

**Analysis of the IEO2001 Non-OPEC Supply Projections,  
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There are serious questions concerning the validity of the non-OPEC supply analysis in the U.S. DOE/EIA's International Energy Outlook 2001 (IEO2001). Listed below are statements contained in the IEO2001 that deal with projected supply from non-OPEC regions or countries followed by a critical analysis of each statement.

1). **North Sea**-Concerning the North Sea the IEO2001 states,

"In the IEO2001 forecast, North Sea production reaches a peak in 2006, at almost 6.6 million barrels/day (mb/d). Production from Norway, Western Europe's largest producer, is expected to peak at about 3.7 mb/d in 2004 and then gradually decline to about 3.1 mb/d by the end of the forecast period with the maturing of some of its larger and older fields. The United Kingdom is expected to produce about 3.1 mb/d by the middle of this decade, followed by a decline to 2.7 mb/d by 2020."

An oil production peak as late as 2006 followed by a minor production decline from 2006 to 2020, as projected by the IEO2001, appears totally unrealistic. North Sea crude + condensate production probable either peaked in 2000 or will in 2001 and should decline significantly between 2001 and 2006. The IEO2001 includes natural gas liquids and refinery gain in their definition of oil but crude + condensate makes up over 94% of total North Sea oil production so as crude + condensate production declines, total oil production will decline.

Norwegian crude oil production probably either peaked last year or will this year. The statement in the IEO2001 concerning the decline of Norwegian oil production later in the forecast period due to "the maturing of some of its larger and older fields" seems odd in that the Norwegian oil fields that achieved the highest production rates have already declined dramatically. The data in Table I illustrates the decline of the Norwegian oil fields that achieved the highest production rates.

**Table I-Decline of Norwegian Giant Oil Fields**

<b>Field</b>	<b>Year of Maximum Production</b>	<b>Maximum Production (barrels/day)</b>	<b>Year 2001 Production* (barrels/day)</b>
Gullfaks	1994	530,000	202,032
Oseberg	1994	502,644	203,606
Statfjord	1991	646,000	177,240

\*January/February average

Norway presently has only 2 oil fields that produce over 300,000 b/d, Ekofisk and Troll, and both of those fields will enter their terminal decline phase in the next few years. Ekofisk and Troll will be the last of the 300,000 b/d fields in Norway. Seven major fields (Estimated Ultimate Recovery-EUR > 100 million barrels) were brought on-line in 1999 and the introduction of those fields lead to Norwegian oil production increasing about 200,000 b/d in 2000. There are a total of 9 major fields yet to bring on-line in Norway, but only one field has an EUR > 300 million barrels. For comparison, Norway's portion of the Statfjord field has an EUR of approximately 3,600 million barrels. The projected on-line dates for the 9 fields are spread out over the next 10 years so no single year will experience the dramatic increase in new oil production that was observed as a result of the 1999 new field additions. In the meantime, older fields will continue to decline. Most Norwegian fields brought on-line before 1999 will be in terminal decline by 2002. The decline rates of mature Norwegian major oil fields are typically 15-25%/year. The oil discovery rate in Norway has been poor in recent years so as the older fields decline, a steep decline should be expected for Norwegian oil production.

United Kingdom (U.K.) crude + condensate production peaked in 1999. In 2000 crude + condensate production declined 209,000 b/d. The start-up delay of the Franklin/Elgin complex

and the shutdown of the Shearwater field contributed to the production decline last year but U.K. crude + condensate production would have declined in spite of those problems. The decline of mature U.K. major fields is driving the overall decline of U.K. crude + condensate production. Of 41 U.K. major fields that had been in decline for at least 3 years as of 1999, the average decline rate was 13% (latest available data). The Franklin and Elgin fields are the last of the major fields in the U.K. sector of the North Sea to be brought on-line so a continuing production decline for the U.K. should be expected.

Norway and the U.K. produce approximately 95% of total North Sea crude + condensate production. The number three oil producer in the North Sea is Denmark which produces approximately 370,000 b/d of crude oil. Crude oil production in Denmark either peaked last year or will this year as Denmark's major fields have reached maturity and many of them are now in decline. Based upon the increasing number of rapidly declining major fields in Norway, the U.K. and Denmark, North Sea oil production should be substantially lower in 2020 than the IEO2001 projection. The importance of major fields in the North Sea is that the overwhelming majority of North Sea oil production comes from major fields.

2). **Mexico**-Concerning Mexico the IEO2001 states,

"Mexico is expected to adopt energy policies that encourage the efficient development of its vast resource base. Expected production volumes in Mexico exceed 4 million barrels/day by the end of the decade and show little decline out to 2020."

