

**IMPLICATIONS
OF
NEW ENERGY DEVELOPMENTS**

*A report for the
Minister of National Development
and the
New Zealand Planning Council*

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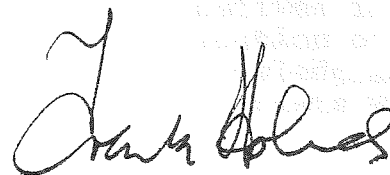
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FOREWORD

This report, prepared by Graeme Thompson and Chris Livesey of the Planning Council Secretariat, Norman Macbeth (Consultant) and myself, is part of a larger study of investment issues being prepared for discussion by the Planning Council. It is a report on some of the wider implications of energy development based on Maui gas, but clearly not a comprehensive discussion of energy or natural gas issues as a whole, or of the merits of particular projects and development programmes. The report was made available a few weeks ago to the Government, through the Minister of National Development, and to the Leaders of other parties in Parliament, to supplement other studies in Maui development.

Although the full Council has not debated the issues discussed in the report, it has authorised me to publish a slightly condensed and edited version of the document to facilitate public discussion on proposals clearly of great importance to New Zealand's development in the 1980s.

The Council's full report on investment issues will be published soon. The Council would appreciate comments on any aspects of this document on energy development which readers feel should be reconsidered in the larger work.



Frank Holmes
CHAIRMAN

Part 1

INTRODUCTION

This report arises from a study which the Planning Council is making of investment issues. The Minister of National Development and Energy, Mr Birch, asked whether work on the implications for the economy of large-scale investments in energy development could be accelerated. The Council gave the Chairman authority to do this. The report prepared by the Chairman, Sir Frank Holmes, with the assistance of Graeme Thompson, Norman Macbeth and Chris Livesey, was submitted to the Minister on 15 August 1979.

The Minister made a major policy statement on September 13 on the use of gas from the Maui field,* and acknowledged the assistance received from the Planning Council. As a matter of public interest, the Council has decided that publication of the report should not be delayed until the full study of investment issues is completed. It has thus authorised the Chairman to issue the document, making it clear that this is an interim report by himself and his colleagues, which will be thoroughly debated by the full Council when it considers the completed study.

This report is an edited version of the report to the Minister incorporating revisions and amendments made as a result of its earlier restricted circulation and excluding all confidential information. We acknowledge the assistance which was given by government officials in several departments, by executives in several companies involved in the production and distribution of energy and in the construction industry, and by other knowledgeable individuals. Responsibility for the report, of course, rests with the authors.

* Appendix A.

PART 2

ENERGY DEVELOPMENTS

The major energy developments with which we shall be concerned in this report are those based on natural gas. By making the best possible use of the large gas deposit in the Maui field - and of the smaller Kapuni deposit - New Zealand will be able to insulate itself, to some extent, against further increases in prices of imported liquid fuels over the next decade.

For the purpose of this exercise, four options were examined:

I: Minimum investment Projects already authorised, or implicit in current policies. These projects should reduce New Zealand's dependence on imported fuels from 85 percent to about 70 percent by 1985.

IIA: 50 percent self-sufficiency The projects examined under this option should enable New Zealand to reduce its dependence on imported fuels to about half the country's requirements by 1989 (and to about 55 percent by 1985).

IIB: Exports of energy Exports along with the projects in IIA.

III: Maximum self-sufficiency The projects outlined under this heading will provide for about 80 percent of the country's fuel requirements by 1989. One hundred percent self-sufficiency could be achieved by then, or perhaps a few years later, by the development of even more expensive sources of energy (solar heat, biomass, synthetic liquid fuels from coal). These more distant prospects have not been included in this study.

A brief description of the main projects making up each energy option follows. A key to the projects and the detailed calculations relating to each option are shown in Appendix B.

Option I

Extensions to Marsden Point refinery, including installation of a catalytic cracker (henceforth referred to as Project 1.1).

Construction of an ammonia-urea plant by Petrocorp (2.1).

Pipeline extensions by the Natural Gas Corporation from Huntly to Auckland with spurs to Kinleith and Kawerau (3.1).

Conversion of major industrial consumers - and domestic consumers - on the pipeline route from imported fuels to natural gas (4.1).

Conversion of 150 000 vehicles from petrol to dual petrol - CNG capability (5).

Conversion of 25 000 vehicles from petrol to dual petrol - LPG capability (6.1).

Expansion of public transport system and conversion of vehicles from imported liquid fuels to gas or electricity (7.1).

Exploration - \$25 million p.a. (13).

Research and development - \$5 million p.a. (14).

Option IIA:

Refinery extension (as in 1.1) plus hydrolytic cracker.

Ammonia-urea plant (as in Option I 2.1).

NGC pipeline (3.1) plus extension from Auckland to Marsden Point (3.2)

Conversion of industrial and other consumers (4.1) plus further conversions made possible by pipeline extension (3.2) above (4.2).

CNG conversions as in Option I (5)

LPG conversions: 40 000 vehicles in 5 years (6.2)

Public transport: as in Option I (7.1)

Methanol - construction of plant with capacity of 2500 tonnes per day (9.1)

Exploration (13) and research and development (14) as in Option I.

Option IIB

All projects listed under IIA, above plus Maui B (8), and investment in liquified natural gas for export (12).

Option III

Refinery expansion as in Option I (1.1)

Ammonia-urea plant (2), CNG conversions (5), Exploration (13), Research and development (14) as in earlier options.

Other petrochemical projects (2.3).

Pipeline extension as in Option II plus extensions to East Coast, N.I. and South Island main centres (3.3)

Conversion of more industrial consumers to natural gas (4.3)

LPG conversions: 150 000 vehicles in 10 years (6.3)

Public transport: \$40 million p.a. for 10 years (7.3)

Construction of Maui B platform (8)

Methanol: construction of plant(s) with capacity of 6000 tonnes per day (9.3)

Synthetic petrol plant - Mobil process (10)

Synthetic diesel/Petrol plant - Arge process (11)

The order of magnitude of investment in each of the four options may be judged from the following table:

TABLE I

SOME IMPLICATIONS OF ALTERNATIVE ENERGY OPTIONS

<u>Options</u>	I	IIA	IIB	III
	\$(million)			
<u>Investment</u>	1028	1325	3125	3453
Public sector	363	407	812	1061
Private sector	665	918	2313	2392
Overseas expenditure	538	773	2318	2222
Local expenditure	490	552	807	1231
<u>On completion of projects</u>				
Import savings p.a.	285	387	412	1200
Extra exports p.a.	5	172	270	20
Net factor payments* p.a.	81	116	348	333
Extra freight cost p.a.	1	35	105	5
<u>Labour requirements</u>	number of jobs			
Construction (av. annual)	2040	2400	2000	2700
Extra jobs created	400	800	1500	3000

* Calculated as 15 percent of the overseas expenditure in each option.

The preceding table, while it enables quick comparisons to be made, is in no sense a comparative cost-benefit study. In the first place, the options are not all co-terminous. Thus, the full benefits purchased by the expenditure under Options I, IIA and IIB are not all apparent by 1985, but more of them are reflected under Option III.

A general caution about the approximations necessary to produce this table - and, indeed, all the figures in this report - is appropriate. Several of the projects, particularly those of more recent origin, have not been costed, even by their proponents. They have been included in this exercise if only to suggest that further investigation is warranted. The Mobil and Arge plants were included in Option III only to allow for synthetic fuel development and not to suggest any preferences for these processes over alternatives such as the Fischer-Tropz process, the cost of which would be of the same order.

