A paper prepared for the

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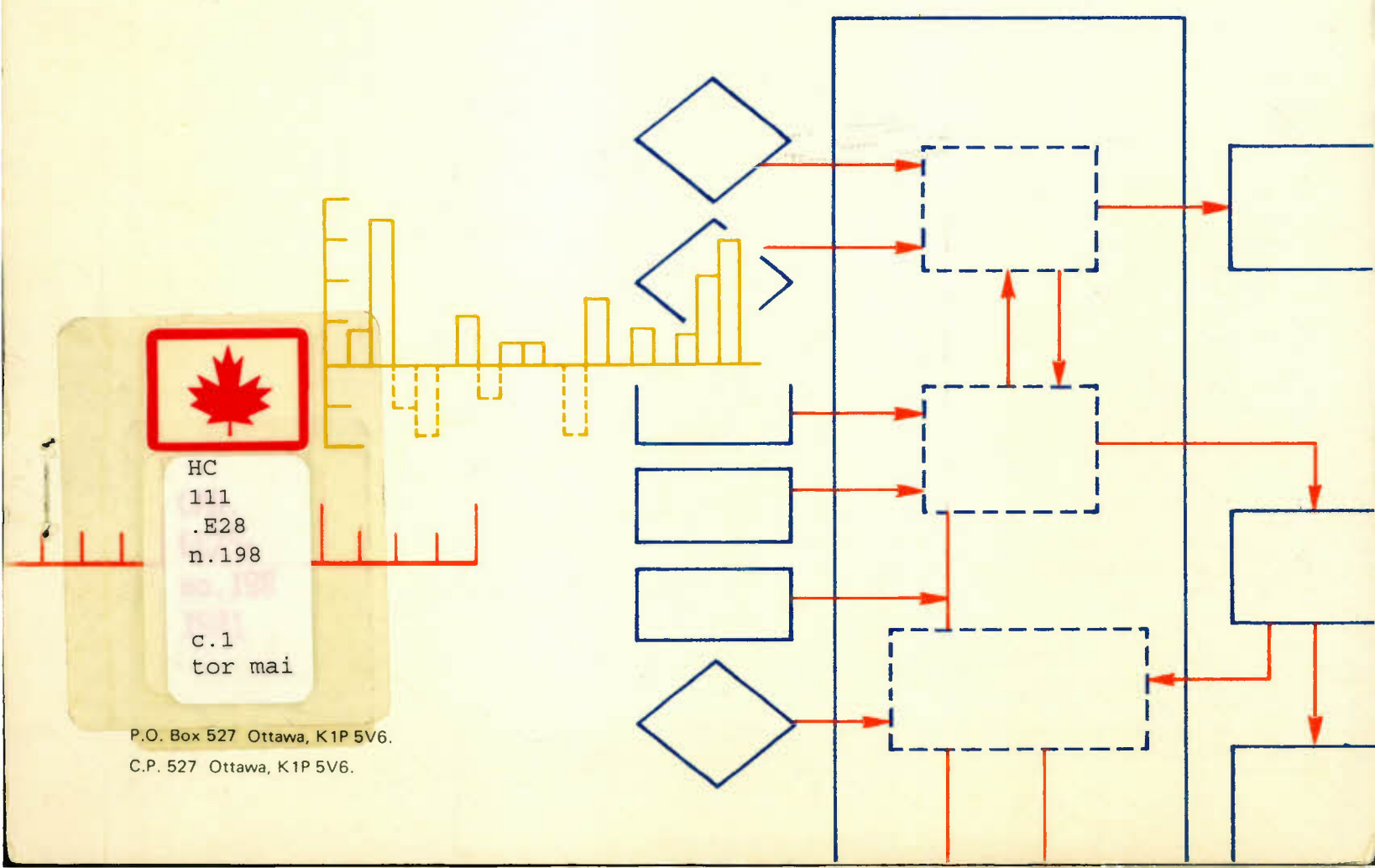

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DISCUSSION PAPER NO. 198

An Exploration of Crude Petroleum Self-Sufficiency in Alternative Canadian Demand Environments

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and M. Willis

Technical Background Documentation
to the Special Committee on Alternative
Energy and Oil Substitution

The findings of this Discussion Paper are the personal responsibility of the authors and, as such, have not been endorsed by Members of the Economic Council of Canada.

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Résumé

Le Comité spécial de l'énergie de remplacement du pétrole a demandé au Conseil économique du Canada d'entreprendre, dans le cadre de deux scénarios de demande, une deuxième série de recherches sur les effets que pourrait avoir sur l'économie une dépendance réduite vis-à-vis le pétrole importé. Dans le présent document, nous examinons trois situations où la dépendance du pétrole importé diffère pour chacune.

Le premier scénario de demande, fondé sur une augmentation annuelle d'un peu plus de 1 % des besoins de pétrole au cours de la décennie est semblable à l'hypothèse formulée par l'Office national de l'énergie dans son Rapport sur le pétrole de 1978. Le second scénario est incorporé dans le programme national de l'énergie et suppose une diminution annuelle de 2,6 % des besoins de pétrole brut au cours de la décennie.

En ce qui concerne l'offre, nous examinons trois options. La première porte sur l'autosuffissance pétrolière obtenue uniquement par la mise en valeur des sables bitumineux de l'Ouest du Canada et répond à l'hypothèse d'une forte demande. La deuxième examine la quantité d'approvisionnements nécessaires pour une autosuffisance pétrolière dans le cas du scénario d'une

demande réduite. La troisième option suppose qu'en raison du contexte politique et législatif, tous les projets d'exploitation des sables bitumineux, établis ou projetés, sont annulés. Cette option est explorée pour les deux scénarios de demande.

Nous avons établi deux scénarios quant aux prix mondiaux : ils se fondent respectivement sur des hausses annuelles de 1,0 à 1,5 % et de 7 % du prix réel. Nous les utilisons de concert avec les hypothèses des prix intérieurs du pétrole brut et du gaz naturel formulées par le programme national de l'énergie.

Les simulations montrent que la configuration de l'offre et de la demande peut avoir d'importantes conséquences pour l'économie canadienne, compte tenu en particulier du régime de prix mixte instauré par le gouvernement fédéral dans son programme national de l'énergie. Le niveau de l'inflation dans l'économie est inversement proportionnel au degré d'autosuffisance, tout comme l'inflation est directement touchée par les prix internationaux du pétrole que prend en compte le régime de prix mixte. Notre dépendance vis-à-vis le pétrole importé dont les prix grimpent selon les caprices du cartel de l'OPEP, est directement transmise à tous les consommateurs d'énergie du pays par le mouvement des prix.

La situation financière du gouvernement fédéral s'améliore de façon marquée, tandis que celle des gouvernements provinciaux se détériore ou demeure aux mêmes niveaux. Comme toujours, la situation au chapitre des paiements internationaux est sévèrement affectée par nos besoins de pétrole importé.

Le volume de l'activité économique est directement lié au degré d'autosuffisance pétrolière mais subit des effets contraires selon le niveau de la demande de pétrole brut dans l'économie. Les conséquences économiques d'une dépendance moins grande vis-à-vis le pétrole de sources étrangères et intérieures, mais surtout étrangères, sont bénéfiques pour tous les secteurs de l'économie. Ces effets influent directement sur le consommateur canadien.

ABSTRACT

The Special Committee on Alternative Energy and Oil Substitution asked the Economic Council of Canada to conduct a second set of investigations into the impact on the economy of reduced dependence on imported oil, in view of two distinct demand assumptions. In this paper, we examine three environments of varying degrees of dependence on imported oil.

The first demand assumption, an annual increase of a little over 1 per cent in petroleum requirements over the decade, is similar to the assumption made by the National Energy Board in their 1978 Oil Report. The second demand alternative is incorporated in the National Energy Program and assumes an annual decrease of 2.6 per cent in crude petroleum requirements over the decade.

Three supply environments are examined. The first option pursues oil self sufficiency solely through the development of Western Canada's oil sands resources within the high demand case. The second option examines the supply requirements for oil self sufficiency in the case of the reduced demand assumption. The third supply environment assumes that, because of the political and legislative climate, all scheduled and potential oil sands projects are cancelled. This option is explored under the two demand scenarios.

Two world pricing environments -- a 1.0 to 1.5 per cent annual real price increase and a 7 per cent real price increase -- are used in conjunction with the National Energy Program's

domestic pricing environment for crude petroleum and natural gas.

The simulations show that the configuration of supply and demand has major implications for the Canadian economy, especially given the blended pricing scheme introduced by the federal government in its National Energy Program. The level of inflation in the economy is inversely related to the degree of self sufficiency, as inflation is directly affected by international petroleum prices through the blended pricing scheme. Our reliance on imported oil, priced at the vagaries of the OPEC cartel, is directly transmitted through price effects to every energy consumer in the country.

The fiscal position of the federal government is dramatically improved, while provincial balances either deteriorate or remain at similar levels. As always, the international payments position of the country is severely affected by our reliance on imported oil.

The volume of economic activity is directly related to the degree of oil self sufficiency and is inversely impacted by the level of crude petroleum demand in the economy. The economic consequences of the achievement of a reduced reliance on petroleum, from both imported and domestic sources, but mainly imported, are beneficial to all sectors of the economy. The Canadian consumer is directly impacted by these consequences.

INTRODUCTION

The Special Committee on Alternative Energy and Oil Substitution has asked the Economic Council to conduct further investigations into the impact on the economy of reducing Canadian dependence on imported oil, in view of two distinct demand assumptions. In this document we examine three environments of varying degrees of dependence on imported oil.

The first option incorporates the effects of pursuing oil self sufficiency by 1990, solely through the development of Western Canada's oil sands resources. However, within this environment we examine the composition of supply under two different demand assumptions. The first demand alternative assumes an annual increase of a little over 1 per cent in crude petroleum requirements over the decade. Within this demand alternative the oil sands production and investment requirements necessary to attain self sufficiency by 1990 are examined. The second demand assumption is that which is incorporated in the National Energy Program and assumes an average annual decrease of 2.6 per cent in crude petroleum requirements over the decade. Due to the lower oil requirements there is not necessarily as stringent a supply requirement and thus a different self sufficiency environment is constructed to fulfil this latter demand requirement.

The third supply environment that is examined assumes that, because of the present turmoil surrounding the crude petroleum industry, the major new oil sands projects, Cold Lake and Alsands, and any further oil sands projects, are cancelled. The only projects remaining are the presently planned expansion of the Syncrude project[1] and the Suncor project. The supply requirements for crude petroleum under our two demand scenarios are examined for this supply environment.

In examining these self sufficiency alternatives two world pricing environments were used. The first one is the environment that is included in the Economic Council of Canada's Seventeenth Annual Review base case, implying a 1.0 to 1.5 per cent real price increase over the 1981-1990 period in the international price of crude petroleum. The second world pricing environment is one in which the real price of international oil increases by 7 per cent annually over the 1981-1990 period.

These self sufficiency and international pricing environments are studied within the context of the National Energy Program domestic pricing environment for crude petroleum and natural gas. That is an environment where a blended price for crude petroleum is incorporated into the domestic pricing system while the prices dictated in the National Energy Program document for natural gas remain in effect.

The two questions of self sufficiency and demand are interrelated: their analysis shows that the impact of the

Table 1

A Classification of the Alternatives - Self Sufficiency, Demand and Pricing

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The following degrees of Self Sufficiency are examined

- self sufficiency by 1990
- no new oil sands projects

Within the following demand environments

- High Demand - 1.2% average annual increase in crude petroleum requirements
- Low Demand - 2.6% average annual decrease in crude petroleum requirements

Within the following international pricing environments

- 1.0-1.5% real increase (1981-1990)
- 7.0% real increase (1981-1990)

Within the National Energy Program Domestic Pricing Environment for crude petroleum and natural gas

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investment projects on growth and demand is important for the Canadian economy. Their impact on the level of inflation in the economy and on the balance of payments is also substantial.

Following a brief presentation of the current medium-term outlook for the Canadian economy as incorporated in the Council's base case in the Seventeenth Annual Review we present our assumptions for the two self sufficiency environments within the two world pricing environments and the domestic pricing schemes. We then present an analysis of the impact on selected economic indicators, such as the consumer price index, growth in gross national product, cumulative employment effects, exchange rate effects, the current account balance, and the impact on federal and provincial balances. We then briefly summarize the lessons which can be learned from this exercise and the main points emerging from our analysis of the various alternatives.

THE BASE CASE OUTLINE

THE ASSUMPTIONS

Let us again review the assumptions that underline the base case projection. The base case is used for purposes of comparison when alternatives are developed and discussed and is the same base case that was used in previous simulations for the Committee. The assumptions can be divided into three broad classes: those directly associated with the external environment (U.S. and other OECD); those closely related to domestic energy pricing and energy investment; and, those related to domestic fiscal and monetary policy.

Table 2 includes the major indicators that summarize the anticipated performance of the United States and other OECD economies for the period 1980-1990. Most apparent is the weak performance we anticipate for the OECD and in particular for the United States in 1980. This poor performance continues in 1981 with only a weak recovery. In the United States, we anticipate the unemployment rate will increase to 8.4 per cent and then follow a path close to 7 per cent as we move to the mid point of the decade. Inflation rates in the United States are projected to be close to 14 per cent in 1980 and to average above 8.5 per cent for the remainder of the decade. U.S. interest rates are anticipated to follow a downward trend from current levels, averaging close to 9.0 per cent by mid decade.

Table 2

External Environment Assumptions - Base Case Projection[1]

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
OECD											
Industrial Production (Per Cent Change)	-1.7	1.2	5.1	5.0	4.4	3.6	3.6	3.4	3.8	3.5	3.5
United States[2]											
Real GNE (Per Cent Change)	-1.3	0.5	3.6	2.7	3.0	2.0	2.4	2.4	2.9	2.2	2.2
Industrial Production (Per Cent Change)	-4.0	0.7	5.9	5.2	4.4	3.2	3.2	2.9	3.4	2.9	2.9
CPI (Per Cent Change)	14.0	11.2	10.1	8.2	8.3	9.2	9.3	9.8	8.6	8.2	8.2
Unemployment (Per Cent Level)	7.5	8.4	7.9	7.4	7.1	7.1	7.0	7.0	6.9	6.8	6.7
Short-Term Interest Rate (Per Cent Level)	11.3	10.4	8.9	8.7	8.6	9.0	9.1	9.4	8.7	8.6	8.6
Overseas Countries[3]											
Industrial Production (Per Cent Change)	2.1	2.1	3.4	4.6	4.4	4.4	4.5	4.5	4.5	4.5	4.6
Crude Petroleum[3]											
International Price - $ CDN (Per Cent Change)	63.5	11.1	9.7	10.6	9.4	9.2	9.0	8.8	8.8	8.7	8.8

1 CANDIDE Model 2.0, August 1980.

2 Latest available projections of Wharton Econometric Forecasting Associates, Philadelphia, Pa., as of August, 1980.

3 Economic Council of Canada Estimates, August, 1980.

This performance is extremely poor for both the United States and other OECD countries. The recovery period (1981-1982) for the United States is nothing like that which was experienced after the U.S. downturn of 1974-1975. Whereas real growth in the United States during 1976 approached 7.0 per cent, we do not see this occurring during the period 1981-1984. Worse still, the weak sectors in the U.S. economy are those which are very important for Canadian exports: automobiles, farm machinery, steel and lumber.

After a substantial adjustment in 1980, the international price of crude petroleum in the base case tracks a path which is near 10.0 per cent during 1981-1985 and then drops to 9.0 per cent for the remainder of the decade. This implies that the annual increase in international oil prices will be from one to one and a half percentage points more than Canadian domestic prices.

In our base case projection after incorporating the most recent adjustments to the domestic oil price, August, 1980, we made the assumption that the domestic price of crude petroleum will not be governed by pre-July 1980 agreements between the federal government, the producing provinces and the producers. We have assumed that the domestic price of crude petroleum will advance at the rate of $4.00 per barrel per year from 1981 onward, but the existing revenue splits as of August 1980 between the producing provinces, the producers and the federal government

Table 3

Large-Scale Energy Investment Project Phasing 1980-1990[1]

Project	Phase In	Peak Period	Phase Out
Syncrude Extended	1980	1981-1982	1988
Alsands	1981	1984-1985	1987
Q + M Pipeline	1981	1982	1984
Alaska Highway Gas Pipeline	1981	1983-1984	1987
Cold Lake	1982	1986-1987	1990
East Coast Gas Pipeline	1988	1990	1992

1 Economic Council of Canada Estimates

Table 4

Domestic Policy Assumptions, August 1980[1]

Oil Pricing	$4 per barrel per year (.85 natural gas price parity) with pre-budget revenue splits between producing provinces, producers and federal government maintained. Federal oil import subsidy programme maintained. Syncrude levy held at $1.75 ceiling.
Tax Policy	All policies presently in place are unchanged.
Spending Policy	Government restraint with 1.5 per cent per year real growth in goods and services. All indexed transfers maintained. Established programme financing renegotiated in 1981-1982 along existing lines. Equalization payments and tax point agreements maintained.
Monetary Policy	Canadian interest rates follow U.S. rates as decade unfolds. Money supply growth targets in the 5 to 9 per cent range (average 8 per cent).

1 Economic Council of Canada Estimates

will be maintained. We have also assumed maintenance of the federal oil import subsidy programme.

Table 3 summarizes the major oil sands and energy pipeline investment projects now underway or anticipated during the period 1980-1990, the effects of which are built into the base case. Table 4 summarizes the domestic policy assumptions underlying the base case projections.

This is only a broad outline of a very detailed set of assumptions which are incorporated in the base case calculation. A more detailed discussion is found in Canada - The Medium Term, Performance and Issues (ECC Fall 1980).

SUMMARY OF THE BASE CASE PROJECTION

The base case projection points to the many problems that we currently face in an unchanged domestic policy environment with a lacklustre world outlook situation. In summary, the major areas of concern which emerge from a close examination of Table 5 are as follows:

-- Real growth in 1980 is extremely weak with an unspectacular recovery period in 1981-1983. There are only 2 years during the period where growth is near potential.

-- Inflation in 1980 we anticipate will be close to the double digit range with high rates continuing through 1981. The long term trend we expect to track in the range of 8.0 to 9.0 per cent.

Table 5

Selected Indicators - Base Case Projection[1]
(percentage increase)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Gross National Product ($1971)	-0.4	1.4	3.1	3.5	3.3	2.4	2.7	3.1	2.6	2.2	2.6
Consumer Price Index	9.8	10.6	9.9	9.0	9.0	8.7	8.1	8.4	7.9	8.1	8.2
Unemployment Rate (level)	7.9	8.0	7.5	7.0	6.7	6.5	6.5	6.1	5.9	5.9	5.6
Labour Force	2.4	2.1	1.9	1.9	1.9	1.5	1.7	1.5	1.6	1.5	1.4
Employment	2.0	2.0	2.4	2.4	2.4	1.7	1.7	2.0	1.9	1.5	1.7
Productivity	-2.3	-0.7	0.9	1.3	1.1	1.0	1.4	1.4	1.2	1.0	1.3
Real Wage Rate	-2.2	-2.4	-0.1	0.7	0.5	1.2	1.7	1.3	2.2	1.9	2.0
Nominal Wage Rate	7.4	8.0	9.8	9.8	9.6	9.9	10.0	9.8	10.2	10.1	10.4
Saving Rate (level)	10.1	9.5	9.2	9.1	8.8	8.6	8.5	8.3	8.1	7.9	7.6
Participation Rate (level)	62.4	62.7	63.1	63.5	64.0	64.3	64.7	65.1	65.5	65.9	66.3
Real Investment (% of GNE)	22.6	23.0	23.2	23.8	24.6	24.8	24.9	25.1	25.2	25.3	25.4
Federal Deficit (% of GNE)	-3.8	-4.0	-3.6	-3.3	-2.5	-2.5	-2.4	-2.3	-1.9	-1.7	-1.3
Provincial Surplus (% of GNE)	1.0	1.4	1.7	1.8	1.9	2.0	1.9	1.8	1.5	1.3	1.1
Balance of Payments											
Current Account Balance (% of GNE)	-1.8	-1.8	-1.6	-2.0	-2.1	-2.2	-2.2	-2.4	-2.3	-2.4	-2.3
Energy Balance (% of GNE)	1.2	1.5	1.5	0.9	0.8	0.4	0.0	-0.4	-0.7	-1.0	-1.1
Non-energy Balance (% of GNE)	-3.1	-3.3	-3.1	-3.0	-2.9	-2.6	-2.2	-2.0	-1.6	-1.4	-1.3

1 CANDIDE Model 2.0, August 1980

-- Unemployment rates remain above 7 per cent until 1982. They then drift close to 6 per cent.

-- Continued decline in the rate of growth of real wages through 1982 and then only a modest recovery in growth. Nominal wage growth in the 8.0 to 10.0 per cent range in 1981-1983 with a long run trend close to 10 per cent.

-- Decline in the personal saving rate from the current high level of above 10 per cent, in part due to the erosion of personal savings incentives from inflation.

-- An increased percentage of output devoted to investment dominated by many large energy projects assumed to come on stream in the early part of the decade.

-- Continued federal deficits and provincial surpluses.

-- Continued current account deficits.

-- Poor performance in rate of growth of output per manhour in part due to the cyclical adjustment currently underway in the economies of our trading partners.

DEMAND/SUPPLY SCENARIOS

As suggested in the introduction, we use two demand assumptions for crude petroleum within our study of the various levels of self sufficiency. The High Demand assumption maintains moderate growth in crude petroleum demand within the economy amounting to a little over 1.1 per cent per annum over the decade. This is a similar demand scenario to that included in the National Energy Board's November 1978 oil report. This scenario suggests a very modest rate of growth of crude petroleum usage, with a decline in its market share, particularly in the residential and commercial sectors where natural gas and electricity are anticipated to assume a growing market share.

Our second demand assumption, termed Low Demand, is the demand outlook included in the National Energy Program and detailed on page 99 of the program. It suggests an overall rate of growth of crude petroleum usage in the 1980 to 1990 period of an annual decrease of 2.6 per cent over the 10 year period. Suggested in this projection is a declining share of oil within total primary energy demand, a much increased share for natural gas and electricity, and a considerable increase in the share of renewables. Within this demand assumption, there is a projection of a slight decrease in oil consumption by the transportation sector, a more than halving of the consumption in the residential/commercial/industrial sector, and a maintenance of the present level of consumption in other areas of the economy.[2]

In constructing the supply scenarios for these demand assumptions we have relied heavily upon the work previously done for the Committee, and described in detail in the paper presented in November 1980. The first supply environment to be explored assumes that the Canadian economy reaches self sufficiency in crude petroleum supply by 1990, using on stream production from extra oil sands plants to fill the supply gap. In order to properly construct the two self sufficiency alternatives with the High and Low Demand cases, it was necessary to examine each demand case separately. Chart 1 shows the composition of domestic supply of crude petroleum in our Self Sufficiency, High Demand case. To fulfil the supply requirements to reach self sufficiency by 1990, it was necessary, as it was in our earlier work, to add five additional crude petroleum oil sands plants in addition to the Cold Lake and Alsands projects.[3] The investment schedule used for the addition of the plants is identical to that described in the previous paper and is presented in Table 6. Chart 2 shows the demand/supply schedule of crude petroleum in this Self Sufficiency, High Demand alternative. The slight increase in the rate of growth of crude petroleum requirements can be seen. The sharp reduction in imports towards the end of the period is evident as self sufficiency is attained through the use of the five additional tar sands plants.

In the other self sufficiency alternative, which explores self sufficiency by 1990 in the case of the Low Demand assumption, it was necessary to add only two tar sands plants, in addition to the Cold Lake and Alsands projects. The timing of the Cold Lake

Chart 1

COMPOSITION OF DOMESTIC SUPPLY - SELF SUFFICIENCY BY 1990 (HIGH DEMAND)

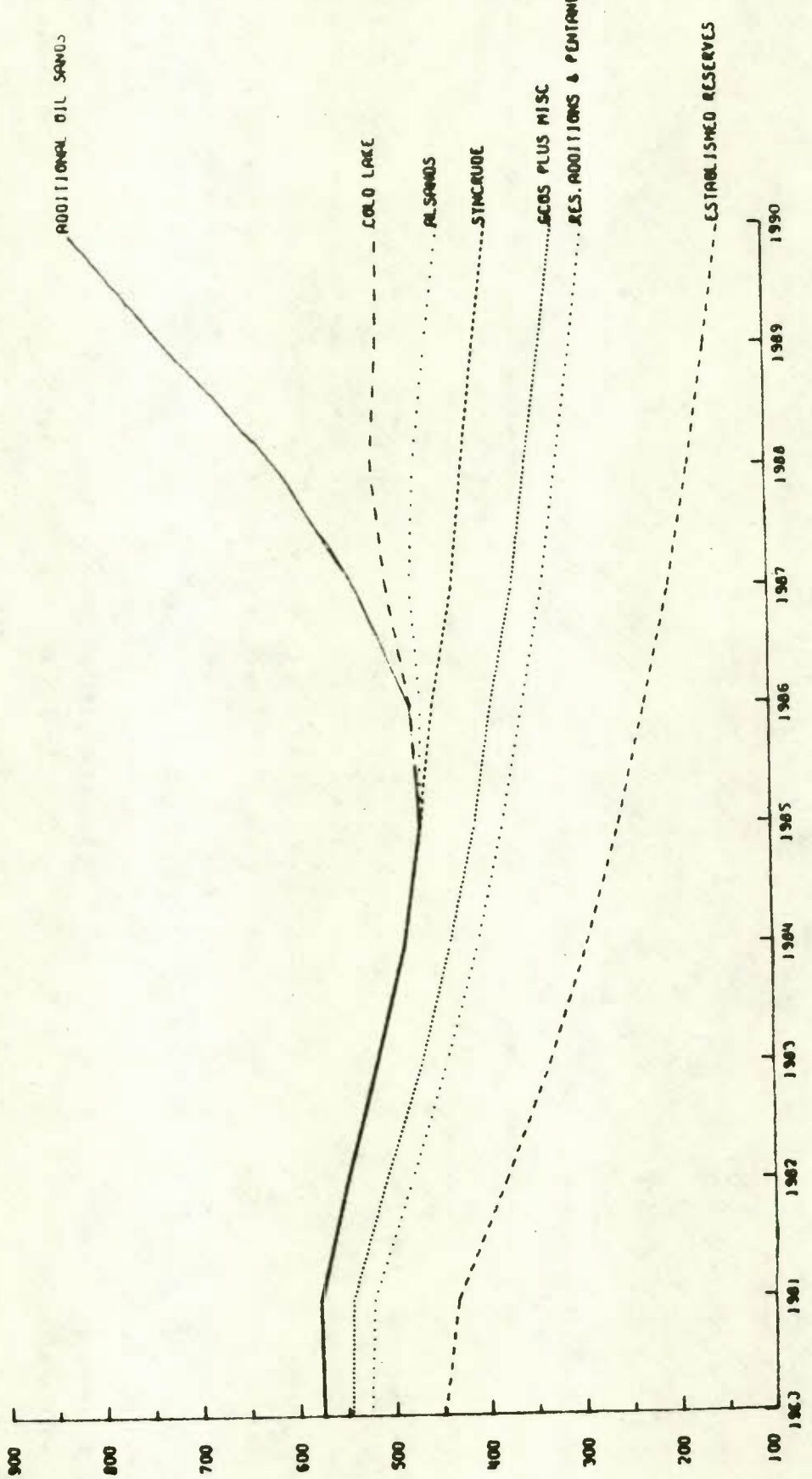


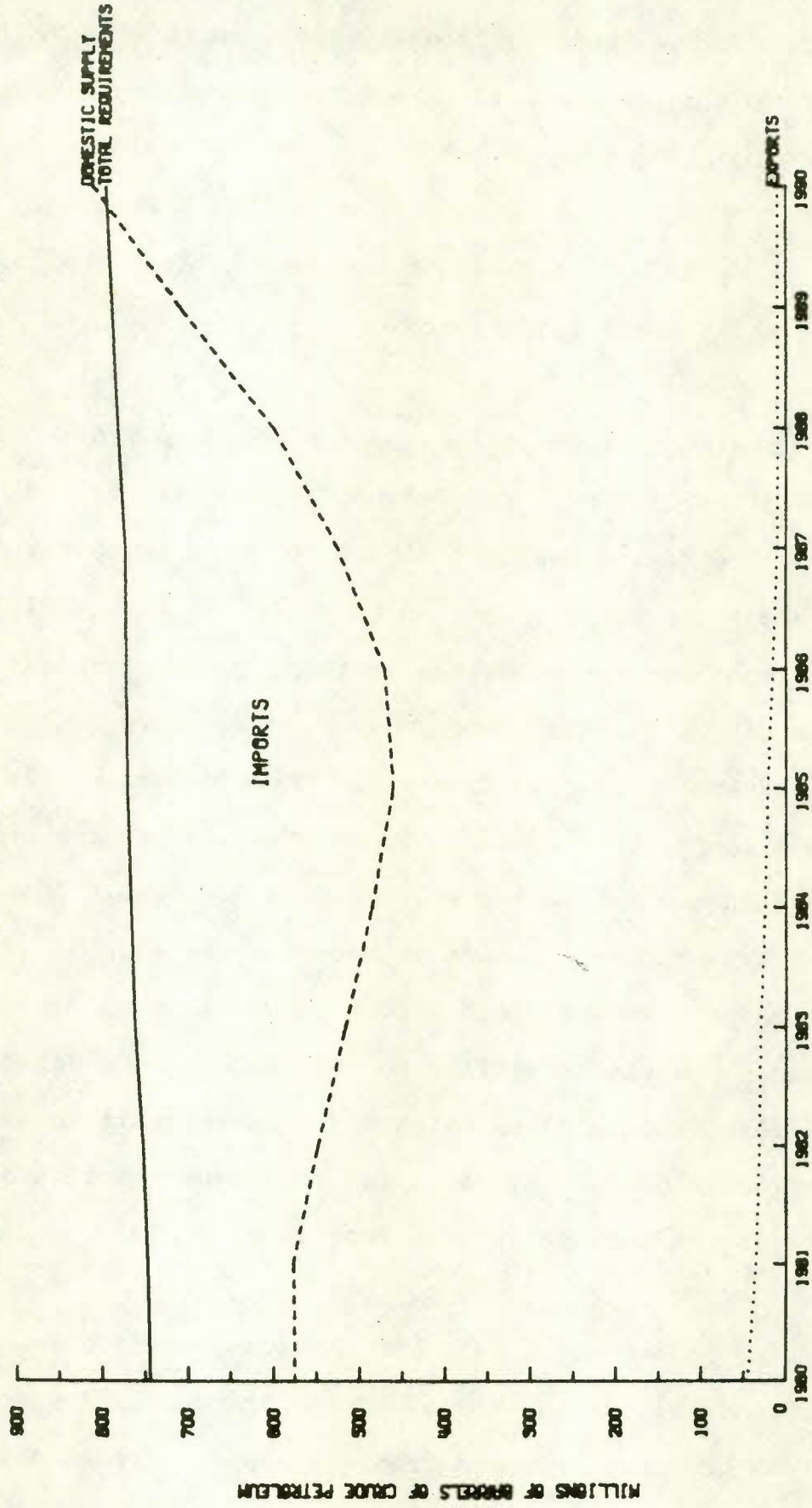
Table 6

Oil Sands Investment Assumptions - Self Sufficiency Scenario (millions of 1971 dollars)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Great Canadian Oil Sands (GCOS) and Miscellaneous	40.5	27.0	30.4	30.4	27.0	27.0	27.0	27.0	27.0	27.0	27.0
Syncrude plus Syncrude Extended	252.9	232.0	216.5	203.7	215.8	229.3	215.8	218.5	195.6	76.2	74.2
Alsands (Mining)	27.0	25.0	132.9	275.2	284.0	576.7	488.3	177.4	27.0	27.0	27.0
Cold Lake (In Situ)	36.8	142.6	182.1	377.2	347.3	449.0	382.2	349.6	362.1	238.1	99.3
Plant #3 (In Situ)	37.4	156.1	235.6	445.0	482.6	456.3	403.0	359.8	340.6	261.9	134.6
Plant #4 (Mining)	-	49.9	191.6	250.2	509.9	473.5	450.6	387.2	350.7	337.3	236.8
Plant #5 (In Situ)	-	25.0	120.7	220.9	380.1	491.7	462.0	418.9	369.0	344.0	287.0
Plant #6 (Mining)	-	-	49.9	191.6	250.2	509.9	473.5	450.6	387.2	350.7	337.3
Plant #7 (In Situ)	-	-	25.0	120.7	220.9	380.1	491.7	462.0	418.9	369.0	344.0
Total	394.6	657.6	1184.7	2114.9	2717.8	3593.5	3394.2	2851.0	2478.1	2031.2	1567.0

Chart 2

DEMAND/SUPPLY SCHEDULE OF CRUDE PETROLEUM - SELF SUFFICIENCY WITH HIGH DEMAND



and Oil Sands Plants is similar to that assumed in our High Demand Case. The first additional plant, which presumably would be the Petro Canada Project, is assumed to come on stream in 1988, and the fourth plant, which presumably would be an in situ plant, is presumed to come on stream with only marginal production by 1990: marginal, but enough to fill the gap in order to attain self sufficiency.

