Existing Conservation and Alternative Technology Gains Far Outweigh Arctic National Wildlife Refuge Potential: Oil Imports Have Declined Significantly Since 2005

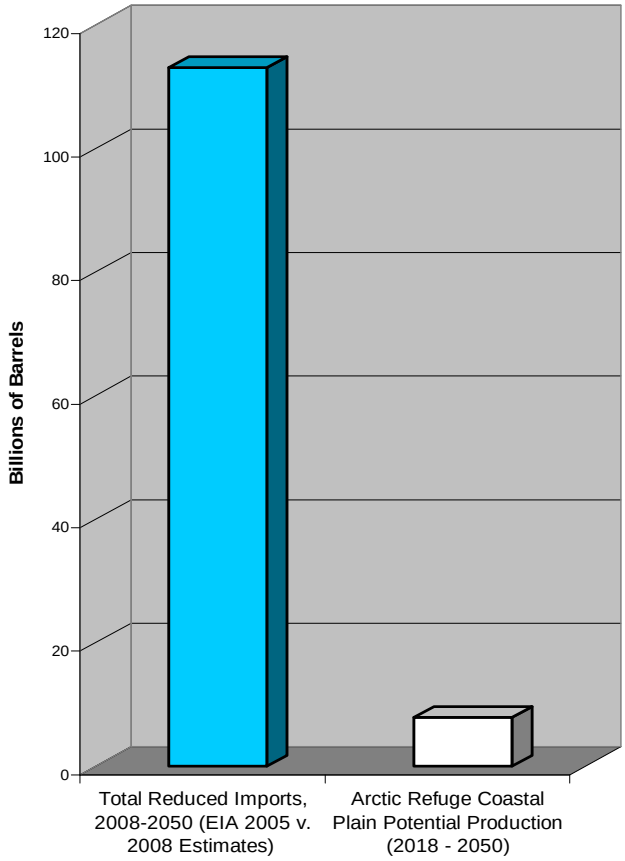
A Report to the Alaska Wilderness League

By

Richard A. Fineberg
Principal Investigator, Research Associates
Ester, Alaska 99725

June 4, 2008

Barrels Gained through Conservation and Alternative Technology Since 2005 v. Arctic Refuge Production Potential, 2008-2050
(Estimates derived from EIA and USGS Reports)



Notes:

The tall blue bar at the left represents the dramatic reduction to this nation's estimated import requirement between now and 2050 achieved in the last three years. This estimate is based on EIA's 2008 projections through 2030, compared to the agency's 2005 estimates. The 113 billion barrel total -- more than 36% of the total import requirement three years ago -- is made up of reduced consumption (94.3 billion barrels) and increased domestic production, excluding the Arctic Refuge (18.7 billion barrels).

Arctic Refuge production is estimated at 7.9 billion barrels, or approximately 3/4 of the estimated mean technically recoverable volume of undiscovered oil this region is thought to hold.

Executive Summary

Existing Conservation and Alternative Technology Gains Far Outweigh Arctic National Wildlife Refuge Potential: Oil Imports Have Declined Significantly Since 2005

The U.S. Energy Information Administration (EIA) May 2008 update report on the petroleum potential of the Arctic National Wildlife Refuge Coastal Plain region concludes that:

- Based on the USGS mean resources estimate, EIA reports that leasing and development on the Arctic Refuge Coastal Plain region would result in production of approximately 2.6 billion barrels of oil between 2018 and 2030.
- Production from the Arctic Refuge Coastal Plain region would peak in 2027 at approximately 780,000 barrels per day (0.78 million bpd) and would average approximately 657,000 bpd (0.657 million bpd) between 2018 and 2030.
- During the decade between 2021 and 2030, Arctic Refuge production would reduce prices at the gas pump by approximately $0.032 (3.2 cents) per gallon. At peak, the gas pump reduction would be less than $0.04 (four cents) per gallon, based on a $0.78 per barrel reduction in the price of crude oil (all figures in 2008 dollars).
- Due to geologic and logistical constraints, EIA has not increased its estimate of Arctic Refuge production potential through 2030 since its last review in 2004, despite high oil prices.
- If Congress authorized leasing on the Arctic Refuge Coastal Plain, first production would not occur until ten years later.

Drilling advocates, perhaps mistaking wishful thinking for reality, frequently overlook significant data that do not support their views, such as the mean

estimates of Arctic Refuge protection potential published by USGS and EIA. In the resulting confusion, it is easy to lose sight of important new developments that have bearing on the proposal to seek oil on the Arctic Refuge Coastal Plain. Salient facts and projections discussed in this report include the following:

- For the first time in the last quarter-century, since 2005 net petroleum imports have exhibited a decreasing trend.
- In recent years, reductions in petroleum consumption and early implementation of alternative technologies have led to reductions in projected future imports that dwarf the production potential of the Arctic Refuge.
- When national trends reported by EIA are extended out to the year 2050, this nation is on track to achieve a reduction in imports of more than 100 billion barrels of oil through conservation and alternative technologies. By comparison, potential production from the Arctic Refuge Coastal Plain region during the same period is estimated to be less than 10 billion barrels of oil.

These data and developments make a strong case for aggressive pursuit of conservation and alternative technology measures. The demonstrated and potential future import reductions attributable to these measures strongly support the proposition that the proposal to seek oil on the Coastal Plain of the Arctic National Wildlife Refuge should be dismissed as a misguided distraction from the urgent energy tasks at hand.

Table of Contents

List of Figures

Existing Conservation and Alternative Technology Gains Far Outweigh Arctic National Wildlife Refuge Potential: Oil Imports Have Declined Significantly Since 2005

I. Introduction: Game Plan for This Report

This report reviews the long-standing debate over the proposal to drill for oil on the Coastal Plain of the Arctic National Wildlife Refuge from an energy perspective. Section II summarizes the salient points in the new report on oil potential of the Arctic National Wildlife Refuge Coastal Plain region, released by the U.S. Energy Information Administration (EIA) May 22, 2008. Section III reviews current national petroleum production, consumption and import levels, while Section IV places potential Arctic Refuge production in the broader national energy context. The six figures in Sections III and IV present important summary information regarding the current and future national energy picture and estimated potential oil production from the Arctic Refuge Coastal Plain region. These data provide focus on the striking reductions to import requirements that are already being realized, which dwarf the comparatively small role that development of the Arctic Refuge can be expected to play in addressing the nation's energy problems. Section V concludes with discussion of some of the implications of continued debate over Arctic Refuge petroleum development.