The net factor payments calculated for each option are a reminder of New Zealand's continuing balance-of-payments difficulties. Virtually all the overseas expenditure required for any project (and energy projects tend to have a high overseas content) will have to be borrowed abroad, and the borrowings will have to be

serviced - either from increased exports or from import savings.

An attempt has been made to assess the timing of expenditures on the various options if their proponents proceeded as presently intended, without any attempt by Government to get them to programme their operations to avoid national or regional problems. Especially as some of the projects are by no means yet fully developed, this exercise involves some rough judgements. However, it does suggest the possibility of a bunching of expenditures from 1980-81 to 1982-83, which should be taken into account by those concerned with policy decisions.

Indicated expenditure under Option III - the most extensive option under consideration in this study - rises from \$200 million in 1979-80, to \$600 million in 1981-82, before declining to \$170 million a year from 1986-87 to 1988-89. This option calls for a maximum labour force of 7000 (in 1981-82) directly engaged on energy projects; no account has been taken of secondary effects on the demand for labour, which would be considerable in small localities such as Oaonui or Marsden Point.

Even the minimum investment scenario (Option I) envisages considerable fluctuations in annual investment: from \$160 million in 1979-80, to \$309 million in 1981-82, to \$120 million in 1983-84. Labour requirements range from 1300 in 1979-80, to 3600 in 1981-82, to 800 in 1983-84,

The broader economic effects of two of the major projects under earlier consideration were chosen for study by the Ministry of Works and Development, which has developed an Investment Impact Model for such purposes. The effects are described in more detail in a departmental publication* which is summarised below.

The two projects are the building of a large synthetic fuels plant (included in Option III of this report) and the establishment of an LNG export facility based on Maui gas (Option IIB). Although the export of LNG has since been ruled out by the Government, the exercise is still useful in illustrating the constraints and effects on the rest of the economy of large investments in energy. These large capital-intensive projects initially restrain economic growth, but subsequently lead to an increase in the level of GDP of several percent, depending on the project and on economic circumstances, the authors found. "In either option, import volumes and the current account deficit are increased during the construction period but the deficit decreases significantly after the plants are commissioned. It seems clear that the economy can sustain the period of heavy expenditure."

Other energy developments (including stockpiling)

We have not attempted to include in the report at this stage other possible energy developments such as the utilisation of coal reserves. It has been suggested to us that it would be highly desirable to move quickly into the production of ethanol from plants, whey, or wood-wastes. It is argued that several small plants built in different parts of the country could make a more

* The Economic Impact of Maui Gas Options Sept. 17, 1979 S.J. Gale, Ministry of Energy. H.E. Grant and A.W. Smith, Ministry of Works & Development

rapid contribution to saving exchange than the larger plants considered here. We have not made any provision for such developments in our present analysis.

We have made the assumption in the next section of our report that hydro-electric power development will continue, but at a reducing rate, with the commissioning of some major projects deferred. Given the probability of a considerable surplus of electric power supply over likely demand for some years, there is obviously room for debate about the construction programme which we have assumed. It will no doubt be reviewed in the context of an overall strategy for energy development.

The Government's decisions on investment in energy development will be influenced by the view it takes on the prospect of future interruptions to supplies of crude oil and other liquid fuels brought about by political factors - such as the recent suspension of supplies from Iran. The Council has no special competence in this field, but we have examined the cost of insuring against any interruption to the supply of imported fuel requirements.

Stockpiling options (e.g. the accumulation of extra supplies of crude oil) can be tacked on to any of the options as a hedge against rising prices abroad, or interruption to normal supplies.

It is perfectly feasible at any stage for the Government to decide to build a stockpile of, say, 3 months supply (defined either as 3 months feedstock for the Marsden Point refinery or as crude oil sufficient to provide for a quarter of the country's total consumption of petrol and petroleum products). Without any further construction, existing storage facilities are considerable: Marsden A & B (140 000) tonnes, New Plymouth (100 000 tonnes), Otahuhu (60 000 tonnes) and Whirinaki (30 000 tonnes).

In addition, crude oil or refined products could be stored in large oil tankers purchased or leased for this purpose. A tanker of 110 000-120 000 tonnes capacity costs about \$30 million in today's market and would be leased for about \$3 million per annum. Anchored in sheltered water, the tanker would be able to deliver its cargo at short notice to the Whangarei refinery. The cost of stockpiling 3 months petroleum in this manner would be about \$300 million, virtually all in foreign exchange, incurred in the year of decision.

OTHER INVESTMENTS

In addition to the energy developments which we have discussed, there are a small number of large development projects, mainly export oriented, which require mention because they would, if approved, compete to some extent for construction and other resources required for energy development. Five possibilities have been suggested to us and are listed as examples only, with assumed costs:

	\$(million)
a. NZ Steel expansion	455
b. Ferro-silicon plant, Southland	100
c. CSR/Baigent Mill, Nelson	60
d. Cement plant, Oamaru	75
e. Comalco third pot-line	160
	<hr/>
Total	850
	<hr/>

These or other projects of this order of magnitude must be considered as part of the emerging programme of major capital works. Like the main energy projects they would be capital-intensive, involving substantial foreign exchange costs and increased imports of capital goods. They would call mainly on foreign and domestic private capital and make little direct claim on public sector resources. They would add, however, about \$850 million to total investment outlays, most of this in the years 1980-84.

Energy developments and the other major projects, however large, will account for only a small proportion of total investment outlays in the 1980s. Changes already being promoted in the structure of the economy, to make it more export-oriented, productive and competitive, will stimulate much other new investment. Recovery from the protracted period of low growth, high inflation and unusually high interest rates will be accompanied by increased private sector investment throughout the economy, if past experience is any guide. The energy programme has to be assessed in this broader investment perspective.

Investment Patterns

Investment spending in New Zealand has historically ranged between 20 percent and 25 percent of GDP. Five-year averages show remarkably little variation: between 1952 and 1977 the 5-yearly average has varied only between 22.1 percent of GDP and 23.6 percent. The public sector (which includes local bodies and trading organisations, such as Air New Zealand) has accounted for about 35 percent of all investment -- a lower proportion than in earlier decades. About one-third of public investment is for administrative and social services, one third for electricity, gas, water and communications, and the rest in other market sectors.

Public investment comprises a large proportion of total investment in transport, forestry, mining and quarrying, finance and insurance - but a small proportion in other market production sectors, particularly agriculture and manufacturing. Public investment, with the principal exception of investment in electric power generation, has failed in recent years to match the growth in GDP.

In 1971-72 to 1977-78 private investment accounted for about 65 percent of all fixed investment but one-third of this was spent on private housing and a significant amount on private non-profit services - churches, clubs, etc. Only about 40 percent of total investment represents private investment in areas which contribute materially to growth in domestic output, e.g. manufacturing, agriculture and the trade sector.

Table 2 shows the figures for public and private investment by type of capital goods in 1976-77.

TABLE 2
INVESTMENT BY TYPE OF CAPITAL GOODS 1976-77*

	Private		Public**		Total	
	\$ (million)	%	\$ (million)	%	\$ (million)	%
Residential Building	765	23	76	2	841	25
Non-residential Building	387	11	336	10	723	21
Other Construction	96	3	345	10	441	13
Land Improvements	44	1	15	1	59	2
Transport Equipment	365	11	103	3	468	14
Machinery, Plant and other equipment	532	16	318	9	850	25
Total	2 189	65	1 193	35	3 383	100

* Provisional figures

** Central and local government; includes all Government enterprises

The Planning Council's review of recent investment patterns suggests, in brief:

- (a) that New Zealand investment levels have been high in relation to the rates of growth obtained;
- (b) that the allocation between types of investment may have contributed to relatively low growth; in particular, our growth has been constrained by shortages of overseas exchange, indicating that not enough investment has been directed to earning overseas exchange or providing effective substitutes for imported goods and services.

