Price with Loan Guarantee	-1	(4,7,5)
5	#1 - Direct Grant (2/3--1/3) for Pilot Plant	-3	(5,3,8)
6	#7a - Guaranteed Price	-4	(2,8,6)
7	#2 - Direct Grant (1/2--1/2) for Demonstration Plant	-5	(4,3,9)
8	#7d - Guaranteed Price (Alternative with Loan Guarantee)	-5	(1,9,6)
9	#7c - Guaranteed Price (Alternative)	-6	(1,8,7)
10	#5 - Guaranteed Purchase/Fixed Price	-8	(3,2,11)
11	#8b - Limited Price Guarantee/Advance Payments	-8	(1,6,9)
12≀	#8a - Limited Price and Loan Guarantee	-9	(0,7,9)
13≀	#9 - Sale of Options/Guaranteed Price	-9	(0,7,9)

*Weights: For = +1, Undecided or No Opinion = 0, Against = -1.

≀ Tied Ranking

NOTE: Not ranked, but supported positively by all but one company: 100 per cent government financing a la World War II synthetic rubber program. Not ranked, but suggested positively by several companies: 100 per cent government risk insurance.

**Most companies favored a combination of these two incentives.

The third column of Table 2 reflects the difference in the number of favorable and unfavorable reactions; it is simply the algebraic sum of the total favorable, unfavorable, and undecided weights for each incentive. Thus, in the case of the second most popular incentive--Incentive 3, the convertible grant--in which there were 8 in favor, 6 opposed, and 2 undecided, the difference between those for and those against was +2, as noted in column 3 of Table 2.

This second preferred incentive also illustrates the need for incorporating provisos. In this particular case, there were two such major provisos: most of the companies assumed the convertible grant would be extended to cover 90 percent of the cost of a synfuel plant, and further assumed that the convertible grant would also be extended to cover the construction of the first commercial scale plant, not just the pilot and demonstrator plants as stipulated in the Phase II booklet.

Several of the companies based their approval of the first and third most popular incentives, numbers 4 and 6 respectively, on the assumption that the loan incentive would actually be combined with a guaranteed purchase incentive (in all but one case, the CPFF version).

The combined package of the 90 percent loan guarantee and the guaranteed purchase (CPFF) is the most promising, and potentially the most successful of all combinations of the 9 (or 13, including alternatives) incentives discussed with the 16 companies.

The loan guarantee alone would be necessary in the view of many of the companies in order to permit them to construct the first commercialization stage plant for any of the four synfuel technologies. However, the loan guarantee by itself would be insufficient, in the eyes of many of the companies favoring it, since it does not provide insurance against operating risks once the first plant is built. The guaranteed purchase (CPFF) fulfills that need. For this reason, the preferred package of incentives combines the loan guarantee with the guaranteed procurement on a cost-plus-fixed-fee basis.

The preference for the combined 90 percent loan guarantee and guaranteed purchase (CPFF) is reflected by the relatively high popularity of Incentive 7b--the 50 percent guaranteed price combined with 50 percent loan guarantee. Nevertheless, as attested by Table 2, Incentive 7b was held in net disfavor, primarily for the reason that it guaranteed only half of the purchase price and construction loan.

The sole objection to the preferred combination of the 90 percent loan guarantee and full guaranteed procurement (CPFF) is that the government still would not be guaranteeing the first commercialization project on a 100 percent basis: a position considered to be essential by a number of the companies interviewed. The remainder of the construction costs not covered by the government loan guarantee would have to be financed, probably, under equity arrangements which would be too risky for most investors, in the eyes of many of the companies interviewed. It is the desirability of 100 percent government financing of the first commercialization plant, as seen by almost all the companies interviewed, which leads to the conclusion that the favored incentive with all but one of the companies would be Phase I Incentive 7: 100 percent financing by the government similar to the World War II synthetic rubber program.

That preference for the World War II synthetic rubber program precedent is noted at the bottom of Table 2, together with another incentive suggested by a number of companies: 100 percent government all-risk insurance. An all-risk insurance program should be very attractive to the government too, since its cost would be minimal unless a catastrophe were experienced, which is unlikely. It would delay government payments for several years, pending outcome of plant construction and initial operation. It would remove all the uncertainties which hinder all the companies in the development of the first commercial scale plants. IPMC strongly recommends that FEA consider instituting an appropriate government all-risk insurance incentive for synfuel commercialization.

As is apparent from Table 2, the general ordering of the incentives, from most to least favored, reflects increasing financial risk. That is, the financial risk to the companies under the various incentives varies inversely with the rank of the incentive. Incentive popularity is inversely proportional to risk.

Since incentive popularity falls off rapidly after the first three (indeed, Incentive 7a (Rank 6) is almost as unpopular as Incentive 1 is popular), it is pointless to delve more deeply into the last seven incentives of Table 2. It might, however, be noted that the least popular incentives--numbers 11, 12 and 13--are twice as unpopular as the loan guarantee is popular. This fact once again underscores the primary conclusion that the majority of the proposed incentives were unpopular with a majority of the companies interviewed.

It must, however, be re-emphasized that the popularity of the various incentives differed among companies associated with the four

different technologies, and even differed for the same technology among companies of different sizes.

Because many of the companies preferred not to be identified with their comments, it was decided not to make an analysis among the comments of Section III by large and small companies, since in many instances that further distinction, in addition to separation by industry, would make identification of company comments too readily accomplished.