II. EIA's May 2008 Report on the Arctic Refuge

The EIA's May 2008 *Analysis of Crude Oil Production in the Arctic National Wildlife Refuge* concludes that under its mean resources case,[1] seven

[1] To deal with the inherent uncertainty of estimates of Arctic Refuge petroleum potential, EIA follows the U.S. Geological Survey (USGS) in presenting its results in terms of three exploration outcomes or cases: high resource (5 percent probability), mean (average or expected results) and low resource (95 percent probability). The USGS mean resource course assumes discovery of 10.4 billion barrels of technically recoverable oil, compared to 16.0 billion barrels in the high resource case and 5.7 billion barrels in the low resources case. USGS estimates that there is only a 1 in 20 chance that the high resource case volume will be discovered. (EIA, *The Effects of the Alaska Oil and Natural Gas Provisions of H.R.4 and S.1766 on U.S. Energy Markets,* February 2002 [Report No. SR-OIAF/2002-02], p.7. See also: USGS, *The Oil and Gas Resource Potential of the Arctic National Wildlife Refuge, 1002 Area, Petroleum Assessment, 1998,*

fields would produce approximately 2.6 billion barrels of oil between 2018 and 2030, peaking at 0.78 million bpd and averaging approximately 0.657 bpd during this 13-year period. Under this scenario, EIA estimates these seven fields would produce an additional 1.6 billion barrels of oil after 2030.[2]

According to the EIA, at peak production the Arctic Refuge development would reduce the price of a barrel of oil by approximately $0.78 per barrel, with a resulting reduction to average gasoline prices of less than $0.04 (four cents) per gallon. Between 2021 and 2030, the gas pump effect would average $0.032 (3.2 cents) per gallon. EIA notes that this relatively small effect on gasoline prices could easily be countermanded by OPEC production cuts.[3]

The EIA estimates of Arctic Refuge region production through 2030 and the economic effects of this endeavor were developed by applying the mean estimate of technically recoverable oil, derived from a three-year study of the region's petroleum potential by the U.S. Geological Survey (USGS), to the EIA's own National Energy Modeling System reference case.[4] EIA's 2008 report was prepared in response to a request from Alaska Senator Ted Stevens (R-Alaska) that the agency update its previous estimates of Arctic Refuge production potential to reflect "recent developments, particularly with regard to the price of

---

Including Economic Analysis, USGS Fact Sheet FS-028-01, April 2001 [http://pubs.usgs.gov/fs/fs-0028-01/fs-0028-01.pdf].)

[2] EIA, *Analysis of Crude Oil Production in the Arctic National Wildlife Refuge*, May 2008 (Report No. SR/OIAF/2008-03), pp. 5, 8 (http://www.eia.doe.gov/oiaf/servicerpt/anwr/index.html).
EIA's estimated Arctic Refuge mean resources case scenario production profile between first production in 2018 and 2030 is calculated by subtracting Alaska reference case annual production totals (without Arctic Refuge development) from the corresponding Alaska totals under the Arctic Refuge development mean resources case in Table 11 of the EIA reference and Arctic Refuge mean resource case scenarios (posted on line with the May 2008 report).

[3] Mean resources case per-barrel price effect for 2025 are summarized in *Analysis of Crude Oil Production in the Arctic National Wildlife Refuge*, p. 11 (converted to 2008 dollars using GDP deflator); gasoline price effects were calculated from Table 12 of the EIA reference case (without Arctic Refuge development) and Arctic Refuge mean resource case scenarios .

[4] *Analysis of Crude Oil Production in the Arctic National Wildlife Refuge*, pp. 4-5; U.S. Geological Survey, *The Oil and Gas Resource Potential of the Arctic National Wildlife Refuge 1002 Area, Alaska*, Open File Report 98-34, 1999 (2-vol. CD; summarized in *Arctic National Wildlife Refuge, 1002 Area, Petroleum Assessment, 1998, Including Economic Analysis*).

oil."[5] Despite the increase in oil prices since 2004, EIA's current estimate of production from the Arctic Refuge region is similar to that of its previous report, issued in 2004.[6]

The most significant new element in EIA's 2008 report is a discussion of the logistical and geological reasons why EIA does not expect that recent increases in current and forecast oil prices will increase Arctic Refuge region production estimates or accelerate production prior to 2030, compared to the agency's prior estimates.[7] In discussing the time between the decision to explore on the North Slope and first production, EIA reports:

> The assumption that ANWR oil production would begin 10 years after legislation approves the Federal oil and natural gas leasing in the 1002 area is based on the following 8-to-12 year timeline:
>
> - 2 to 3 years to obtain leases, including the development of a U.S. Bureau of Land Management (BLM) leasing program, which includes approval of an Environmental Impact Statement, the collection and analysis of seismic data, and the auction and award of leases.
> - 2 to 3 years to drill a single exploratory well. . . . Typically, Alaska North Slope exploration wells take two full winter seasons to reach the desired depth.
> - 1 to 2 years to develop a production development plan and obtain BLM approval for that plan, if a commercial oil reservoir is discovered. . . .
> - 3 to 4 years to construct the feeder pipelines; to fabricate oil separation and treatment plants, and transport them up from the lower-48 States to the North Slope by ocean barge; construct drilling pads; drill to depth; and complete the wells.[8]

The report also identifies additional factors that might slow development, such as seasonal weather limitations on the North Slope that constrict time available

---

[5] Letter from Senator Ted Stevens to Guy Caruso, Administrator, EIA, Dec. 6, 2007.

[6] In fact, although the total mean scenario production figure is essentially unchanged at 2.6 billion barrels, in the 2008 report EIA has changed its production profile, reducing its 2004 peak production estimate of 876,000 bpd to 780,000 bpd. (*Analysis of Crude Oil Production in the Arctic National Wildlife Refuge*, p. 8 and *Analysis of Oil and Gas Production in the Arctic National Wildlife Refuge*, March 2004 [Report No. SR/OIAF/2004-04], p. 7).

[7] *Analysis of Crude Oil Production in the Arctic National Wildlife Refuge*, p. 3 ("Timing of First Production") and pp. 6-8 ("Current Oil Market conditions").

[8] *Analysis of Crude Oil Production in the Arctic National Wildlife Refuge* p. 3.

annually for exploration and development activities. For example, there are winter time windows for collecting seismic data and drilling wells (3 to 4 months annually) and summer time windows for barging heavy infrastructure equipment to remote well site (2 to 3 months annually). The report notes that between discovery and production, two outlier North Slope developments (Alpine and Badami) took six and eight years, respectively. EIA notes that its estimated time lines do not include delays that might result from legal challenges.[9]

EIA's production estimates for the Arctic Refuge region are based on geological findings, not economic conditions. Again following the approach of the USGS study team, the new EIA analysis assumes that the largest fields will be developed first, and that new fields that might be discovered beneath the Arctic Refuge Coastal Plain will be brought on-line every other year. According to the EIA report:

> The decision to use a 2-year time lag in bringing ANWR fields into production is driven by four factors. First, there is the large expected size of the ANWR fields, which complicates the logistical problems associated with their development. Second, there is considerable investment infrastructure required both to begin production in these fields and to link these fields to the TransAlaska Pipeline System (TAPS). Third, there is competition in investment and drilling resources from other domestic and foreign projects, which potentially limits the resources available for ANWR development. Finally, increasing the rate of ANWR development might also require an expansion of TAPS throughput capacity.[10]

Under this scenario, the seventh field slated for development would start producing in 2030.[11]

In light of these considerations, EIA concludes that even though current and long-term oil prices have risen dramatically since 2004, it does not follow that this development would lead to increase production from the Arctic Refuge region prior to 2030:

---

[9] *Analysis of Crude Oil Production in the Arctic National Wildlife Refuge*, pp. 3-4.

[10] *Analysis of Crude Oil Production in the Arctic National Wildlife Refuge*, p. 4.

[11] *Analysis of Crude Oil Production in the Arctic National Wildlife Refuge*, p. 5.

> Considered in isolation, higher prices alone might raise an expectation of higher ultimate recovery from whatever oil resource exists in place. . . . However. . . .the main impact . . . on the amount of oil actually recovered from ANWR is likely to occur after 2030, the current time horizon for EIA analyses.[12]

Post-2030 prospects for the Arctic Refuge Coastal Plain will be discussed in Section IV. But the immediate task is to consider EIA's assessment of the current national energy picture.