Mexico's oil production has relied heavily upon production from the Cantarell field (EUR ~ 25 billion barrels) which dwarfs all other Mexican oil fields. Over the last decade Cantarell's crude oil production has consistently been > 1,000,000 b/d and in 1999 Cantarell's production was over 1,200,000 b/d, 41.7% of Mexico's crude oil production. In the last few years, Cantarell's crude oil production level has been maintained by a massive nitrogen injection project that forces oil out of the field. In spite of this effort, Cantarell's crude oil production is poised to decline and that will drag down future Mexican oil production. A production decline rate of 10%/year or greater is reasonable for Cantarell based upon the decline rates of other giant (EUR > 500 million barrels) and supergiant (EUR > 5 billion barrels) fields around the world that are in decline. If Cantarell starts declining in 2002, as appears likely, at a rate of 10%/year, production from Cantarell would decline approximately 500,000 b/d by 2007 and approximately 800,000 b/d by 2012. Such a decline would have a significant impact on future Mexican oil production.

Other large fields in Mexico such as Ku (~282,000 b/d peak) and Abkatun (~413,000 b/d peak), which provided another 13% of Mexico's crude oil production in 1999, are in decline. This has led to smaller than projected oil production increases in Mexico for the last few years. There are undeveloped areas, particularly in the Gulf of Mexico, that will be developed in coming years but it is likely that Mexican oil production will experience a sizeable decline over the next two decades as the large Mexican fields decline. An oil production level of 4 mb/d will probably not be attainable.

3). **India**-Concerning India the IEO2001 states,

"India is expected to show some modest production increase early in this decade and only a modest decline in output thereafter."

India's crude + condensate production has declined about 60,000 b/d since it reached its highest level in 1995. The production decline has been strongly influenced by the decline of India's largest oil field, the Bombay High field. The Bombay High field provided 35.9% of India's total crude oil production in 1999. Production from the Bombay High field will continue its downward trend in the future and drag India's total oil production down with it.

4). **Colombia**-Concerning Colombia the IEO2001 states,

"Colombia's current economic downturn has somewhat delayed its bid to join the relatively short list of worldwide million barrel/day producers, but its output is expected to top a million barrels/day within the decade and show little decline for the remainder of the forecast period."

The three largest oil fields in Colombia: Cusiana, Cupiagua and Cano Limon produce approximately 60% of Colombia's crude oil. All three fields are now in rapid decline. Colombian crude + condensate production declined 125,000 b/d in 2000 to 700,600 b/d. State oil company Ecopetrol predicts a further decline of 68,600 b/d in 2001 to 632,000 b/d. The expectation that Colombia will become a million barrel/day producer by the middle of this decade appears baseless.

5). **Argentina**-Concerning Argentina the IEO2001 states,

"Argentina is expected to increase its production volumes by at least 100,000 b/d over the next 2 years, and by the middle of the decade it could possibly become a million barrel/day producer."

This statement appears to be totally unrealistic. In the last 2 years Argentina's crude + condensate production declined approximately 90,000 b/d. The March issue of the International Energy Agency's Oil Market Report projects a continuation of the declining production because the vast majority of Argentina's oil fields are in terminal decline.

6). **Canada**-Concerning Canada the IEO2001 states,

"Canada's projected output is expected to increase by more than 200,000 b/d over the next 2 years, mainly from Newfoundland's Hibernia oil project, which could produce more than 150,000 b/d at its peak sometime in the next several years. Canada is projected to add an additional 600,000 b/d in output from a combination of frontier area offshore projects and oil from tar sands."

According to the February issue of the International Energy Agency's Oil Market Report, Hibernia field production averaged 144,000 b/d in 2000 and was expected to remain at that level in 2001. The start-up of the Tera Nova field (125,000 b/d peak) has been delayed to the fourth quarter of 2001 so it will contribute little to Canadian oil production this year. Some production increase over the next 2 years appears likely but a 200,000 b/d increase appears unattainable. Any increases from the Atlantic offshore fields and tar sands development will be partially negated by declining crude oil production from Alberta and Saskatchewan. An oil production increase of 600,000 b/d in the future appears extremely optimistic considering that offshore Atlantic oil resources are limited and oil production from frontier areas and tar sands development will have to replace declining crude production from western Canada and offshore Atlantic.

7). **China**-Concerning China the IEO2001 states,

"In China, oil production is projected to decline to 3.0 mb/d by 2020."

In recent years, China's oil production has remained flat at approximately 3.2 mb/d. Approximately 60% of China's 1999 oil production came from 3 giant fields: Daqing, Shengli and Liaohe. Up to this point only Shengli has had a significant decline in production (~20%) but all three will experience significant declines in coming years which will drag down China's oil production in the future. Further development of offshore and frontier areas in China will only partially replace the decline of these three giant fields. The IEO2001 projection of Chinese oil production at 3.0 mb/d in 2020 appears very optimistic.

The IEO2001 projects that non-OPEC supply will increase from 44.6 mb/d to 60 mb/d in 2020. IEO2001 projections for other non-OPEC countries also appear to be unrealistically optimistic although sufficient information on those countries is not available to make an educated assessment of their validity. The 60 mb/d projection by the IEO2001 appears to be totally unrealistic.