4. COMPARISON WITH OTHER FORECASTS

Forecasts Made After January 1979

Two oil companies (Exxon and British Petroleum) have made projections for production through the year 2000 since the Iranian revolution. Few details are given in either the Exxon or British Petroleum forecasts.

Conservable care must be made in directly comparing these estimates with the OTA estimates. The Exxon forecast includes synthetics and unconventional oil in its projection, which are not included in the OTA study. The British Petroleum forecast is for non-Communist world crude oil production. This study does not consider natural gas liquids production or the effect of the Communist countries.

The British Petroleum estimate falls into the lower half of our production range while the Exxon forecast is at the upper end of our projection range. The primary difference in the Exxon and BP forecasts appears to be the projection of new discoveries outside of OPEC. This difference reflects the subjective judgments that are necessary in long term petroleum production forecasts.

British Petroleum (BP)*

BP forecasts non-Communist world crude oil production peaking in 1985 in the range 54-61 MBD and then steadily declining to a level of 40-48 MBD in the year 2000. The higher levels assumed Saudi Arabian production at 12 MBD, Iran at 4 MBD, and the removal of conservation limits imposed by some other OPEC countries.

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* British Petroleum Ltd., Oil Crisis Again, September 1979. (Note numbers are read from graphs and not tables.)

After adding approximately 3 MBD of natural gas liquids (today's current rate) to the above estimate, one obtains a range of 43-51 MBD for non-Communist world oil production. This range is in the lower half of the OTA range of production estimates for the year 2000.

Exxon*

Exxon projects conventional free world liquid petroleum supply rising to 58 MBD in 1990 and 60 MBD in the year 2000.** This estimate for 2000 is near the higher estimate of supply possibilities listed in this OTA report.

A breakdown by region is compared with the OTA estimate for the year 2000 in Table 17. Exxon's estimates for the U.S., Canada, and OPEC production fall with the range of OTA estimates for the year 2000. Their estimate for Europe, other non-OPEC countries, and Communist exports are slighter higher than the OTA range of production possibilities. The regional Exxon estimates have been compared to the OTA estimates in each section of the report.

Table 17

Liquid Petroleum Supply in the Year 2000 (MBD)

	Exxon	OTA
OPEC	33	27-37
U.S. and Canada	8	5-9
Europe	4	2.0-3.5
Other Non-OPEC	14	8-12
Subtotal	59	42-62
Communist exports	1	(-2) to 0
Total	60	40-62

(May not add due to rounding)

* Exxon, World Energy Outlook to 2000, December 1979.

** Unconventional and synthetic production, estimated by Exxon to be 6 MBD in the year 2000, has been deleted in the description here.

Congressional Budget Office

Concurrently with the preparation of this report, the Congressional Budget Office (CBO) prepared a report The World Oil Market in the 1980s: Implications for the United States which was released in may 1980. This report has point projections of future oil supply through this decade. Their estimates of production in the US and in the non-OPEC LDC's are somewhat higher than those in this OTA report. These higher estimates are based upon assumed, new discovery rates which are higher than those given in this report.

The CBO study projects world petroleum availability in 1985 to be 54.5 MBD. This estimate falls within the range of OTA estimates (47-60 MBD) for 1985. The corresponding regional estimates are compared in the table below.

Table 18

1985 Non-Communist World Oil Supply (MBD)

	OTA	CBO
Developed countries		
United States	7.2-8.6	9.4
Canada	1.6-108	1.5
North Sea	2.8-4	3.7
Other	.8	1*
	13-15.5	15.6
OPEC	28.5-35	30.1
Non-OPEC LDC	7.5-9	9.8*
Communist trade	(-2)-o	-1
Totals... (May not add due to rounding)	47-60	54.5

* Australia was classified with the non-OPEC LDC category in the CBO report. OTA estimated its production at .5 MBD and included it in the other category of the developed countries in this description of the CBO report.

SOURCE: OTA, CBO.

Forecasts Prior to January 1979

It is difficult to compare the analysis here with other forecasts made prior to the disruption in Iran. Prior to the Iranian revolution, many projections had assumed that oil exporters would produce at *(or close* to) their maximum production rates. However, as was discussed in Section 3, the events in Iran have made it clear that many oil exporters would prefer to lower production rates.

In the analysis here OTA has attempted to take into consideration the political, economic, technical, and geological factors that determine production in each country. Several studies (including the Energy Information Agency of DOE and Electrical" Power Research Institute studies discussed below), working with data prior to the Iranian revolution, had ignored the importance of the non-geological factors. Consequently, these studies have estimated non-Communist world oil supply to be significantly higher than the OTA estimates in this report.