III. The National Energy Context: Surprising Trends

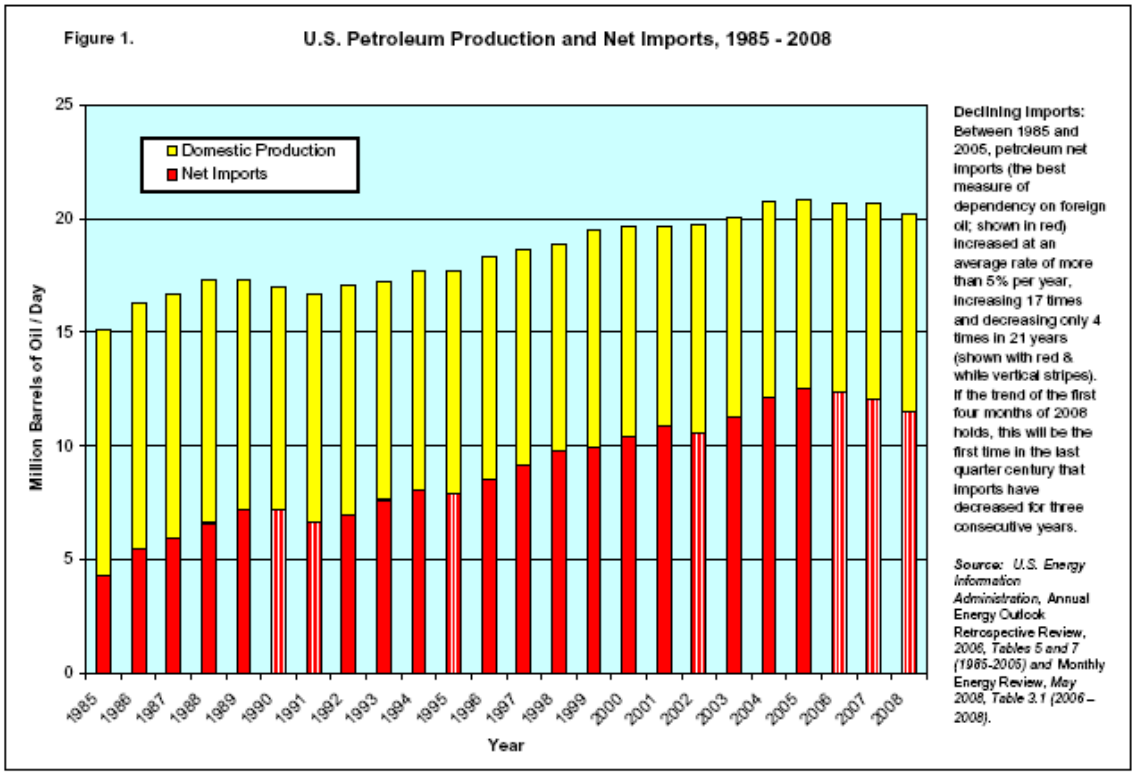
Review of national trends in petroleum production, consumption and import levels, based on EIA data, spotlights two surprising and significant trends regarding oil imports that are frequently overlooked in current discussions of energy policy. The first is historical fact. Since 2005 this nation's petroleum usage and petroleum net import levels have been declining, reversing the trend of increasing consumption and increasing use of foreign oil that had prevailed for more than two decades.[13] As shown in Figure 1, between 1985 and 2005 net imports increased in 17 years and declined in four. Overall, since 1985, U.S. petroleum imports have increased by an average of about five percent per year. At the start of this period, total consumption averaged about 15 million bpd, of which net imports comprised about 4.2 million. By 2005, total domestic consumption topped 20 million bpd and imports exceeded 12 million. While the increase in imports over this period is a dominant aspect of this figure, in the last four years this trend appears to have broken. Since 2005, total consumption has leveled off and actually declined slightly, while net imports have also declined, from a high of 12.5 million bpd in 2005 to a current level of approximately 11.5

---

[12] *Analysis of Crude Oil Production in the Arctic National Wildlife Refuge*, p. 6.

[13] Because the U.S. is both an importer and exporter of petroleum and petroleum products, EIA advises that net imports, rather than total imports, is the best measure of dependence on foreign oil. See: C. William Skinner, "Measuring Dependence on Imported Oil," *Monthly Energy Review* (U.S. Energy Information Administration), August 1995. (". . . [T]he most appropriate measure of this country's actual dependence on foreign oil is one based on the *net requirement for import*s, or total imports minus exports, rather than on total imports alone.")

million bpd in 2008.[14] Moreover, if the rest of 2008 follows the trend established during the first four months of the year, 2008 will mark the first time in the last quarter-century that net imports have declined for three years in a row.



Research Associates, Ester, Alaska / May 2008

When one examines EIA forecast figures, it becomes apparent that the recent historical trend of decreasing net imports is even more pronounced. To understand the significance of the trend in future imports, consider the EIA data for the year 2025, shown in Figure 2. This figure combines EIA historical import

[14] EIA reports that for the first four months of 2008 net imports averaged slightly less than 11.5 million bpd, comprising approximately 57% of total domestic supply. (U.S. Energy Information Administration, *Monthly Energy Review*, May 2008, p. 39 [Table 3.1, Petroleum Overview].)

Drilling advocates often overstate import levels and confuse the picture by using gross imports, without subtracting product exports, which total nearly one million bpd, from the gross import total. For example, on May 1, 2008, U.S. Senator Ted Stevens, speaking on the Senate floor, said, "Mr. President, we import more than 12.5 million barrels a day of petroleum – over 60 percent of our energy needs. As a matter of fact, I think it's higher than that now in the last two or three days." Three weeks later, Senator Stevens told his colleagues, "we import today 67 percent of our oil." (Senator Ted Stevens, "Senator Stevens Highlights Inconsistencies in Anti-Drilling Stance" and "Senator Stevens Calls for Oil and Gas Development in Alaska" [press releases on Senate floor statements], May 1 and May 23, 2008.)

Figure 2.

Oil Prices and U.S. Net Imports (Volume and % of Total Supply), Selected Years
(Based on EIA data)