The composition of domestic supply of crude petroleum in this second Self Sufficiency, Low Demand Case is illustrated in Chart 3. The demand/supply schedule for this second self sufficiency case is presented in Chart 4. It is clearly apparent that the considerable reduction in total crude petroleum requirements within the economy has made our move to self sufficiency much easier. Except for the addition of the fourth tar sands plant, this scenario is very similar to the results expressed in the National Energy Program document. The addition of the fourth tar sands plant is necessary because in our assumptions for enhanced oil recovery and heavy oil upgrading, we have used a projection similar to that made by the National Energy Board in late 1978, which is a less optimistic assessment of the production possibilities for this type of oil than that included in the National Energy Program.

In our second set of supply alternatives, we have assumed that all tar sands plants additional to the Syncrude and Suncor expansions have been removed from our supply estimation, due to

Chart 3

COMPOSITION OF DOMESTIC SUPPLY - SELF SUFFICIENCY BY 1990 FLOW DEMAND

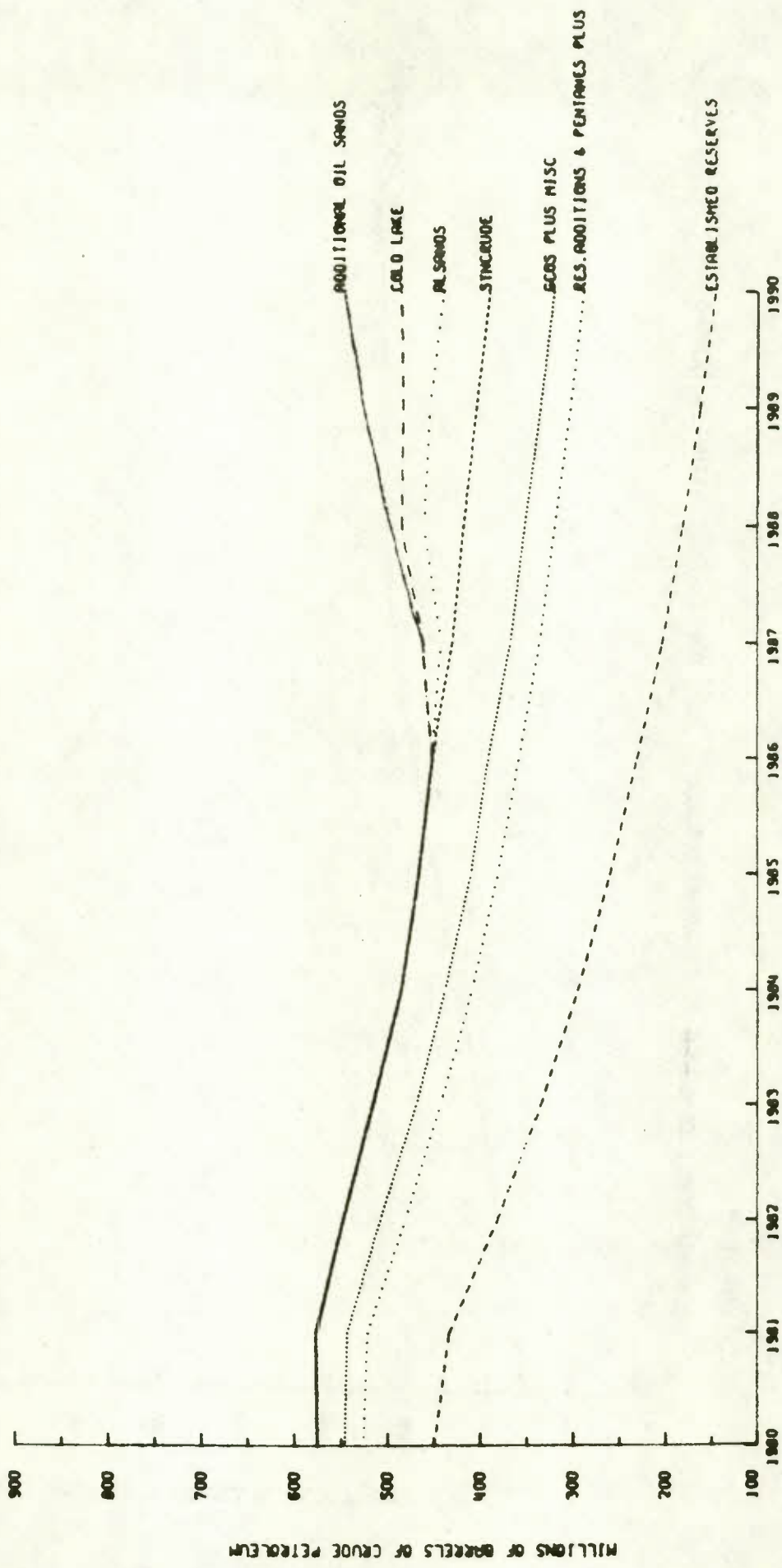
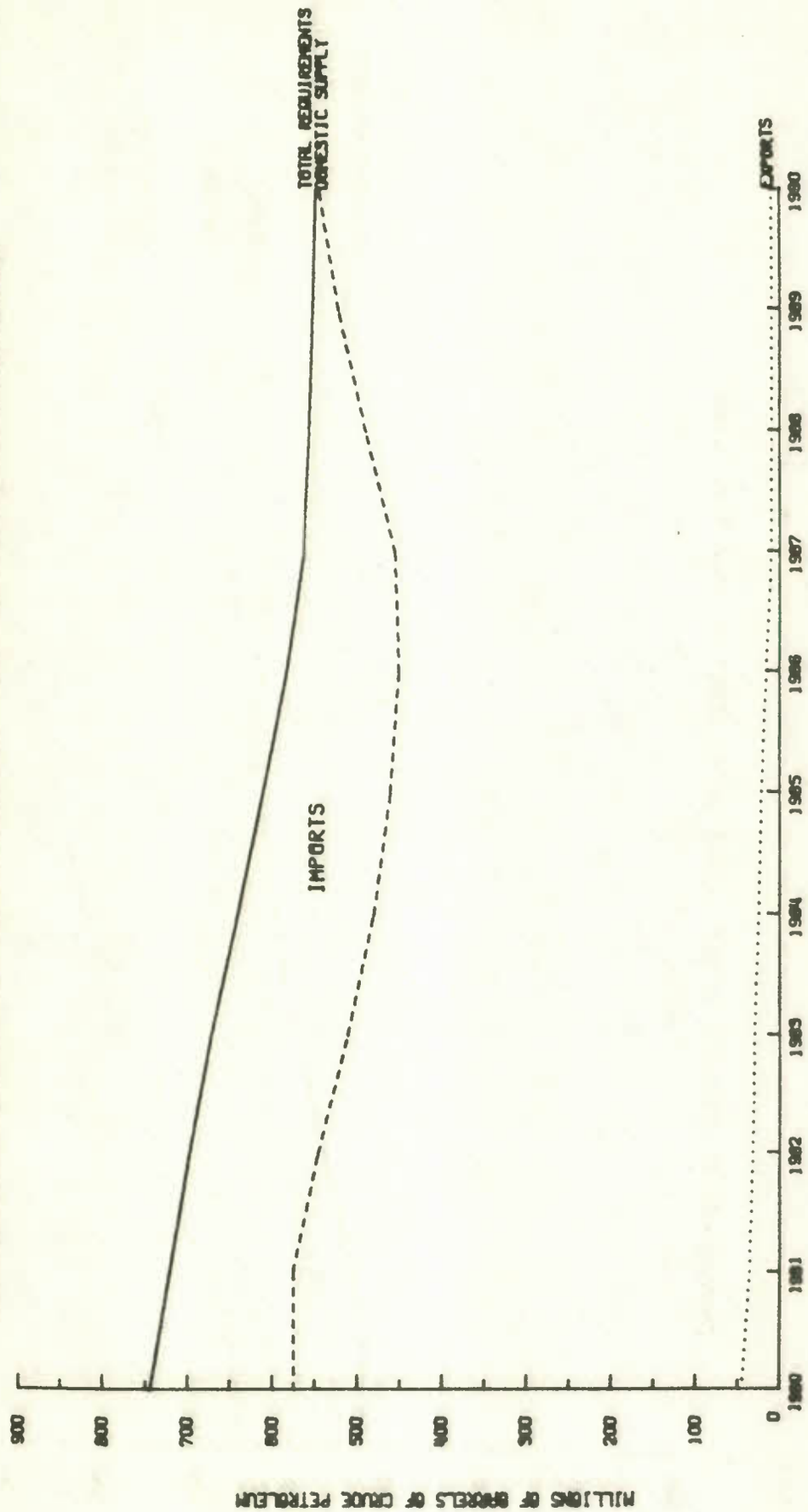


Chart 4

DEMAND/SUPPLY SCHEDULE OF CRUDE PETROLEUM - SELF SUFFICIENCY WITH LOW DEMAND



the uncertainty of the political and regulatory situation presently surrounding the tar sands projects. All other major projects which are presently on stream, and are assumptions in the base case, such as the Q&M pipeline and the Alaska Highway Natural Gas Pipeline are assumed to be completed during the projection period. The Syncrude plant is assumed to expand to its third train and the Suncor plant is projected to expand such as suggested in the National Energy Board projections.

Chart 5 shows the composition of domestic supply in what we term the No New Oil Sands Projects alternatives. This domestic supply environment is the assumption used for both the High and Low Demand cases. As you can see, there is a vast difference between the supply availability of this production estimate in which there are no additional tar sands plants, and thus no additional production towards the end of the decade, and the production estimated in the self sufficiency cases.

Chart 6 presents the demand/supply schedule for crude petroleum in the No New Oil Sands Case with a High Demand environment. The growing import gap can be clearly seen. By the end of the period close to half of our total crude petroleum requirements are imported. The short fall in domestic production has clearly slanted our supply schedule in favour of foreign, high priced crude petroleum supply. Chart 7 shows a similar demand/supply schedule in the No New Oils Sands Case with a Low Demand environment. By the end of the period, we are still importing a

Chart 5

COMPOSITION OF DOMESTIC SUPPLY - NO OIL SANDS PROJECTS (HIGH & LOW DEMAND)

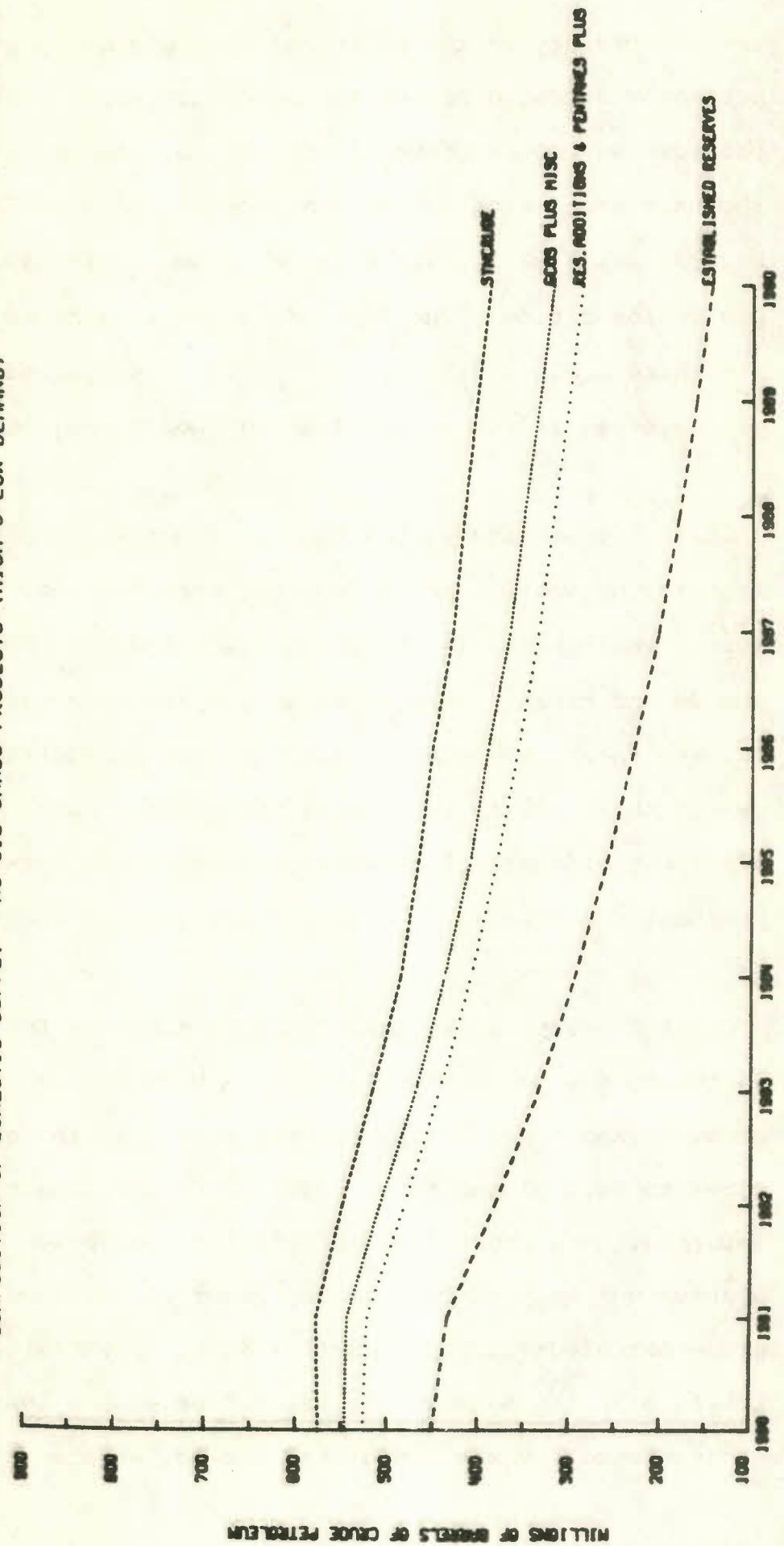


Chart 6

DEMAND/SUPPLY SCHEDULE OF CRUDE PETROLEUM - NO NEW OIL SANDS WITH HIGH DEMAND

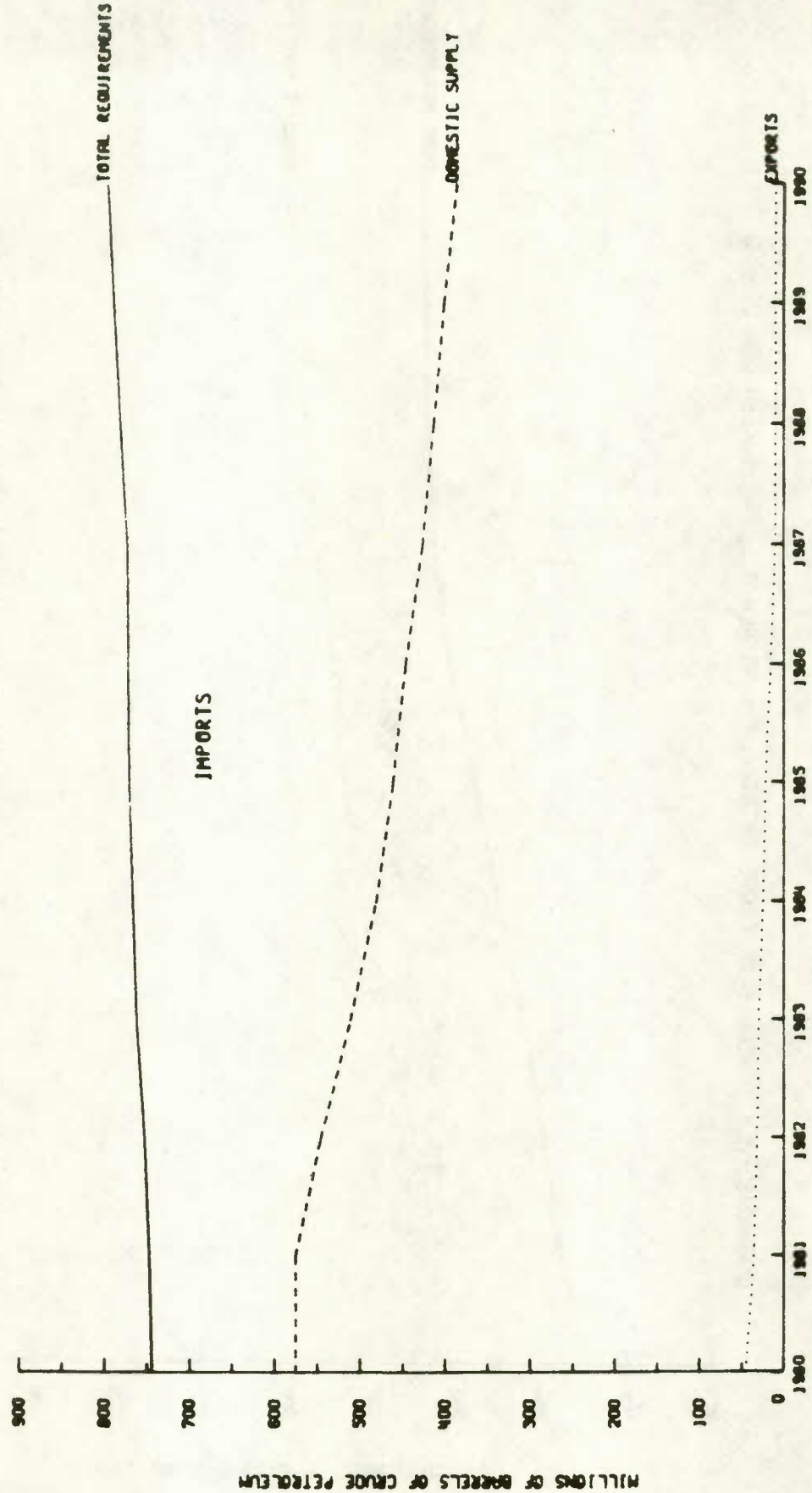
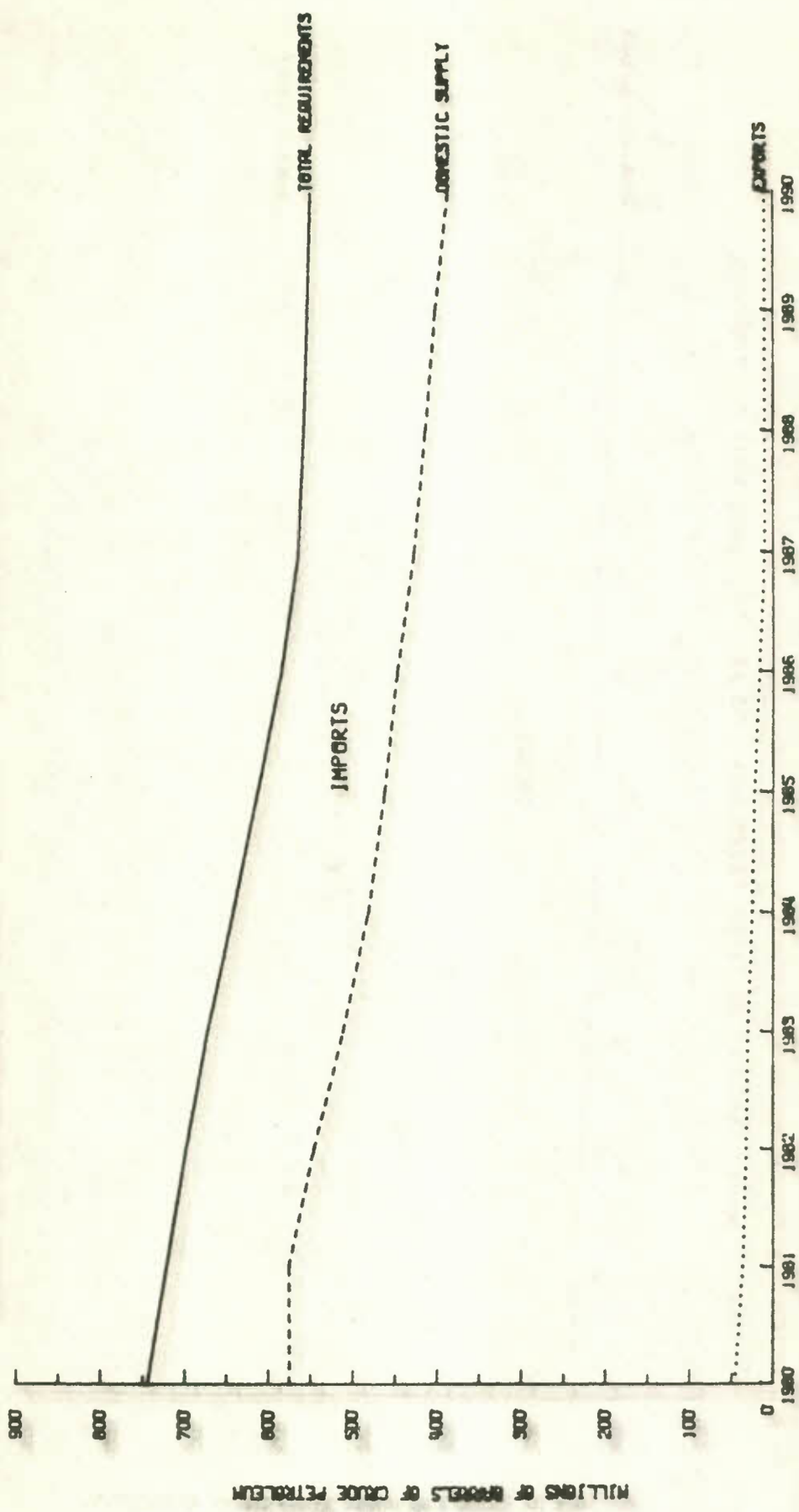


Chart 7

DEMAND/SUPPLY SCHEDULE OF CRUDE PETROLEUM - NO NEW OIL SANDS WITH LOW DEMAND

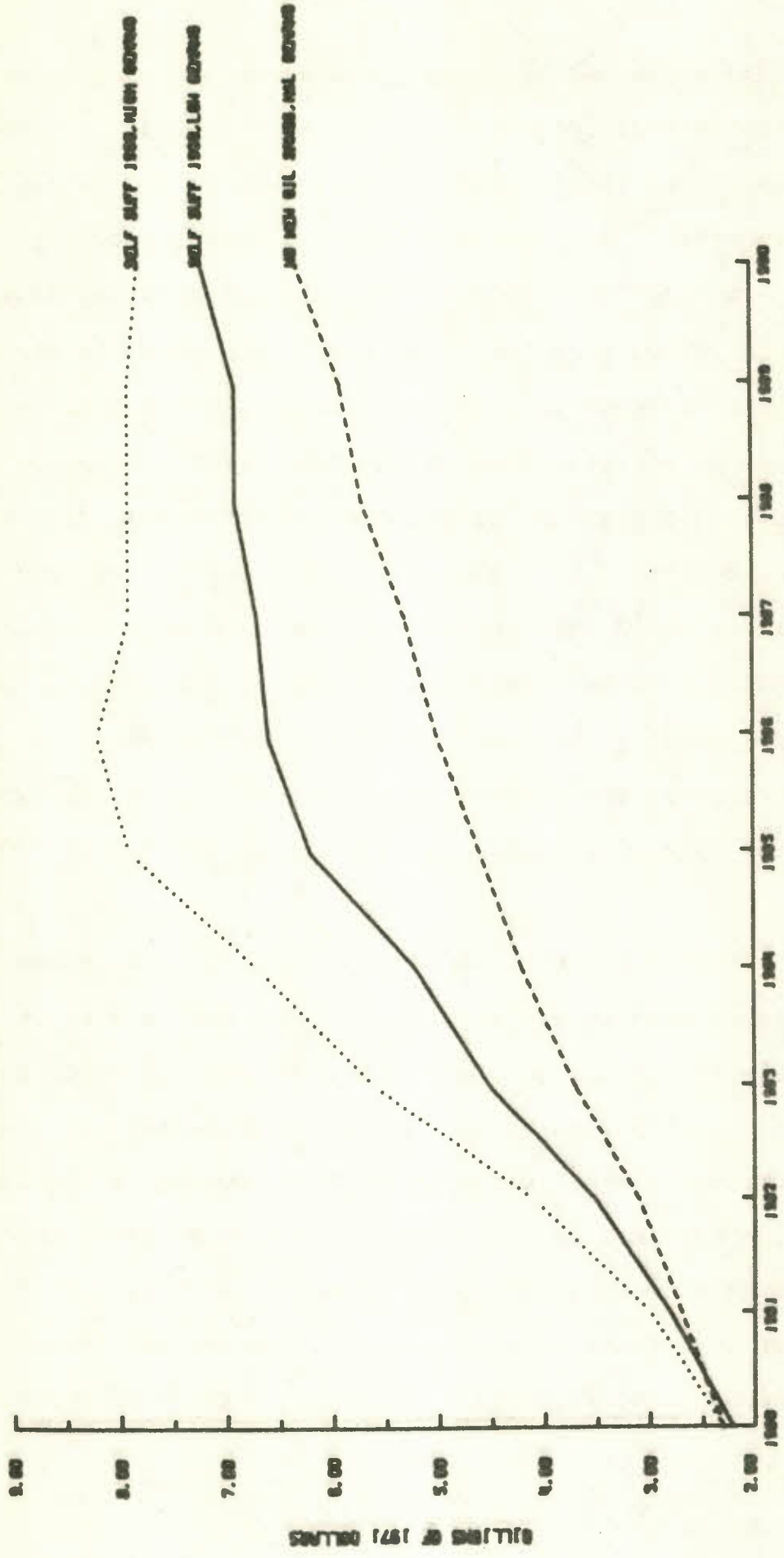


similar amount of crude petroleum as we were at the beginning of the period. However, due to the reduction in total crude petroleum requirements assumed in this Low Demand scenario, the shortfall has been maintained at almost a constant rate throughout the period. There is a suggestion towards the end of the period that the quantity of imports would widen if this graph were extended into the next decade, given a situation where there was no additional tar sands production. Clearly, as we are aware, the amount of production forthcoming from conventional crude petroleum reserves is projected to decrease substantially in the 1990-1995 period. In the case of a scenario where no additional tar sands production was forthcoming, even with drastically reduced petroleum demand as we see in this Low Demand scenario, there would be an implication of much increased demand for foreign supplies to fill the gap.

Chart 8 presents the crude petroleum and natural gas mining investment in billions of 1971 dollars assumed in our three supply scenarios. Even in the No New Oil Sands category, there is still a substantial amount of investment by the end of the period, which presumably would be coming forth from both conventional and non-conventional crude petroleum and natural gas mining investment expenditures. However, a substantial portion of investment expenditure has been removed in the No New Oil Sands Case, especially relative to the High Demand Case.

Chart 8

CRUDE PETROLEUM AND NATURAL GAS MINING INVESTMENT



THE WORLD PRICING ENVIRONMENTS

As we mentioned in our brief review of the base case assumptions, the international price of crude petroleum in the base case tracks a path which averages 10 per cent during the 1981-1985 period then drops to 9 per cent for the remainder of the decade. This follows, of course, after a substantial adjustment in 1980. We have used this international pricing path as the basis for our Low World Price alternative and have used it in concert with our assumptions in the base case for the external environment and commodity prices, such as are reviewed in Table 2.