- (c) that while investment in housing has not seemed excessive, the complementary investments in suburban development and associated facilities may have been costly to the economy;
- (d) that investment in non-residential building does seem to have been high, but that this and new housing construction could both now decline in importance as a consequence of demographic and social change;
- (e) that because of the weight of construction in total investment, inefficiencies or delays in this industry will lower the returns on investment as a whole;
- (f) that although the proportion of New Zealand investment in new machinery and equipment seems on the surface to be adequate, it may be comparatively low when the costs of imported capital goods are taken into account;
- (g) that investment in new machinery and equipment, especially in the manufacturing and agricultural sectors, is a critically important area for economic restructuring.

Recent investment performance

There is room for considerable improvement in New Zealand's investment performance in the 1980s. The more we can improve the efficiency of our construction industries and make better use of the capital we install, the easier it will be to manage the investment projects which we are considering, while continuing to improve personal living standards and public services.

We have been operating at investment levels well into the middle ranges for the more developed economies, yet our production and income growth has been disappointingly low. In the decade to 1975-76, for example, the ratio of investment to GDP averaged nearly 23 percent and real growth of GDP 3.3 percent. The increase in productivity was negligible. During the decade the net capital stock grew by an estimated 44 percent, while GDP rose 39 percent. Since 1975-76 there has been almost no growth in output, and investment has declined.

The reasons for this performance lie largely in the way we have made investment decisions and then used the capital we have available. The low level of capital utilisation is one reason for the poor returns on investment - many factories, shops and public facilities are much less intensively used than in other countries because of single shift operation, restricted shopping hours or other established practices. The investment process itself is often costly, because of the generally long gestation periods for investment - delays in approvals, in construction or in obtaining and installing capital equipment from abroad. A third area of concern is that investment decisions, are often made without adequate prior analysis, and sometimes in the public sector which accounts for about one-third of investment, on doubtful economic grounds. It is also argued that public policy, particularly in its regulatory aspects, distorts the allocation of private sector investment and reduces the return to investment in the economy as a whole. Thus policy changes would contribute to improved performance in the future.

Prospects

Investment activity is currently at a relatively low ebb after a steady decline from 1975. Lags in the investment process kept it moving for some time after the end of the 1972-74 boom, and have left considerable unutilised capacity. Recent consumption-led growth in demand has stimulated little new investment. The latest New Zealand Institute of Economic Research forecasts suggest limited growth of investment at current prices. In real terms the decline has been severe and is not yet arrested.

TABLE 3

Investment, 1975-76 to 1979-80

	1975-76		1976-77		1977-78		1978-79 *		1979-80 *
	\$(m)	% change	\$(m)	% change	\$(m)	% change	\$(m)	% change	\$(m)
Private	1904	18	2244	-10	2017	1.5	2050	13.5	2330
Public	1224	-1	1204	14	1376	10	1515	6	1605
TOTAL	3128	10	3448	-2	3393	5	3565	10	3935

Investment / GDP	Percent				
	27	25	23	20	20

* NZIER estimate

In the private sector, investment is based on confidence in the future. Currently this confidence is low. Five factors in particular seem to be inhibiting new investment.

Low domestic demand.

The industrial relations situation.

Concern about the future of the balance of payments and therefore about a continual foreign exchange constraint on growth.

Expectations that the profitability of investment could be undermined by inflation.

The present level and uncertain future of interest rates.

Success in current efforts to boost exports and stabilise the domestic economy will restore investment confidence and stimulate spending on new capital assets. A cyclical upswing which restored the average New Zealand investment ratio would imply extra investment of a least \$500 million in 1979 prices.

Several factors, however, will limit the expansion of private investment for the domestic market by large or small enterprises. Shortage of overseas exchange is likely to remain a problem for some time, requiring restraint on activities which do not contribute to dealing with the shortage. Macro-economic policies must be designed to contain the increase in consumption (and the consequential investment)

to a level determined by our success in increasing our foreign exchange earning capacity. The greater our success in this area the faster the rate of growth permissible in consumption and the investment required to supply it.

In the short term, oil price increases will aggravate our balance of payments problems and limit the possibilities for consumption and income growth. The impact will include the effects of more costly oil on the prices of non-oil imports, on invisibles payments and possibly on export prices as our trading partners adjust to the new situation. A considerably larger deficit on overseas exchange transactions must now be forecast. Efforts to reduce oil consumption in New Zealand - carless days, closed weekends, price increases - will also have some impact on domestic economic activity, even if the conservation measures are directed mainly at private motorists. The combined effect will be to extend the already protracted period of economic recovery from the 1975 recession.

In addition, the changed demographic trends will exert a powerful longer term influence. In the 1970s residential building accounted for about one-third of private investment outlays and over 20 percent of total investment. The housing requirements of an expanding population also involved much complementary investment in land development, the provision of roads and services, and associated facilities. With the population static, there has been a very substantial decline in new housing development. There will not be much recovery if the population continues to grow very slowly. In addition, higher transport costs will have an impact. Social attitudes seem to be changing - for example towards a preference for modification of existing homes, for higher-density living, or for greater flexibility. Finance is not so much directed as in the past towards new rather than existing houses. Such trends would have considerable implications for the capacity to finance new investment in other fields.

Slower population growth may also reduce requirements for more non-residential building, including the commercial and public office buildings which have absorbed substantial investment funds. Hospital and school building programmes can be reduced without detriment to health or education services. Further economies would be possible if existing non-residential building could be more effectively used.

On the other hand, recent government initiatives have been designed to encourage more investment in priority activities and to accelerate economic change. The measures include the introduction of much more flexible monetary policies, changes in transport policy, measures to encourage agricultural exports which include the supplementary minimum prices scheme, the relaxation of price controls, a new system of export incentives for manufacturing and service industries, the introduction of a flexible exchange rate regime, and the first steps towards modifying the import licensing system.

Private sector investment trends will be determined by the interaction of all the influences noted above.

We should expect substantial growth in priority areas of investment, especially in the plant, machinery and other equipment needed to increase foreign exchange earnings, and much more modest increases in

other private investment, including housing.

In the public sector, investment except in energy has tended to decline as a proportion of total investment and of GDP. This has occurred partly through the shift of investment into the private sector, e.g. reduced state housing activity, and a decline in the relative importance of railways as a transport mode, and partly because of increased emphasis on labour-intensive services and less on physical facilities in some Government programmes. As noted in the Council's report on the Welfare State, capital expenditures by central government have been relatively restrained and local authority expenditures (excluding those of hospital and education boards) have also declined as a proportion of GDP in recent years.

We expect these trends to continue and to be reinforced by the change in the demographic patterns. The most striking prospect is that of a reduction in primary school rolls of 19-28 percent by 1989. Generally, low population growth would ease the pressures for expansion in a number of areas of public sector investment. Greater emphasis on the flexible delivery of social services, as recommended by the Council, would itself reduce capital requirements. Moreover, there is scope for more effective use of many existing public facilities. There are some signs of deferred development, e.g. in local and regional schemes for water supply and waste disposal, and the improvement of transport facilities will command some priority. However, the overall prospects are for little if any growth in public sector investment, in real terms, in the next 5 years. The public sector works programme, which incorporates the bulk of public investment, could on present indications be smaller in real terms in 1985 than it is at present.

With positive policies to stimulate priority activities, total investment could rise by, say, 3-4 percent per annum in real terms, during the period 1980-85, reaching about 22% of GDP. However, this is unlikely to occur without continued stimulus by Government.