Year	/ - - - - - - - - - - - - - - - - - *Actual* - - - - - - - - - - - - - - - - - /								/ - - - - - - - - - - - - - - - - - *Forecast* - - - - - - - - - - - - - - - - - /				***Reference***
	2001	*2002*	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2010*	*2020*	*2025*	*2030*	
AEO 2002											--	--	*Annual Energy Outlook 2002,*
Net Imports									14.27	16.66			Table A11, Petroleum Supply and
Total Supply									23.16	26.61			Disposition Balance, p. 150.
% Imports									61.61%	62.61%			
AEO 2003 / *Price in 2025 **											*$31.63 /bbl.*	--	*Annual Energy Outlook 2003,*
Net Imports (billion bbls.)									13.76	17.72	19.79		Table A11, Petroleum Supply and
Total Supply "									22.97	27.11	29.17		Disposition Balance, p. 150.
% Imports	55%								59.90%	65.36%	67.84%		
AEO 2004 / *Price in 2025 **											*$31.54 /bbl.*	--	*Annual Energy Outlook 2004,*
Net Imports (billion bbls.)									13.16	17.44	19.69		Table A11, Petroleum Supply and
Total Supply "									22.69	26.41	28.30		Disposition Balance, p. 150.
% Imports		54%							58.00%	66.04%	69.58%		
AEO 2005 / *Price in 2025 **											*$40.01 /bbl.*	--	*Annual Energy Outlook 2005,*
Net Imports (billion bbls.)									13.37	17.11	19.11		Table A11, Petroleum Supply and
Total Supply									22.98	26.32	27.93		Disposition Balance, p. 157.
% Imports			56%						58.18%	65.01%	68.42%		
AEO 2006 / *Price in 2025 **											*$56.60 /bbl.*		*Annual Energy Outlook 2006,*
Net Imports (billion bbls.)									12.33	14.42	15.68	17.24	Table A11, Petroleum Supply and
Total Supply "									22.21	24.87	26.12	27.65	Disposition Balance, p. 152.
% Imports				58%					55.52%	57.98%	60.03%	62.35%	
AEO 2007 / *Price in 2025 **											*$57.46 /bbl.*		*Annual Energy Outlook 2007,*
Net Imports (billion bbls.)									11.79	13.56	14.87	16.37	Table A11, Liquid Fuels Supply and
Total Supply "									21.49	23.94	25.22	26.84	Disposition Balance, p. 156.
% Imports					61%				54.86%	56.64%	58.96%	60.99%	
AEO 2008 / *Price in 2025 **											*$67.50 /bbl.*		*Annual Energy Outlook 2008*
Net Imports (billion bbls.)									11.39	11.36	11.53	12.41	(early release [revised]),
Total Supply "									21.02	22.04	22.34	22.86	Table A11, Liquid Fuels Supply and
% Imports						60%			54.19%	51.54%	51.61%	54.29%	Disposition Balance, p. 23.
Monthly Energy Review, May 2008							58%	57%					*Monthly Energy Review* , May 2008, p. 39 (Table 3.1, Petroleum Overview)

* $ / barrel price in 2025 given in real (2008) dollars, adjusted for inflation using Gross Domestic Product deflator. (For an example of this calculation, see Figure 4 , fn. 1.)

Research Associates, Ester, Alaska (May 2008)

data (shown in the left portion of table) with forecast data for selected years (on right-hand side of table). Looking forward, EIA projections anticipate significant price-induced reductions to future petroleum consumption, as well as smaller increases in domestic production due to the implementation of alternative technologies.

As shown in Figure 2, in 2003, actual net imports were reported (two years later) at approximately 56% of total petroleum supply; at that time, EIA anticipated that by 2025 the net import level would climb to nearly 68% .In 2004, the long-standing trend of increasing net imports shown in Figure 1 was still evident, with net imports at 58% of total petroleum supply and anticipated net imports for 2025 rising to nearly 70%. But in 2005, the net import forecast for 2025 leveled off. And then, over the next three years the EIA's net import forecast for 2025 began to decline sharply. The 2008 *Annual Energy Outlook* reference (base case) scenario anticipates that by 2025 U.S. petroleum imports will drop to approximately 52% of total domestic consumption, down from the 70% import level EIA had anticipated just four years ago.[15]

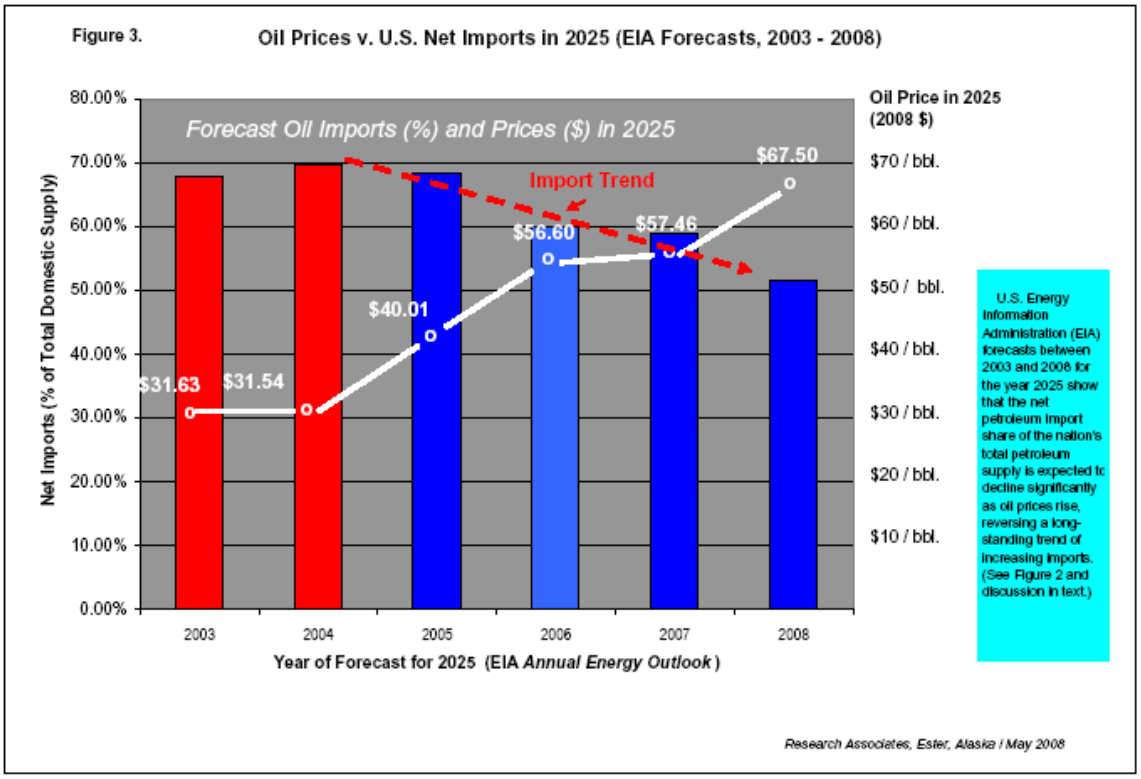
Transportation fuels play an important role in the change in imports over time. Because a major portion of this nation's petroleum consumption goes to vehicle fuel, the enactment of CAFÉ (corporate automotive fuel efficiency) standards last December contributes significantly to reduced petroleum consumption. But the new CAFÉ standards were only put into effect through 2022. With those standards no longer on the books between 2022 and 2030, EIA's 2008 reference case shows that petroleum imports, generally declining between now and 2021, begin to increase again.[16]

---

[15] The dramatic decline in future imports is shown in charts that EIA officials typically releases with the informal analysis of its *Annual Energy Outlook*. Four EIA charts issued since 2004 that demonstrate this trend are attached as Appendix 1.

[16] See: John J. Conti (Director, Office of Integrated Analysis and Forecasting, EIA), "Annual Energy OIutlook 2008: EISA2007 and Other Major Impacts" (presentation to the 2008 Energy Conference, Washington, DC), Slides 10 and 11, April 7-8, 2008.

Figure 3 isolates key EIA forecast data from 2025 to display the relationship between increasing oil prices and declining imports. The lesson of this figure is clear: Oil prices play a key role in reducing petroleum consumption.



IV. The National Energy Context: Barrels Saved v. Barrels Produced

In this section, the spotlight shifts from price, domestic production and import trends already in motion to the likely future effects of forecast reductions in petroleum imports. These baseline import reductions effects are then compared to the much smaller potential impacts of the undiscovered oil that is thought to lie beneath the Coastal Plain of the Arctic Refuge.

