Order Code RS21787
March 30, 2004



# Foreign Trade Effects of an Alaskan Natural Gas Pipeline

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## Summary

The Energy Information Administration (EIA), in the Annual Energy Outlook 2004 (AEO), projects increased demand for imported natural gas through 2025. The AEO reference case forecast assumes a natural gas pipeline will begin delivering Alaskan natural gas to the lower 48 state consuming markets in 2018. H.R. 6, the omnibus energy bill, contains provisions to enhance the future supply of natural gas through construction of a pipeline.

This report examines the effects of an Alaska natural gas pipeline on the U.S. current account balance. The EIA finds that if the pipeline is not constructed, natural gas prices will increase, markets will adjust, and imports of natural gas will increase. However, due to price induced market adjustments, the increase in imports is projected to be less than the gas volume lost from the lack of pipeline construction. As a result, if no pipeline is constructed, the effect on the current account balance will be less than the value of the amount of gas that was projected to be delivered through a pipeline. This report will not be updated.

## Background

This report examines the policy implications for the U.S. current account balance of the construction of natural gas pipeline from Alaska to the lower 48 states. The 108th Congress has included in H.R. 6, the omnibus energy bill, provisions which provide incentives for the construction of an Alaska natural gas pipeline. A pipeline would link currently unavailable Alaskan gas supplies to the consuming market. This report analyzes the possible expansion or contraction of natural gas imports as a result of constructing, or not constructing, an Alaskan pipeline, within the framework of the National Energy Modeling System (NEMS).[1] NEMS is used by the EIA as a tool to forecast future energy

[1] For a full description of the structure and use of NEMS, see: Energy Information Administration, "The National Energy Modeling System: An Overview 2003." March 2003. pp.1-73.

trends as included in the AEO.[2] Recently, the EIA has published analyses of a variety of restricted natural gas supply scenarios including the non-availability of an Alaska natural gas pipeline.[3]

## Market Forecast

The AEO reference case forecast is the EIA's baseline estimate of the state of energy markets in the out years to 2025.[4] The reference case forecast projects natural gas prices to be high enough after 2009 to begin construction of an Alaska natural gas pipeline.[5] In the forecast, natural gas deliveries come on stream from a pipeline in 2018 with full capacity deliveries becoming available near the end of the forecast period, in 2024. If policy based incentives to construct a pipeline become available, it is possible that a pipeline might be constructed sooner than in the AEO reference case altering the results presented in this report. As a result of the construction and delivery time line assumed in the reference case, the forecasts with and without the construction of a pipeline are virtually identical until 2018. This report will examine differences in the forecasts for the years 2020 and 2025.[6]

To focus on the international trade effects of the pipeline, likely variations in the current account balance in 2020 and 2025 will be calculated. The current account balance is a basic measure of a nation's foreign trade position and is defined as the nation's exports of goods and services minus the nation's imports of goods and services. When a nation's exports exceed its imports, the country has a current account surplus. When a nation's imports exceed its exports, the nation has a current account deficit. The EIA forecasts do not include estimates of the cost of constructing the pipeline, or any trade effects that might come about as a result of sourcing decisions for the steel and other goods and services used in the construction process. The current account balance effects described in this report are limited to the natural gas that a pipeline would deliver to the market.

## Current Account Effects

In the AEO reference case, an Alaska natural gas pipeline is expected to deliver approximately 2 trillion cubic feet (tcf), about 7% of yearly consumption, of gas per year

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[2] Energy Information Administration, "Annual Energy Outlook 2004 With Projections to 2025." January 2004.

[3] Energy Information Administration, "Analysis of Restricted Natural Gas Supply Cases." February, 2004.

[4] The AEO forecast is not a prediction of what will happen in the future, rather, it is a projection of what could happen if policies and trends in place today remained in effect and if no additional policies or trends affected outcomes.

[5] While the AEO reference case assumes that a natural gas pipeline will begin construction in 2009 and come on stream in 2018, this assumption is based solely on private sector economic decisions. Because there is no policy in place as of January 2004 to provide incentives to construct a pipeline the forecast does not include public incentives to construct a pipeline.