Taken together, the demands for finance and construction skills (other than for the large-scale projects identified in Part 2 of the report) seem likely to be within the capacity of the economy. Because of the lower growth to be expected in some forms of investment - residential and non-residential building and other construction, for example - there should be adequate scope for New Zealand participation in the financing of energy development and other large-scale projects planned for the 1980s.

IMPLICATIONS OF ENERGY DEVELOPMENT

The programme of new capital works outlined in Part 2 would cost between \$1.9 billion and \$3.1 billion in the period 1980-84, depending on the option chosen with a further investment of up to \$1.2 billion by 1989. This is an exceptionally large programme by New Zealand standards big enough to alter the pattern of past investment and the balance of the economy.

Growth of investment relative to GDP

As stated in the previous section we expect investment other than in the specified large-scale projects to increase in real terms, in the early 1980s, to perhaps 22 percent of GDP led by private sector investment in machinery, plant and other equipment in export-oriented activity, to sustain the real growth in foreign-exchange earnings needed to relieve the balance of payments constraint. This process cannot be delayed.

New energy development and the other major projects would, on the figures used above, add amounts equivalent to between 2 and 3 percent of GDP to the investment programme.

This investment is designed to make New Zealand stronger and more secure in the long run. But before the benefits are derived, considerable human effort and enterprise and a large expenditure on domestic and particularly imported resources will be required. Unfortunately, our rate of economic growth is currently running below the 3 percent increase of real domestic product which the Planning Council considers feasible for the decade of the 1980s as a whole. Policy up till now has been directed to reducing our dependence on overseas borrowing, by reducing the deficit in our balance of payments. This deficit was equivalent to over 14 percent of GDP in 1974-75; it is likely to be between 4 and 5 percent of GDP this year; and the Planning Council has previously advocated that it should be reduced to about 2-3 percent of GDP, on average, by about 1983. To get this deficit down requires domestic spending to grow less rapidly than domestic output. This is one reason why the Council advocated that the growth of government spending overall should be held to about 2 percent annually over the decade, or even less if the 3 percent growth of GDP were not achieved. It also implies a relatively slow growth of personal consumption in the short run.

While low population growth is expected over the next decade (an average of between 0.35 percent and 0.66 percent a year, depending on the alternative assumptions now being used) the Department of Labour forecasts indicate a potential growth rate in the labour force of 1.8 to 2.0 percent a year.

To allow for any significant increase in disposable incomes, per member of the labour force, they will have to rise by more than this. The acceptable minimum is a matter as much for political as economic discussion. Recent experience strongly suggests that no sustained period of static or declining incomes is likely to be acceptable or consistent with a stable industrial relations situation. Accommodating the desire for some increase in real disposable incomes, in

a period of slow economic growth and balance of payments adjustment, will limit the capacity to finance new energy investment other than by the use of foreign capital.

Overseas Finance

In recent discussion of investment issues, the Planning Council considered that there were limits to the extent to which the additional investment requirements of the energy programme should be financed through reductions in potential consumption growth, and that recourse to the use of foreign capital would be an appropriate means of filling the gap between domestic financing capabilities and the whole cost of the energy programme. They recognised that the increased imports of capital goods which could be financed by foreign capital, and the costs of servicing, would at least temporarily enlarge the balance of payments deficit on current account, and deter the achievement of the aim of keeping it at about 2-3 percent of GDP. They saw no objection to this if it were directly related to major projects designed to reduce import dependence or increase exports in the medium term. New Zealand should be able to borrow overseas or to attract direct foreign investment for projects which are profitable and which will clearly generate earnings or savings of overseas exchange which increase the country's capacity to service the debt. All the major projects have the potential to earn or save enough foreign exchange to recover the foreign currency costs, and thereafter to make a major contribution to the balance of payments.

The break-down into overseas and local expenditure in the tables in Part 2 of this report is necessarily arbitrary. Virtually every development project includes some items of equipment which can be supplied either locally or from overseas. Price is not always the crucial factor in deciding whether to import; delivery dates are sometimes so critical that a contract may have to be let to an overseas supplier who can promise early delivery.

As a rough measure of the speed at which overseas expenditure involved in each option might be recovered, the import savings (plus extra exports, minus net factor payments and extra freight costs) resulting from each option may be compared with the overseas expenditure listed under the option.

This calculation shows a net return of \$208 million per annum in overseas earnings and savings for the investment of \$538 million in overseas funds under Option I; the outlay will have paid for itself in 2.6 years. (This calculation is not to be confused with the more precise discounted cash flow concept, as no allowance has been made for such factors as the lapse of time between the payment for imports of equipment and the commissioning of the plant).

On the same basis, overseas expenditure on Option IIA projects would be recovered in 1.9 years, on Option IIB projects in 8.2 years, and Option III projects in 2.6 years. If the minimum repayment term were the overriding criterion, Option IIA would be the preferred course of action.

A major problem is that the net benefits of large scale development projects yet to be initiated will not begin to be felt on the balance of payments until well into the 1980s, and the full

impact possibly not until the 1990s. This leaves a substantial period when, like North Sea oil, preparing for the utilisation of Maui gas will involve net cost rather than net benefit to the balance of payments. It is particularly important that other measures to relieve New Zealand's well-known balance of payments constraint are not hindered by the energy development programme over the next 5-7 years.

The expenditure profiles of the major projects in Part 2 indicate that, in the absence of more deliberate programming, there could be some bunching of overseas expenditure between 1980-81 and 1982-83. There is also some bunching in the repayment schedule for official debt during the same period. However, those responsible for debt management will not doubt be consulted in the process of decision-making on the major projects. With proper planning, there seems no reason why the servicing and repayment of official debt should cause any serious constraint on the timing of the investment programme.

As for the balance between official borrowing overseas and direct foreign investment, we see this as something to be decided primarily on a project-by-project basis.

At the minimum, direct investment is needed where it gives access to processes, to technical or managerial expertise, or to overseas markets. This may be of particular importance where technologies new to New Zealand (or internationally) are involved. It may also give some assurance as to the commercial viability of the projects, always provided that the foreign investor is actually risking capital in the venture and not being guaranteed a specified rate of return on the funds employed. Foreign investment can cost less than borrowing in terms of overseas exchange payments if, as is often the case, the profits remain to be reinvested within the country. However, the delays often involved in negotiating with particular foreign companies, and sometimes the terms on which they will invest, can reduce the returns to the economy.

Borrowing is quicker, although this is no advantage if it permits hasty decisions or inadequate consideration of the profitability of the investment in economic, if not in financial, terms. There is a major role for overseas borrowing in providing the equity which may be desirable in many large projects to ensure that New Zealand interests are served. The limits lie in the capacity to service overseas debt during the lengthy gestation periods of the longer projects.

Either full public ownership or 100 percent overseas investment may be appropriate for certain projects, but these could be the exception in a development programme which should, as far as possible, combine the advantages to be gained by joint New Zealand (public or private) and foreign involvement.

It was the view of the Planning Council in discussing these issues that public sector and other major project proposals should wherever possible be subject to formal appraisal procedures not just to determine their technical feasibility but also to assess the expected rates of return, estimate regional, environmental

and other impacts, calculate the risks, and indicate the weight given to non-measurable factors such as security of supply. They saw a careful assessment of risks as an integral part of the evaluation process for large projects. This would apply especially to those projects involving exports, or the introduction of new technologies, whether or not foreign capital was to be involved.