As discussed in Section II of this report, EIA estimates that through 2030 the Arctic Refuge region can produce approximately 2.6 billion barrels of the

USGS mean estimate of 10.4 billion barrels of oil ultimately recoverable from the region. While the EIA's assessment must be taken seriously, to assess the implications of potential Arctic Refuge development, policy makers may find it useful to look past the 2030 termination date of the EIA's national energy model.[17] The analysis presented here assesses domestic energy and Arctic Refuge region developments in the years subsequent to the termination date of the EIA model by extending the results of EIA's energy model through the year 2050. To extend the horizon on Arctic Refuge development, for purposes of this analysis the Arctic Refuge province between 2018 and 2050 is assumed to conform, in general terms, to the production profile established at the Prudhoe Bay complex during its first three decades of operation. This approach yields an estimate of approximately 7.9 billion barrels produced from the Arctic Refuge region between 2018 and 2050.[18]

To compare the production estimate for the Arctic Refuge Coastal plain region and the likely outcomes of the energy programs presently underway, played out over the same time horizon, national figures from the EIA reference case are extended using straight-line projections of the rates of change that EIA has calculated for domestic consumption and domestic production.[19] The resulting gap between these two figures is the revised import requirement.

---

[17] While it is reasonable to assume that at high oil prices most (if not all) of the technically recoverable oil that might lie beneath the Coastal Plain would eventually be produced, an earlier EIA report estimated that it might take as long as 65 years to achieve this goal. (EIA, *Potential Oil Production from the Coastal Plain of the Arctic National Wildlife Refuge: Updated Assessment*, May 2000 [Report No. SR/O&G/2000-02], Table 3 and Figure 3).Although EIA does not repeat this statement in its recent report, EIA does state that high prices could result in increased Arctic Refuge production after 2030 (see Section I, above).

[18] During its first 30 years of operation, the Prudhoe Bay complex has produced approximately three-quarters of the estimated recoverable reserves from the North Slope's Prudhoe Bay complex (The annual rates of production for fields in the Prudhoe Bay complex between 1977 and 2006 are reported in "Table III.3. Oil Production, Historic," *Division of Oil and Gas 2007 Report*, pp. 3-4 - 3-7). For purposes of this analysis, the production profile for the Prudhoe Bay complex has been applied to the mean technical volume of Arctic Refuge potential production through the 29th year; for the final four years of this period, a field decline rate of 6% per year was assumed. (This calculating procedure was employed because production from the Prudhoe Bay complex during its 30th year [2006] was reduced by British Petroleum's oil spill and corrosion problems at the Prudhoe Bay field itself.)

[19] This analysis uses the projected rates of change EIA has estimated would prevail during the third decade of this century.

When developments on the national energy scene and in the Arctic Refuge are compared on an apples-to-apples basis, the results presented in Figure 4 (below) and depicted graphically in Figure 5 show that the net energy gains resulting from conservation and alternative technologies are likely to far outweigh the limited production potential of the Arctic Refuge.

Figure 4.

Reductions to U.S. Oil Imports since 2005 v. Potential Production From the Arctic National Wildlife Refuge Coastal Plain 2008-2050 (Table)

	(1)	*(2)*	*(3)*	*(4)*	*(5)*
		/ - - - - - - - - - - - - - - - - - - *Billion Barrels* - /			
Case	Avg. Price, Of Oil, 2025 *(2008 $/Bbl.)*	Domestic Production *(excluding Arctic Refuge)*	Potential Arctic Refuge Region Production *(2018 – 2050)*	Total Domestic Consumption	Import Requirement *(With [without] Arctic Refuge)*
***AEO 2008* (Reference Case [updated early release])**	**$67.50**	**160.8**	**7.9**	**358.4**	**189.7** ***[197.6]***
***AEO 2005* (Current Futures Case)**	**$40.01**	**142.1**	**7.9**	**452.8**	**302.8** ***[310.7]***
Change 2008 v. 2005	**$18.26**	**18.7**	**0.0**	**(94.3)**	**(113.1)** ***[113.1]***
% Change (2008 v. 2005)	+67.7%	+13.2%	(0.0%)	(20.8%)	(37.2%) *[36.4%]*

Sources*:*

Col. (1): From U.S. Energy Information Administration, *Annual Energy Outlook 2005* and *Annual Energy Outlook 2008* (updated early release, Mar. 4, 2008), Table A1 (prices adjusted to 2008 $ using Gross Domestic Product deflator [$64.49*121.86 / 116.43 = $67.50]).

Col. (2), (4): From: *Annual Energy Outlook 2005* and *Annual Energy Outlook 2008* (early release), Table 11 (projections from 2031-2050 projected by author, based on EIA average of annual rate of change for 2021-2030 and 2026-2030).

Col. (3): Estimated from: U.S. Geological Survey, *Arctic National Wildlife Refuge, 1002 Area, Petroleum Assessment, 1998, Including Economic Analysis* (fact sheet summarizing U.S. Open File Report 98-34 [CD], updated in 2001), Table 1. For purposes of this analysis, the production profile for the Prudhoe Bay complex has been applied to the mean technical volume of Arctic Refuge potential production through the 29th year; for the final four years of this period, a field decline rate of 6% per year was assumed. This figure optimistically assumes that 3/4 of the total mean undiscovered technically recoverable volume of oil from the Arctic Refuge can be produced between 2008 and 2050, beginning in 2018. (See discussion in text.).

Col. (5): With Arctic Refuge = Col. (4) - (Col. [2] + Col. [3]); without Arctic Refuge (shown in brackets) = Col. (4) - Col. (2).

Figure 5, on the following page, puts the estimated aggregate numbers for U.S. oil consumption between the present and 2050 (shown in Figure 4), into calendar-year perspective.[20] The chart in Figure 5 is read as follows: Reading from the bottom up, for any calendar year (shown on the horizontal axis), total domestic petroleum consumption consists of the following components:

Domestic Production

- Net domestic production, as estimated in 2005 (excluding alternative technologies and production from the Arctic Refuge Coastal Plain
- Increased domestic production from alternative sources (2008 estimate v. 2005)
- Arctic Refuge Coastal Plain region (2005 and 2008)

Net Imports (as estimated in 2008)

- Reduction in imports due to lower consumption (the red line rising to right at top represents total consumption as estimated in 2005; the black line at top of estimated imports in 2008 represents total petroleum consumption as estimated in 2008)

The blue areas of Figure 5 represent estimated barrels of oil that, under EIA's 2005 forecast through 2030, would have had to be imported for domestic consumption between the present and 2050 – barrels that were no longer needed by 2008. Put otherwise: the blue portions represent barrels saved through conservation and alternative technologies.