[6] Gas volume data is expressed in trillion cubic feet (tcf) and prices are expressed in 2002 dollars to control for estimated inflation.

by the time it reaches full capacity operation in 2024. Although deliveries are forecast to begin in 2018, they are expected to begin at approximately 0.8 tcf per year and grow to full capacity.

By 2020 the reference case forecast projects a gap between total domestic production, 23.89 tcf, and total demand, 30.36 tcf, requiring imports of 6.47 tcf. The forecast projects that by 2020 pipeline natural gas imports from Canada will be in decline compared to 2003 level. The U.S. imported 3.4 tcf of natural gas from Canada in 2003, about 97% of import requirements. By 2020 Canadian imports are expected to decline to 2.5 tcf, even though total U.S. import requirement will have nearly doubled over 2003 levels. The reference forecast projects that essentially all of the additional U.S. import requirements will come from liquefied natural gas (LNG). The values cited in the forecast are determined in conjunction with the forecast wellhead price of natural gas in 2020 which is expected to reach $4.28 per thousand cubic feet in real terms, which would be over $8.00 per thousand cubic feet in nominal terms.[7]

By 2025, the reference case projects total domestic production to reach 24.09 tcf and total demand to reach 31.33 tcf with a gap of 7.24 tcf to be filled by imports. In 2025, Canadian pipeline imports are projected to be 2.56 tcf with LNG again filling most of the remaining import gap. The reference case forecast projects LNG demand growing from 2.16 tcf in 2010 to 4.14 tcf in 2020 and 4.8 tcf in 2025. By 2025, the reference case projects a wellhead natural gas price of $4.40 per thousand cubic feet in real terms, translating to a nominal price of about $8.40.[8]

In contrast to the reference case forecast, the no pipeline case assumes that a natural gas pipeline from Alaska is not constructed. As a result, Alaskan natural gas production, which totaled about 0.51 tcf in 2003, is projected to rise to 0.72 tcf in 2020 and 0.51 tcf in 2025, less than the 2.29 tcf and 2.71 tcf for the same years in the reference case.[9] Since imports are expected to fill the gap between U.S. domestic production and total demand, a simple analysis might suggest that the no pipeline case would show an approximate 2 tcf increase in imports to compensate for no delivery of Alaskan gas. This is not the case, however. The unavailability of Alaskan natural gas through the pipeline leads to price increases in the natural gas market. These price increases reduce the total demand for natural gas, as well as providing an incentive for producers both in the U.S. and Canada to increase production. As a result of these adjustments, the gas not available because of a lack of a pipeline from Alaska is not replaced by imports on a one to one basis in the EIA analysis.

The increases in imports attributable to the lack of a natural gas pipeline from Alaska are 0.72 tcf in 2020, and 0.63 tcf in 2025 as projected in the EIA no pipeline case. To determine the effect of these projected increases in natural gas imports, these quantities

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[7] Energy Information Administration, "Analysis of Restricted Natural Gas Supply Cases." February 2004. pp. 35-37, Tables C2, C3.

[8] Ibid.

[9] Part of Alaskan natural gas supply is exported to Japan in the form of LNG. The 68 billion cubic feet per year liquefaction terminal at Kenai, Alaska has been exporting to Japan for over 30 years. Source: The Energy Information Administration, "The Global Liquefied Natural Gas Market: Status and Outlook." December 2003. p.11.

must be multiplied by appropriate prices. The EIA publishes import prices as part of the AEO reference case, but not for the no pipeline case. As an approximation of the import price in the no pipeline case, CRS has computed prices based on the EIA reference case prices.[10] For 2020, the estimated import price is $4.81 per thousand cubic feet, and for 2025 it is $4.90 per thousand cubic feet. Based on these values for price and quantity of imported natural gas, estimated increases in the value of natural gas imports as a result of lack of construction of a pipeline would be approximately $3.46 billion in 2020 and $3.09 billion in 2025.[11] To put these projected increases in imports in perspective, they are less than 1% of the current account deficit in 2002, the year to which the price of natural gas is set in the EIA forecasts.