Manpower and Industrial Relations

In some of its aspects the energy programme will be quite labour-intensive. This applies principally to the vehicle conversion and gas distribution elements of the programme and industrial conversion to gas. Most of it, however, will consist of large, capital-intensive projects with a high import content. Relatively small numbers of workers will be required, although heavy demands will be placed on skills in short supply. The non-energy projects listed in Part 3 are also of this type. In the past only a few projects of this type have been implemented. The hydro projects which formerly dominated our energy programme have relatively high domestic content and large labour requirements - typically 40 percent of the costs are for labour and another 35 percent for local materials also with considerable labour content. The phasing down of the power programme will reduce the requirements for construction workers, equipment and professional skills.

The new energy developments will directly generate comparatively little new employment. Construction and installation of the main plants may require perhaps 2 or 3 workers per \$1 million of investment. The maximum direct labour requirement in the options listed is about 7000 in 1981-82 for Option III and that is comparatively short lived. There will, of course be indirect requirements e.g. for supplies, transport and other services. More important the eventual strengthening of the country's overseas energy position will provide a better basis for sustained expansion of domestic demand generally, and therefore for increased jobs to satisfy that demand.

Those whom we have consulted in the New Zealand construction sector do not foresee problems in New Zealand industry's ability to supply domestic inputs for the energy development envisaged. The downturn in construction has left many suppliers with under-utilised capacity and management skills. The same applies to their own management and design teams. However, even though the direct labour content of the projects is relatively low, management in the construction sector sees availability of manpower with the required skills and the maintenance of good industrial relations as the fundamental issues to which attention must be paid if a large project is to be effectively carried through.

The problem is complicated by the severity with which the construction sector has been hit by the current recession of activity, and by the consequent loss of skilled people which this has involved. The changing nature of the energy programme will be superimposed on other structural changes which have been occurring in the sector, which we discussed in Part 3.

The industry adjusts rather quickly to a reduced level of activity. This is indicated both by the low rates of registered unemployment

among carpenters, electricians and others with construction skills and the large net emigration in these categories. Only general labourers are readily available.

This makes it difficult for the industry to cope with any rapid increase in demand. Experience of the 1972-74 construction boom suggests that it is prudent to think in terms of an upper limit to the capacity of the sector to expand. The MWD Development and Programming Branch consider that this upper limit may be of the order of 10 percent per annum. The indications from their programming model are that this constraint could operate in 1980-83 even without major energy investments, if there is the desired growth of investment in agriculture, manufacturing and other foreign exchange earning activity.

Moreover, the shift towards specialised construction will involve other constraints. On average, 75-85 percent of the work required for residential and non-residential building involves carpenters, plumbers, bricklayers, painters, electricians and similar skills. For civil and electrical engineering work this proportion is only 10-15 percent, and for chemical engineering probably even less. The pressures will therefore bear heavily on a small segment of the construction industry.

The construction skills involved are largely of a mechanical and electrical nature. Because of New Zealand's limited industrial development in recent years there is a limited number of people skilled in these trades. Past efforts to overcome the shortages by immigration, particularly in the boilermaking and rigging disciplines, have not always proved as beneficial as expected, because of difficulties in relationships between management and workers.

Skilled labour supply problems could be compounded by the probable upsurge in industrial construction in Australia while New Zealand is trying to expand. This could attract and hold New Zealand labour and make it difficult to attract Australians. What is clearly required is an effort through New Zealand overseas posts and by other means to secure the additional skilled workers, preferably New Zealanders, who will be essential as the programme gathers momentum.

There is also a need to accelerate training programmes and to devise new and effective ways to produce a larger supply of skills domestically. Consultations with unions, companies and training institutions should be initiated without delay if they are not already underway.

We believe that the issues call for special consideration by the Minister of Labour and officials. The capacity constraints cannot be ignored and the industrial relations problems, if not sensitively handled, could raise costs, extend construction times, lower economic and financial rates of return, and postpone foreign exchange benefits. It is essential that the manpower and industrial relations aspects be analysed thoroughly in the pre-project planning stage, in order to avoid interruptions, delays and other problems which will result in escalating costs. It has been represented to us that a negotiated contract, preferably with enterprises knowledgeable about New Zealand conditions, is

superior to an open tender in giving adequate lead time for such planning.

Apart from specific skills such as those of boilermakers, riggers and welders there will be increased demand for general tradesmen including electricians, labourers, engineers and fitters. Shortages may be regional e.g. Whangarei, New Plymouth, as well as national. To meet the former, there may need to be an emphasis on off-site work such as prefabrication, assembly and the use of modular construction methods.

This is itself an area of shortage of skills. Fabrication off-shore, i.e. in other countries, is also a possibility but would increase the already large foreign exchange component of the programme and carry some risk of repercussions on the domestic industrial scene.

Plant erection costs are large enough when construction proceeds smoothly. Project delays resulting from labour problems can have a profound effect on the overall completion schedule and erection costs. Problems deriving from the national industrial climate as well as job site relations are important. Part of the construction force has been itinerant in the past, with an interest in getting maximum benefits over limited periods of employment. It probably makes sense to try to minimise this component by getting as much work as possible done by long-term employees, preferably resident in the area. Camps on or near the construction site are recognised as a focus of construction problems.

The use of overseas construction teams, in special circumstances, has not caused major problems in the past, but this approach to overcoming constraints has been used selectively and only occasionally. There does not seem to be any fundamental union objection to the use of highly specialised overseas skills, and this is recognised as providing opportunities for developing them domestically, for subsequent projects. In the present industrial relations environment, however, any major attempt to use foreign labour to overcome constraints within New Zealand could be self-defeating, arousing widespread resistance and delaying rather than accelerating the completion of major projects.

It is pertinent to reiterate that, in the past, we seem on average to have taken longer to complete investment projects than is usual in many other countries. High capital costs put the enterprises concerned at a competitive disadvantage in international trade, and/or have adverse effects on their domestic customers. A co-operative effort to enhance the capacity of the construction sector to implement large projects on schedule and to become more competitive internationally would be valuable not only for the energy programme in the 1980s, but also as a basis for profitable domestic and overseas activities by the enterprises in the sector in the future.

Environmental and Planning Procedures

A major issue for the energy programme is the extent to which delays may arise in the process of resolving conflicts over the use of resources for development, through the operation of established planning procedures and the efforts of environmental and conservationist groups. The latter have had some impact on Government thinking in the energy field, e.g. in relation to the nuclear

option, power planning and such projects as Marsden B. Here, as overseas, they will inevitably, and often beneficially, influence the pace and direction of further energy development. As in some other countries also, the procedures for planning approvals at regional and local levels are important in determining the location, timing and cost of projects using land, water or other resources.

There is an urgent need to reappraise present procedures with a view to reducing unnecessary delays without prejudicing open discussion of potential environmental and social impacts. Some of the delays are within the Government's own control to the extent that they stem from lack of speed and efficiency or inadequate co-operation among Government departments in processing applications. The more important question is how one might simplify the current maze of regulations and approvals under different pieces of legislation, through which proposals must go, while allowing for effective participation in open debate by those who believe that the proposals should be stopped or modified in the public interest. This is a question of general importance, but it assumes particular significance for major projects such as many of those discussed here among the options for energy development.

It is for political judgement whether the unnecessary delays should be eliminated by streamlining present procedures, e.g. by adding works of major national importance to "public works" in the Town and Country Planning Act, or by special legislation designed to bring the hearing of various objections to a single point and establish the broader public interests to be served by the project in question. Whichever route is chosen, important aims should be to encourage, not stifle debate; to inform those potentially affected by the project and involve the Commission for the Environment as early as possible in the process; for Central Government to co-operate closely with local and regional authorities in the area involved in assessing the public interest; and to do everything possible to encourage open and effective processes of consultation and discussion and to reduce potential sources of conflict and construction delay if the project (modified or not) goes ahead.