In our second world pricing alternative, the High World Price alternative, an assumption is made that the real international price of crude petroleum will increase by 7 per cent per annum over the 1981-1990 period, again after the substantial adjustment in 1980. This implies that by 1990 the international price of crude petroleum will reach $149.79 in Canadian dollars, considerably higher than the base case assumption of $84.59.

Since an annual increase of 7 per cent real in the international price of oil would presumably inflict a substantial inflationary blow on the economies of our trading partners as well as on our own economy, an alternative overseas and U.S. scenario has again been included with the 7 per cent real pricing alternative. This scenario, especially constructed

Table 7

Comparison of United States and Overseas Environments - Low World Price Scenario and High World Price Scenario

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
OECD Industrial Production (per cent change)											
Low World Price Environment	-1.7	1.2	5.1	5.0	4.4	3.6	3.6	3.4	3.8	3.5	3.5
High World Price Environment	-1.7	1.2	5.1	4.8	4.0	3.0	2.9	2.8	3.6	2.9	2.9
Overseas Industrial Production (per cent change)											
Low World Price Environment	2.1	2.1	3.4	4.6	4.4	4.4	4.5	4.5	4.5	4.5	4.6
High World Price Environment	2.1	2.1	3.4	4.4	4.1	4.2	4.2	4.2	4.2	4.3	4.3
U.S. Industrial Production (per cent change)											
Low World Price Environment	-3.5	0.7	5.9	5.2	4.4	3.2	3.2	2.9	3.4	2.9	2.9
High World Price Environment	-3.5	0.7	5.9	5.0	4.0	2.5	2.3	2.0	3.3	2.1	2.1
U.S. Consumer Price Index (per cent change)											
Low World Price Environment	14.0	11.2	10.1	8.2	8.3	9.2	9.3	9.8	8.6	8.2	8.2
High World Price Environment	14.0	11.2	10.1	8.6	9.2	10.5	11.1	12.2	10.5	10.3	10.3
U.S. Short Term Interest Rate (per cent)											
Low World Price Environment	11.25	10.40	8.94	8.73	8.58	8.96	9.06	9.41	8.73	8.56	8.56
High World Price Environment	11.25	10.40	8.94	8.90	8.98	10.00	10.69	11.60	10.60	10.60	10.80

Source: Low World Price Environment: Latest available projections of Wharton Econometric Forecasting Associates, Philadelphia, Pa., as of August, 1980.

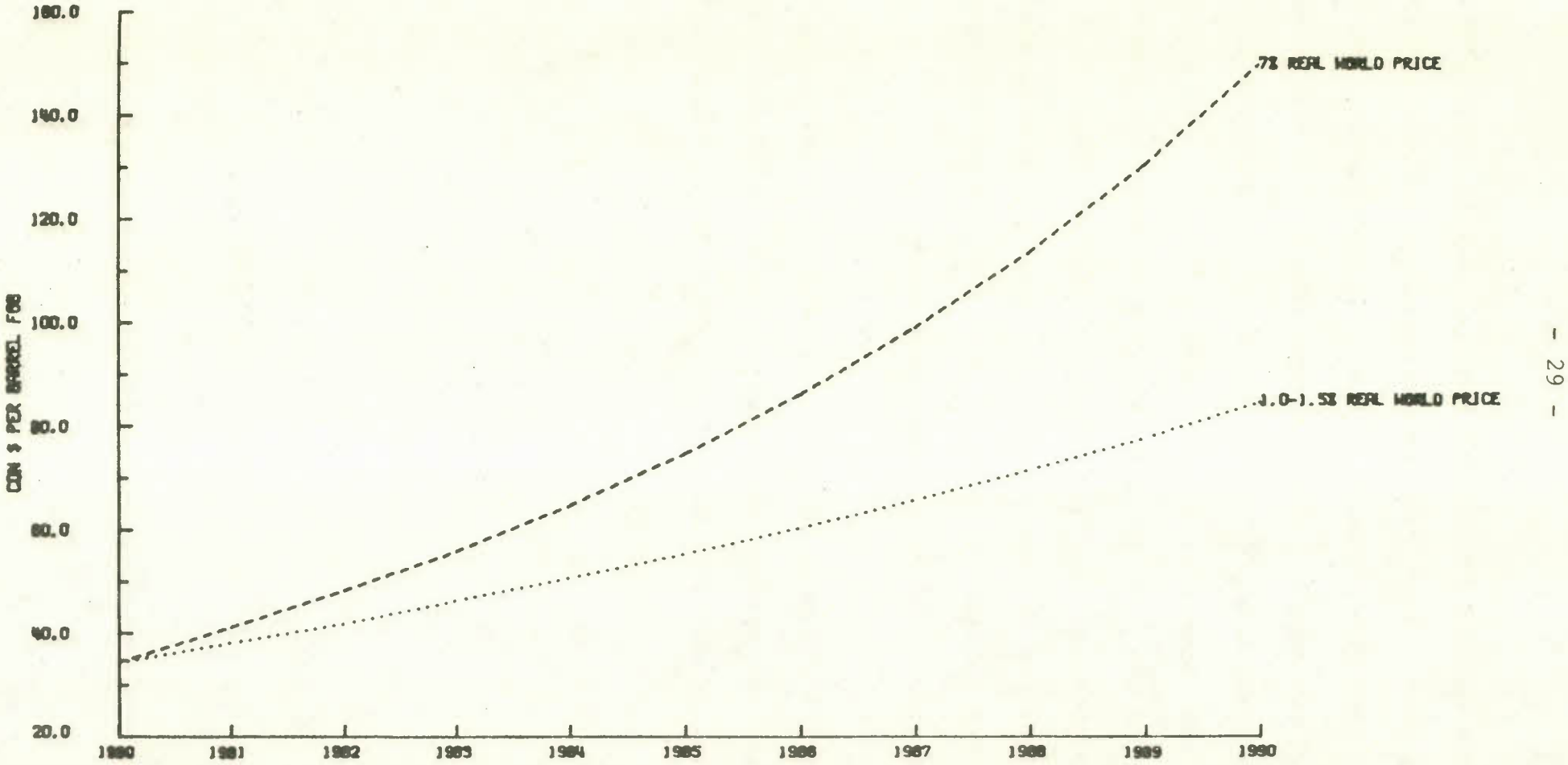
High World Price Environment: Wharton Econometric Forecasting Associates, Special Solution, July 1980.

for the Council by the Wharton Econometric Forecasting Associates early last summer, has been adjusted to reflect the latest short-term developments in the American economy commensurate with the short-term U.S. forecast included in the base case. The major assumptions of this U.S. scenario, relative to the base case U.S. scenario, are included in Table 7. In addition to altering the U.S. forecast we also adjusted the forecasts of our major overseas trading partners -- the economies of the United Kingdom, the Federal Republic of Germany, France, Italy, and Japan -- in order to reflect this substantial increase in the international price of crude petroleum.

Chart 9 presents the two international pricing assumptions. We will now explore the implications of these international pricing assumptions on domestic crude petroleum pricing.

Chart 9

INTERNATIONAL PRICE OF CRUDE PETROLEUM



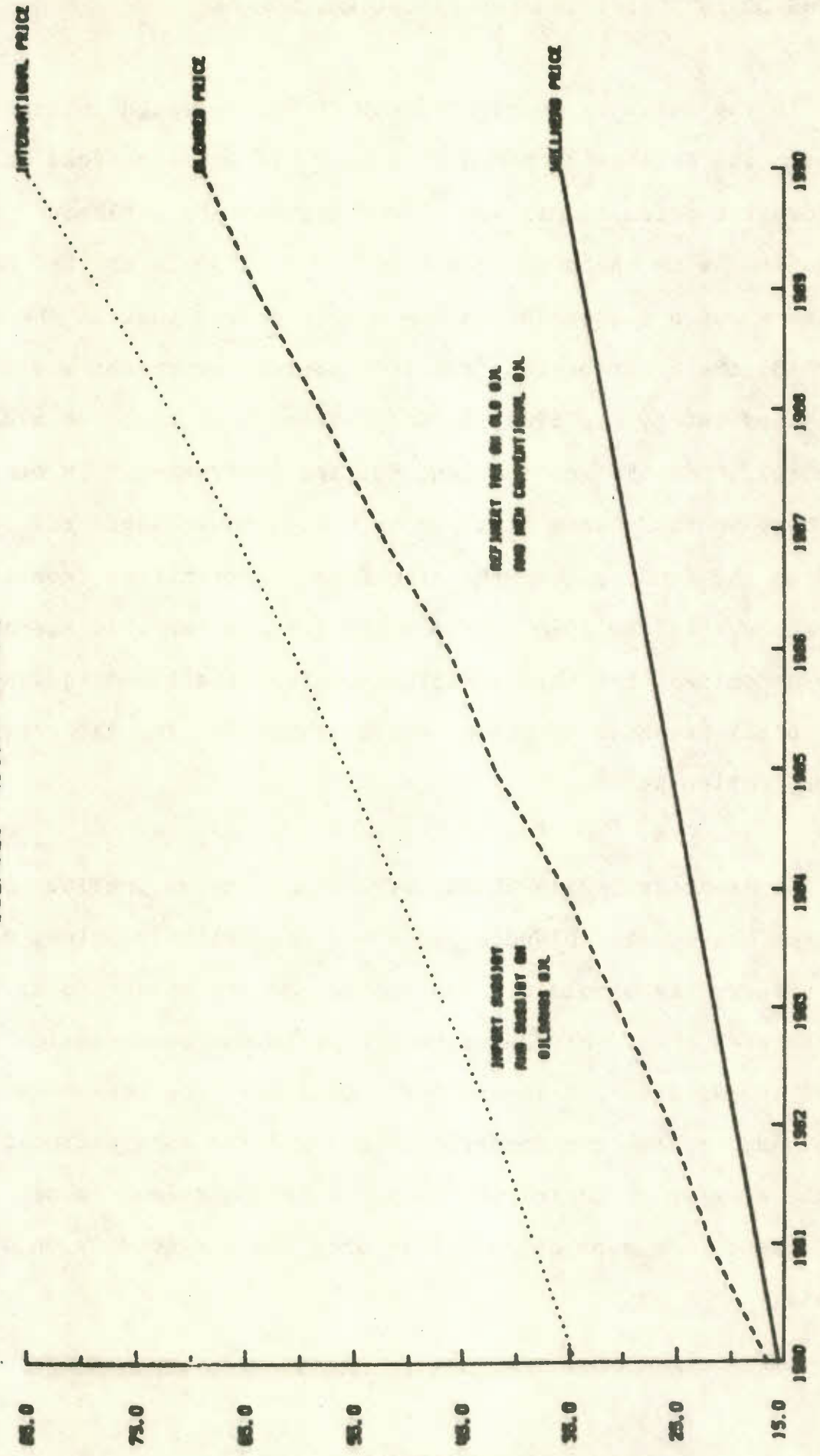
THE DOMESTIC PRICING AND FISCAL ENVIRONMENT

In the National Energy Program (NEP), released in association with the October 28th budget speech, it was announced that the domestic price of oil would be determined by a blended pricing scheme as in the pricing schedule described in the NEP document. There was a suggestion in the Budget papers that in the blending fund, the contribution from the federal government would be phased out by mid 1982, at which time there would be a slight surplus position on the fund for the government. In other words, there would be some small contribution towards general revenues from the fund, rather than the usual contribution from general revenues to the fund. In our simulations for this exercise, it was decided that this contribution from the blending fund towards general revenues be phased out by mid 1986, for the rest of the projection period.

As is described in Chart 10, taken from the previous paper, the area between the blended price and the wellhead price, marked refinery tax on old oil and the tax on new conventional oil, is the area that contributes to the petroleum compensation charge, as it was labelled in the NEP. Similarly the area between the blended price (the domestic price) and the international price is the area which contributes towards the petroleum compensation payment, the subsidy on oil imports and the subsidy on oil sands oil.

Chart 10

BLENDED PRICING SCHEME

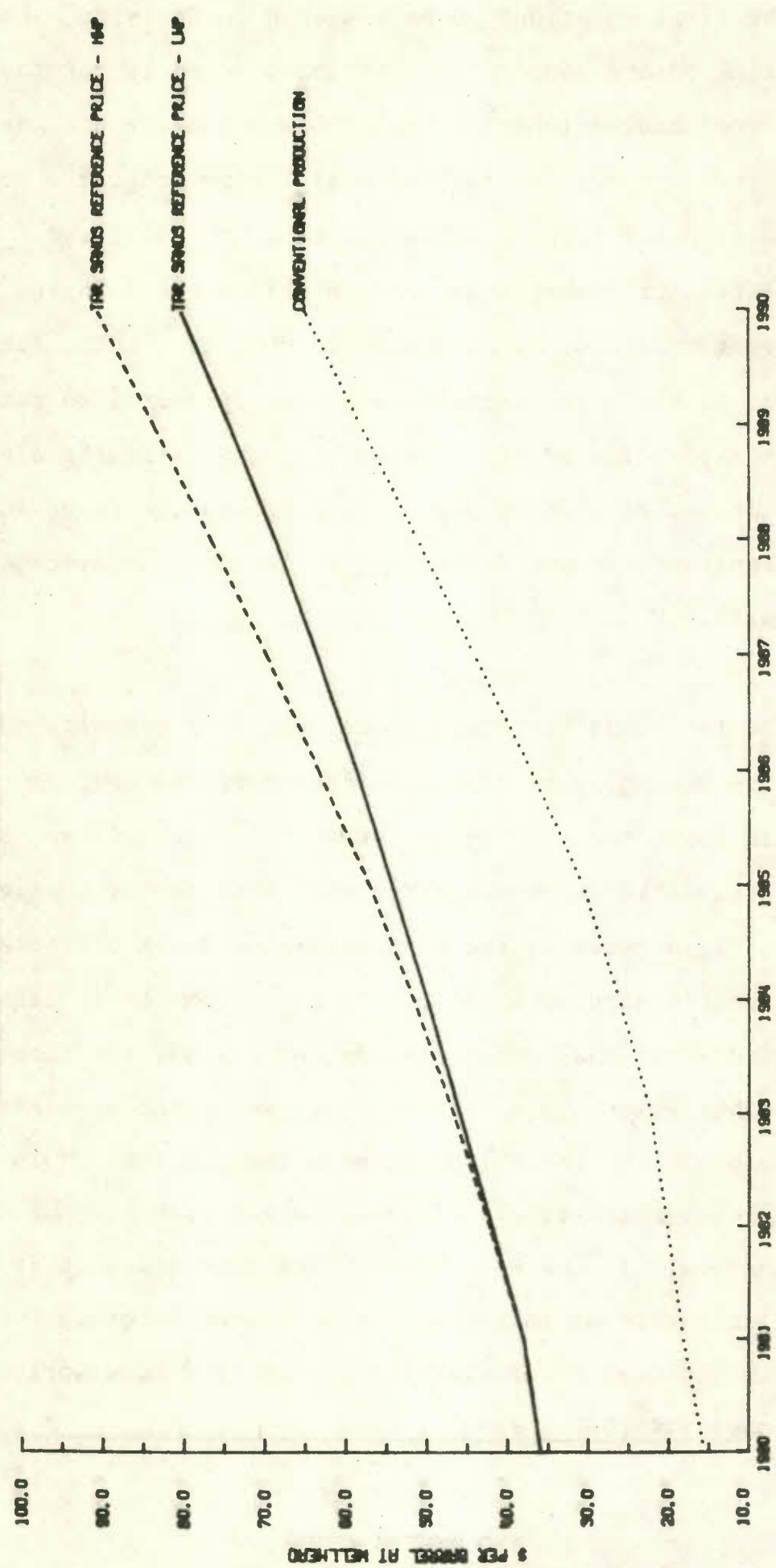


The first questions to be answered in devising a blended pricing scheme concern the announced schedule for the wellhead price of conventional crude petroleum and for the tar sands reference price. In the National Energy Program a schedule was submitted for both of these prices at the wellhead. Chart 11 presents the assumptions used in this paper. In the case of conventional production annual increments for the first three years of $2.00 per barrel are gradually increased until in the last five years of the time period, the increases are $3.50 every six months or $7.00 a year. This brings the price for conventional production at the wellhead to an average of $65.00 by 1990.

The tar sands reference price, which is established at $38.00 at the beginning of 1981, is indexed by the CPI and, in the Low World Price case, moves to $80.27 by 1990. It was stated in the NEP that this reference price will increase by the lesser of the rate of increase in the Consumer Price Index or in the international price. It can be seen from Chart 9 that by 1990, our international price has reached $84.59, therefore the Consumer Price Index rate of increase on the tarsands reference base of $38.00 in 1981 produces a lower price. This tarsands reference price is used in association with the Low World Price scenarios. In the High World Price scenarios, it is assumed that a higher rate of inflation would be used to gauge the increases in this price, particularly when compared to a world price that reaches $145.00 by 1990.

Chart 11

WELLHEAD PRICE OF CRUDE PETROLEUM



For the High World Price scenarios, a rate of increase of the CPI has been used such that the tar sands reference price achieves $90.56 by 1990, considerably higher than the reference price used in the Low World Price alternatives.

In the National Energy Program a pricing schedule for the domestic and wellhead prices of natural gas was announced that included a gas revenue tax. Effective November 1st, 1980, this tax was levied on both domestic and export consumption of natural gas at the rate of 30 cents per MCF. The tax will be further increased by 15 cents per mcf on July 1, 1981, and by similar 15 cent increases on January 1, 1982 and on January 1, 1983. Therefore, by January 1, 1983, this tax will be 75 cents per mcf. In these simulations we have assumed that the tax remains at 75 cents per mcf for the remainder of the projection period, and that the domestic price of natural gas increases at a much slower rate than domestic oil prices, thereby achieving a substantial price premium over oil. By 1990, as shown in Chart 12, the Toronto City Gate price of natural gas (the domestic price) is $10.24, while the wellhead price, excluding the petroleum tax and transportation costs, is $6.51. This represents a considerable premium towards gas in pricing over oil.

Chart 13 presents the domestic price of crude petroleum, the price per barrel at the Toronto City Gate in the Low World Price environment. In the alternative where self sufficiency is attained by 1990 in a high demand environment, the domestic price

Chart 12
NATURAL GAS PRICES

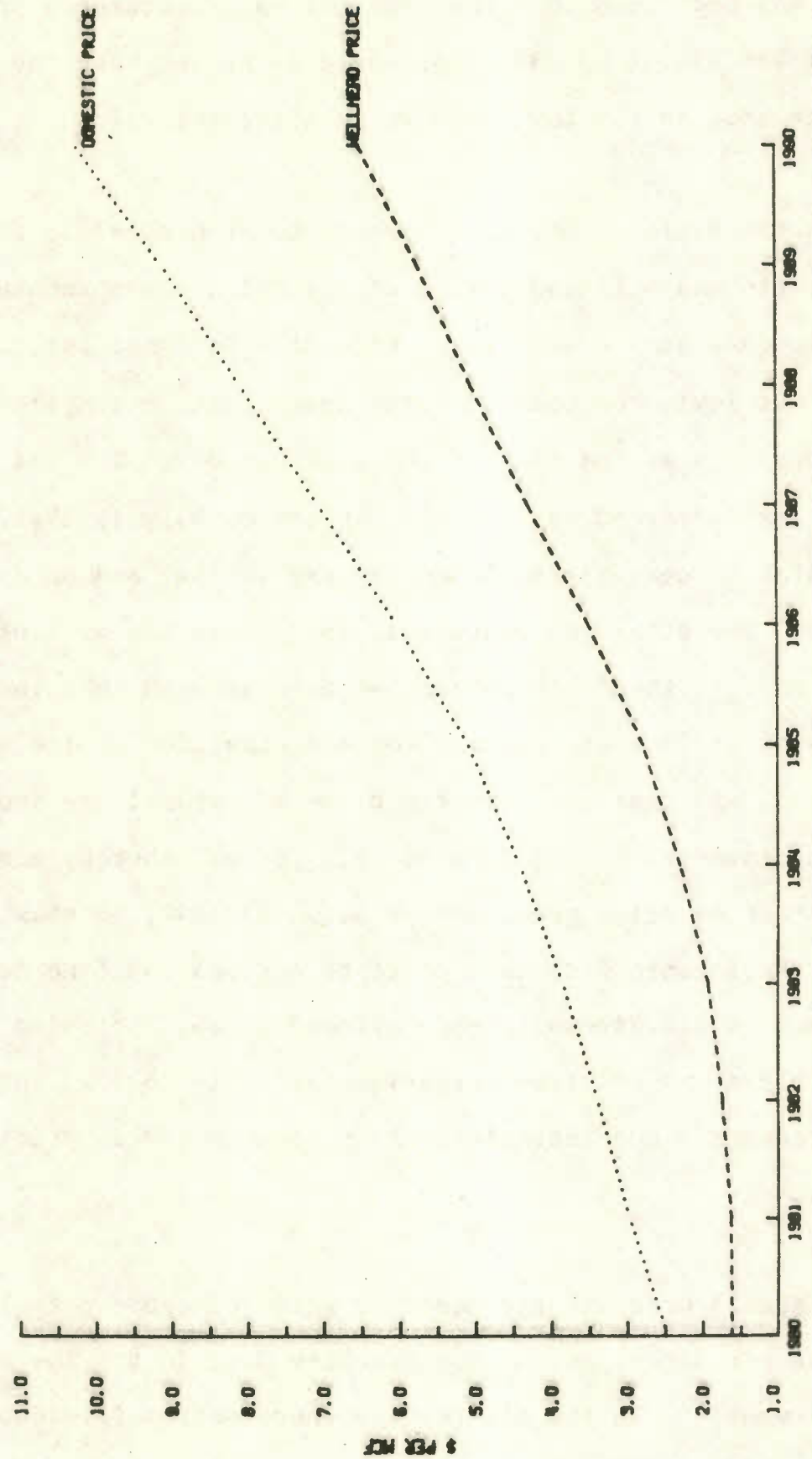
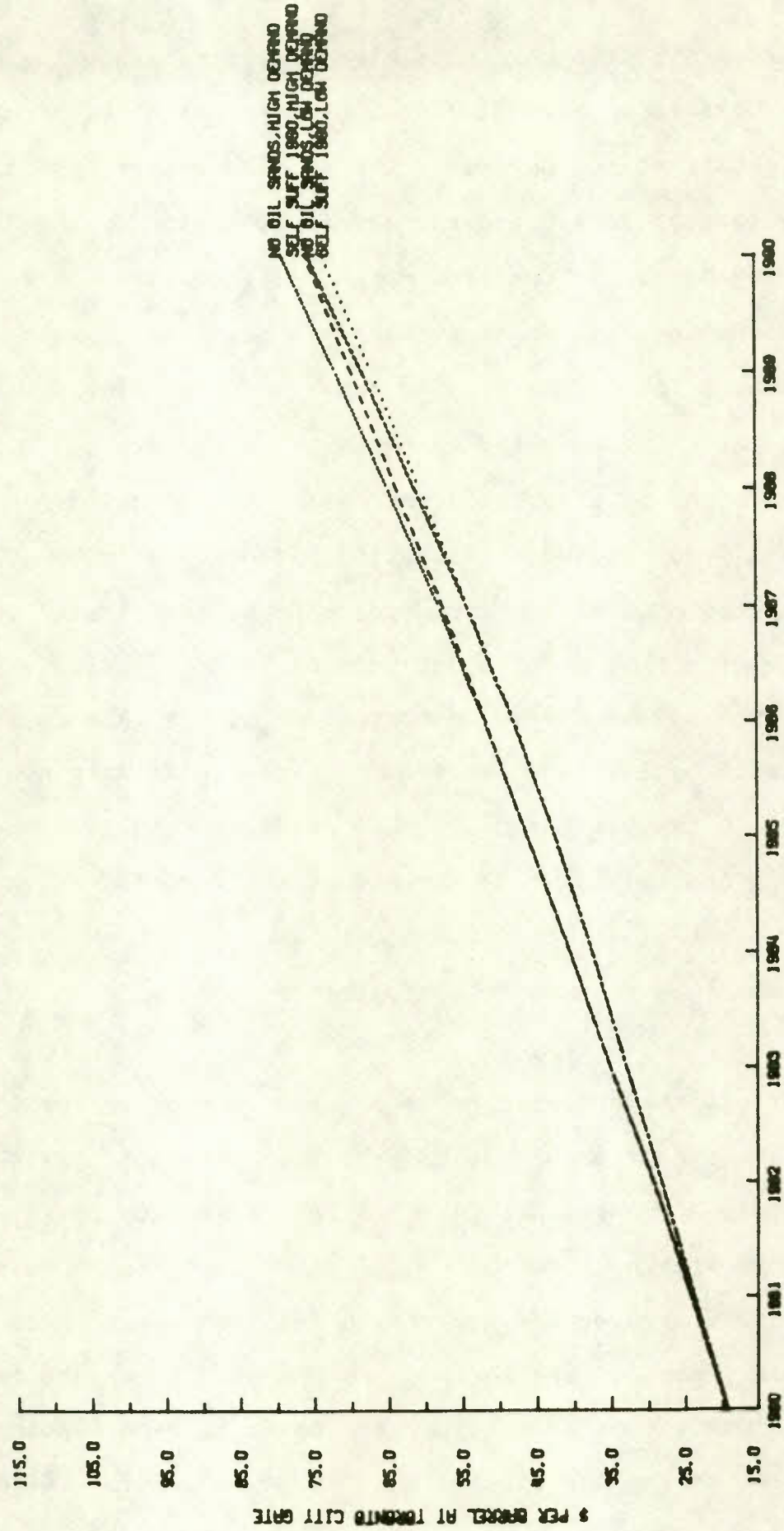


Chart 13

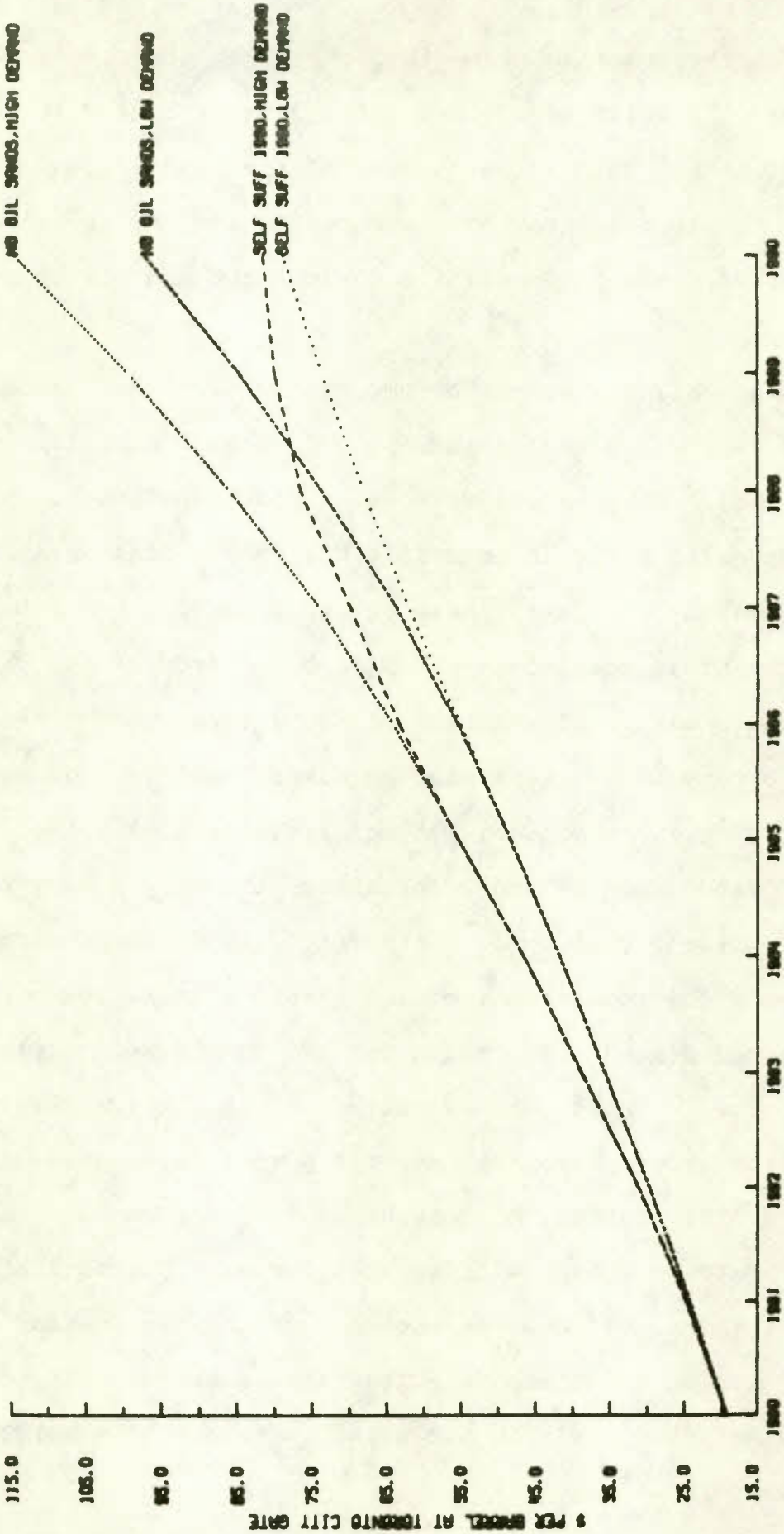
DOMESTIC PRICE OF CRUDE PETROLEUM (BUDGET PRICING,WORLD PRICE LOW)



is higher than in the self sufficiency alternative with low demand. This is so because of the greater weight of imports in the early part of the period in the pricing scheme, and the higher weight of subsidized tar sands production in the latter part of the period in the high demand alternative. In the two alternatives in which we assumed no new oil sands investment and production, a similar pattern is shown. In the high demand scenario there is a greater weight exerted by imported oil towards the end of the period when oil sands production would have started to achieve a mitigating effect on price developments. The higher world price combines with the domestic pricing elements to bring about a domestic crude petroleum price which by the end of period is over $3.00 higher than in the similar alternative in which self sufficiency is attained. Likewise, in the Low Demand, No Oil Sands alternative, the domestic price is higher by the end of the period, reflecting the heavier weight of imported oil as it makes up the shortfall in supply caused by reduced domestic resources.