---

[20] It should be noted that long-range forecasts always come with caveats about the future; this one is no exception. Despite the uncertainties inherent in long-range projections, this analysis was conservatively designed with the best available inputs to provide a reasonable framework for assessing policy options. The analysis presented here can be regarded as conservatively calculated for the following reasons:

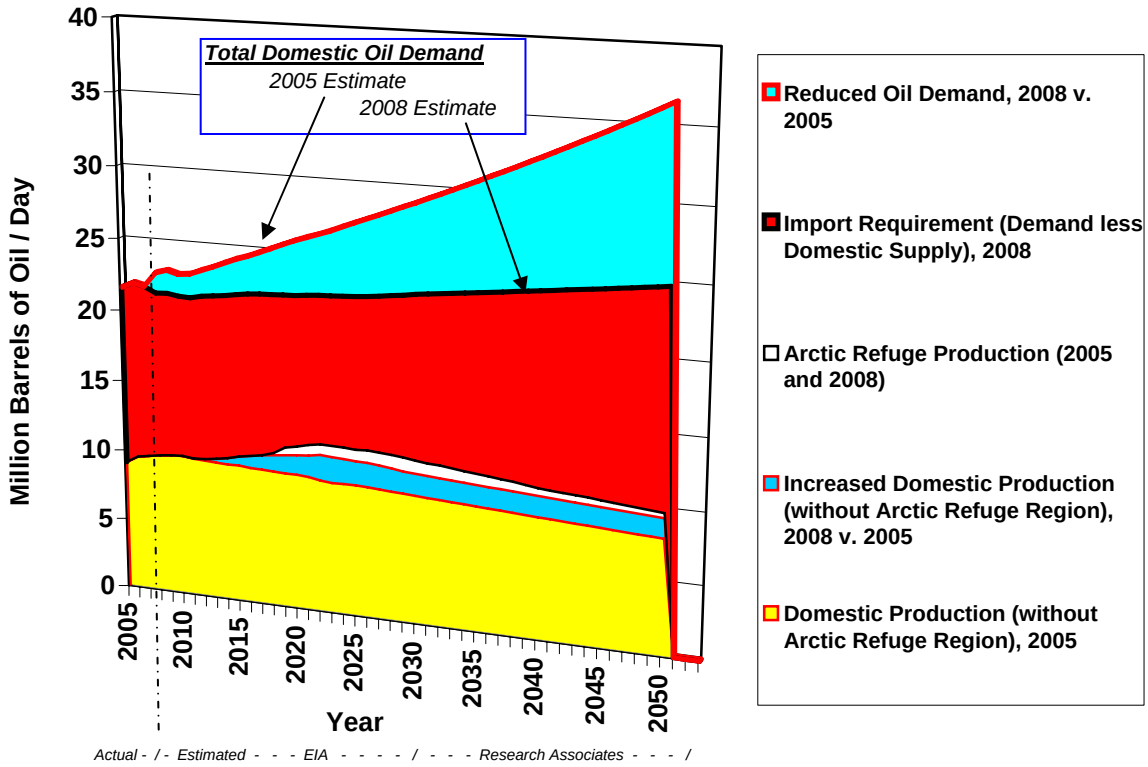
(a) The EIA projections through 2030 reflect only conservation and alternative technology measures already in place; the enactment of further measures (for example, extension of CAFÉ standards beyond their present expiration date of 2022) would yield energy savings additional to those EIA has calculated between 2022 and 2030.

(b) The extension of EIA projections 2050 does not assume new technological developments or policies that might be expected to achieve additional energy savings between 2031 and 2050.

(c) For purposes of this comparison, it is assumed that the USGS mean estimate of technically recoverable oil from the Arctic Refuge Coastal Plain region – 10.4 billion barrels of oil – can be developed and produced at a pace comparable to that achieved from the Prudhoe Bay complex. Since Arctic Refuge field sizes and total province volumes are expected to be significantly smaller than the corresponding numbers from the Prudhoe Bay complex, the Arctic Refuge will not benefit from the economies of scale realized in Prudhoe Bay complex development. For this reason, the Arctic Refuge complex estimate used for purposes of this analysis – 7.9 billion barrels – is an inherently optimistic assumption. (For further discussion, see footnote 18 and notes to Figure 4, col. 3, and Figure 5.)

Figure 5.

Reductions to U.S. Oil Imports since 2005 v. Potential Production from the Arctic National Wildlife Refuge Coastal Region



Reductions to U.S. oil import requirements since 2005 (shown in blue above), outweigh the production potential of the Arctic National Wildlife Refuge (shown in white) by more than ten to one. In other words, for every barrel of oil that might (or might not) be discovered and produced from the Arctic Refuge between now and 2050 (with production starting in 2018 at the earliest), over the last three years conservation due to high oil prices and the development of alternative energy technologies have already combined to reduced the nation's long-term petroleum import requirement by more than ten times the total amount of oil anticipated to lie beneath the Arctic Refuge Coastal Plain.

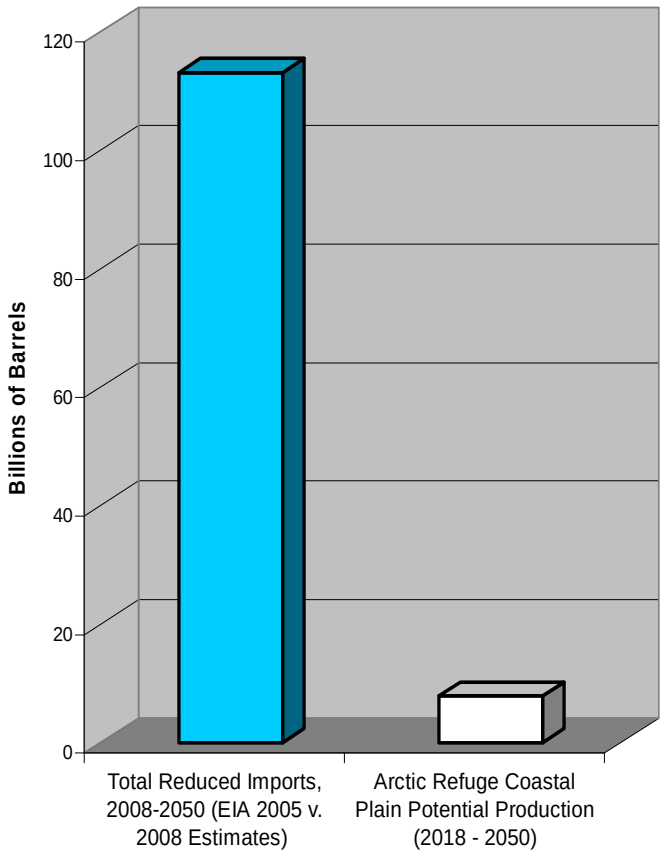
These gains, which are already in motion, have been realized without the benefit of a national energy policy and will reduce the need for imports between now and 2050 by more than 100 billion barrels of oil. By comparison, during the same period under the aggressive development scenario shown here the Arctic Refuge would produce less than 8 billion barrels of oil (approximately three-quarters of the mean technically recoverable volume of undiscovered oil, 10.4 billion barrels, thought to lie beneath the Coastal Plain).

(Domestic production and import requirement projections through 2050 based on U.S. Energy Information Administration [EIA] data through 2030; Arctic Refuge production estimate by Research Associates, based on U.S. Geological Survey data. [See Figure 4.])

Figure 6 graphically depicts a key comparison that emerges from the analysis presented in Figures 4 and 5. Between now and 2050 this nation appears to be on track to achieve a reduction in imports of more than 100 billion barrels through conservation and alternative technologies. This figure dwarfs potential production from the Arctic Refuge Coastal Plain region during the same period by a factor of more than 10 to one.

Figure 6.