Risks

Two main categories of risk attend the development of energy on the scale envisaged. One is related to the choice of project, the other to the dimensions of the programme as a whole.

(i) Project Issues

In a programme of such high priority as has been given to the utilisation of natural gas resources, the risk exists that projects will be approved and commitments made without thorough economic evaluation, independent of the financial interests involved. Sound project appraisal is the best insurance against costly mistakes, especially in the public sector. In countries where major decisions have been made without it, the results have usually been disastrous.

The possibilities of delay in obtaining planning approvals, or through the opposition of environmental groups to particular projects, have been noted above. The risk of increased costs can be

minimised if acceptable procedures for resolving conflicts openly and promptly can be devised.

There is the possibility, if not the expectation, that costs will be increased by on-site industrial relations problems, unless these are handled sensitively by people who understand the New Zealand situation and plan to minimise conflicts.

Cost escalation appears to be almost the rule in the development of new energy resources. This is especially likely when new technologies are involved.

The Economist (30 June, 1979) reports on a Rand Corporation study of 40 companies which have recently built large chemical or fuel plants. Cost over-runs of 300 percent in constant dollars have been typical of first-of-a-kind energy process plants. "Even after pilot plants are built, the errors are large. Some run 500 percent over initial estimates". Rand attributes this to the tendency to leave out subsidiary costs, engineering improvements in the course of the project, "enthusiasm", relative price changes affecting chemical plants, labour productivity problems, resistance from environmentalists, and what the US military call the unkunks - the unknown unknowns.

Further risk attaches to the calculation of rates of return both for import substitution projects involving new technology, where the costs can only be described as speculative and profitability depends on further increases in oil prices, and for projects depending partly or wholly on uncertain world prices for their products.

In the development of products for domestic use, international cost comparisons are important because the economy will suffer if it is committed to high-cost or subsidised supply where costs of production turn out to be manifestly excessive in relation to the cost of imports.

Exporting raises other issues:

- * New Zealand gas, from offshore platforms costing up to \$600 million, is probably quite expensive as a feedstock by some international standards. In some oil-producing countries, gas is a free good. Processing plants may be more costly here than elsewhere. Those in developing countries are often built largely with concessional aid funds (typically 40-year loans with a 10-year grace period and interest at 1 percent). The economics of exporting may be precarious.
- * Other countries such as Japan or the United States want cheap sources of supply and their interest must be in stimulating maximum growth in production, to increase their bargaining power and keep prices down.
- * The argument that New Zealand can trade gas products for oil, directly or indirectly, is suspect because those who buy gas are unlikely to have spare oil. A wide differential could develop between oil and gas prices, to New Zealand's disadvantage, if gas is more abundant in the medium term. Moreover, such

exporting would not in itself reduce New Zealand's dependence on external sources of liquid fuel, although it could relieve our balance of payments constraint.

- * Large-scale capital-intensive production for export would have limited domestic income or employment effects, as many developing countries have found. Foreign investors naturally seek low-cost (and if necessary subsidised) supplies and often costly infra-structure to be provided by the host country as well as generous tax concessions.
- * New Zealand has very little experience in this field, and independent advice is difficult to obtain. There are very large commercial interests involved. The financial scale of the proposals is vast by New Zealand standards.

These are arguments not for rejection of proposals but for caution, sound project evaluation even if this involves a delay of a few weeks or months, and a caveat emptor attitude where appropriate. Independent advice might be sought, for example, from the World Bank or its private enterprise affiliate the International Finance Corporation. Both have extensive experience of similar projects in developing countries. International legal assistance might also be obtained in the negotiation of projects, something that a number of developing countries have found worthwhile. Where foreign companies are concerned, a commitment to share in the risks should be negotiated.

(ii) Programmes Issues

There are limits to the size of energy programmes which New Zealand can be expected to implement successfully. The limits cannot be defined with any precision, and will be imposed more by construction capacity than by any financial constraint. There are probably institutional limits too, in the capacity of Government departments and corporations to handle a variety of projects at one time. It would seem common sense to start with 1 or 2 projects rather than 6 or 8, and to add to their number as each progresses and as the capacity to manage and implement large projects expands. Too much at one time could prove to be indigestible in the energy sector and might also have serious effects on investment activity in other sectors, including the export growth areas of the economy.

Phased development on the energy front would permit more careful analysis of some of the larger and more speculative projects, and give time to consider the range of alternatives. It would preserve flexibility and keep options open.

While movement towards greater self-sufficiency in liquid fuels must have high priority, the risks of complete self-sufficiency should not be ignored. Security of supply would not be guaranteed if all fuel came from the Maui field. It would take only a major earthquake in Taranaki, or a gas explosion there or in Whangarei, to deprive the country of much or all of its fuel, perhaps for years. One objective of the programme should be to spread and minimise the risks and increase diversity in the sources of supply.

There is a risk that energy policy will concentrate on gas development without adequate attention to other energy possibilities, or

ignore a need for pricing policies which encourage the best allocation of the range of resources available. A comprehensive energy policy must address all the issues including the best use of the surplus electricity generating capacity; the possibilities of further electrification of transport systems, and of increased use of electricity as an automotive fuel; the case for a two-island electricity pricing policy; the future of Southland lignite; the longer term ethanol/methanol options based on plants or wood; the gas policy for the South Island; and the longer range research and development programme. The immediate choices concern Maui gas but this is for the medium term. New Zealand should not become locked into a natural gas strategy to the exclusion of other opportunities as they evolve, through changing price relationships or further technological development.

Flexibility, multiple supply sources, and the preservation of options, should be features of the energy programme if the risks are to be adequately spread and the potential gains fully realised.

Part 5

CONCLUSIONS

The major projects studied in this report would involve investment expenditures equivalent to between 2 percent and 3 percent of the gross domestic product. They have a high overseas exchange content, so that the net benefits to the balance of payments, which will be substantial, will not be felt until the end of the next decade.

Recent and expected increases in oil prices not only increase the value to the economy of the projects under consideration, but also emphasise the importance in the short term of conservation measures and of the effective implementation of other policies which will stimulate the earning and saving of overseas exchange during the period before the energy projects bear fruit.

There has been a severe recession in the construction industry and total investment, at about 20 percent of GDP, is low by comparison with historic averages. Demographic projections and the availability of surplus hydro power suggest that the public sector works programme will decline somewhat in real terms in the next few years. Recovery in housing and in several sectors of non-residential building will probably also be slow. However, policy is rightly aimed at a substantial increase in investment in exchange-earning and exchange-saving projects. Overall, we calculate that provision must be made for a significant rise in the ratio of investment to GDP, to say 22 percent by 1985, for purposes other than the major energy projects being considered.

Adding a major energy development programme to the investment already required accentuates the problem of providing for modest increases in personal consumption per head and in public expenditures in a period of relatively slow overall growth. The Planning Council has previously advocated reducing the deficit in the balance of payments to between 2 percent and 3 percent of GDP on average from 1983 onwards. To permit energy and other investments to go ahead which will quite quickly save or earn the equivalent of the overseas exchange borrowed or invested for their construction, it would be acceptable to raise this target to, say 4-5 percent of GDP for a period. We emphasise that this does not remove the need for restraint on the growth of public expenditure and consumption along the lines recommended by the Council.

There is a danger of bunching of expenditure in the investment projects in 1981-82 and 1982-83. For several reasons, it would be desirable to attempt some smoothing of the programme in both directions. Expeditious decisions on some elements would help the construction industry to recover from its present depressed state and limit the loss of skills. Deferment of less essential or doubtful projects would ease pressures for example on manpower and overseas exchange, and reduce the dangers of cost escalation and unnecessary instability in the construction industries and those closely linked to them.