In Chart 14 the domestic price of crude petroleum for the similar investment scenarios under a High World Oil price environment is presented. In the Self Sufficiency by 1990 alternative with high domestic oil consumption, the domestic price by 1990 is over $81.00, reflecting the higher world price in the early part of the period, and the greater weight of tar sands production at a higher tar sands reference price in the latter part of the period. In the Low Demand, Self Sufficiency

Chart 14


DOMESTIC PRICE OF CRUDE PETROLEUM (BUDGET PRICING,WORLD PRICE HIGH)
NO OIL SANDS,HIGH DEMAND
NO OIL SANDS,LOW DEMAND
SELF SUFF 1990,HIGH DEMAND
SELF SUFF 1990,LOW DEMAND
$ PER BARREL AT TORONTO CITY GATE
115.0
105.0
95.0
85.0
75.0
65.0
55.0
45.0
35.0
25.0
15.0
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990

alternative, the domestic price is higher than its counterpart in the Low World Price environment, but lower relative to the high demand case. This is so because of the gradual reduction in the weight of imports throughout the period and the lower weight of high priced domestic production towards the end of the period.

In the alternative where we assume no new oil sands production and also assume a high domestic demand for crude petroleum, the High World Price alternative achieves a startling result. By 1990 the domestic price is over $114.00, and is considerably higher throughout the latter half of the period. The high domestic demand is coupled with low domestic production, implying a much greater weight of imported oil at a very high price, hence, at a very high cost to the consumer: not as high as if one were paying world prices, but still substantially higher. In the No Oil Sands, Low Demand alternative, the weight of imported oil in the price formation of domestic oil is still substantial, although much lower than in the high demand alternative because of the reduced demand. The price by 1990 "achieves" nearly $97.00 a barrel. These two last alternatives are examples of the effect on the crude petroleum domestic price, formulated under the blended price scheme, of considerable real price increases in the world price, combined with reduced domestic production of alternate forms of oil and, in the case of the high demand scenario, with no reduction in domestic consumption. It presents what could be termed, within our eight scenarios, the worst possible case.

Table 8

Domestic Price of Crude Petroleum ($ per barrel at Toronto City Gate)

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
World Oil Price Low, Budget Pricing											
Self Sufficiency, High Demand	19.31	24.26	29.30	35.01	40.37	46.04	51.52	57.19	63.40	69.41	75.51
Self Sufficiency, Low Demand	19.31	23.89	28.24	32.85	37.40	42.31	47.70	53.83	60.22	66.67	73.29
No New Oil Sands, High Demand	19.31	24.26	29.30	35.01	40.37	46.02	51.73	57.77	64.60	71.56	78.89
No New Oil Sands, Low Demand	19.31	23.89	28.24	32.85	37.40	42.31	47.81	54.00	60.91	67.94	75.26
World Oil Price High, Budget Pricing											
Self Sufficiency, High Demand	19.31	24.76	31.04	38.66	46.41	55.11	62.97	69.53	76.26	79.75	81.30
Self Sufficiency, Low Demand	19.31	24.34	29.64	35.57	41.60	48.14	54.80	61.73	67.90	73.42	78.65
No New Oil Sands, High Demand	19.31	24.76	31.04	38.66	46.41	55.09	63.92	73.65	85.77	99.09	114.35
No New Oil Sands, Low Demand	19.31	24.34	29.64	35.57	41.60	48.14	55.12	63.33	73.44	84.46	96.98

Table 8 presents the levels of the domestic price per barrel for the various alternatives.

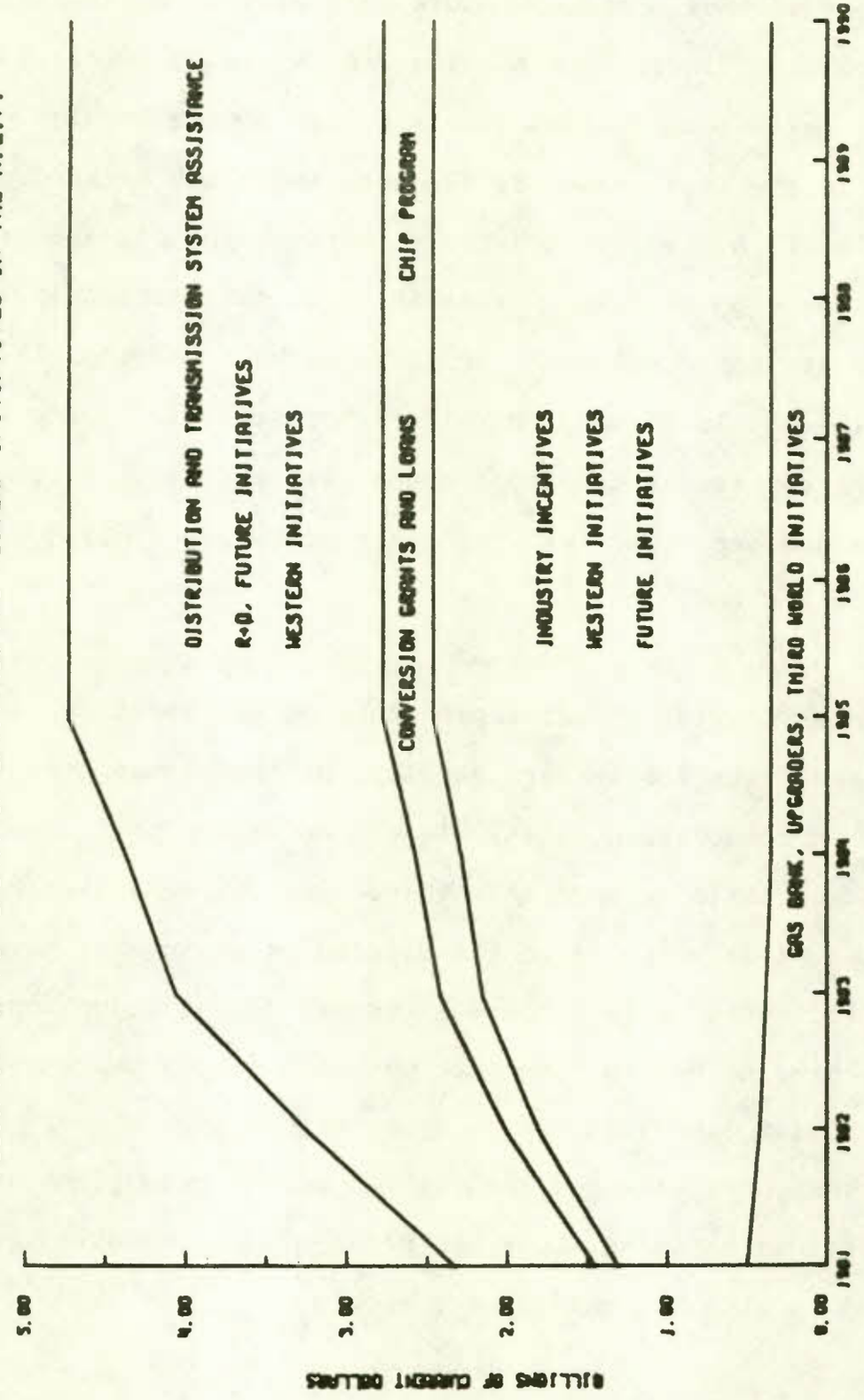
Included in the National Energy Program was a statement of new energy initiatives amounting to over $8 billion (current dollars) which have been incorporated in all the alternatives. These initiatives, which were described in detail on page 90 of the National Energy Program, were assumed to be continued throughout the decade at the level that they had attained in current dollars in 1985, thus, assuming a real decline in expenditures towards incentives over the latter part of the decade.

Chart 15 illustrates the expenditures on these initiatives and their distribution among the many programs delineated in the National Energy Program. These include expenditures on, what is termed in the national accounts system, capital assistance towards distribution and transmission systems, towards research and development, towards future initiatives, and towards the western development program. Within the category, capital assistance to persons, we have two major energy incentive programs -- the conversion grants and loans to individuals and to households, and the CHIP program to assist in insulation initiatives throughout the economy.

Many of the programs within these energy initiatives fall under the heading 'industry incentives', and include incentives towards exploration and development, incentives towards production of non-conventional oil, and assistance in heavy oil upgrading programs. Also in this category are other components of the

Chart 15

ALLOCATION OF NEW ENERGY EXPENDITURES AND WESTERN INITIATIVES IN THE N.E.P.



western development fund initiatives, as well as future initiatives such as propane vehicle initiatives, regarding propane powered fleets, and housing demonstration initiatives, regarding maximum insulation levels within housing design. Included in the last group are funds to establish Petro Canada International, a new firm created to explore for oil and gas solely in developing areas, areas in which multinational oil companies are often reluctant to invest. This company will harness the skills of many private sector firms in Canada for the benefit of the lesser developed countries, and it will also seek joint venture opportunities with other state-owned oil companies in the western world.

The monies for the annual expenditure on all these new energy initiatives, plus the western development fund, have been included in both demand cases. It can be argued that in the high demand case, it is assumed that these expenditures, plus any associated price response to the blended price scheme, have not been sufficient to affect the desired oil demand reductions, but however, have helped to reinforce Canada's energy awareness. In the Low Demand cases, it can be hypothesised that these expenditures have effected the desired demand reductions and have been useful in bringing about the major off-oil substitution described in the National Energy Program.

The associated revenue programmes from the National Energy Program have also been included in these simulations. These

programmes include the natural gas and petroleum liquids tax previously mentioned, at a maximum of 75 cents per mcf by 1984; the extended oil export tax on aviation petroleum, and associated fuel products, inclusive of its sharing scheme with the petroleum-producing provinces for the crude petroleum tax revenues; and the previously mentioned petroleum compensation charge which is used to offset the petroleum compensation payments.

IMPACT ON SELECTED ECONOMIC INDICATORS

Now that we have reviewed the assumptions incorporated into the eight alternatives under consideration, let us consider their impact on selected major economic indicators such as the consumer price index, real growth in gross national product, growth in real disposable income, employment effects, effects on the current account balance and exchange rate, and effects on government balances.

We will consider each of the investment alternatives under the two world pricing environments; first, under the Low World Price environment, and then secondly, under the High World Price environment. These investment alternatives include the self sufficiency cases and the cases in which the major oil sands projects were removed, analysed under both the high and the low demand assumptions.

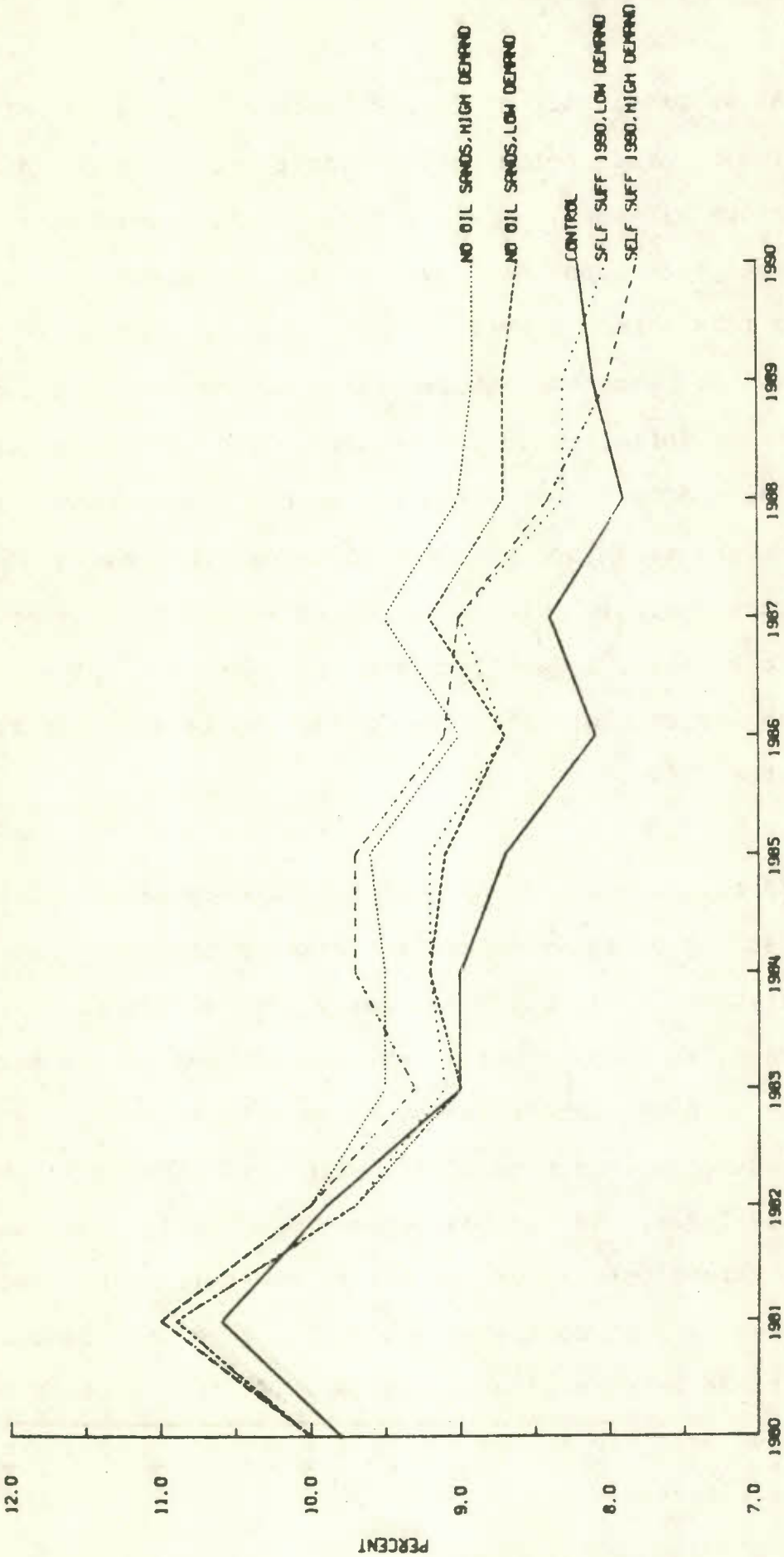
CONSUMER PRICE INDEX

As we previously discussed, in our examination of the domestic price of crude petroleum, a wide range of price impacts from the various alternatives was apparent. In examining the impact of these prices upon the level of inflation and upon the economy, two things become very obvious. In Chart 16 it is clear that the level of petroleum imports has a substantial bearing upon the rate of inflation in the economy. The second factor is the level of demand for crude petroleum within the economy. If this demand is high, as in our high demand cases, the weight of imported oil in the domestic price of crude petroleum is greater. Hence there is a stronger impact from the international price of petroleum upon the rate of inflation, resulting in a higher rate of change in the CPI.

In this chart, in the Self Sufficiency alternative where there is strong consumer demand for crude petroleum, the rate of inflation is higher in the early part of the period. It then crosses to below control level at the end of the period, due to both exchange rate effects, as we will later see, and due to the impact of a lessening of the weight of imports in the Consumer Price Index. In the Low Demand, Self Sufficiency alternative, the rate of change of the CPI is one-half point lower throughout the early part of the period due to a reduced demand for imports of crude petroleum in the system. It then crosses over the high demand scenario at the end of the period, mainly due to exchange rate effects.

Chart 16

CONSUMER PRICE INDEX - % CHANGE (BUDGET PRICING, WORLD PRICE LOW)



In the second chart, Chart 17, which shows the Consumer Price Index in the High World Price environment, it is clear that the higher world price for crude petroleum is affecting the rate of inflation in Canada via the blended pricing scheme. The Canadian economy is no longer shielded from changes in international prices of crude petroleum, as it was in our earlier set of simulations under the $2.00 and $4.00 alternatives. There, changes in the international price of crude petroleum had no direct effect on Canadian inflation rates. However, they did have substantial effects on the federal budget positions.

In this chart we can see a similar pattern in the Self Sufficiency, High and Low Demand alternatives. In the High Demand alternative, the rate of change in the CPI is higher in the earlier part of the decade due to the weight of imports in the CPI. In the Low Demand alternative, the import requirements of crude petroleum in the economy are not as extensive, hence there are reduced exchange rate effects, and reduced effects of the weight of imports in the blended price formation of domestic crude petroleum prices. This point becomes very obvious in the No Oil Sands alternatives where in the High Demand case, the economy is faced with continuing double digit inflation throughout the decade. Here imports of crude petroleum, required in order to make up the supply shortfall from the reduced domestic production, imply a much higher level for the blended price of domestic crude petroleum. If you remember in

Chart 17

CONSUMER PRICE INDEX - % CHANGE (BUDGET PRICING,WORLD PRICE HIGH)

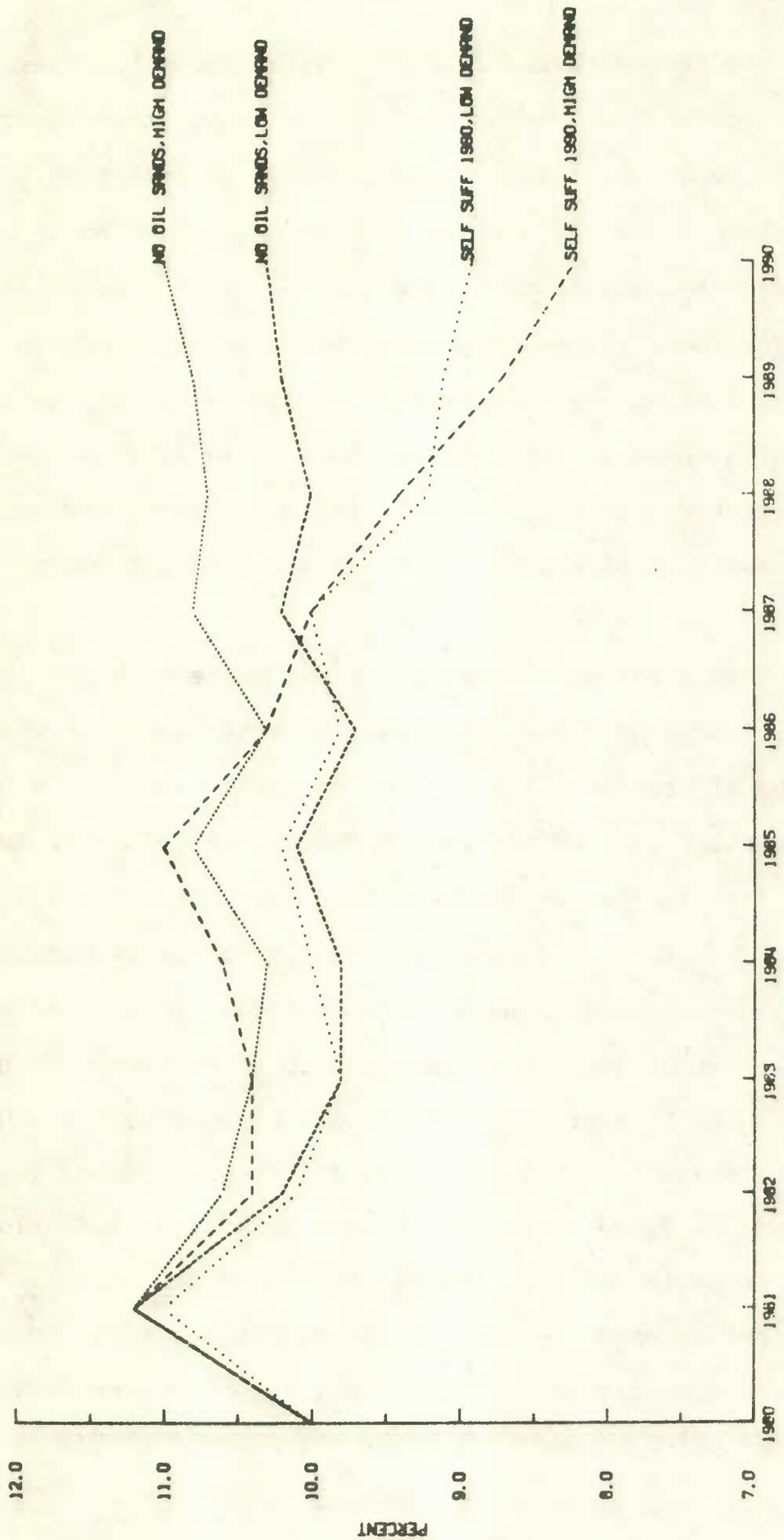


Table 8, the blended price reached over $114.00 a barrel by the end of the decade in the No Oil Sands, High Demand Case, and over $97.00 a barrel in the No Oil Sands, Low Demand Case. If the production is not forthcoming to offset the higher oil import bill, in a substantially higher world price environment for international crude petroleum, the Canadian economy is faced with much higher rates of inflation throughout the period. This effect can be counteracted to some extent by reduced Canadian demand for crude petroleum. However, by the end of the period, the weight of the imports in the formation of the blended pricing scheme implies a much higher crude petroleum price facing the consumer and industry; hence, a much higher level of inflation in the economy.

REAL GROSS NATIONAL PRODUCT

In our discussion of the impact of the various alternatives on inflation in the Canadian economy, one can see that the reduced domestic supply of crude petroleum has had a negative impact on the inflation rates in the economy. In our discussion of the growth in real gross national product, it will become further evident that crude petroleum self sufficiency in the Canadian economy not only enhances the price performance of the economy, but also enhances the growth performance.

Chart 18 presents the rate of growth in real gross national product in the Low World Price environment. In the two self sufficiency alternatives, in the early part of the period, the rate of growth of the economy is much stronger due to the impact of the investment in the oil sands plants. This is particularly evident in the High Demand scenario where the economy achieves a growth rate close to 4.4 per cent in the early part of the period. This growth rate then falls below that of the Base Case due to the earlier timing of these investment projects and to a higher level of inflation in the system. In the Low Demand alternative, the reduced investment requirements necessary for the achievement of self sufficiency imply a lower rate of growth in the early part of the period, relative to the High Demand alternative. Again, real GNP growth is lower than in the Base Case by the end of the period, due to increased inflationary pressures.

Chart 18

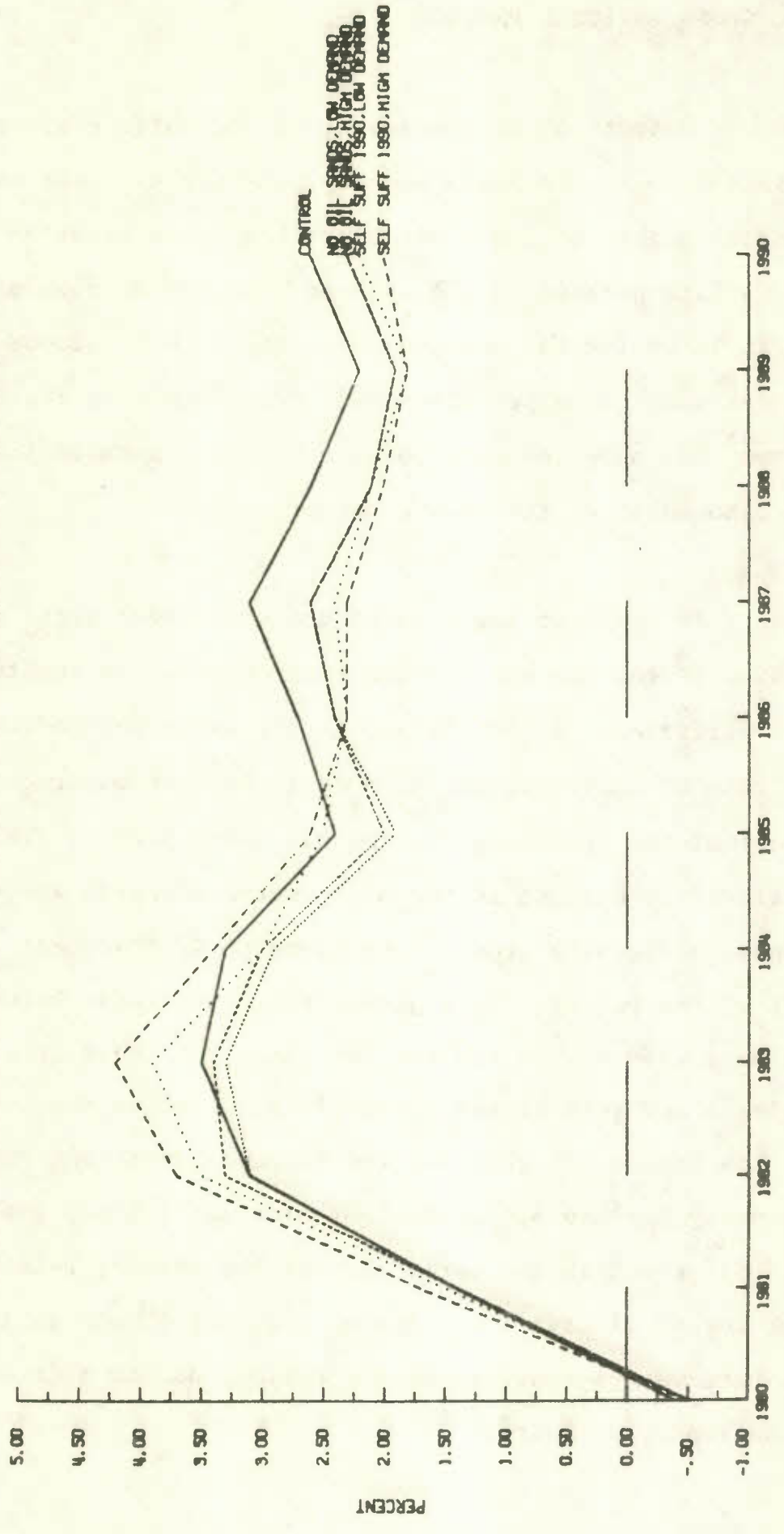
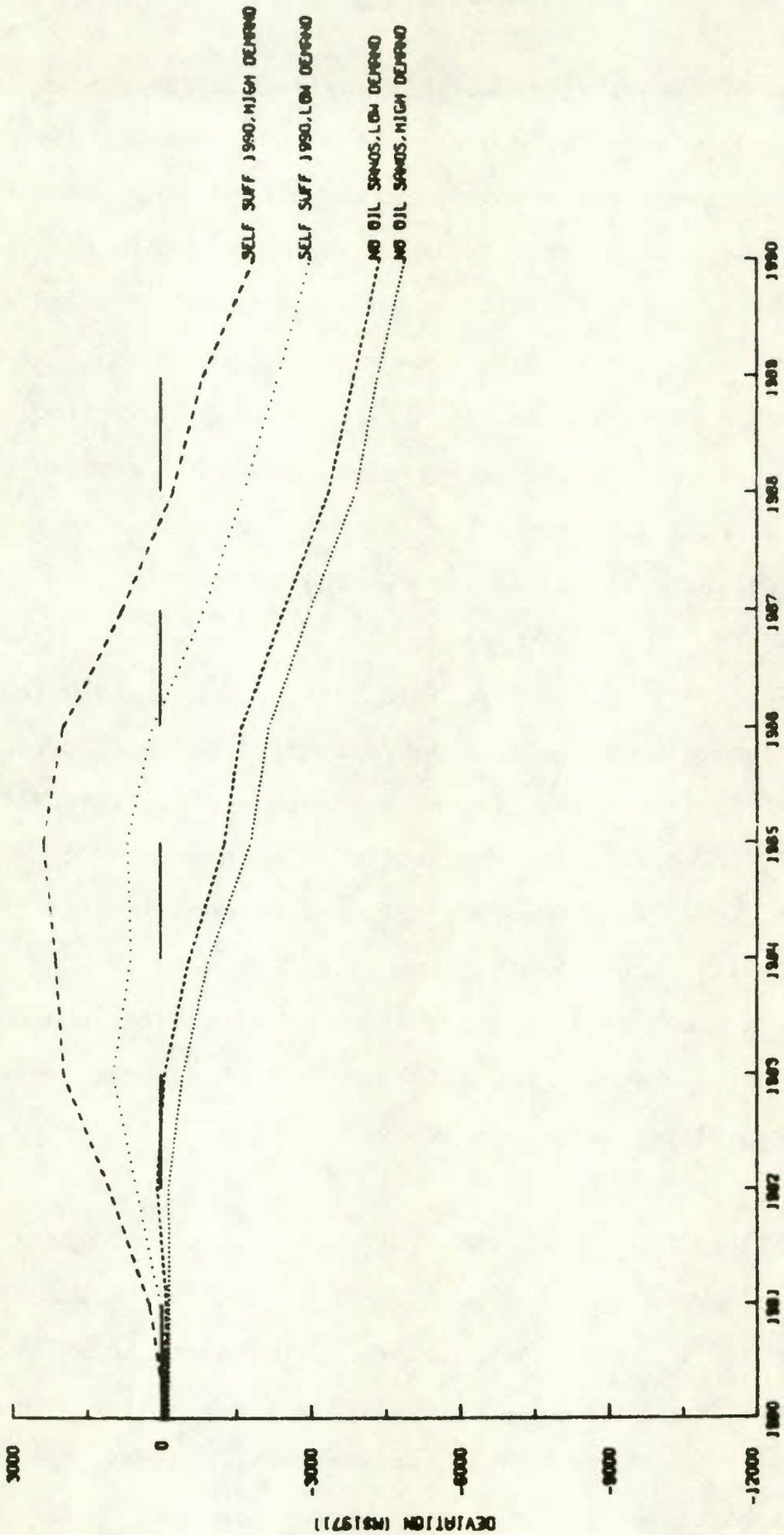

GROSS NATIONAL PRODUCT 71$ - % CHANGE (BUDGET PRICING, WORLD PRICE LOW)
CONTROL
NO OIL SANCTIONS, LOW DEMAND
NO OIL SANCTIONS, HIGH DEMAND
SELF SUFF 1980, LOW DEMAND
SELF SUFF 1980, HIGH DEMAND
PERCENT
5.00
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
-.50
-1.00
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990

Chart 19

GNP($1971 MILLIONS) - DEVIATION FROM CONTROL (BUDGET PRICING,WORLD PRICE LOW)



In the No Oil Sands alternatives, the rate of growth is lower than in the Base Case throughout most of the period. The reduction in investment spending within the economy leads to a reduction in economic activity in the economy. This reduced growth is reinforced by a higher crude petroleum price in all our alternatives than in the Base Case where we had assumed an annual increase of $4.00 per barrel in the price of crude petroleum throughout the whole period. As we will indicate when we turn to a discussion of the level of GNP in Chart 19, output is reduced in the No Oil Sands cases throughout the period.