However, it was decided to break down Table 2 by industry. The results are presented in Tables 3 and 4 for the gas and oil companies respectively. Six gas and six oil companies were interviewed, the two together representing three-quarters of all the companies visited. As there were only two utilities and two "others," the statistics were considered too sparse in those cases to merit separate tabulations.

For the record, however, in the case of the utilities the direct grants for the pilot and demonstration plants were the two preferred incentives, sharing first place in the composite utility ranking. The third incentive preferred by the utilities was the convertible grant. The fourth ranked utility incentive was the guaranteed purchase/CPFF. Eight of the remaining nine incentives (with their various alternatives) were equally unpopular with the two utilities interviewed. The least popular incentive with the utilities was, interestingly, the loan guarantee--the most popular of all the suggested incentives with the other companies.

The preferences of the two "other" companies interviewed were even less marked than those of the two utilities. The two "others" preferred the convertible grant and the guaranteed purchase/CPFF, which were equally popular. All the other eleven incentives (including the various alternatives) were equally unpopular with the two "other" companies.

Returning to Tables 3 and 4, the preference rankings of the gas and oil companies respectively, it will be observed that the overall preference rankings of Table 2 closely follow those of the gas companies, as was suggested in the Introduction to this Executive Summary. Indeed, the first three preferred incentives are the same for both the gas companies and the overall preference rankings: the loan guarantee, Incentive 4, was ranked first, followed by the convertible grant and the guaranteed purchase/CPFF, which are equally popular. There are slight ranking differences among the remaining incentives, but nothing of a substantial nature in comparison with the overall rankings.

Table 3

Preference Ranking of Gas Companies

Rank	Incentive Number and Title	"For" Minus "Against" (Net)*	+/0/-*
1	#4 - Loan Guarantee	+4	(5,0,1)
2≀	#3 - Convertible Grant	+2	(4,0,2)
3≀	#6 - Guaranteed Purchase/CPFF	+2	(4,0,2)
4	#1 - Direct Grant (2/3--1/3) for Pilot Plant	0	(2,2,2)
5≀	#7a - Guaranteed Price	0	(1,4,1)
6≀	#7b - Guaranteed Price with Loan Guarantee	0	(1,4,1)
7≀	#7c - Guaranteed Price (Alternative)	0	(1,4,1)
8	#8b - Limited Price Guarantee/Advance Payments	-1	(1,3,2)
9	#7d - Guaranteed Price (Alternative with Loan Guarantee)	-1	(0,5,1)
10	#2 - Direct Grant (1/2--1/2) for Demonstration Plant	-2	(1,2,3)
11≀	#8a - Limited Price and Loan Guarantee	-2	(0,4,2)
12≀	#9 - Sale of Options/Guaranteed Price	-2	(0,4,2)
13	#5 - Guaranteed Purchase/Fixed Price	-4	(1,0,5)

*Weights: For = +1, Undecided or No Opinion = 0, Against = -1.

≀Tied Ranking

Table 4

Preference Ranking of Oil Companies

Rank	Incentive Number and Title	"For" Minus "Against" (Net)*	+/0/-*
1	#4 - Loan Guarantee	+3	(4,1,1)
2	#7b - Guaranteed Price with Loan Guarantee	+1	(3,1,2)
3≀	#3 - Convertible Grant	-2	(2,0,4)
4≀	#5 - Guaranteed Purchase/Fixed Price	-2	(2,0,4)
5≀	#6 - Guaranteed Purchase/CPFF	-2	(2,0,4)
6≀	#7a - Guaranteed Price	-2	(1,2,3)
7≀	#7d - Guaranteed Price (Alternative with Loan Guarantee)	-2	(1,2,3)
8≀	#1 - Direct Grant (2/3--1/3) for Pilot Plant	-4	(1,0,5)
9≀	#2 - Direct Grant (1/2--1/2) for Demonstration Plant	-4	(1,0,5)
10	#7c - Guaranteed Price (Alternative)	-4	(0,2,4)
11≀	#8a - Limited Price and Loan Guarantee	-5	(0,1,5)
12≀	#9 - Sale of Options/Guaranteed Price	-5	(0,1,5)
13≀	#8b - Limited Price Guarantee/Advance Payments	-5	(0,1,5)

*Weights: For = +1, Undecided or No Opinion = 0, Against = -1.

≀Tied Ranking

In the case of the oil companies, Table 4, the preferred incentive once again is the loan guarantee; however, the second most popular incentive was number 7b, the combination of the guaranteed price and loan guarantee on the 50 percent basis. As noted before, the combination of the 90 percent loan guarantee and the guaranteed purchase/CPFF was the most popular incentive combination; this fact is merely supported by the oil companies' preference for Incentive 7b.

Three incentives which to the oil companies are of equal attractiveness--the convertible grant, the guaranteed purchase/fixed price, and the guaranteed purchase/CPFF--also were ranked highly by the gas companies, although with a slight difference in preference ranking.

Perhaps the major difference between the oil companies' preferences and those of the gas companies relates to the direct grants for pilot and demonstrator plants. As will be seen from Table 4, those two OCR-type incentives were ranked toward the bottom of the oil company list, in positions eight and nine (the two being held in equal disfavor). But even that ranking is not far from the Table 2 ranking of five and seven for the pilot and demonstrationplant grants, respectively.

The other rankings show only small differences between the overall rankings and those of the gas companies, as would be expected.

IPMC concludes that there were no substantial differences in priorities between the gas and oil companies. Both preferred the combined incentive package of the 90 percent loan guarantee and guaranteed purchase/CPFF. Only the utilities disliked the loan guarantee incentive, and even they were attracted by the guaranteed purchase/CPFF incentive.