Although these values represent potential increases in the current account deficits in 2020 and 2025 (or reductions in the surpluses), they might well be either increased or decreased by other related effects in the economy that might result from higher projected natural gas prices. For example, industrial demand for natural gas is projected to decrease. This could mean that the U.S. production of chemicals, especially those that have natural gas as a large cost component, might be reduced. This might mean greater imports of fertilizers and other chemicals bringing additional pressure on the current account balance. On the other hand, if the higher natural gas prices resulted in general reductions in income and employment in the United States, that might imply lower imports of consumer goods and services, improving the current account balance. The EIA analysis, which focuses on energy issues, does not provide a detailed picture of all the secondary economic effects of higher natural gas prices as they alter relationships in the economy as a whole.

## Analysis

An Alaska natural gas pipeline is projected to account for about 2 tcf of delivered gas in 2025 when operating at full capacity, but imports increase by only 0.63 tcf in that year as a result of the lack of pipeline construction. In 2020, a pipeline is projected to deliver about 1.6 tcf, reflecting the build-up of delivered gas as operation begins in 2018, but imports increase by only 0.72 tcf in the forecasts if no pipeline is constructed. It might appear that 1.37 tcf of gas in 2025, and almost 1 tcf in 2020, has disappeared. The lost volumes can be accounted for by examining the effects of the higher projected prices of natural gas in 2025 and 2020 on aggregate demand and supply.

As a likely result of higher prices, projected natural gas demand is lower in the no pipeline case, both in 2025 and in 2020. Aggregate demand is 0.71 tcf lower in 2025 and 0.62 tcf lower in 2020 compared to the reference case. In a 2025 comparison of demand patterns in the reference case and the no Alaska pipeline case, all sectors reduce their

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[10] Over the six year period, 2020 to 2025, the average projected price premium for imported prices over lower 48 state wellhead prices was 6% in the reference case. I applied a 6% premium to lower 48 state wellhead prices to obtain approximate import prices in the no pipeline case. The estimated prices may be somewhat downward biased, because the increased volume of imports in the no pipeline case might raise the market price of imported gas over the historic premium.

[11] Energy Information Administration, "Analysis of Restricted Natural Gas Supply Cases." February 2004. pp. 35-37, 40-42. Tables C2,C3,C5,C6.

consumption, but the largest declines are in the industrial and electric generators at 0.11 tcf (1%) and 0.31 tcf (3.7%), respectively. In comparison, the residential and commercial sectors reduced their consumption by only 0.06 tcf (0.5%) in total. Fuel switching and reduced demand due to curtailed production are likely explanations for the relatively larger reductions in the industrial and electric generator sectors.

The pattern of reduced consumption is similar in 2020. Residential and commercial consumption each decline about 1%, while industrial demand declines by about 2% and demand from electric generators falls by 2.7%.

On the production side of the market, because of the incentive of higher prices, domestic onshore and offshore production of natural gas in the lower 48 states increases, by 0.23 tcf in 2020 and 0.67 tcf in 2025. For 2025, if the reduced demand of 0.71 tcf is added to the increased lower 48 states production of 0.67 tcf the total is 1.38 tcf. If 1.38 tcf is added to the extra imports of 0.63 tcf the total is approximately equal to the 2 tcf that is not delivered through an Alaskan pipeline. For 2020, the reduction in demand is 0.72 tcf and the added production projected from onshore and offshore production in the lower 48 states is 0.28 tcf which, when added, equals 1 tcf. Imports are projected to increase by 0.72 tcf in 2020 which when added to the 1 tcf demand reduction and lower 48 state increased production equals 1.72 tcf which again is approximately equal to the amount of gas not delivered as a result of no construction of an Alaska pipeline.[12]

## Conclusion

In the AEO reference case, an Alaska natural gas pipeline is projected to begin deliveries in 2018 and achieve full capacity delivery of about 2 tcf of gas per year to market when it achieves full capacity operation in 2025. This quantity of natural gas, subtracted from the market in the no pipeline case, is sufficient to alter projected market prices. In the no pipeline case, increases in the price of natural gas cause changes in consumption and production of gas, as well as the composition of gas sources. These price changes and resultant changes suggest that, in the forecast, energy markets compensate for the lack of Alaskan gas supplies in a variety of ways. As a result, the forecast increase in gas imports is not as great as the loss in deliveries from the pipeline if it is not constructed.

[12] Ibid.