In order to clarify the discussion, regard Chart 19 which shows the deviation from the control in real gross national product in millions of 1971 dollars. In the Low World Price alternative, where self sufficiency is attained by 1990 in a high demand environment, the level of gross national product in 1985 is $2.4 billion ($1971) higher than in the Base Case. By the end of the period it is somewhat lower, a reflection of the rearrangement of timing of the investment projects and the inflationary pressures arising from higher petroleum prices.

Similarly, in the Low Demand, Self Sufficiency alternative, the level of gross national product is $1 billion higher in 1983. However, again the more inflationary environment, relative to the control solution, implies a reduction in gross national product by the end of the period. The gap in levels between the High and Low Demand cases begins to narrow as other factors in the economy offset the reduction in investment activity.

Chart 20

GROSS NATIONAL PRODUCT 71$ - % CHANGE (BUDGET PRICING,WORLD PRICE HIGH)

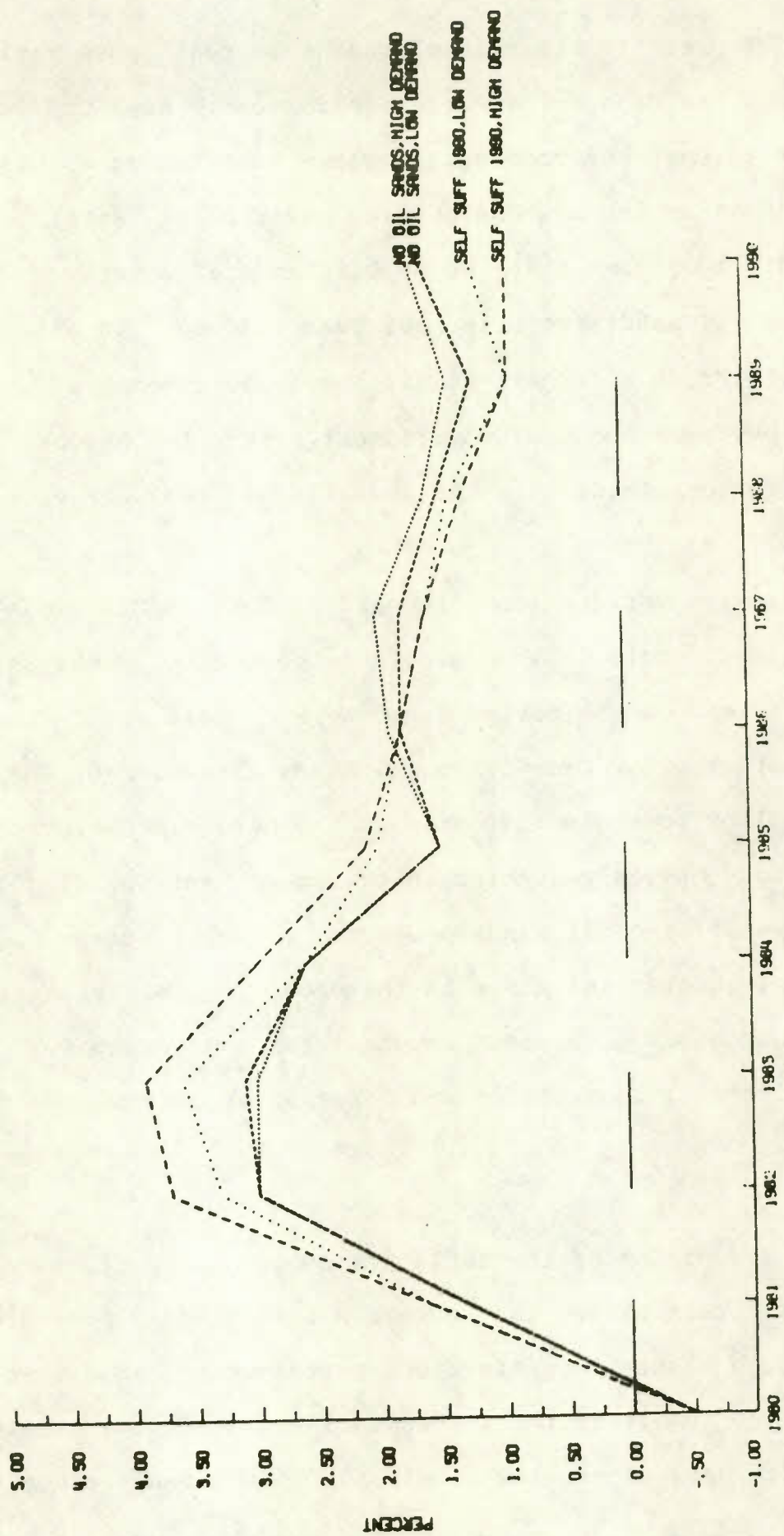


Chart 20 presents the rate of change in real gross national product in the High World Price environment. Real GNE in the two self sufficiency environments, while not attaining as high a rate of growth as in the Low World Price environment, still is substantially higher than the No Oil Sands alternatives, where the major oil sands projects have been removed. In all of the High World Price alternatives, it should be remembered that a bleaker overseas and U.S. environment alternate the domestically induced factors leading to the reduction in real GNP growth.

In this high world price alternative, both No Oil Sands alternatives result in a considerable reduction in the level of GNE by the end of the period from the Base Case level (Chart 21). In 1990, in the Low Demand, No Oil Sands alternative, GNE is $11.9 billion lower in 1990 than in the base case solution. This implies not only a reduction in the investment spending due to the removal of the oil sands projects, but also arises from the effects of higher inflation in the economy on other levels of activity such as government expenditures and revenues, competitiveness, consumption and other areas of investment activity.

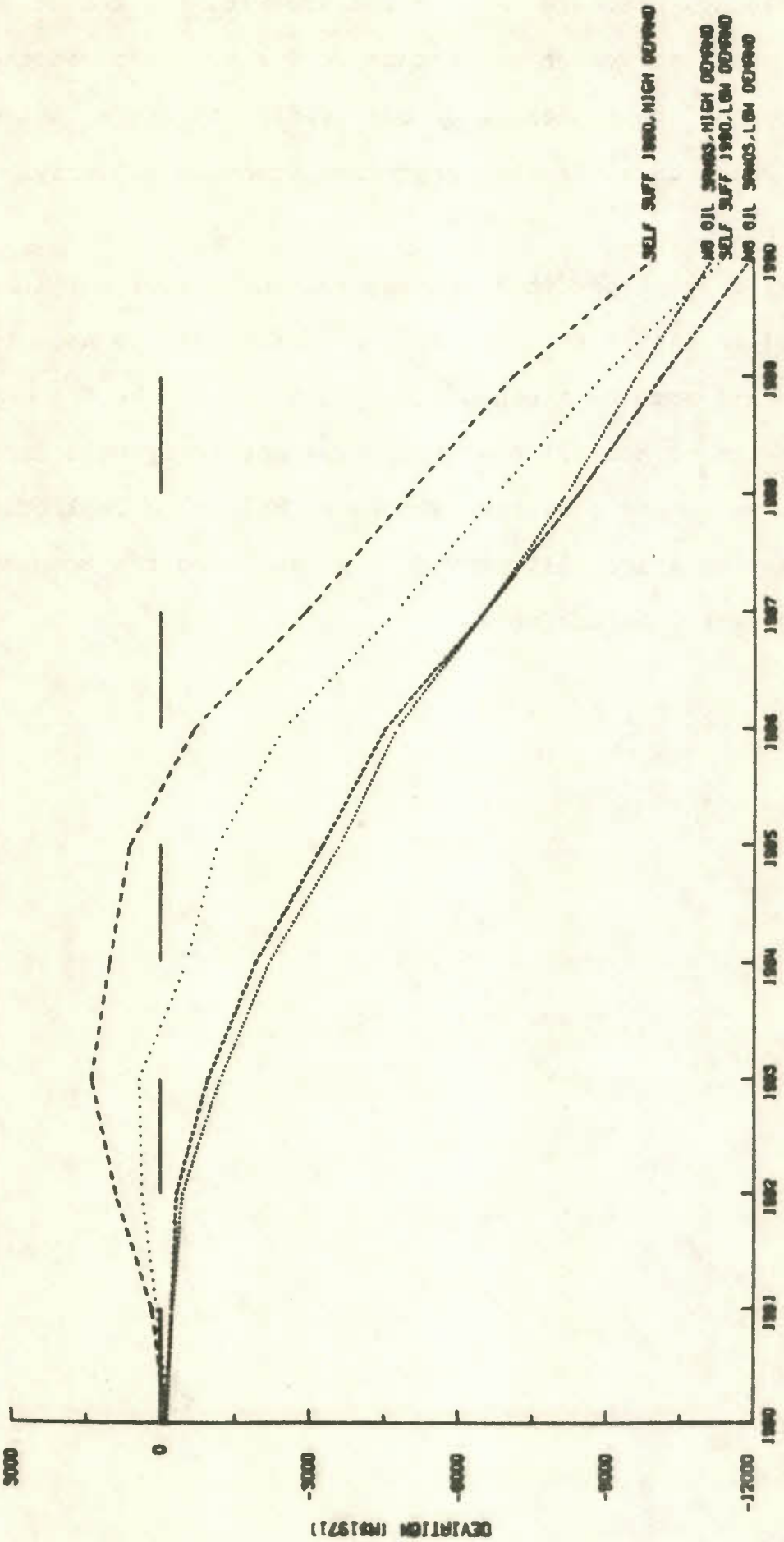
In our discussion of the implications for GNE performance in our eight alternatives, the increased inflationary pressures arising from higher domestic crude petroleum prices cast a shadow that strives to offset the increased investment activity in the self sufficiency alternatives. In the No Oil Sands cases, these

inflationary pressures act in concert with the reduction in investment, to weaken the economy. The reduction in the stimulus provided by the economies of our trading partners in the High World Price cases further depresses economic activity.

We will see later that substantial government surpluses, accrued in the latter part of the period, may be used to ameliorate some of the negative pressures on the economy. Conversion to non-oil energy sources may imply considerable revisions to our equipment stock, as well as a reallocation in life styles which will provide a stimulus to the economy beyond our present expectations.

Chart 21

GNP($1971 MILLIONS) - DEVIATION FROM CONTROL (BUDGET PRICING, WORLD PRICE HIGH)

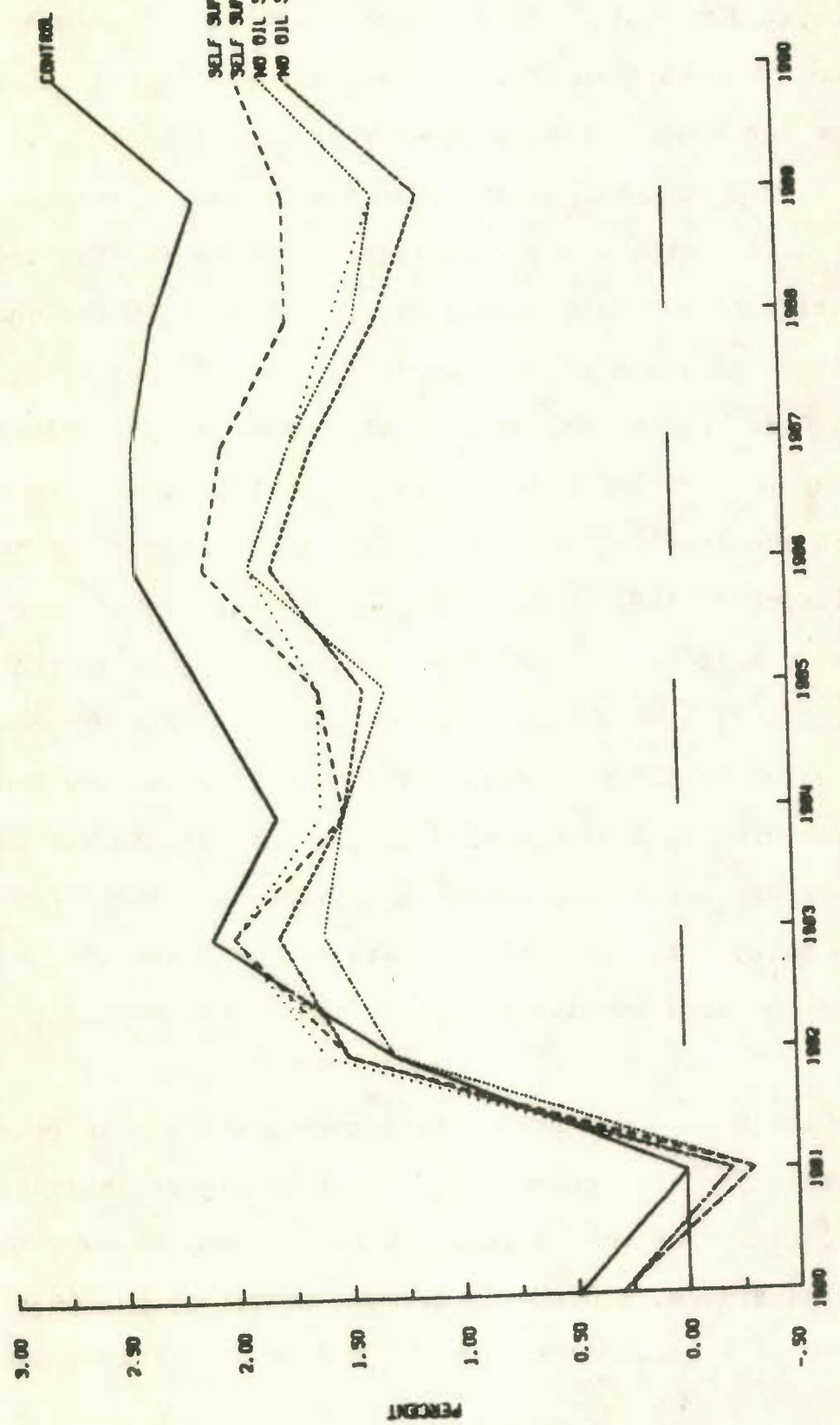


REAL DISPOSABLE INCOME

Charts 22 and 23 illustrate the per cent change in real disposable income for our eight alternatives. In the Low World Price environment it is apparent that rate of change in real income is less than that in the Base Case in all the alternatives where the budget domestic energy pricing scheme is in effect. The higher rate of inflation in the economy, particularly in the last half of the decade, implies a decline in real incomes, relative to the Base Case. In the two Self Sufficiency alternatives, and especially in the High Demand alternative, the Base Case rate of change in real incomes is maintained until midway through the period. In the No Oil Sands alternatives, where the level of economic activity is reduced due to the exclusion of the tar sands projects, real incomes are lower. This fact is reinforced if we regard movements in the real wage, Appendix Table 4.0, where we see that the rate of change in this indicator is 1.2 per cent in the No Oil Sands, Low Demand alternative in 1990 compared to 2.0 per cent in the Base Case. As well as having considerable implications for income levels, this factor also impacts the rate of participation in the labour force, an area we will return to in a later section.

In the High World Price environment, the higher rate of inflation in the economy, arising from higher international crude petroleum prices transmitted to the economy through the blended pricing system, dictates a greater reduction in the rate of change of real incomes. By the end of the period, the most

Chart 22

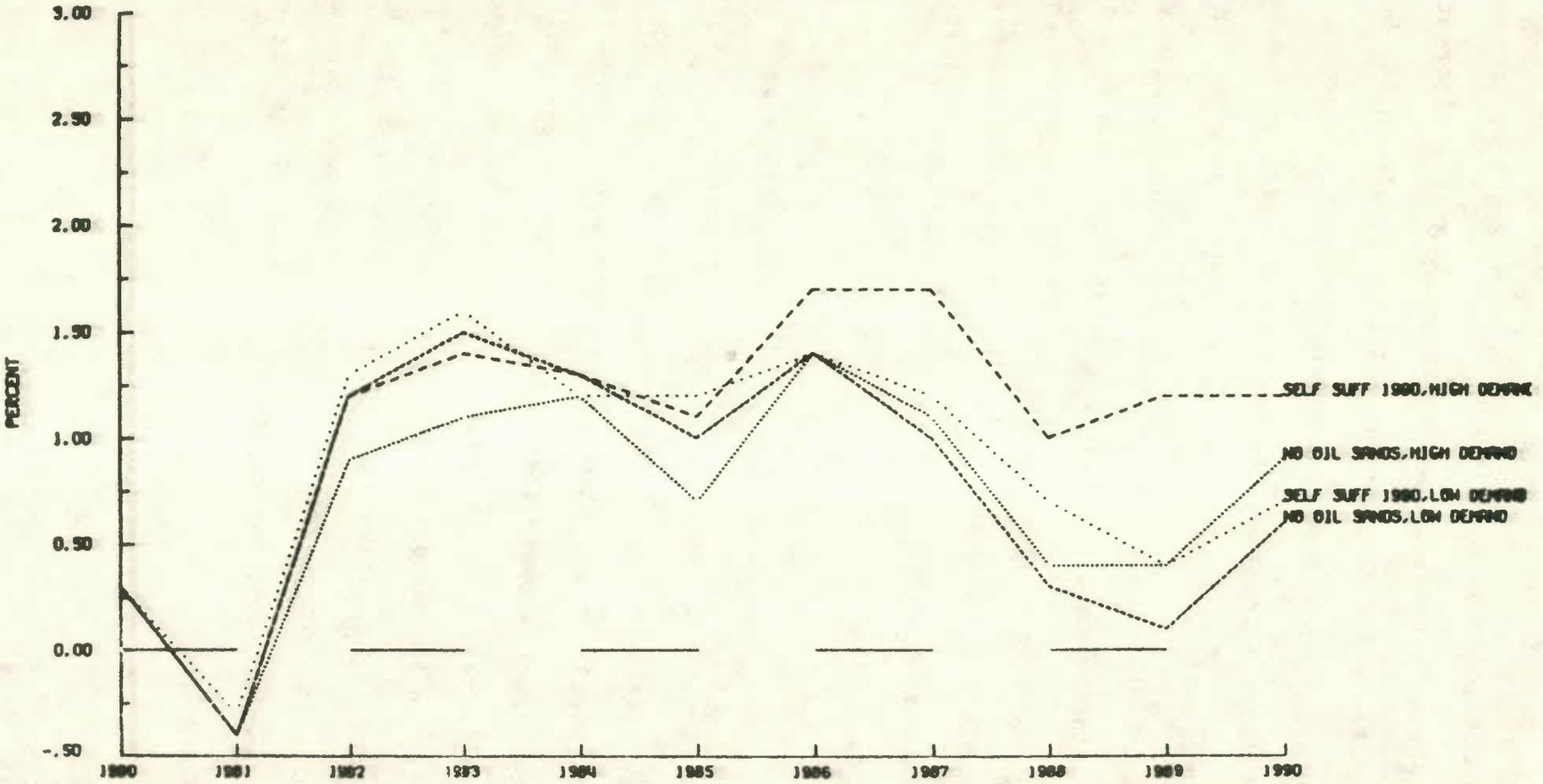

REAL DISPOSABLE INCOME - % CHANGE (BUDGET PRICING,WORLD PRICE LOW)
CONTROL
SELF SUFF 1990,HIGH DEMAND
SELF SUFF 1990,LOW DEMAND
NO OIL SANDS,HIGH DEMAND
NO OIL SANDS,LOW DEMAND
PERCENT
3.00
2.50
2.00
1.50
1.00
0.50
0.00
-.50
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990

optimistic case in this set of alternatives, seen in Chart 23, the Self Sufficiency, High Demand case, has a lower rate of change in real disposable income than any of the alternatives in the Low World Price environment. Income levels in the Self Sufficiency, High Demand case are maintained at a reasonably constant level throughout the period. However, in the other cases, the ameliorating effect of an appreciating dollar on the rate of inflation is offset by a severe reduction in real wage levels. In the No Oil Sands, Low Demand case the rate of change in the real wage is negative for over half the period and barely rises above 0.5 per cent. By 1990 in this case, the level of real disposable income is close to $12 billion ($1971) lower than in the Base Case.

The real income gains accruing to wage earners as a result of increased economic activity in the Self Sufficiency Cases are largely offset by higher rates of inflation in the economy. The overall result in all alternatives is one of reduced real incomes, especially in the latter part of the period. This is not only a result of the direct impact of reduced economic activity in the No Oil Sands alternatives, but also an indirect result of the negative impacts on the economy of the higher rates of inflation. These factors become even more evident when we turn to a discussion of the employment effects in the alternatives under study.

Chart 23

REAL DISPOSABLE INCOME - % CHANGE (BUDGET PRICING,WORLD PRICE HIGH)



EMPLOYMENT

As we have discussed in the previous section, the alternatives all show a considerable reduction in real incomes and in real wages. This would act as a dis-incentive to secondary labour force participation in the economy and would presumably have an effect on unemployment rates (as well as on social welfare programs). Table 5.0 in the Appendix presents the unemployment rates for the various alternatives. In this section we shall discuss the other major factor dominant in the determination of those unemployment rates -- the employment effects.

Charts 24 and 25 illustrate the cumulative differences from the Base Case (which is the zero line) in thousands of persons employed in the economy. In the Low World Price environment, we see a substantial gain in the number of persons employed in the Self Sufficiency, High Demand alternative. The additional investment activity provided by the construction of the tar sands plants required to attain self sufficiency, plus the secondary requirements, are muted to some extent by the negative effects of the higher level of inflation in the economy. However, there is still an employment gain. Similarly, in the Self Sufficiency, Low Demand case the employment effect is positive until late in the period when it is overridden by the inflationary effects. In both of these cases there is an improvement in the unemployment rate during the majority of the period, however, by 1990 it also is showing some deterioration.

Chart 24

EMPLOYMENT - THOUSANDS (BUDGET PRICING, WORLD PRICE LOW)

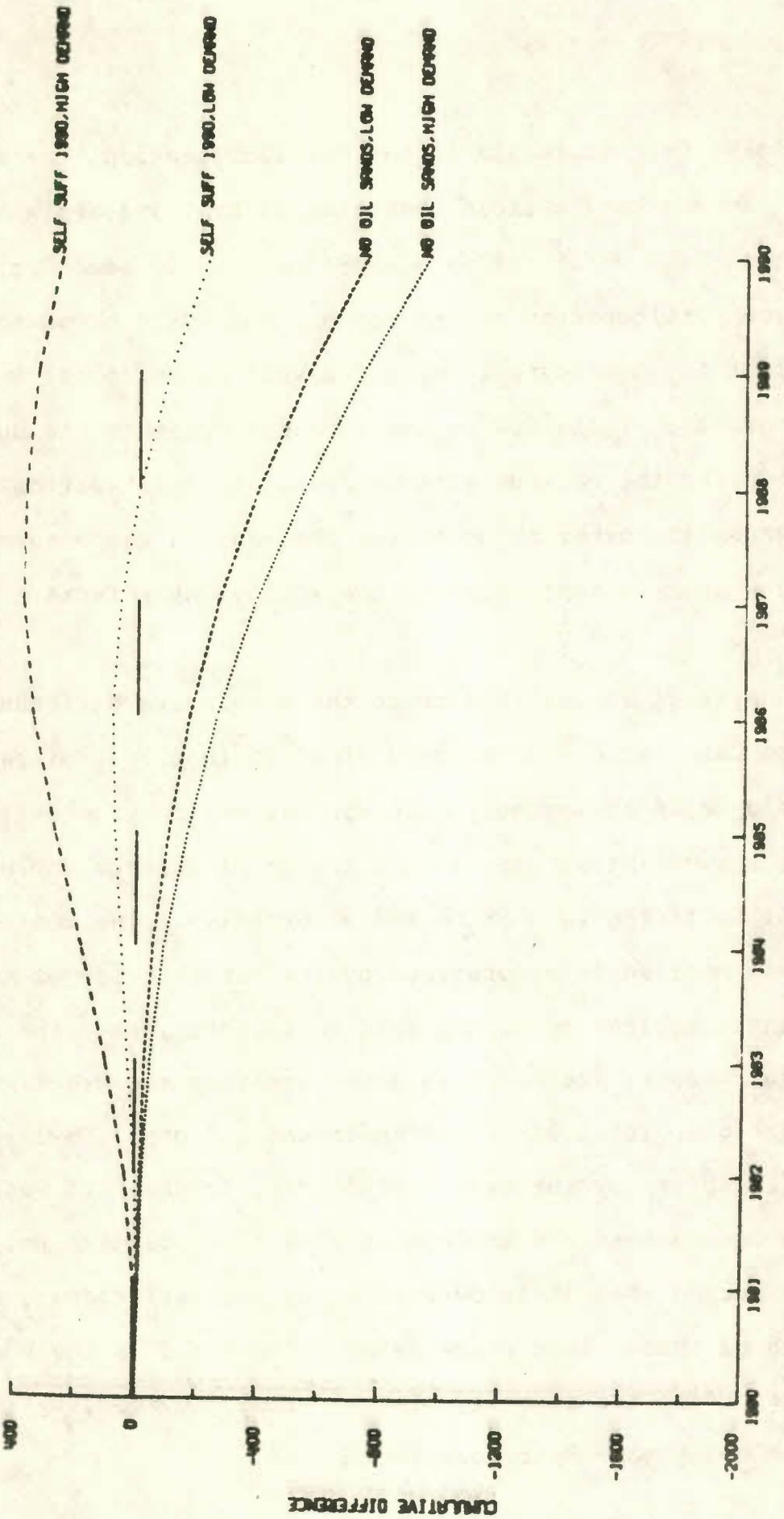
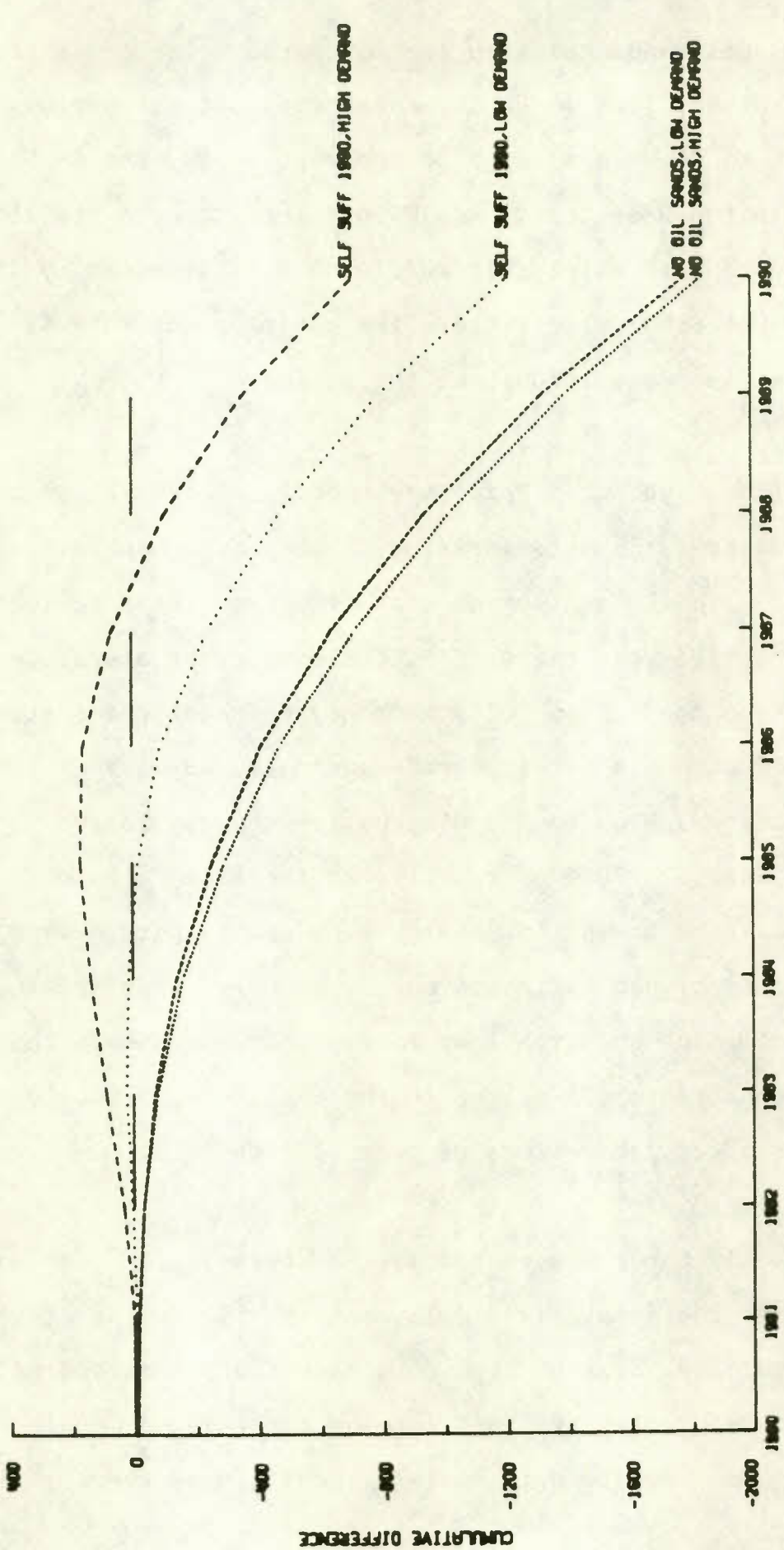


Chart 25


EMPLOYMENT - THOUSANDS (BUDGET PRICING, WORLD PRICE HIGH)
SELF SUFF 1980, HIGH DEMAND
SELF SUFF 1980, LOW DEMAND
NO OIL SANDS, LOW DEMAND
NO OIL SANDS, HIGH DEMAND
CUMULATIVE DIFFERENCE
400
0
-400
-800
-1200
-1600
-2000
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990

In the No Oil Sands cases in the Low World Price environment there is a steady loss in employment throughout the period. By 1990 in the No Oil Sands, High Demand case employment is 950,000 less than in the Base Case, and 700,000 less than in the similar demand situation in which self sufficiency is attained by 1990. In both No Oil Sands alternatives the unemployment rate is higher than in the Base Case throughout the period.