Past experience strongly suggests that there are severe limits on the capacity of the construction sector to implement, on schedule,

a number of large capital intensive projects concurrently. Too much pressure imposed on the segments of the construction sector involved could not only impede progress in energy development, but also have an adverse effect on investment activity or other sectors of the economy.

Although the projects are not particularly labour-intensive, we see manpower and industrial relations issues as the most important potential constraints on the effective implementation of the energy programme. This is partly because of possible difficulties in securing enough workers with the required skills. It is perhaps more important to try to devise ways of improving past performance in planning to create conditions which will be conducive to good industrial relations, efficiency of operation, and the avoidance of damaging escalation of costs. In order to minimise these constraints, Government should seek the co-operation of the major employers and unions and other appropriate agencies likely to be involved:

- (a) to ensure that contracts for major projects pay adequate attention to the potential problems of manpower and industrial relations.
- (b) to plan for changes in training programmes which may be needed to equip New Zealand workers expeditiously to fill the jobs required.
- (c) to devise systematic efforts to attract from overseas workers (especially emigrant New Zealanders) with skills not available or likely to be available in New Zealand.
- (d) to co-ordinate approaches to the flexible planning of construction work, with emphasis on maximising stable employment opportunities in the area where the projects are to be constructed, and developing offsite fabrication and assembly work where this will ease problems on-site.
- (e) to minimise any problems which might arise from the use of overseas contractors and contract labour.

Provision must be made for assessment and public discussion of the impact of the projects on the physical environment and social life of the areas concerned. We believe that present procedures for obtaining planning approvals and resolving environmental conflicts are unduly cumbersome. Urgent reappraisal is needed to avoid delays which frustrate both developers and environmentalists.

Our studies suggest that the further we pursue maximum self-sufficiency the higher the cost will be. For example Option III requires about three times the investment needed for the 50% self-sufficiency option, with continuing high costs likely for the energy produced by some of the projects in that option. In noting this, we are merely pricing the options, not ruling any of them out. The decision on what price should be paid to reduce dependence on imports involves political and strategic, as well as economic, considerations. Moreover, the economic considerations, notably the likely trends of oil prices, are by no means clear cut.

In this context, it is relevant to distinguish between the financial and economic consequences of the "take-or-pay" agreement for the use of Maui gas.

The agreement is set out in the 1973 White Paper, which outlines the terms and conditions of sale from Maui Development, Ltd, to the Crown. This agreement binds the Crown (now represented by the Ministry of Energy) to take specified minimum annual quantities of gas and/or to pay for these minimum quantities. All gas not required for electricity generation is distributed and sold by the Natural Gas Corporation.

The terms of the agreement give the Government a financial inducement to develop the gas field as early and as swiftly as possible - in other words, to tilt the scales in favour of Options II and III.

It is important to note that any gas paid for but not used in the early years of that contract is still available for use in later years. To draw off and put to efficient use the maximum quantities of gas (and condensate) as early as possible will require massive investment in energy and energy-related fields. Contractual payments under the take-or-pay agreement are only one of the factors to be assessed in deciding whether or when to increase the draw-off from the Maui field. A premature commitment to the accelerated exploitation of Maui purely for financial reasons could subsequently be regretted.

It is evident that the risks involved in some aspects of the programme are high for a small country. There is merit in keeping some options open, especially when delay will not be inconsistent with a programme for expansion which will quite rapidly reduce our import dependence. All major projects should be subject to as full an evaluation as possible, both individually and as elements in an energy development strategy. Particular caution is required for major export proposals and those involving new technology. Where large commercial risks are involved, foreign investors should be asked to share them.

Our rough judgement on the broad options which we have outlined is that Option IIA seems likely, at this stage, to minimise the risks while enabling substantial progress to be made towards the objectives of the development strategy. However, for firm decisions to be made, a much more thorough evaluation is needed than we have been able to make in this report.

APPENDIX A

NEWS RELEASE

From the Office of
The Minister of Energy

13 September 1979

NATURAL GAS AND LIQUID FUELS

In a response to the likelihood of continuing tightness in world oil supply and the prospect of escalating imported oil prices, the Government has allocated more than 60 percent of the Maui gas field as a substitute for oil imports.

This was announced today by the Minister of Energy, Mr Birch.

"This allocation indicates, first, that the use of natural gas as a premium fuel yields the maximum national benefit from the Maui field," the Minister said. "Accordingly, 26 percent of the field is allotted for reticulation.

"It reflects, secondly, the growing and prospective use of compressed natural gas (CNG) and liquid petroleum gas (LPG) as substitutes for automotive fuel, and of LPG as an industrial fuel.

"A further 25 percent of the field is allocated for production of synthetic fuels and methanol. Work by the Liquid Fuels Trust Board is continuing to determine the precise nature of the processes for synthetic fuels manufacture and the Board will report again by the end of October. The options are the Fischer-Tropsch process, as used by SASOL in South Africa, and the new Mobil process.

Allocation of 9 percent for methanol was made on the basis that a plant with capacity for producing up to 2,500 tonnes of methanol per day will be built. The Government is to proceed immediately to negotiate with selected parties having the ability and expertise to make an early start on such a plant.

"A substantial part of the field will remain uncommitted for the present, to enable its use for new developments or the expansion of any of the agreed options.

"It should also be noted that for every 5 petajoules of gas taken from the field, another 1 (one) petajoule of condensate is produced and effectively replaces a like amount of imported product."

Mr Birch said the timing of the decision announced today had been critical to continued progress on the design for the expanded oil refinery at Marsden Point.

"The refining company needed a Government decision on questions of methanol blending and other alternative fuels at this stage if delay was to be avoided in its 50-month critical path programme towards completion," the Minister said.

"The Government decision on the advice of the Liquid Fuels Trust Board is that there is no need for the possibility of methanol blending to be specifically designed for but that allowance should

be made in the designing of the refinery configuration, for the reservation of 40 to 60 petajoules per year of gas for synthetic fuels production and for replacement of petrol by CNG and LPG.

"A decision now to be agreed on between the Government and the refining company is whether a catalytic cracker or a hydro cracker should be installed. A hydro cracker is favoured by the Government, as it will allow greater flexibility in diesel and jet fuel production.

"Negotiations with the refining company are to proceed with the aim of reaching early agreement.

"The Liquid Fuels Trust Board has been asked to report again to the Government by the end of October on both the manufacture of synthetic liquid fuels and the matter of whether New Zealand should require new motor vehicles to be methanol-compatible at the time, about four years from now, when methanol comes on-stream.

"Decisions announced today by the Government pave the way for this country to become more than 50 percent self-sufficient in transport fuels by 1987. A substantial contribution to self-sufficiency will be made by the increased condensate to flow from Maui and Kapuni, and the balance will come from CNG, LPG and synthetic fuels."

Mr Birch said that the decisions announced today included the Government decision to accept the Liquid Fuels Trust Board's recommendation to use the cumulative take-or-pay quantities agreed to in the Maui contract as the guideline to the depletion rate of the field.

"This means that, unless the size of the Maui fields proves to be substantially greater than currently understood, or unless further gas fields are discovered, the export of liquified natural gas (LNG) is unlikely to proceed," the Minister said.

The rate of depletion of the gas field will be less than the annual take-or-pay quantities through the 1980s and in excess of them after 1995.

"The sum total of the decisions taken will mean that gross annual foreign exchange savings of approximately \$500 million in 1979 terms will arise out of the development of the Maui field and the expansion of the refinery. Exports of some methanol, as chemical methanol, will earn foreign exchange up to approximately \$60 million per year but the remaining annual benefit will ensue from direct substitution of gas-derived fuels for imported oil and from the extra capacity of the expanded refinery.