Energy Information Agency

The Energy Information Agency (EIA) of the Department of Energy made an estimate of future non-Communist world oil supply in its Volume 3 of the 1978 Annual Report to the Congress which was released in 1979. The EIA has projected free world oil supply to range between 56.2-63.1 MBD in 1985 and 70.3-90.4 MBD in 1995.

These estimates are considerably higher than the projections for non-Communist world oil supply made in this report. The EIA estimates for 1995 estimates are even 10 to 30 MBD above the OTA high estimate for

production in the year 2000. However, the EIA has recently testified* that the disruption in Iran has significantly altered their projections and that their production rates will be modified.

It is important to understand the EIA methodology which caused these high projections. EIA does not make a country by country analysis of the production possibilities of the major producers. Instead EIA relies heavily on econometric modelling resulting in the their supply estimates of petroleum being price driven. This does not imply that all other factors are totally ignored but only that the price of oil is the major factor in determining the available supply of petroleum. A range of production estimates is then made under varying assumptions on price.

The EIA uses different price analyses for determining the production ranges for foreign non-OPEC, OPEC, and the U.S. For foreign non-OPEC production (Mexico, North Sea, etc.), the EIA first obtained ranges of foreign supply potential (at constant prices) provided by the International Affairs Division of DOE. The future production rates for these countries are then determined using a long-term supply elasticity of 0.2. This assumption means that any 10% in price would lead to a 2% increase in production after ten years have elapsed. Thus price determines supply in the EIA model.

OPEC production is determined by EIA to be a function of world demand for oil, capacity expansion plans, and price. This process can be briefly described as follows:

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c. Roger LeGassie, EIA before the Permanent Select House Committee on Intelligence, October 17, 1979.

OPEC expands capacity from its current level of 34 MBD to a level of 39 MBD in 1995 if oil prices remain constant or decline in real dollars (approximately .3 MBD a year).

If prices rise, OPEC would increase its annual rate of capacity an additional .65 MBD a year after 1985 with capacity increasing until the level of 45.8 MBD is obtained.

Future U.S. petroleum production is determined based on a combination of geologic, price and cost of production assumptions. Increases in price are assumed to have a direct effect on the rate of exploration for and development of our current undiscovered resources. Estimates of the U.S. undiscovered resource are taken from 1975 U.S.G.S. estimates. (Most experts consider these estimates inflated based upon recent disappointing drilling experience.)

The EIA approach is of limited value in making supply projections, since in their analysis supply is primarily price determined. In reality the supply of oil is price-driven for only a limited range of circumstances. The first circumstance is where the cost of production is close to the market price. This is true in some places but these places would produce only small amounts because they are in small (high-cost) fields. The second circumstance is where known reserves are viewed as the only national asset able to generate economic development, and the rate of development is limited by foreign exchange. This was true in the Shah's Iran (and may be true of Iran in the future) and is perhaps true of Nigeria. But this circumstance does not apply to most known reserves. For most of the world's production of oil, increases in supply will be determined either by geology (U.S., U.S.S.R., North Sea) or by political factors (Persian Gulf).

The EIA model gives little consideration to the conservation objectives that have been explicitly stated by several governments. Saudi production is projected to range between 14-16.4 MBD despite official Saudi statements that sustainable capacity would not be extended beyond levels to support production of 12 MBD and that actual production may be held to 10 MBD. Kuwait and the UAE are projected to increase production by 1995 a minimum of 1.2 MBD despite statements by these two governments that they will not increase production.

The EIA price analysis also leads to some extremely high estimates for future U.S. production from new (post 1978) additions to reserves. In 1978 the U.S. added only 1.3 billion barrels to reserves, and the average annual addition since 1973 has been approximately 1.5 billion barrels despite a five-fold price increase since 1973. The continued addition of 1.5 billion barrels per year to reserves would result in a production of approximately 3 MBD from this source by 1995. However, EIA estimates that between 4.34 and 10.73 MBD will come from production from reserve additions.

Electrical Power Research Institute (EPRI), Outlook for World Oil into the 21st Century, May 1978

EPRI published a forecast of future non-Communist world oil supply excluding U.S. production will rise to a maximum level of 72 MBD, occuring at the earliest by 1995-96. OPEC production will account for 51 MBD of this production.

It is important to note that EPRI had assumed that political considerations by exporting countries will not cause production to be limited. This assumption is based upon an analysis by Professor D.A. Rustow.

As stated by EPRI in this report,

> "very brief 1 y, Professor Rustow believes that the governments of the major oil exporting countries, regardless of political orientations, Will find it expedient to sell oil to the non-Communist world within the limits of their technical capacity and economic needs. Thus , in most situations purely political considerations are unlikely to determine the long term glob al avail ability and price of oil."

Events following the disrupt ion in Iran have made this assumption untenable.

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