It is in the High World Price environment, Chart 25, where we see the most dramatic deterioration in the employment situation. The initial gains in employment resulting from the additional investment activity in the Self Sufficiency cases are eroded by the effects on the economy of a much higher rate of inflation, plus the reduction in foreign trade activity. By 1990 in the Self Sufficiency, High Demand alternative the cumulative employment loss is 700,000, relative to the Base Case, or 450,000, relative to its Low World Price counterpart. Thus, the effects of the higher inflation on the economy, both arising from domestic inflation and from lost foreign markets due to the higher international oil prices in those markets, directly account for a cumulative loss of over 400,000 jobs.

In the No Oil Sands alternatives, the situation is much worse. In both cases the cumulative employment loss is in the vicinity of 1,800,000 jobs, arising from both direct and indirect affects of lost economic activity, lost foreign markets and double digit inflation. Contrary to our initial expectations, the

unemployment rate in these cases tracks close to 7.0 per cent through the latter part of the period. It remains at that level due to the strong dis-incentive to work provided by the meagre increments in real wages. In 1990 in the No Oil Sands, High Demand case 462,000 fewer persons are employed; however, 300,000 persons withdraw from the labour force because of the dis-incentive to obtain work.

The employment picture in all our alternatives is coloured in darkest tones by the impact of much higher rates of inflation, both on the Canadian economy and on the international economy. As was noted in our discussion of real GNP, compensating factors arising within the transition to a less oil-dominated life style may provide some stimulus to the rather dismal picture portrayed in this paper.

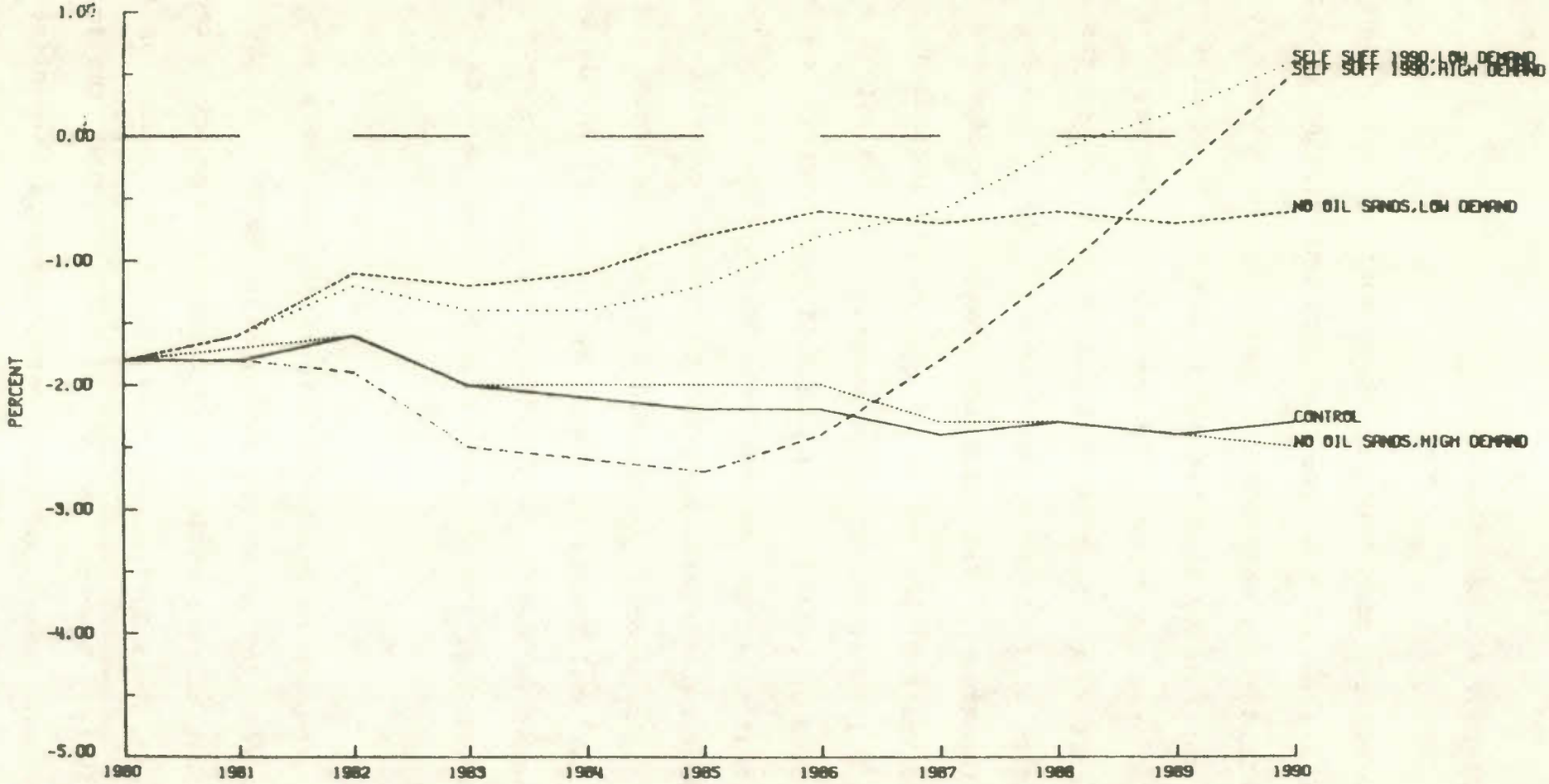
THE CURRENT ACCOUNT BALANCE

The effects upon the current account balance in our alternatives are the result of many conflicting impacts. In the Low World Price environment, Chart 26, the outcome for the two self sufficiency alternatives is similar to conclusions reached in our previous report. In the Self Sufficiency, High Demand alternative the balance initially worsens as increased investment activity attracts more imports due to the high import content of the investment. The situation dramatically improves in the last three years of the period as the rapidly increasing reduction in high priced crude petroleum imports combines with a small decline in economic activity. In the Self Sufficiency, Low Demand alternative we see an immediate improvement in the current account balance arising from the gradual reduction in crude petroleum imports, associated with the low demand assumptions of the National Energy Program. By the end of the decade, the balances in the two self sufficiency cases are very similar, a reflection of the similarity in petroleum imports and in activity levels.

In the two No Oil Sands alternatives we see a very different picture. In the No Oil Sands, High Demand case the current account balance is initially improved compared to the High Demand, Self Sufficiency case, due to the reduction in investment activity. However, by the end of the period, the impact of the increased imports of crude petroleum more than offsets the improvement in the balance arising from reduced non-oil imports. The energy balance falls to -1.8 per cent of GNP, while the

Chart 26

CURRENT ACCOUNT BALANCE - % OF GNP (BUDGET PRICING,WORLD PRICE LOW)



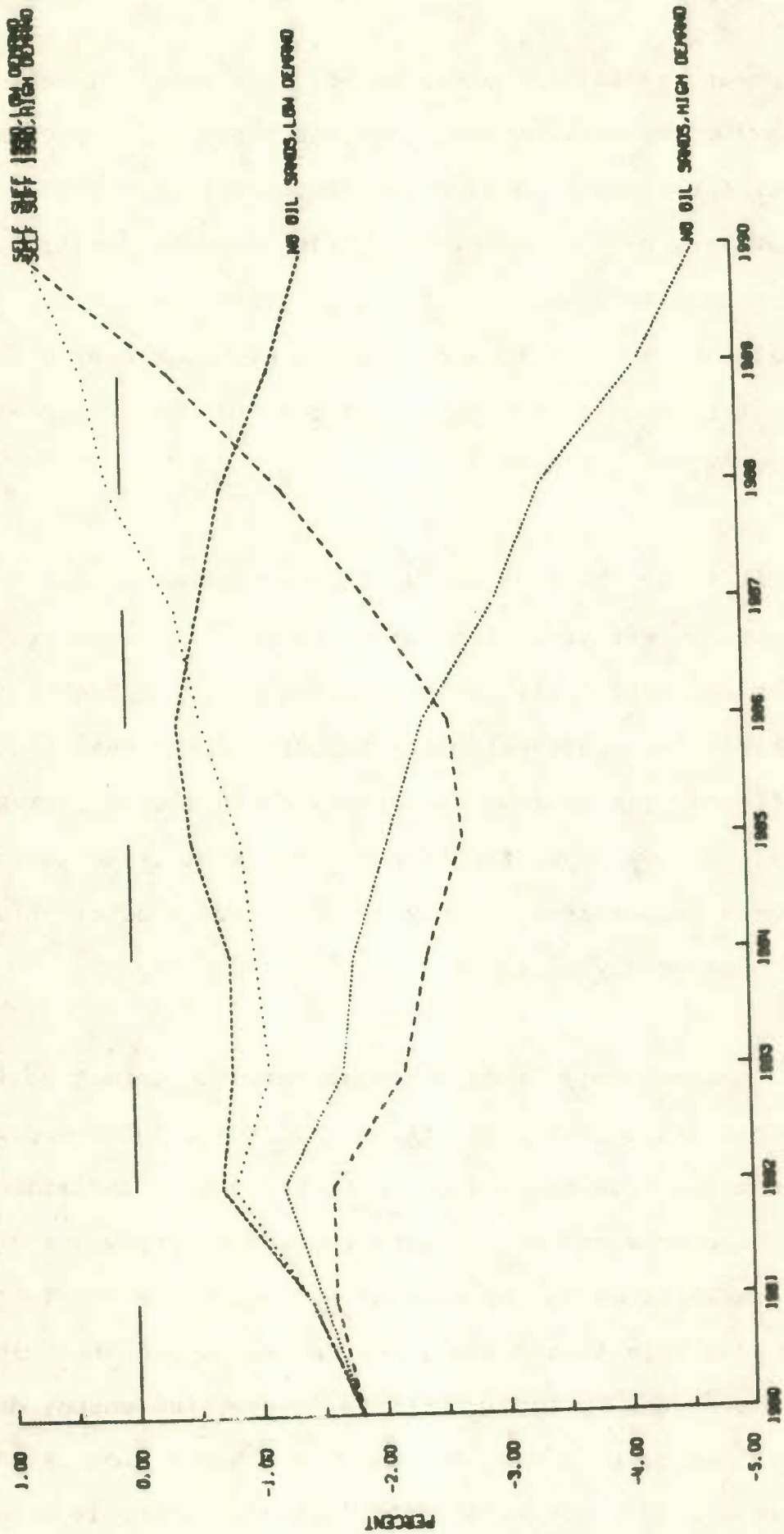
non-energy balance rises to -0.7 per cent. In the No Oil Sands, Low Demand alternative, there is a gradual improvement in the current account balance due to the NEP reduction in oil imports. However, by the end of the period, a deteriorating energy balance has only marginally remained in surplus while the non-energy balance improves to a deficit of -1.0 per cent of GNP from a figure that is over three per cent of GNP in the early part of the projection period.

It is in the High World Price environment, Chart 27, where dramatic swings in the current account balance are observed. In the two self sufficiency alternatives, the higher international prices for crude petroleum imports offset the reduced activity effects arising from higher prices in the earlier part of the period. By 1990, the balances are similar to those in the Low World Price cases, mainly arising from a substantial improvement in the energy balances.

In the No Oil Sands alternatives, the impact of the much higher world crude petroleum prices plus the reduced export activity stemming from the reduced activity due to inflation in the U.S. and overseas economies combine to produce the severe deterioration in the current account balance. In the No Oil Sands, High Demand case, the deficit approaches close to 4.7 per cent of GNP by 1990. Of this figure, the energy deficit is 3.8 per cent of GNP. In the No Oil Sands, Low Demand case the situation is not as drastic, although there is a marked worsening of the deficit, most of which arises from the deteriorating

Chart 27

CURRENT ACCOUNT BALANCE - % OF GNP (BUDGET PRICING, WORLD PRICE HIGH)



energy balance in concert with a minor improvement in the non-energy balance.

The impacts on the current account balance are again clearly associated with the degree of self sufficiency in the economy and the demand configuration of the path towards self sufficiency. As we have noted before, the volume of imports of crude petroleum in Canada and their price have a substantial impact on the health of the Canadian balance of payments.

THE EXCHANGE RATE

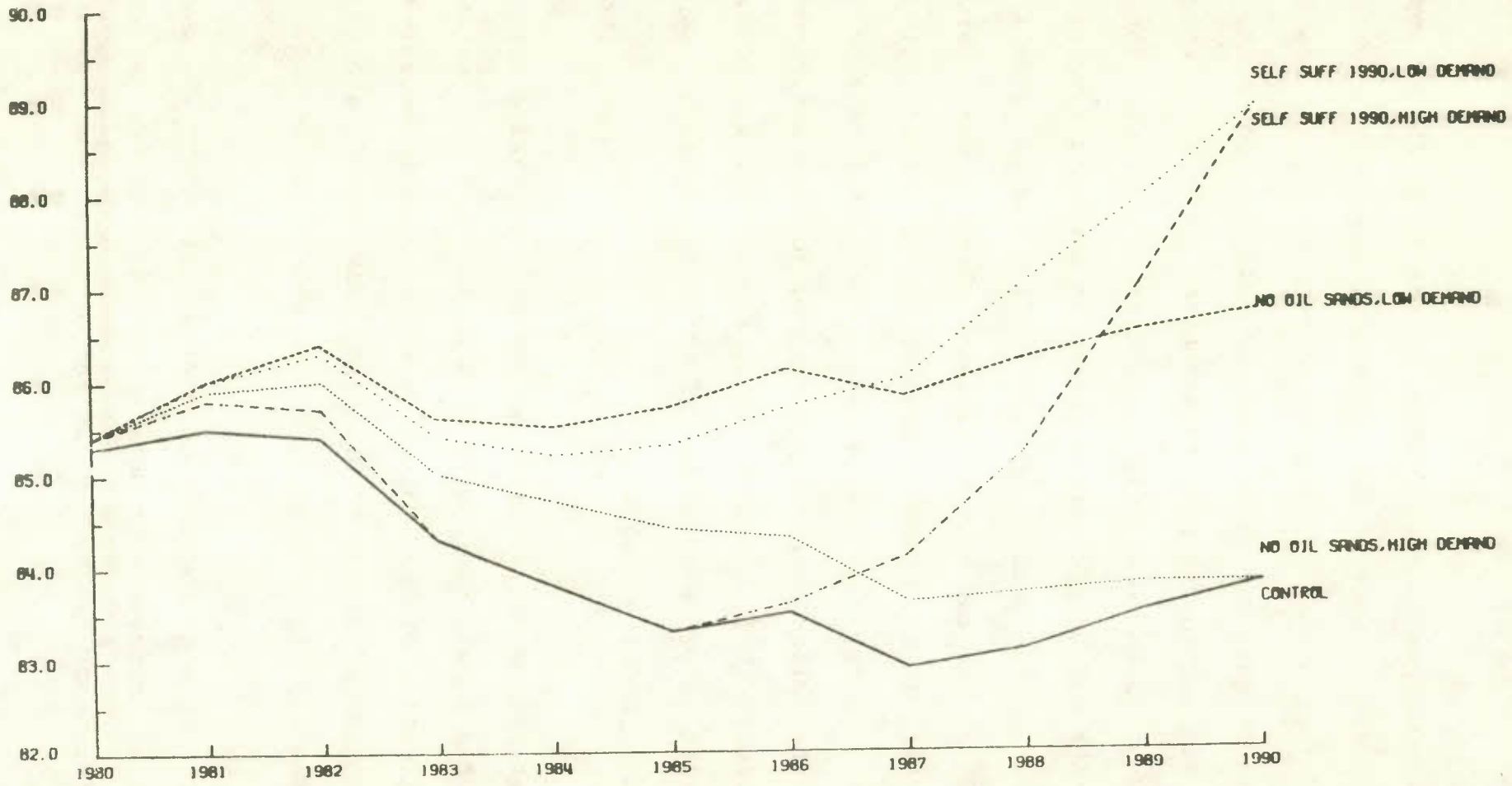
In our previous discussion of the inflationary impacts on the Canadian economy of our various alternatives we referred to the implications of exchange rate effects. In the Low World Price environment, the pattern of exchange rate movements in Chart 28 is similar to the pattern exhibited in Chart 26 where we presented the Low World Price current account balance effects. By the end of the period, there is a marked improvement in the value of the Canadian dollar as it rises to close to 90 cents U.S. in the two self sufficiency alternatives. Particularly evident is the dramatic upswing in the dollar value in the Self Sufficiency, High Demand case. These improvements in the value of the dollar reduce the amount of foreign inflation within the economy, through its impact on foreign trade prices, and thereby assist in offsetting the inflationary impact of higher domestic crude petroleum prices.

In the No Oil Sands, High Demand Alternative the exchange rate tracks a path similar to that of the Base Case solution, a reflection of the similarity in the foreign balances in the two solutions. In the No Oil Sands, Low Demand case the dollar improves only marginally by the end of the period.

In the High World Price environment, Chart 29, the value of the dollar improves even more dramatically in the two self sufficiency cases. By the end of the period the Canadian dollar

Chart 28

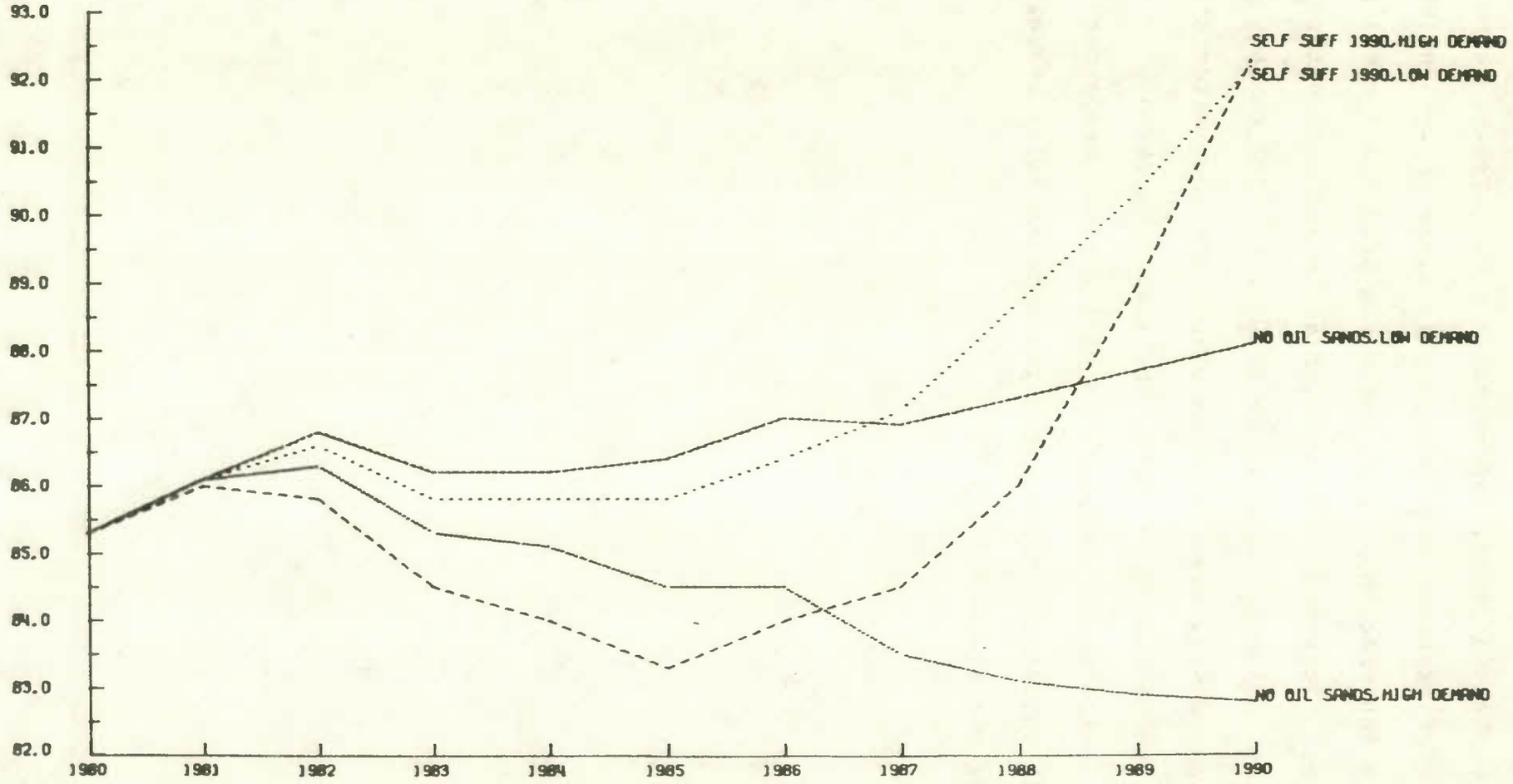
EXCHANGE RATE - U.S. CENTS (BUDGET PRICING,WORLD PRICE LOW)



approaches 93 cents, expressed in terms of U.S. currency. The range of exchange rate outcomes is wider in the environment in which international crude petroleum prices are considerably higher. In the No Oil Sands, High Demand alternative the value of the dollar is below 83 cents U.S. by 1990 thereby implying a spread of well over 10 cents within the four alternatives. In the two No Oil Sands cases, the worsening exchange rate in the high world price environments will further exacerbate the double digit inflation arising from the substantially increased domestic crude petroleum prices.

Chart 29

EXCHANGE RATE - U.S. CENTS (BUDGET PRICING,WORLD PRICE HIGH)



THE ALL LEVEL GOVERNMENT DEFICIT

In considering the impact of our various alternatives on the all level government budget position as reflected in Charts 30 and 31, it becomes apparent that in all of the cases there has been a substantial improvement in the governments' position. This improvement arises mainly from the federal sector, as we shall see later, and is directly attributable to the instigation of the blended pricing scheme for domestic crude petroleum pricing. The federal government is no longer saddled with the burden of oil import subsidy payments which are sensitive to international petroleum prices.

The all level government budget position in the Low World Price environment, Chart 30, shows an improvement, relative to the Base Case, for all the alternatives. However, the two self sufficiency cases exhibit a much better fiscal stance throughout the decade, while the two No Oil Sands alternatives show less improvement, particularly in the latter part of the decade.

In the High World Price environment, Chart 31, we see a similar pattern. The greater the degree of self sufficiency in the economy, the more substantial the improvement in the governments' position. This is particularly evident in the No Oil Sands, High Demand alternative where the initial improvement in the fiscal balances is short-lived as inflation and reduced levels of economic activity take their toll.

Chart 30

TOTAL DEFICIT - % OF GNP (BUDGET PRICING, WORLD PRICE LOW)

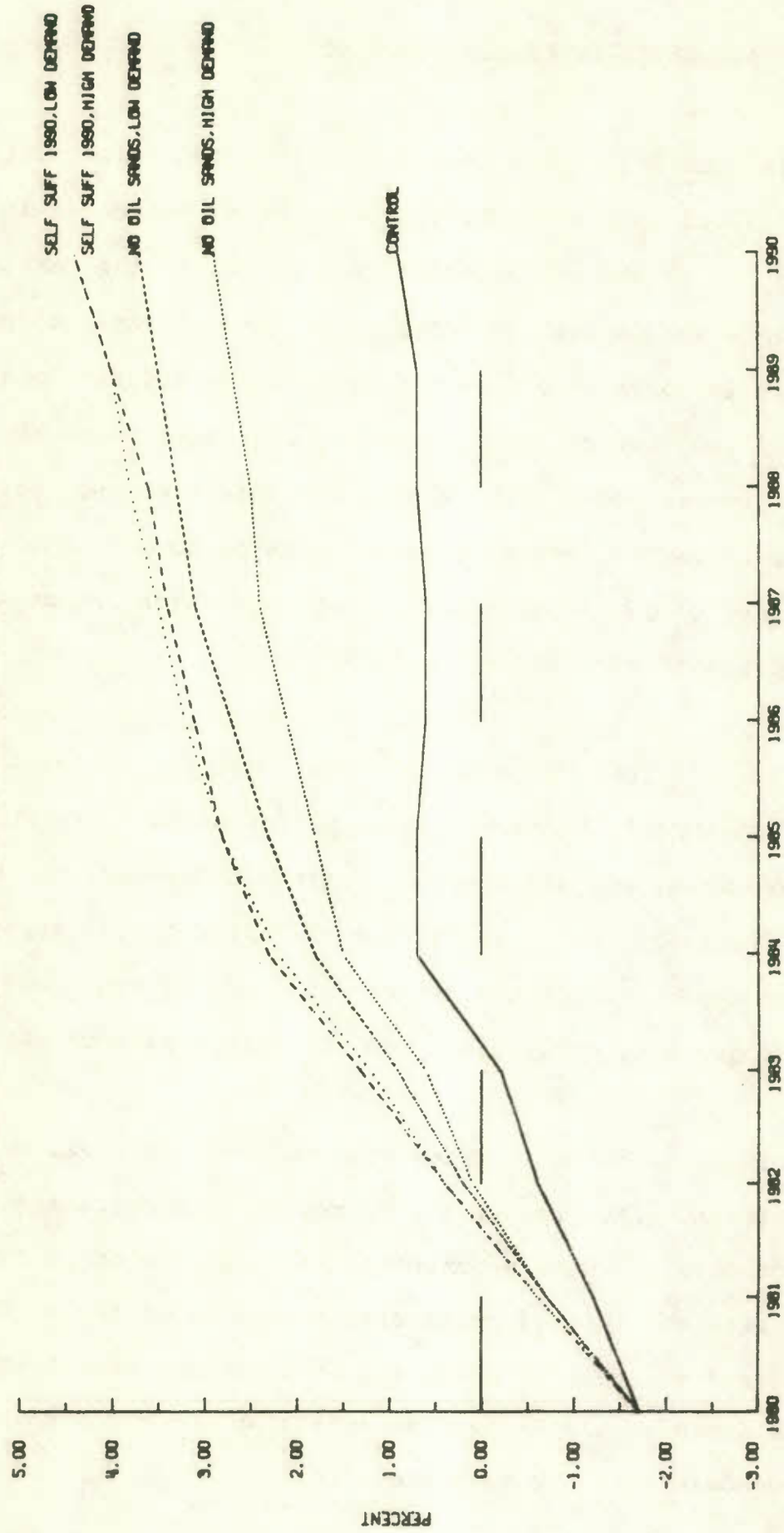
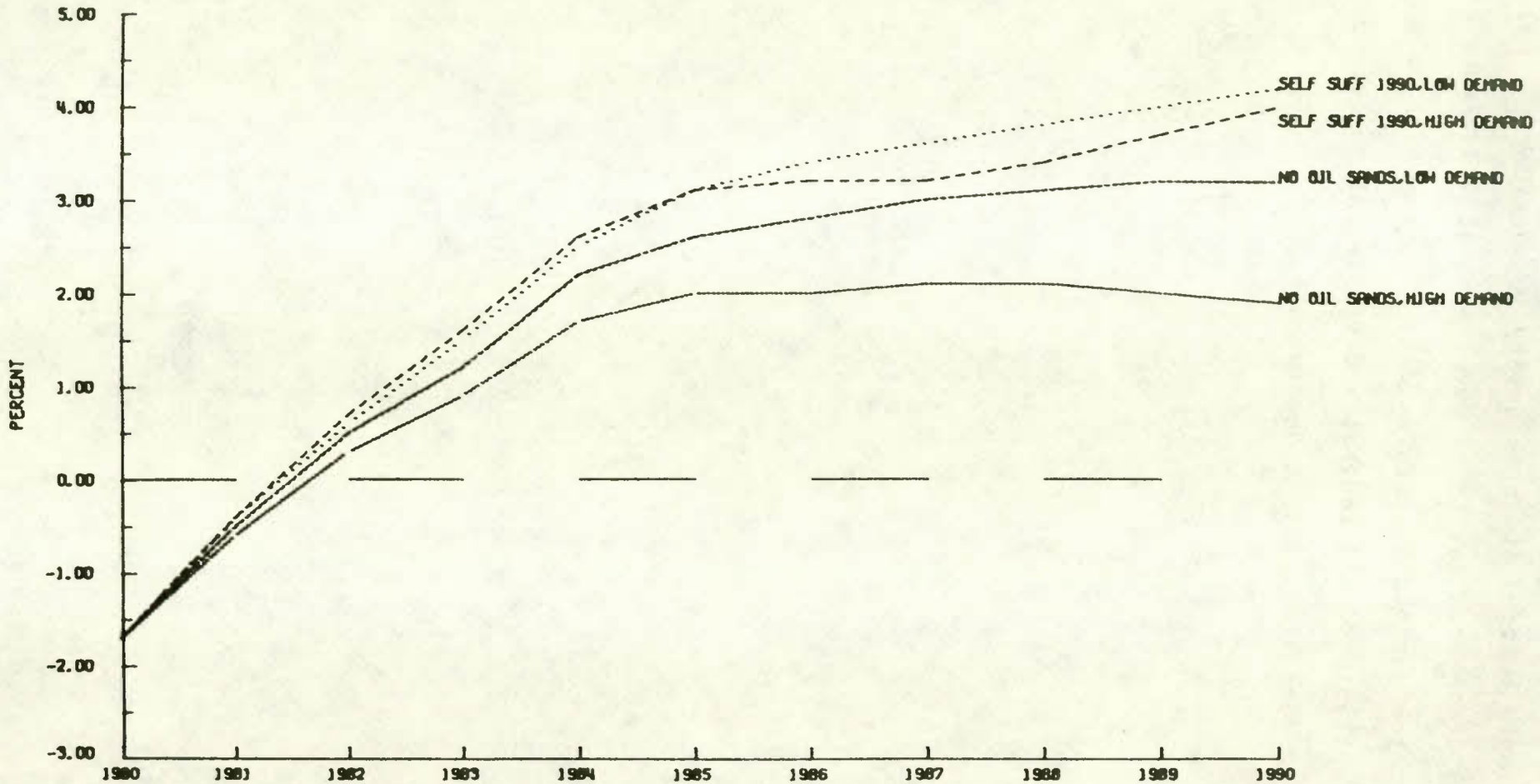


Chart 31

TOTAL DEFICIT - % OF GNP (BUDGET PRICING,WORLD PRICE HIGH)



As mentioned before, it is necessary to consider the balances separately at the two levels of government in order to clearly understand the various factors at play. We now turn to a separate analysis of the federal and provincial budget positions in order to facilitate that understanding.