Barrels Gained through Conservation and Alternative Technology Since 2005 v. Arctic Refuge Production Potential, 2008-2050
(Estimates based on EIA and USGS Reports)



Total Reduced Imports, 2008-2050 (EIA 2005 v. 2008 Estimates)

Arctic Refuge Coastal Plain Potential Production (2018 - 2050)

Notes:

The tall blue bar at the left represents the dramatic reduction to this nation's estimated import requirement between now and 2050 achieved in the last three years. This estimate is based on EIA's 2008 projections through 2030, compared to the agency's 2005 estimates. The 113 billion barrel total -- more than 36% of the total import requirement three years ago -- is made up of reduced consumption (94.3 billion barrels) and increased domestic production, excluding the Arctic Refuge (18.7 billion barrels).

Arctic Refuge production is estimated at 7.9 billion barrels, or approximately 3/4 of the estimated mean technically recoverable volume of undiscovered oil this region is thought to hold.

See Figure 4 for data and sources.

(Research Associates, Ester, Alaska / May 2008)

V. Conclusions

The EIA's May 2008 update report on the petroleum potential of the Arctic National Wildlife Refuge Coastal Plain region concludes that:

- Based on the USGS mean (expected) resources case estimate of the size of fields likely to be discovered in the Arctic Refuge Coastal Plain region, EIA restimates that leasing and development on the Arctic Refuge Coastal Plain region would result in production of approximately 2.6 billion barrels of oil between 2018 and 2030.
- Production from the Arctic Refuge Coastal Plain region would peak in 2027 at approximately 780,000 barrels per day (0.78 million bpd) and would average approximately 657,000 bpd (0.657 million bpd) between 2018 and 2030.
- During the decade between 2021 and 2030, Arctic Refuge production would reduce prices at the gas pump by approximately $0.032 (3.2 cents) per gallon. At peak, the gas pump reduction would be less than $0.04 (four cents) per gallon, based on a $0.78 per barrel reduction in the price of crude oil (all figures in 2008 dollars).
- Due to geologic and logistical constraints, EIA has not increased its estimate of Arctic Refuge production potential through 2030 since its last review in 2004, despite high oil prices.
- If Congress authorized leasing on the Arctic Refuge Coastal Plain, first production would not occur until 10 years later.

The most significant addition to EIA's 2008 report is the discussion of the factors that constrain the prospects for development on the remote Arctic Refuge Coastal Plain through 2030, the final year covered by the agency's National Energy Modeling System. In its assessment of Arctic Refuge production potential, a three-year study completed in 1998, the U.S. Geological Survey concluded that a super-giant field like Prudhoe Bay was unlikely to be discovered

on the Arctic Refuge Coastal Plain, but that the region holds a number of smaller fields whose combined mean technically recoverable volumes would total 10.4 billion barrels.[21] As noted in Section II above, with Arctic Refuge development requiring development of multiple fields, EIA estimates that logistical constraints will necessitate a two-year delay between first production at one remote field on the Arctic Refuge Coastal Plain and initiation of production at the next field.

The EIA's conclusions must have been a disappointment to Alaska Senator Stevens, who had asked EIA to update its previous report to reflect the effects of recent high oil prices. At least twice in May 2008, Senator Stevens told his colleagues that the Arctic Refuge will produce more than one million barrels of oil per day.[22] But under the EIA's mean (expected) production profile, Arctic Refuge production falls far short of 1.0 million bpd, peaking at 0.78 million bpd and averaging approximately 0.657 bpd between 2018 and 2030 (see Section II).

Drilling advocates, perhaps mistaking wishful thinking for reality, frequently overlook significant data that do not support their views, such as the mean estimates of Arctic Refuge protection potential published by USGS and EIA. In the resulting confusion, it is easy to lose sight of important new developments that have bearing on the proposal to seek oil on the Arctic Refuge Coastal Plain. Salient facts and projections discussed in the preceding sections include the following:

- For the first time in the last quarter-century, since 2005 net petroleum imports have exhibited a decreasing trend.
- In recent years, reductions in petroleum consumption and early implementation of alternative technologies have led to reductions in

[21] Emil D. Attanasi and John H. Schuenemeyer, *Frontier Areas and Resource Assessment: The Case of the 1002 Area of the Alaska North Slope*, USGS Open-File Report 02-119, March 2002, p. 10.

[22] "Senator Stevens Highlights Inconsistencies in Anti-Drilling Stance" and "Senator Stevens Calls for Oil and Gas Development in Alaska." Also on May 1, Congressman Don Young told his colleagues that the Arctic Refuge could provide the nation with one million barrels of oil per day for 30 years. (Congressman Don Young, "Dear Colleague," May 1, 2008.)

projected future imports that dwarf the production potential of the Arctic Refuge.

- When national trends reported by EIA are extended out to the year 2050, this nation is on track to achieve a reduction in imports of more than 100 billion barrels of oil through conservation and alternative technologies. By comparison, potential production from the Arctic Refuge Coastal Plain region during the same period during the same period is estimated to be less than 10 billion barrels of oil.

The developments summarized in this report augur well for an extraordinary reduction in the volume of oil this nation will need to import in coming decades. These data make a strong case for continuing aggressive pursuit of the net energy gains from conservation and alternative technologies that are necessary to address current energy problems. Compared to the limited amount of oil the Arctic Refuge might produce over the same period**,** these measures appear to be on track to reduce future demand for petroleum imports more than ten fold.

This analysis is not intended to minimize the severity of the energy crisis with which this nation must deal; indeed, there is general agreement today that this nation is paying an extremely high price for past failures to avert the problems we now face.[23] At the same time, as the United States continues to develop fundamental solutions to the energy problems that confront the nation and the world, the information presented in this report strongly supports the proposition that the proposal to drill for oil on the Arctic Refuge Coastal Plain should be dismissed as a misguided distraction from the urgent tasks at hand.

---

[23] While drilling advocates persist in looking backwards to claim rhetorically that authorizing drilling in the Arctic Refuge a decade ago might have resulted in significant alleviation of today's energy problems, the analysis presented here suggests that a much greater contribution to resolution of current energy problems might have been made by adherence to the national energy policies promulgated during the 1970s by Presidents Nixon and Carter that were later rolled back. At this time such retrospective analysis is a luxury we cannot afford; this report looks forward, limiting examination of past data to the task of understanding where we are today, how we got to this point and where we go from here.

Appendix

U.S. Energy Information Administration Charts
Show Declining Imports Trend

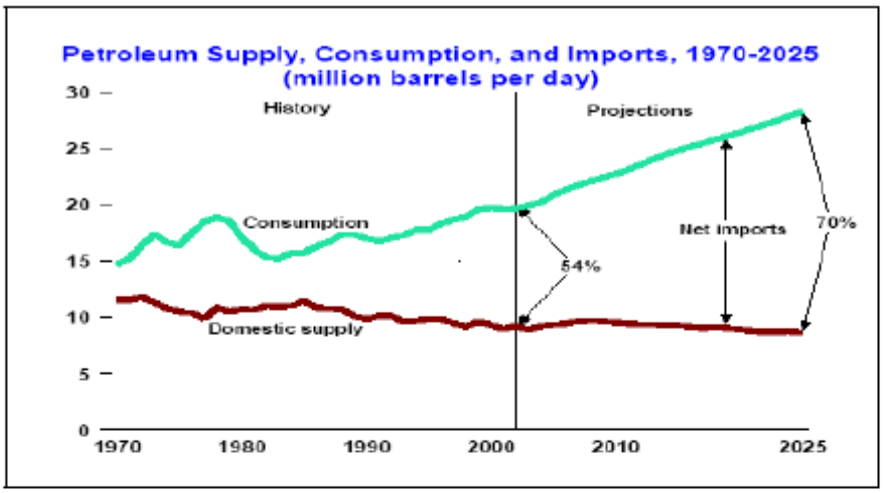
Sheet 1. 2004 and 2006

Sheet 2. 2007 and 2008

Appendix 1 (Sheet 1)