"The way is now clear for implementation, first, of the methanol proposal and, after receiving the further report of the Liquid Fuels Trust Board, the most appropriate synthetic fuels development.

"These projects will call for major construction effort over the next few years to build world-size petrochemical plants and ancillary works. Very large demands will be placed on New Zealand's resources in terms both of investment and skills.

"In coming to its conclusions, the Government was assisted by the Chairman and the chief economist of the New Zealand Planning Council. Their report report explored the implications for the economy of the major investment projects under consideration. Special attention was given to the need to avoid 'bunching' of projects.

"The Government is grateful for the outstanding efforts made by all those associated with the Liquid Fuels Trust Board in the assembly of information and the studies undertaken, which enabled it to report by August 31," said Mr Birch. "The Board has more work still to do and its performance thus far deserves acknowledgment now for its value in enabling the Government to make decisions in relation to New Zealand's liquid fuels needs ahead of the rest of the world."

APPENDIX B

Key to Project Designations and Options

- Option I: Minimum investment (30% self-sufficiency by 1985)
- Option IIA: 50% self-sufficiency by 1989 (45% self-sufficiency by 1985)
- Option IIB: Energy exports; 50% self-sufficiency by 1989
- Option III: Maximum self-sufficiency (80% by 1989)

<u>Project No.</u>	<u>Description</u>	<u>Option(s)</u>
1.1	Refinery extension including catalytic cracker	I, III
1.2	Refinery extension including catalytic cracker and hydro cracker	II
2.1	Petrochemical Corp. ammonia-urea plant	I - II
2.3	Petrochemical Corp. 2.1 plus further petro chems.	III
3.1	Natural Gas Corps. pipeline Huntly-Auckland, Kinleith, Kawerau	I
3.2	3.1 plus Auckland-Marsden Pt.	II
3.3	3.2 plus East Coast N.I. plus S,I.	III
4.1	Conversion of industrial and other consumers to gas to match 3.1 above	I
4.2	Conversion to match 3.2 above	II
4.3	Conversion to match 3.3 above	III
5	CNG conversion of vehicles 150,000 5 years	I - III
6.1	LPG conversion: 25,000 vehicles in 5 years	I
6.2	LPG conversion: 40,000 vehicles in 5 years	II
6.3	LPG conversion: 100,000 vehicles in 10 years	III
7.1	Public transport, expansion, conversion	I - II
7.3	Public transport, expansion, over 10 years	III
8	Maui - Platform B	IIB, III
9.1	Methanol Plant: 2500 tonnes per day	II
9.3	Methanol Plant: 6000 tonnes per day	III
10	Synthetic gasoline plant (Mobil process)	III
11	Synthetic diesel/gasoline (Arge process)	III
12	LNG; plant capacity 120 PJ/y	IIB
13	Exploration: \$25 million p.a.	I - III
14	Research and Development: \$5 million p.a.	I - III

OPTION I - SUMMARY

<u>Project</u>	1979-80	1980-81	1981-82	1982-83	1983-84	Total
	\$(million)					
1.1	24	99	162	75	11	371
2	20	30	17			67
3.1	9	22	24	2	3	60
4.1	5	5	5	5	5	25
5	34	34	34	34	34	170
6.1	17	17	17	17	17	85
7.1	20	20	20	20	20	100
13 and 14	30	30	30	30	30	150
TOTALS	159	257	309	183	120	1 028
Public sector	75	100	88	50	50	363
Private sector	84	157	221	133	70	665
Overseas expenditure	86	139	160	93	60	538
Local expenditure	73	118	149	90	60	490

	number of jobs					
Labour requirement	1300	2700	3600	1800	800	400 permanent
Saving in imports: \$285 million p.a.						
Extra exports: \$5 million p.a.						
Net factor payments: (15 percent of overseas expenditure): \$81 million p.a.						

OPTION IIA - SUMMARY

<u>Project</u>	1979-80	1980-81	1981-82	1982-83	1983-84	Total
	\$(million)					
1.2	24	99	167	85	35	410
2	20	30	17			67
3.2	17	30	32	10	11	100
4.2	6	6	6	6	6	30
5	34	34	34	34	34	170
6.2	19	19	20	20	20	98
7	20	20	20	20	20	100
9.1	5	40	50	100	5	200
13 and 14	30	30	30	30	30	150
TOTALS	175	308	376	305	161	1 325
State sector	85	108	97	58	59	407
Private sector	90	200	279	247	102	918
Overseas expenditure	103	180	211	184	95	773
Local expenditure	72	128	165	121	66	552

	number of jobs					
Labour required	1400	3000	4000	2600	1000	800 permanent
Savings in import payments: \$387 million p.a.						
Extra exports: \$172 million p.a.						
Net factor payments: (15% of \$773 million)						
Extra freight cost: \$35 million p.a.						

Project	OPTION IIB - SUMMARY										
	1979-80	'81	'82	'83	'84	'85	'86	'87	'88	'89	Total
	\$ (million)										
1.2	24	99	167	85	35						410
2.1	20	30	17								67
3.2	17	30	32	10	11						100
4.2	6	6	6	6	6						30
5	34	34	34	34	34						170
6.2	19	19	20	20	20						98
7.1	20	20	20	20	20						100
8		100	125	150	125	100					600
9.1	5	40	50	100	5						200
12	20	20	20	20	20	50	150	150	150	450*	1050*
13, 14	30	30	30	30	30	30	30	30	30	30	300

TOTAL	195	428	521	475	306	180	180	180	180	480*	3125*
Of which											
Public sector	95	151	149	118	111	44	11	11	11	111	812
Private sector	100	277	372	357	195	136	169	169	169	369	2313
Overseas expenditure	131	288	339	342	228	138	133	133	133	453*	2318*
Local expenditure	64	140	182	133	78	42	47	47	47	27	807

* Includes four tankers at \$100 million each.

	number of jobs										
Labour requirement	1400	3800	5000	3400	1800	1000	1000	1000	1000	500	1500
											permanent

Savings in import payments: \$412 million p.a.

Extra exports: \$270 million p.a.

Net factor payments (15% of \$2318 million): \$348 million p.a.

Extra freight cost: \$105 million p.a.

OPTION III - SUMMARY

<u>Project</u>	1979-80	'81	'82	'83	'84	'85	'86	'87	'88	'89	Total
	\$ (million)										
1.1	24	99	162	75	11						371
2.3	20	30	67	100	100	100	50				467
3.3	17	30	32	11	11	11	12	12	12	12	160
4.3	6	6	6	6	6	6	6	6	6	6	60
5.0	34	34	34	34	34						170
6.3	20	20	20	20	20	20	20	20	20	20	200
7.3	20	20	20	20	20	20	20	20	20	20	200
8		100	125	150	125	100					600
9.3	5	40	50	80	60	55	55	60	60	60	525
10	10	30	40	40	40	40					200
11, 13, 14	50	50	50	50	50	50	50	50	50	50	500

TOTAL	206	459	606	586	477	402	213	168	168	168	3453
Of which											
Public sector	85	141	164	159	151	125	80	52	52	52	1061
Private sector	121	318	442	427	326	277	133	116	116	116	2392
Overseas expenditure	123	298	381	375	321	268	137	107	106	106	2222
Local expenditure	83	161	225	211	156	134	76	61	62	62	1231

number of jobs

Labour requirement	1650	4000	7050	4650	3450	2600	1400	900	900	900	3000 permanent
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Savings in import payments: \$1200 million p.a.

Extra exports: \$20 million p.a.

Net factor payments (15% of \$222 million): \$333 million p.a.

Extra freight cost: \$5 million p.a.

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