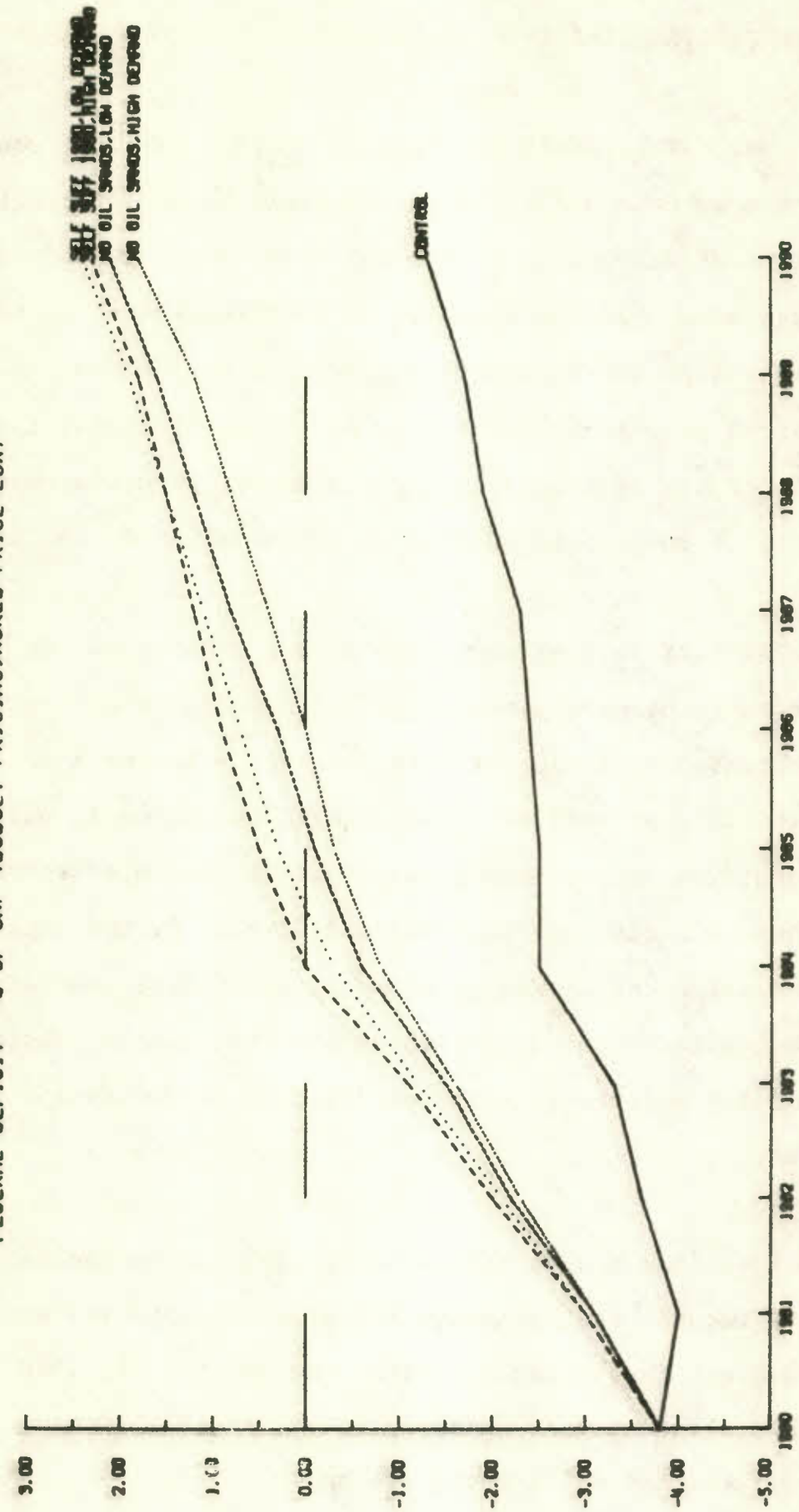
THE FEDERAL DEFICIT

Chart 32 presents the federal deficit as a per cent of GNP for the Base Case and the four Low World Price alternatives. In our previous discussion of the all level government deficit, it was suggested that the majority of the improvement in that balance arose from the substantial change in the federal government's fiscal position. Chart 32 clearly substantiates that claim. In all of the Self Sufficiency and No Oil Sands cases the federal deficit moves into surplus by mid-decade and remains in surplus.

The Self Sufficiency, High Demand case shows the greatest improvement early in the period both from revenues arising from increased economic activity and from a larger share of resource revenues, as well as a substantial reduction in oil import subsidy payments, now financed within the blended pricing system. These effects have been somewhat offset by the impact of higher inflation on indexed government expenditure programmes. However, the contribution of the absence of oil import subsidy payments and the additional resource revenues far outweighs other factors.

A similar budget situation is revealed in the Self Sufficiency, Low Demand case, although the economic activity effects are not as great in the early part of the period. By 1988 the path for this alternative's balance crosses the High Demand case path, however, the differences are small.

Chart 32


FEDERAL DEFICIT - % OF GNP (BUDGET PRICING,WORLD PRICE LOW)
CONTROL
NO OIL SHOCKS,LOW DEMAND
NO OIL SHOCKS,HIGH DEMAND
PERCENT
3.00
2.00
1.00
0.00
-1.00
-2.00
-3.00
-4.00
-5.00
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990

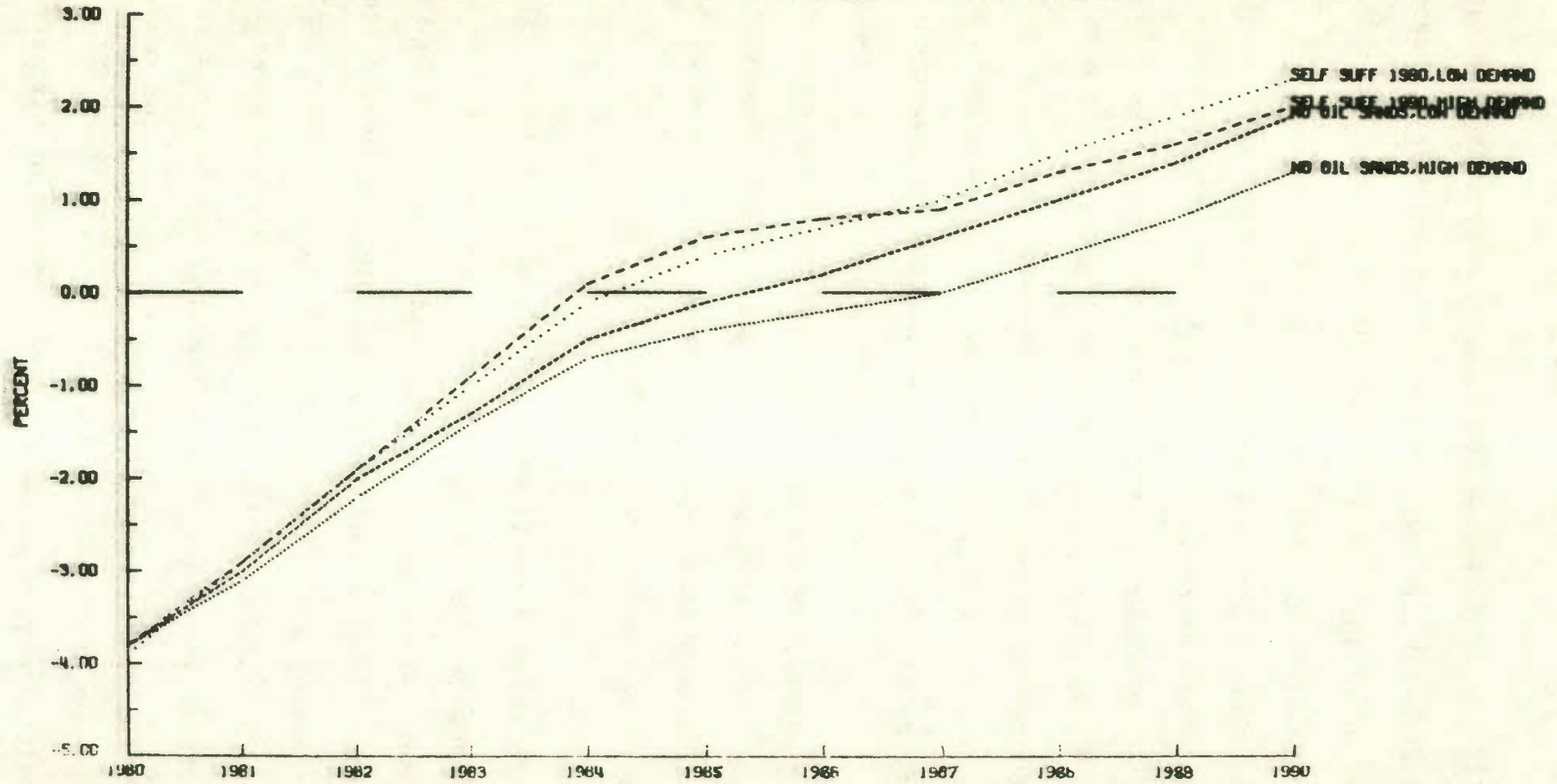
The impact of the reduced economic activity and higher inflation in the two No Oil Sands cases delays these balances from attaining a surplus position until the 1985-1986 period. The balance, by 1990, is $4.5 billion lower in the High Demand case than in its Self Sufficiency counterpart. It is in this case where there is the greatest reduction in economic activity. If you remember, in the High Demand, Self Sufficiency case five oil sands plants, additional to Alsands and Cold Lake, were required to achieve self sufficiency. In the High Demand, No Oil Sands alternative, these five plants plus Alsands and Cold Lake were deleted -- a substantial decline in investment activity.

Similarly in the Low Demand, No Oil Sands case, the federal 'surplus' is well over a billion dollars lower than in its self sufficiency counterpart. In this case, not as much investment activity has been withdrawn.

In the High World Price environment, Chart 33, the federal balance retains a similar configuration as in the Low World Price cases. However, the accelerated inflationary impact of the higher international prices on both revenue and expenditure-producing activities of the federal government implies a reduced fiscal surplus in the long run and a later movement to this surplus position. The federal balance does not attain a surplus position until 1988 in the No Oil Sands, High Demand case, and at the end of the period is $8.0 billion lower than in the Self Sufficiency, High Demand case. The major differences between

Chart 33

FEDERAL DEFICIT - % OF GNP (BUDGET PRICING,WORLD PRICE HIGH)



these alternatives are those arising from the much higher levels of inflation and higher debt servicing costs, arising from a decreased reduction in the stock of debt, and attenuated by higher interest rates.

In assessing the paths of the federal government balances in all of the alternatives, it becomes difficult to be pessimistic about various outcomes in view of the substantial improvement in the federal position over the decade. Reduced oil import subsidies, financed by a compensating charge levied on the consumers, combined with considerable taxation revenues on natural gas and certain types of exported oil products all help to enhance the federal position. One must, however, realize that there are degrees of enhancement. The surplus revenues available to the government might quite possibly be used to offset some of the many negative effects on consumers and industry of the higher domestic crude petroleum prices.

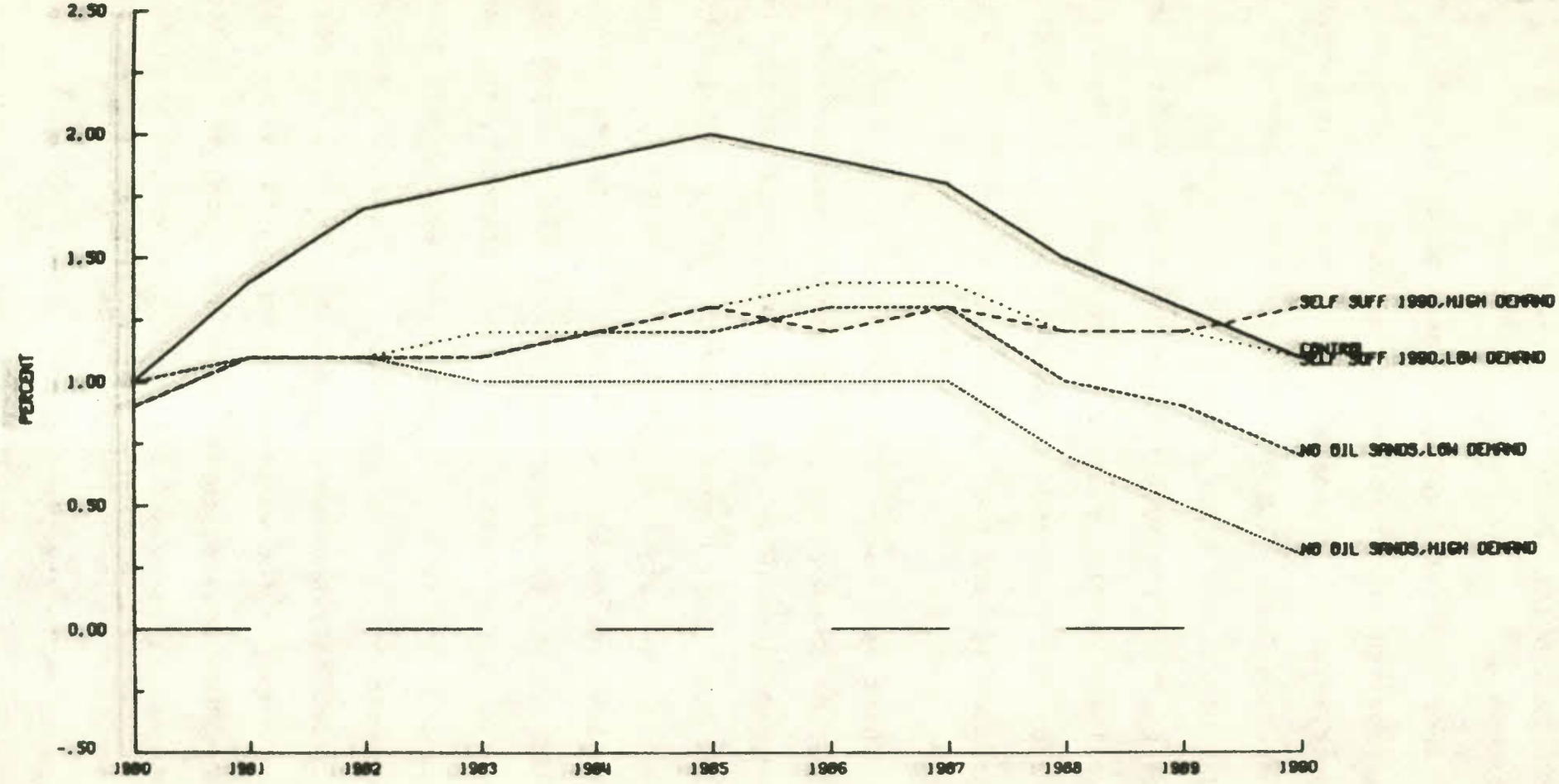
THE PROVINCIAL SURPLUS

Just as the federal government balances show a dramatic improvement in all of the alternatives, likewise does the provincial government balance show a steady deterioration. In our Base Case solution, the provincial surplus as a percentage of GNP peaks at 2.0 per cent in 1985 and never falls below 1.1 per cent. With the advent of the National Energy program and its wellhead pricing dictums for oil and gas, the fortunes of the provincial governments, particularly of the fossil fuel resource producers, have been severely affected.

Chart 34 presents the provincial surplus as a per cent of GNP for the Low World Price environment cases. Most obvious is the marked shift in the balance of all four alternatives, relative to the Base Case, during the early part of the projection period. Reduced royalty revenues in combination with higher inflationary impacts are in no measure offset the increased economic activity effects. It should be remembered that in terms of economic activity feedbacks to government balances, the federal government is impacted to a much greater degree than the provincial governments. In all the cases in Chart 34, the royalty revenues differ only because of production levels, not because of price effects, as the wellhead prices are the same. That is why we see a sudden upswing in the provincial position at the end of the decade as increased oil sands production, even though it is affected by lower royalty rates, contributes to higher royalty payments to the provinces.

Chart 34

PROVINCIAL SURPLUS - % OF GNP (BUDGET PRICING,WORLD PRICE LOW)



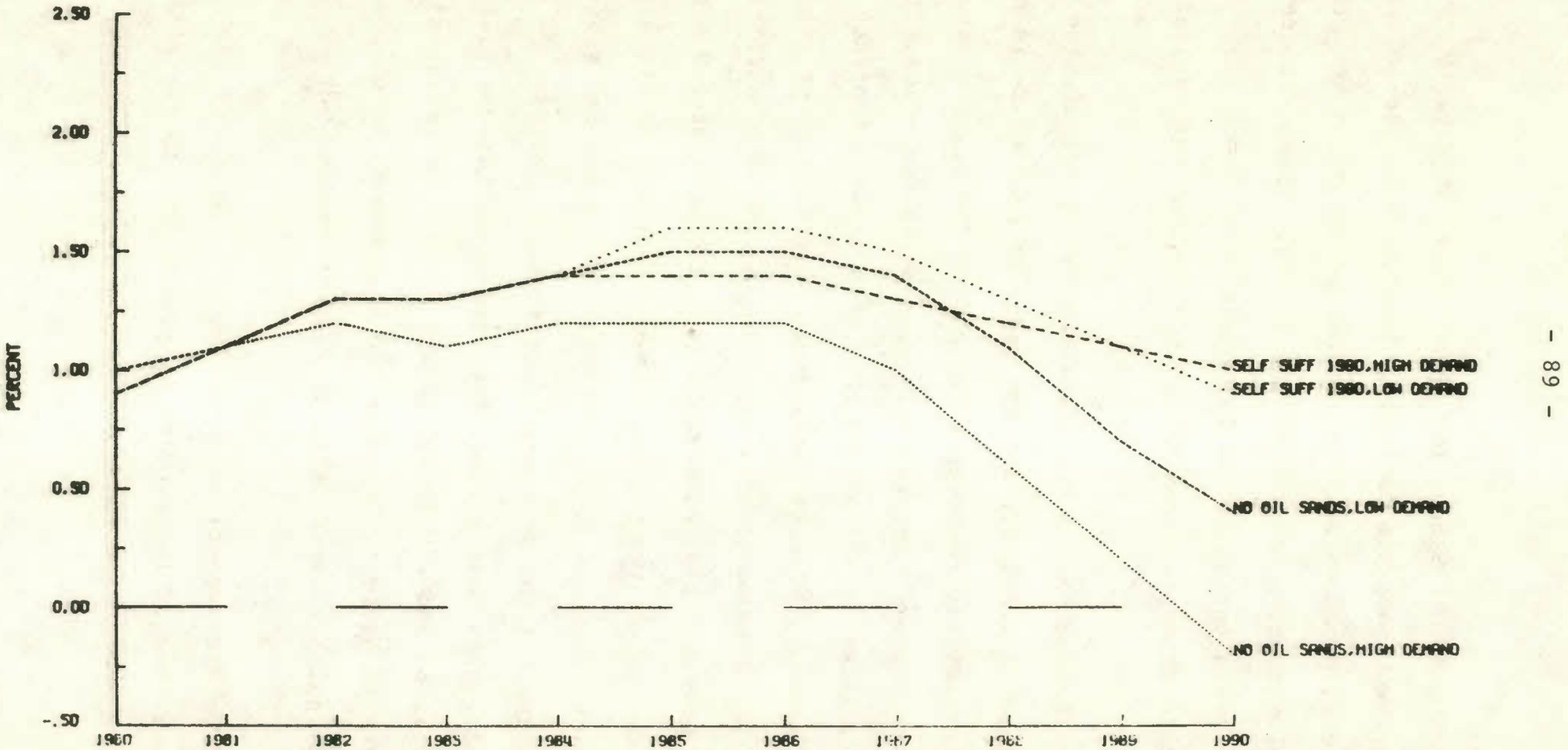
In the No Oil Sands, Low Demand case the royalty revenues are even lower and this factor, in concert with the inflationary impacts, produces an even greater reduction in the provincial surplus towards the end of the decade. These factors are even more prevalent in the No Oil Sands, High Demand case where the balance drops to close to 0.3 per cent of GNP by 1990.

In the High World Price environment, Chart 35, the provincial surplus in the early and mid years of the decade is higher due to higher royalty revenues arising from natural gas exports priced at the higher international crude petroleum price. It is not until later in the period that this factor is offset by inflationary effects and reduced provincial revenues from declining economic activity. In the two Self Sufficiency cases the provincial surplus remains in the area of 1.0 per cent of GNP by the end of the period. However, in the No Oil Sands cases the impact of double digit inflation in the economy severely exacerbates the provincial position, and by 1990 in the No Oil Sands, High Demand case (the case which has the highest rate of inflation and the lowest growth path), the provincial position turns to deficit. Even in the Low Demand, No Oil Sands case the provincial balance falls to 0.4 per cent of GNP by 1990.

From the foregoing discussion it is apparent that the budget experience of the provincial governments in our alternatives is

Chart 35

PROVINCIAL SURPLUS - % OF GNP (BUDGET PRICING,WORLD PRICE HIGH)



very different from that of the federal government. The National Energy Program pricing patterns dictate reduced, and continually reduced, provincial royalty revenues relative to the Base Case. When the wellhead price for conventional oil rises in the latter part of the period, the proportion of production of this type of oil has fallen, hence the effect on provincial royalty revenues is severely muted. Even in the Self Sufficiency cases where considerable synthetic fuel production is on stream at fairly high prices, royalty revenues are reduced due to a lower royalty rate on this type of production.

SUMMARY

In this paper we have attempted to define the economic consequences arising from a range of supply and demand assumptions for crude petroleum in Canada. The National Energy Program has set forth an ambitious outlook for the composition of Canadian energy demand which, in brief, describes a desired movement away from crude petroleum consumption towards other alternative energy forms. Natural gas, electricity, coal and renewables are all projected to assume a much increased role in the supply of Canadian energy requirements.

The demand projection for crude petroleum included in the National Energy Program can only be fulfilled through a series of economic (price induced) incentives substantially augmented by non-economic (non-price) incentives and initiatives. In our range of demand assumptions we have used the NEP projection as our "low" demand forecast, setting it as the lower end of the range. The upper side of the range has been defined by the crude petroleum demand outlook included in the November 1978 Oil Report of the National Energy Board.

Within these demand ranges we have studied two very distinct supply scenarios. Crude petroleum self sufficiency by 1990 effected through increased oil sands production has been the upper side of the coin. At the other extreme, we have postulated that the present climate of uncertainty negatively affects the

oil sands producers to the extent that all new major projects are cancelled.

Our simulations have shown that the configuration of supply and demand has major implications for the Canadian economy, especially given the blended pricing scheme introduced by the federal government in its National Energy Program. The availability of domestic crude petroleum supply and the level of demand for that crude petroleum affects not only the more obvious factors such as the balance of payments and investment activity within the economy, but also severely impacts the level of inflation in Canada. Our reliance on imported oil, priced at the vagaries of the OPEC cartel, is directly transmitted through price effects to every energy consumer in the country. Our ability to reduce this reliance is directly related to our ability to reduce our thirst for crude petroleum and our ability to formulate an investment and regulatory climate conducive to increased energy production.

Table 9 provides a snapshot of the panorama in 1990 presented by the eight simulations considered in this exercise. The level of inflation in the economy is inversely related to the degree of self sufficiency. The higher the volume of petroleum imports in Canada, the higher the rate of change in the CPI. Inflation is directly affected by the level of prices in international crude petroleum markets, through the existence of the blended pricing scheme introduced in the Federal Budget in October 1980. The

fiscal position of the federal government is dramatically improved, while provincial balances either deteriorate or remain at similar levels. As always, the international payments position of the country is severely affected by our reliance on imported crude petroleum.

Chart 36 graphically defines the crude petroleum supply and demand relationship in 1990. To achieve the degree of self sufficiency illustrated, synonymous with the volume of demand indicated by the two sizes of boxes, varying degrees of crude petroleum and natural gas investment activity are required. The volume of activity is directly related to the degree of self sufficiency and inversely impacted by the level of crude petroleum demand in the economy. Similarly, the volume of imports is inversely related to the degree of self sufficiency, and direct by impacted by the level of demand.

The economic consequences of the achievement of a reduced dependence on petroleum, both imported and domestic, but mainly imported, are beneficial to all sectors of the economy. The Canadian consumer is directly affected by these consequences.

Table 9

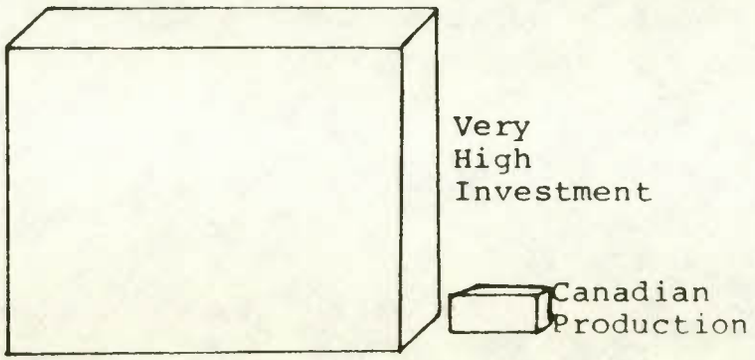
A Snapshot of the Eight Alternatives in 1990

	Oil Imports M of BRL	Crude Oil Domestic Price $1 BRL	Consumer Price Index Level 1971=1.0	% Δ	Real GNE Level B of $1971	% Δ	Cumulative Employment Loss (Control=0)	Federal Balance % of GNP	Provincial Balance % of GNP	Current Account Balance % of GNP
Self Sufficiency 1990, High Demand, Low World Price	0	75.51	5.068	7.8	166.1	2.0	+256	2.3	1.3	0.5
Self Sufficiency 1990, Low Demand, Low World Price	0	73.29	4.995	8.0	164.9	2.2	-228	2.4	1.1	0.6
No Oil Sands Projects, High Demand, Low World Price	449	78.89	5.203	8.9	163.0	2.3	-955	1.8	0.3	-2.5
No Oil Sands Projects, Low Demand, Low World Price	200	75.26	5.052	8.6	163.6	2.3	-750	2.1	0.7	-0.6
Self Sufficiency 1990, High Demand, High World Price	0	81.30	5.461	8.2	158.0	0.9	-708	2.0	1.0	0.7
Self Sufficiency 1990, Low Demand, High World Price	0	78.65	5.358	8.9	156.6	1.2	-1214	2.3	0.9	0.7
No Oil Sands Projects, High Demand, High World Price	449	114.35	5.798	11.0	156.9	1.7	-1842	1.3	-0.2	-4.7
No Oil Sands Projects, Low Demand, High World Price	200	96.98	5.528	10.3	156.0	1.6	-1785	1.9	0.4	-1.5
Base Case (17th Annual Review Control)	384	58.83	4.878	8.2	167.9	2.6	0	-1.8	1.1	-2.8

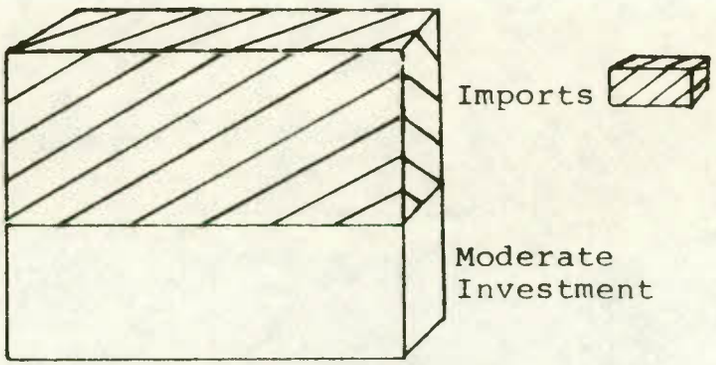
Chart 36
Supply and Demand of Crude Petroleum in 1990

HIGH DEMAND (797 M. Brl.)

Self Sufficiency
By 1990

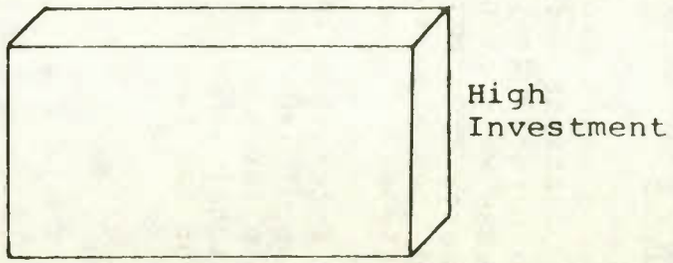


No New Oil Sands

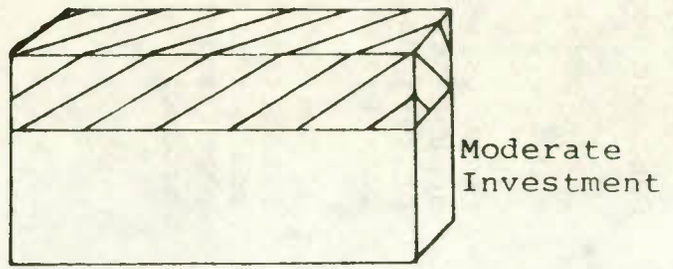


LOW DEMAND (548 M. Brl.)

Self Sufficiency
By 1990



No New Oil Sands



Footnotes

1 Just prior to the writing of this paper, cancellation of the Syncrude expansion plans was announced.

2 In order to implement these demand assumptions within CANDIDE Model 2.0, the consumption demand equations were exoginised and explicit assumptions for demand in natural gas, other fuel products and gasoline, oil and grease were made. The level of demand achieved in the National Energy Program suggests not only price-induced reductions in demand, but also a wide assortment of conversion and conservation incentives.