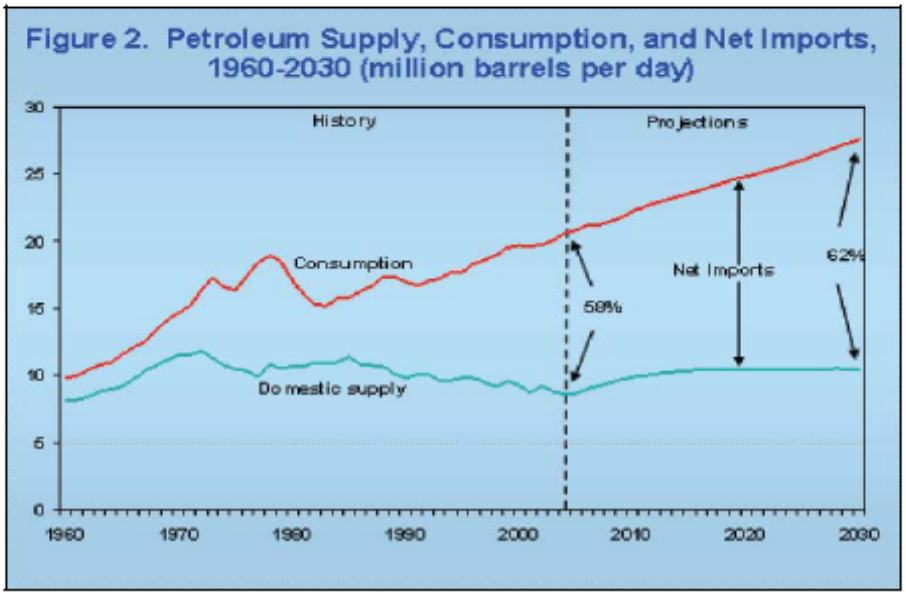
EIA Net Import Projections, 2004 - 2008

2004:



From: U.S. EIA, *Overview of the Annual Energy Outlook 2007*, March 23, 2004.

2006:

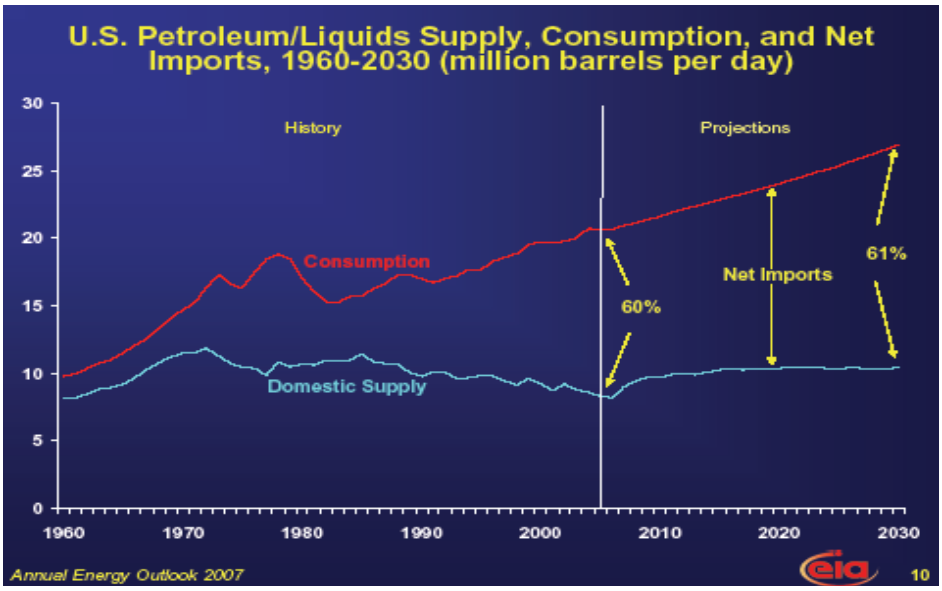


From, U.S. EIA, *"Annual Energy Outlook 2006* (Administrator's Presentation)," December 2005.

Appendix 1 (Sheet 2)

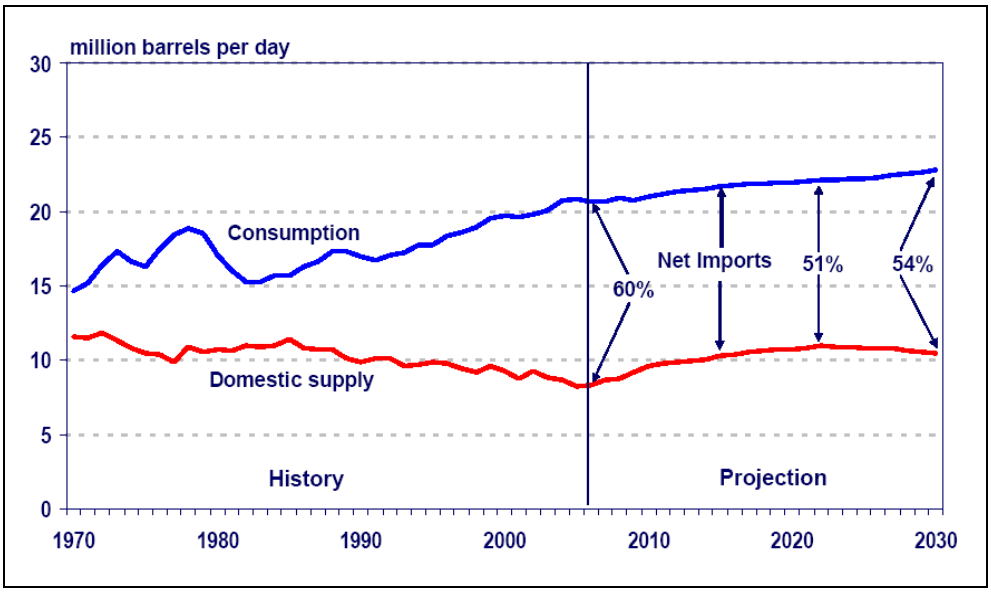
EIA Net Import Projections, 2004 - 2008

2007:



From U.S. EIA, *Annual Energy Outlook 2007*, Advanced Release presentation (posted Dec. 5, 2006).

2008: IMPORT SHARE OF NET LIQUIDS USE DECLINES FROM ITS CURRENT LEVEL.



The EIA's 2008 projection of future oil imports was presented as Figure 9 in EIA Administrator Guy Caruso's March 4, 2008 testimony to the U.S. Senate Energy and Natural Resources Committee,

Richard A. Fineberg, an independent, Alaska-based analyst, has reported on economic and environmental issues associated with Alaska and international petroleum development for more than three decades. He has also served as a senior advisor to the governor of Alaska on oil and gas policy, and as an occasional consultant to various state and federal agencies, including the U.S. Internal Revenue Service, the Alaska Department of Revenue and the Regulatory Commission of Alaska.

Many of the reports Fineberg has prepared for non-government organizations are available on-line at http://www.finebergresearch.com.

Please address questions or comments on this report to:

Richard A. Fineberg
P.O. Box 416
Ester, Alaska 99725, USA

Tel.: (907) 479-7778
E-mail: fineberg@alaska.net