3 The Committee was specifically interested in tar sands plants. Production from a Hibernia location of 140,000 barrels per day could replace that arising from one tar sands plant. Similarly a combination of Hibernia and additional enhanced recovery production could replace equivalent tar sands production.

Appendix

The tables in this Appendix present the data for many of the economic indicators we have discussed in the text, across the various alternatives. Additional information for the many economic indicators in CANDIDE Model 2.0 is available upon request.

CANDIDE MODEL 2.0 - ECONOMIC COUNCIL OF CANADA

TABLE 1.0 CONSUMER PRICE INDEX (% CHANGE) - CPI

LINE	I T E M	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1												
2	CONTROL SOLUTION											
3	================											
4												
5	OIL $4 - 1.0-1.5 % REAL WORLD PRICE-----	9.8	10.6	9.9	9.0	9.0	8.7	8.1	8.4	7.9	8.1	8.2
6												
7												
8	ALTERNATIVE SOLUTIONS											
9	====================											
10												
11	BDGT PRICING, 1.0-1.5% REAL WORLD PRICE											
12												
13	SELF SUFFICIENCY 1990, HIGH DEMAND----	10.0	11.0	10.0	9.3	9.7	9.7	9.1	9.0	8.4	8.0	7.8
14												
15	SELF SUFFICIENCY 1990, LOW DEMAND-----	10.0	10.9	9.7	9.1	9.2	9.2	8.7	9.0	8.3	8.3	8.0
16												
17	NO OIL SANDS PROJECTS, HIGH DEMAND----	10.0	11.0	10.0	9.5	9.5	9.6	9.0	9.5	9.0	8.9	8.9
18												
19	NO OIL SANDS PROJECTS, LOW DEMAND-----	10.0	10.9	9.7	9.0	9.2	9.1	8.7	9.2	8.7	8.7	8.6
20												
21												
22	BDGT PRICING, 7.0 % REAL WORLD PRICE											
23												
24	SELF SUFFICIENCY 1990, HIGH DEMAND----	10.0	11.2	10.4	10.4	10.6	11.0	10.3	10.0	9.4	8.7	8.2
25												
26	SELF SUFFICIENCY 1990, LOW DEMAND-----	10.0	11.0	10.1	9.8	10.0	10.2	9.8	10.0	9.2	9.1	8.9
27												
28	NO OIL SANDS PROJECTS, HIGH DEMAND----	10.0	11.2	10.6	10.4	10.3	10.8	10.3	10.8	10.7	10.8	11.0
29												
30	NO OIL SANDS PROJECTS, LOW DEMAND-----	10.0	11.2	10.2	9.8	9.8	10.1	9.7	10.2	10.0	10.2	10.3

CANDIDE MODEL 2.0 - ECONOMIC COUNCIL OF CANADA

TABLE 2.0 GROSS NATIONAL PRODUCT 1971$ (% CHANGE) - GNE

LINE	I T E M	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1												
2	CONTROL SOLUTION											
3	================											
4												
5	OIL $4 - 1.0-1.5 % REAL WORLD PRICE-----	-0.4	1.4	3.1	3.5	3.3	2.4	2.7	3.1	2.6	2.2	2.6
6												
7												
8	ALTERNATIVE SOLUTIONS											
9	====================											
10												
11	BDGT PRICING, 1.0-1.5% REAL WORLD PRICE											
12												
13	SELF SUFFICIENCY 1990, HIGH DEMAND----	-0.5	1.7	3.7	4.2	3.4	2.6	2.3	2.3	2.0	1.8	2.3
14												
15	SELF SUFFICIENCY 1990, LOW DEMAND-----	-0.5	1.5	3.5	3.9	3.0	2.5	2.3	2.4	2.1	1.8	2.2
16												
17	NO OIL SANDS PROJECTS, HIGH DEMAND----	-0.5	1.4	3.1	3.3	2.9	1.9	2.4	2.6	2.1	1.9	2.3
18												
19	NO OIL SANDS PROJECTS, LOW DEMAND-----	-0.5	1.4	3.3	3.4	3.0	2.0	2.4	2.6	2.1	1.9	2.3
20												
21												
22	BDGT PRICING, 7.0 % REAL WORLD PRICE											
23												
24	SELF SUFFICIENCY 1990, HIGH DEMAND----	-0.5	1.6	3.7	3.9	3.0	2.1	1.8	1.6	1.3	0.9	1.9
25												
26	SELF SUFFICIENCY 1990, LOW DEMAND-----	-0.5	1.6	3.3	3.6	2.6	2.0	1.8	1.6	1.4	0.9	1.2
27												
28	NO OIL SANDS PROJECTS, HIGH DEMAND----	-0.5	1.3	3.0	3.0	2.6	1.5	1.9	2.0	1.6	1.4	1.7
29												
30	NO OIL SANDS PROJECTS, LOW DEMAND-----	-0.5	1.3	3.0	3.1	2.6	1.5	1.8	1.8	1.5	1.2	1.6

CANDIDE MODEL 2.0 - ECONOMIC COUNCIL OF CANADA

TABLE 3.0 PRODUCTIVITY (% CHANGE) - GNE/HE

LINE	I T E M	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1												
2	CONTROL SOLUTION											
3	================											
4												
5	OIL $4 - 1.0-1.5 % REAL WORLD PRICE-----	-2.3	-0.7	0.9	1.3	1.1	1.0	1.4	1.4	1.2	1.0	1.3
6												
7												
8	ALTERNATIVE SOLUTIONS											
9	====================											
10												
11	BDGT PRICING, 1.0-1.5% REAL WORLD PRICE											
12												
13	SELF SUFFICIENCY 1990, HIGH DEMAND----	-2.4	-0.6	1.2	1.6	1.1	1.0	1.2	1.0	0.9	0.9	1.0
14												
15	SELF SUFFICIENCY 1990, LOW DEMAND-----	-2.4	-0.6	1.1	1.4	0.9	1.0	1.1	1.0	1.0	0.8	1.1
16												
17	NO OIL SANDS PROJECTS, HIGH DEMAND----	-2.4	-0.7	0.9	1.2	0.9	0.6	1.2	1.0	0.9	0.9	1.1
18												
19	NO OIL SANDS PROJECTS, LOW DEMAND-----	-2.4	-0.7	1.1	1.2	0.9	0.7	1.2	1.0	0.9	0.9	1.2
20												
21												
22	BDGT PRICING, 7.0 % REAL WORLD PRICE											
23												
24	SELF SUFFICIENCY 1990, HIGH DEMAND----	-2.4	-0.6	1.1	1.2	0.8	0.7	0.8	0.6	0.5	0.4	0.5
25												
26	SELF SUFFICIENCY 1990, LOW DEMAND-----	-2.4	-0.6	1.0	1.2	0.6	0.6	0.7	0.5	0.5	0.3	0.6
27												
28	NO OIL SANDS PROJECTS, HIGH DEMAND----	-2.4	-0.8	0.8	0.9	0.8	0.3	0.9	0.6	0.5	0.5	0.8
29												
30	NO OIL SANDS PROJECTS, LOW DEMAND-----	-2.4	-0.8	0.9	1.0	0.7	0.3	0.8	0.5	0.4	0.4	0.7

CANDIDE MODEL 2.0 - ECONOMIC COUNCIL OF CANADA

TABLE 4.0 REAL WAGE RATE (% CHANGE) - W/CPI

LINE	I T E M	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1												
2	CONTROL SOLUTION											
3	================											
4												
5	OIL $4 - 1.0-1.5 % REAL WORLD PRICE-----	-2.2	-2.4	-0.1	0.7	0.5	1.2	1.7	1.3	2.2	1.9	2.0
6												
7												
8	ALTERNATIVE SOLUTIONS											
9	====================											
10												
11	BDGT PRICING, 1.0-1.5% REAL WORLD PRICE											
12												
13	SELF SUFFICIENCY 1990, HIGH DEMAND----	-2.3	-2.5	0.1	0.5	0.3	0.8	1.7	1.3	1.8	1.8	1.6
14												
15	SELF SUFFICIENCY 1990, LOW DEMAND-----	-2.3	-2.4	0.3	0.5	0.4	0.8	1.3	0.8	1.6	1.3	1.4
16												
17	NO OIL SANDS PROJECTS, HIGH DEMAND----	-2.3	-2.6	0.0	0.3	0.3	0.5	1.3	0.6	1.4	1.2	1.4
18												
19	NO OIL SANDS PROJECTS, LOW DEMAND-----	-2.3	-2.4	0.2	0.5	0.3	0.7	1.2	0.6	1.3	1.1	1.2
20												
21												
22	BDGT PRICING, 7.0 % REAL WORLD PRICE											
23												
24	SELF SUFFICIENCY 1990, HIGH DEMAND----	-2.4	-2.7	-0.2	-0.2	0.0	0.1	1.1	0.9	1.2	1.5	1.5
25												
26	SELF SUFFICIENCY 1990, LOW DEMAND-----	-2.4	-2.6	-0.1	0.1	-0.0	0.1	0.6	0.3	1.0	0.6	0.8
27												
28	NO OIL SANDS PROJECTS, HIGH DEMAND----	-2.4	-2.7	-0.4	-0.3	-0.0	-0.3	0.5	-0.0	0.5	0.4	0.7
29												
30	NO OIL SANDS PROJECTS, LOW DEMAND-----	-2.4	-2.7	-0.1	0.0	0.1	-0.0	0.5	-0.1	0.5	0.2	0.4

CANDIDE MODEL 2.1 - ECONOMIC COUNCIL OF CANADA

TABLE 5.0 UNEMPLOYMENT RATE (LEVEL) - DURATE

LINE	ITEM	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1												
2	CONTROL SOLUTION											
3	================											
4												
5	OIL 84 - 1.0-1.5 % REAL WORLD PRICE-----	7.9	8.0	7.5	7.0	6.7	6.5	6.5	6.1	5.9	5.9	5.6
6												
7												
8	ALTERNATIVE SOLUTIONS											
9	====================											
10												
11	BDGT PRICING, 1.0-1.5% REAL WORLD PRICE											
12												
13	SELF SUFFICIENCY 1990, HIGH DEMAND----	7.9	7.9	7.2	6.4	5.9	5.6	5.7	5.6	5.8	6.0	6.0
14												
15	SELF SUFFICIENCY 1990, LOW DEMAND-----	8.0	8.0	7.4	6.8	6.5	6.2	6.2	6.0	6.0	6.2	6.0
16												
17	NO OIL SANDS PROJECTS, HIGH DEMAND----	7.9	8.0	7.5	7.1	6.8	6.8	6.8	6.5	6.4	6.5	6.3
18												
19	NO OIL SANDS PROJECTS, LOW DEMAND-----	7.9	8.0	7.5	7.1	6.8	6.8	6.8	6.4	6.4	6.4	6.2
20												
21												
22	BDGT PRICING, 7.0 % REAL WORLD PRICE											
23												
24	SELF SUFFICIENCY 1990, HIGH DEMAND----	7.9	7.9	7.1	6.3	5.9	5.6	5.8	5.9	6.2	6.7	7.1
25												
26	SELF SUFFICIENCY 1990, LOW DEMAND-----	8.0	7.9	7.3	6.7	6.5	6.3	6.4	6.4	6.6	7.0	7.2
27												
28	NO OIL SANDS PROJECTS, HIGH DEMAND----	7.9	8.0	7.5	7.1	6.9	6.8	6.9	6.7	6.7	6.8	6.7
29												
30	NO OIL SANDS PROJECTS, LOW DEMAND-----	7.9	8.0	7.5	7.1	6.9	6.9	7.0	6.8	6.8	7.0	7.0

CANDIDE MODEL 2.0 - ECONOMIC COUNCIL OF CANADA

TABLE 6.0 FEDERAL GOVERNMENT DEFICIT (BILLION) - GDF$

LINE	I T E M	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1												
2	CONTROL SOLUTION											
3	================											
4												
5	OIL $4 - 1.0-1.5 % REAL WORLD PRICE-----	-10.8	-12.5	-12.8	-13.3	-11.4	-12.5	-13.4	-13.8	-13.1	-12.7	-10.5
6												
7												
8	ALTERNATIVE SOLUTIONS											
9	====================											
10												
11	BDGT PRICING, 1.0-1.5% REAL WORLD PRICE											
12												
13	SELF SUFFICIENCY 1990, HIGH DEMAND----	-10.9	-9.5	-7.1	-4.3	-0.2	2.5	5.0	7.3	10.4	14.1	19.3
14												
15	SELF SUFFICIENCY 1990, LOW DEMAND-----	-10.9	-9.5	-7.4	-5.0	-1.4	1.6	4.1	7.1	10.6	14.4	19.8
16												
17	NO OIL SANDS PROJECTS, HIGH DEMAND----	-10.9	-9.8	-8.2	-6.4	-3.4	-1.7	-0.1	2.5	5.5	9.3	14.8
18												
19	NO OIL SANDS PROJECTS, LOW DEMAND-----	-10.9	-9.7	-7.8	-5.9	-2.6	-0.5	1.8	4.8	8.2	12.1	17.7
20												
21												
22	BDGT PRICING, 7.0 % REAL WORLD PRICE											
23												
24	SELF SUFFICIENCY 1990, HIGH DEMAND----	-10.9	-9.2	-6.9	-3.7	0.4	3.3	4.5	5.8	9.1	12.6	18.0
25												
26	SELF SUFFICIENCY 1990, LOW DEMAND-----	-10.9	-9.1	-7.0	-4.3	-0.6	2.1	4.0	6.4	10.3	14.3	19.9
27												
28	NO OIL SANDS PROJECTS, HIGH DEMAND----	-10.9	-9.7	-7.8	-5.8	-3.0	-1.8	-1.2	0.2	3.1	6.3	11.3
29												
30	NO OIL SANDS PROJECTS, LOW DEMAND-----	-10.9	-9.4	-7.3	-5.2	-2.1	-0.4	1.2	3.5	6.9	10.6	16.1

CANDIDE MODEL 2.0 - ECONOMIC COUNCIL OF CANADA

TABLE 7.0 FEDERAL DEFICIT PERCENT OF G.N.P. - GDF$/GNE$

LINE	I T E M	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1												
2	CONTROL SOLUTION											
3	================											
4												
5	OIL $4 - 1.0-1.5 % REAL WORLD PRICE----	-3.8	-4.0	-3.6	-3.3	-2.5	-2.5	-2.4	-2.3	-1.9	-1.7	-1.3
6												
7												
8	ALTERNATIVE SOLUTIONS											
9	====================											
10												
11	BDGT PRICING, 1.0-1.5% REAL WORLD PRICE											
12												
13	SELF SUFFICIENCY 1990, HIGH DEMAND----	-3.8	-3.0	-2.0	-1.1	-0.0	0.5	0.9	1.2	1.5	1.8	2.3
14												
15	SELF SUFFICIENCY 1990, LOW DEMAND-----	-3.8	-3.0	-2.1	-1.2	-0.3	0.3	0.7	1.1	1.5	1.9	2.4
16												
17	NO OIL SANDS PROJECTS, HIGH DEMAND----	-3.8	-3.1	-2.3	-1.6	-0.8	-0.3	-0.0	0.4	0.8	1.2	1.8
18												
19	NO OIL SANDS PROJECTS, LOW DEMAND-----	-3.8	-3.1	-2.2	-1.5	-0.6	-0.1	0.3	0.8	1.2	1.6	2.1
20												
21												
22	BDGT PRICING, 7.0 % REAL WORLD PRICE											
23												
24	SELF SUFFICIENCY 1990, HIGH DEMAND----	-3.8	-2.9	-1.9	-0.9	0.1	0.6	0.8	0.9	1.3	1.6	2.0
25												
26	SELF SUFFICIENCY 1990, LOW DEMAND-----	-3.9	-2.9	-1.9	-1.0	-0.1	0.4	0.7	1.0	1.5	1.9	2.3
27												
28	NO OIL SANDS PROJECTS, HIGH DEMAND----	-3.8	-3.1	-2.2	-1.4	-0.7	-0.4	-0.2	0.0	0.4	0.8	1.3
29												
30	NO OIL SANDS PROJECTS, LOW DEMAND-----	-3.8	-3.0	-2.0	-1.3	-0.5	-0.1	0.2	0.6	1.0	1.4	1.9

CANDIDE MODEL 2.0 - ECONOMIC COUNCIL OF CANADA

TABLE 8.0 PROVINCIAL DEFICIT PERCENT OF G.N.P. - GDP$/GNE$

LINE	I T E M	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1												
2	CONTROL SOLUTION											
3	================											
4												
5	OIL $4 - 1.0-1.5 % REAL WORLD PRICE-----	1.0	1.4	1.7	1.8	1.9	2.0	1.9	1.8	1.5	1.3	1.1
6												
7												
8	ALTERNATIVE SOLUTIONS											
9	====================											
10												
11	BDGT PRICING, 1.0-1.5% REAL WORLD PRICE											
12												
13	SELF SUFFICIENCY 1990, HIGH DEMAND----	0.9	1.1	1.1	1.1	1.2	1.3	1.2	1.3	1.2	1.2	1.3
14												
15	SELF SUFFICIENCY 1990, LOW DEMAND-----	0.9	1.1	1.1	1.2	1.2	1.3	1.4	1.4	1.2	1.2	1.1
16												
17	NO OIL SANDS PROJECTS, HIGH DEMAND----	0.9	1.1	1.1	1.0	1.0	1.0	1.0	1.0	0.7	0.5	0.3
18												
19	NO OIL SANDS PROJECTS, LOW DEMAND-----	1.0	1.1	1.1	1.1	1.2	1.2	1.3	1.3	1.0	0.9	0.7
20												
21												
22	BDGT PRICING, 7.0 % REAL WORLD PRICE											
23												
24	SELF SUFFICIENCY 1990, HIGH DEMAND----	0.9	1.1	1.3	1.3	1.4	1.4	1.4	1.3	1.2	1.1	1.0
25												
26	SELF SUFFICIENCY 1990, LOW DEMAND-----	0.9	1.1	1.3	1.3	1.4	1.6	1.6	1.5	1.3	1.1	0.9
27												
28	NO OIL SANDS PROJECTS, HIGH DEMAND----	0.9	1.1	1.2	1.1	1.2	1.2	1.2	1.0	0.6	0.2	-0.2
29												
30	NO OIL SANDS PROJECTS, LOW DEMAND-----	1.0	1.1	1.3	1.3	1.4	1.5	1.5	1.4	1.1	0.7	0.4

CANDIDE MODEL 2.0 - ECONOMIC COUNCIL OF CANADA

TABLE 9.0 CURRENT ACCOUNT BALANCE PERCENT OF G.N.P. - CAN$/GNE$

LINE	I T E M	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1												
2	CONTROL SOLUTION											
3	================											
4												
5	OIL 84 - 1.0-1.5 % REAL WORLD PRICE-----	-1.8	-1.8	-1.6	-2.0	-2.1	-2.2	-2.2	-2.4	-2.3	-2.4	-2.3
6												
7												
8	ALTERNATIVE SOLUTIONS											
9	=====================											
10												
11	BDGT PRICING, 1.0-1.5% REAL WORLD PRICE											
12												
13	SELF SUFFICIENCY 1990, HIGH DEMAND----	-1.8	-1.8	-1.9	-2.5	-2.6	-2.7	-2.4	-1.8	-1.1	-0.3	0.5
14												
15	SELF SUFFICIENCY 1990, LOW DEMAND-----	-1.8	-1.6	-1.2	-1.4	-1.4	-1.2	-0.8	-0.6	-0.1	0.2	0.6
16												
17	NO OIL SANDS PROJECTS, HIGH DEMAND----	-1.8	-1.7	-1.6	-2.0	-2.0	-2.0	-2.0	-2.3	-2.3	-2.4	-2.5
18												
19	NO OIL SANDS PROJECTS, LOW DEMAND-----	-1.8	-1.6	-1.1	-1.2	-1.1	-0.8	-0.6	-0.7	-0.6	-0.7	-0.6
20												
21												
22	BDGT PRICING, 7.0 % REAL WORLD PRICE											
23												
24	SELF SUFFICIENCY 1990, HIGH DEMAND----	-1.8	-1.6	-1.6	-2.2	-2.4	-2.7	-2.6	-2.0	-1.3	-0.4	0.7
25												
26	SELF SUFFICIENCY 1990, LOW DEMAND-----	-1.8	-1.4	-0.8	-1.1	-1.0	-0.9	-0.6	-0.4	0.1	0.3	0.7
27												
28	NO OIL SANDS PROJECTS, HIGH DEMAND----	-1.8	-1.5	-1.2	-1.7	-1.8	-2.1	-2.4	-3.0	-3.4	-4.2	-4.7
29												
30	NO OIL SANDS PROJECTS, LOW DEMAND-----	-1.8	-1.4	-0.7	-0.8	-0.8	-0.5	-0.4	-0.6	-0.8	-1.2	-1.5

CANDIDE MODEL 2.) - ECONOMIC COUNCIL OF CANADA

TABLE 10.0 ENERGY BALANCE PERCENT OF G.N.P. - TBC_BAL_FOSSIL/GNES

LINE	I T E M	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1												
2	CONTROL SOLUTION											
3	================											
4												
5	OIL $4 - 1.0-1.5 % REAL WORLD PRICE-----	1.2	1.5	1.5	0.9	0.8	0.4	0.0	-0.4	-0.7	-1.0	-1.1
6												
7												
8	ALTERNATIVE SOLUTIONS											
9	====================											
10												
11	BDGT PRICING, 1.0-1.5% REAL WORLD PRICE											
12												
13	SELF SUFFICIENCY 1990, HIGH DEMAND----	1.2	1.5	1.4	0.9	0.8	0.4	0.2	0.5	0.7	1.4	2.0
14												
15	SELF SUFFICIENCY 1990, LOW DEMAND-----	1.2	1.6	2.0	1.9	1.8	1.8	1.7	1.7	1.7	1.8	1.9
16												
17	NO OIL SANDS PROJECTS, HIGH DEMAND----	1.2	1.5	1.5	0.9	0.8	0.4	-0.0	-0.5	-1.1	-1.5	-1.8
18												
19	NO OIL SANDS PROJECTS, LOW DEMAND-----	1.2	1.6	2.0	1.9	1.8	1.8	1.7	1.4	0.9	0.6	0.4
20												
21												
22	BDGT PRICING, 7.0 % REAL WORLD PRICE											
23												
24	SELF SUFFICIENCY 1990, HIGH DEMAND----	1.2	1.7	1.7	1.2	1.0	0.4	0.2	0.4	0.7	1.7	2.8
25												
26	SELF SUFFICIENCY 1990, LOW DEMAND-----	1.2	1.8	2.4	2.3	2.3	2.3	2.2	2.2	2.2	2.3	2.6
27												
28	NO OIL SANDS PROJECTS, HIGH DEMAND----	1.2	1.7	1.7	1.2	1.0	0.4	-0.2	-1.0	-2.1	-3.0	-3.8
29												
30	NO OIL SANDS PROJECTS, LOW DEMAND-----	1.2	1.8	2.4	2.3	2.3	2.3	2.2	1.7	1.1	0.4	-0.0

CANDIDE MODEL 2.0 - ECONOMIC COUNCIL OF CANADA

TABLE 11.0 NON-ENERGY BALANCE PERCENT OF G.N.P. - CAN$-FOSSIL/GNE$

LINE	I T E M	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1												
2	CONTROL SOLUTION											
3	================											
4												
5	OIL $4 - 1.0-1.5 % REAL WORLD PRICE-----	-3.1	-3.3	-3.1	-3.0	-2.9	-2.6	-2.2	-2.0	-1.6	-1.4	-1.2
6												
7												
8	ALTERNATIVE SOLUTIONS											
9	====================											
10												
11	BDGT PRICING, 1.0-1.5% REAL WORLD PRICE											
12												
13	SELF SUFFICIENCY 1990, HIGH DEMAND----	-3.0	-3.3	-3.3	-3.4	-3.3	-3.1	-2.6	-2.3	-1.9	-1.7	-1.5
14												
15	SELF SUFFICIENCY 1990, LOW DEMAND-----	-3.0	-3.2	-3.2	-3.3	-3.2	-3.0	-2.5	-2.3	-1.8	-1.5	-1.3
16												
17	NO OIL SANDS PROJECTS, HIGH DEMAND----	-3.0	-3.2	-3.0	-2.9	-2.8	-2.4	-2.0	-1.8	-1.2	-0.9	-0.7
18												
19	NO OIL SANDS PROJECTS, LOW DEMAND-----	-3.0	-3.2	-3.1	-3.1	-3.0	-2.6	-2.3	-2.1	-1.5	-1.2	-1.0
20												
21												
22	BDGT PRICING, 7.0 % REAL WORLD PRICE											
23												
24	SELF SUFFICIENCY 1990, HIGH DEMAND----	-3.0	-3.3	-3.3	-3.4	-3.4	-3.2	-2.7	-2.5	-2.0	-2.1	-2.1
25												
26	SELF SUFFICIENCY 1990, LOW DEMAND-----	-3.0	-3.3	-3.2	-3.3	-3.3	-3.2	-2.8	-2.6	-2.1	-2.0	-1.9
27												
28	NO OIL SANDS PROJECTS, HIGH DEMAND----	-3.0	-3.2	-3.0	-2.9	-2.8	-2.5	-2.2	-2.0	-1.3	-1.1	-1.0
29												
30	NO OIL SANDS PROJECTS, LOW DEMAND-----	-3.0	-3.2	-3.1	-3.0	-3.1	-2.8	-2.6	-2.4	-1.8	-1.6	-1.5

CANDIDE MODEL 2.0 - ECONOMIC COUNCIL OF CANADA

TABLE 12.0 INVESTMENT PERCENT OF G.N.P. - (IBNAM$+IBNACO$)/GNE$

LINE	I T E M	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1												
2	CONTROL SOLUTION											
3	**********											
4												
5	OIL $4 - 1.0-1.5 % REAL WORLD PRICE-----	15.8	16.3	16.8	17.6	18.3	18.6	18.7	19.0	19.2	19.5	19.7
6												
7												
8	ALTERNATIVE SOLUTIONS											
9	**********											
10												
11	BDGT PRICING, 1.0-1.5% REAL WORLD PRICE											
12												
13	SELF SUFFICIENCY 1990, HIGH DEMAND----	15.7	16.3	17.0	18.4	19.4	20.1	20.2	19.9	19.7	19 6	19.4
14												
15	SELF SUFFICIENCY 1990, LOW DEMAND-----	15.7	16.1	16.5	17.5	18.1	18.6	18.7	18.8	18.8	19.0	19.1
16												
17	NO OIL SANDS PROJECTS, HIGH DEMAND----	15.7	16.1	16.3	17.0	17.6	17.7	18.0	18.4	18.6	19.1	19.4
18												
19	NO OIL SANDS PROJECTS, LOW DEMAND-----	15.7	16.0	16.2	16.9	17.4	17.5	17.8	18.1	18.3	18.7	19.0
20												
21												
22	BDGT PRICING, 7.0 % REAL WORLD PRICE											
23												
24	SELF SUFFICIENCY 1990, HIGH DEMAND----	15.7	16.3	17.1	18.5	19.5	20.2	20.3	19.9	19.6	19.5	19.2
25												
26	SELF SUFFICIENCY 1990, LOW DEMAND-----	15.7	16.1	16.5	17.5	18.2	18.6	18.8	18.7	18.6	18.8	19.0
27												
28	NO OIL SANDS PROJECTS, HIGH DEMAND----	15.7	16.0	16.3	17.0	17.6	17.8	18.0	18.3	18.6	19.3	19.8
29												
30	NO OIL SANDS PROJECTS, LOW DEMAND-----	15.8	16.0	16.2	16.8	17.4	17.5	17.7	17.9	18.1	18.6	19.0

CANDIDE MODEL 2.0 - ECONOMIC COUNCIL OF CANADA

TABLE 13.5. EMPLOYMENT (THOUSANDS) - VE

LINE	I T E M	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
1												
2	CONTROL SOLUTION (ACTUAL)											
3	==========											
4												
5	OIL $4 - 1.0-1.5 % REAL WORLD PRICE-----	10360.1	10566.9	10823.2	11085.7	11346.8	11543.5	11738.7	11971.4	12193.2	12381.9	12586.5
6												
7												
8	SHOCK - CONTROL (CUMULATIVE DIFFERENCE)											
9	==========											
10												
11	BDGT PRICING, 1.0-1.5% REAL WORLD PRICE											
12												
13	SELF SUFFICIENCY 1990, HIGH DEMAND----	-4.6	1.0	33.5	101.1	181.0	268.3	343.5	377.3	370.2	333.0	256.5
14												
15	SELF SUFFICIENCY 1990, LOW DEMAND-----	-5.8	-9.8	-0.5	27.0	48.8	72.4	83.2	57.9	-3.0	-98.4	-228.4
16												
17	NO OIL SANDS PROJECTS, HIGH DEMAND----	-4.6	-13.0	-24.6	-47.7	-91.3	-167.1	-260.2	-383.5	-544.4	-734.4	-954.6
18												
19	NO OIL SANDS PROJECTS, LOW DEMAND-----	-4.1	-12.2	-18.2	-29.0	-54.9	-105.5	-169.5	-262.2	-392.4	-555.1	-749.5
20												
21												
22	BDGT PRICING, 7.0 % REAL WORLD PRICE											
23												
24	SELF SUFFICIENCY 1990, HIGH DEMAND----	-5.0	0.9	32.7	88.4	137.2	169.5	157.9	67.5	-102.6	-353.4	-708.0
25												
26	SELF SUFFICIENCY 1990, LOW DEMAND-----	-6.2	-5.7	5.5	23.2	15.0	-16.3	-89.7	-240.5	-472.3	-792.7	-1214.4
27												
28	NO OIL SANDS PROJECTS, HIGH DEMAND----	-5.0	-13.4	-31.3	-76.7	-159.3	-294.5	-473.8	-715.6	-1024.8	-1398.5	-1842.1
29												
30	NO OIL SANDS PROJECTS, LOW DEMAND-----	-4.6	-14.1	-30.4	-68.4	-138.1	-254.1	-413.5	-640.2	-943.4	-1323.0	-1765.1