Assumptions to the Annual Energy Outlook 2025: International Energy Module

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International Energy Module

The International Energy Module (IEM) of the National Energy Modeling System (NEMS) simulates the interaction between U.S. and global petroleum markets. The IEM uses assumptions of economic growth and expectations of future U.S. and world petroleum liquids production and consumption to estimate the effects of changes in the U.S. liquid fuels market on the international petroleum market. For each year of the projection period, the IEM computes a supply curve of world crude oil and provides supply curves for each foreign crude oil type considered. The IEM also provides, for each year of the projection period, endogenous assumptions for petroleum products for U.S. import and export.

In the *Annual Energy Outlook 2025* (AEO2025) Reference case and High and Low Oil Price cases, the world crude oil supply curve remains static. For all other side cases, including the High and Low Oil and Gas Supply cases, the IEM computes changes in the supply curve of world crude oil in response to:

- The difference between projected U.S. total crude oil production and the expected U.S. total crude oil production at the current crude oil price (estimated using the current crude oil price and the exogenous U.S. total crude oil supply curve for each year)

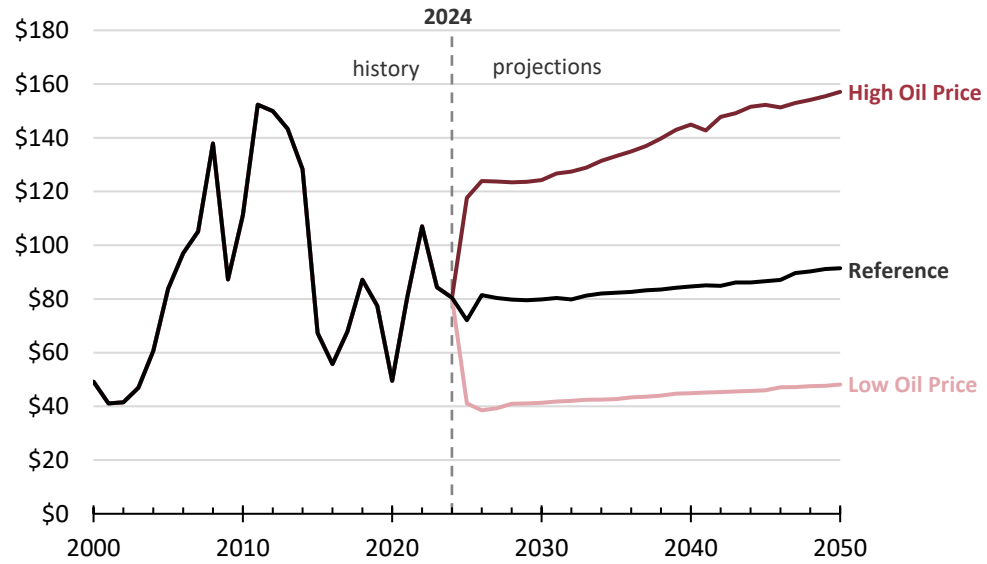
- The difference between projected U.S. total petroleum liquids consumption and the expected U.S. total petroleum liquids consumption at the current crude oil price (estimated using the current crude oil price and the exogenous U.S. total crude oil demand curve)

Key Assumptions

In the AEO2025 Reference case, crude oil prices drop from $80 per barrel (b) in 2024 to $72/b in 2025 (all prices in real 2024 U.S. dollars). Relatively high, though declining, U.S. crude oil production after 2029, combined with moderate growth in world crude oil demand, results in a Brent crude oil price that gradually rises, reaching $91/b by 2050 (Figure 1). U.S. crude oil production peaks from 2027 through 2029 at 14.0 million barrels per day (b/d), gradually declining to 11.3 million b/d by 2050. U.S. net imports of crude oil slowly increase from 2.5 million b/d in 2024 to 4.0 million b/d by 2050 (Figure 2).

Figure 1. Brent crude oil prices in three cases, 2000–2050

2024 real U.S. dollars per barrel

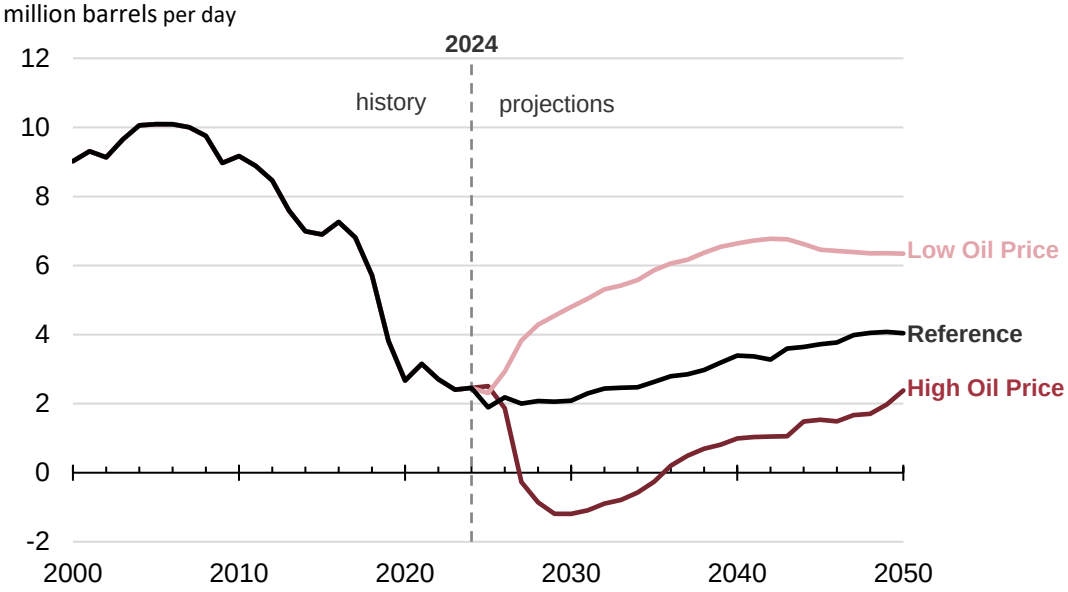


Data source: U.S. Energy Information Administration, *Annual Energy Outlook 2025*, National Energy Modeling System runs: ref2025.d032025a, highprice.d032525b, lowprice.d032125a

In the AEO2025 Low Oil Price case, the Brent crude oil price drops to $41/b in 2025, followed by a gradual increase to $48/b in 2050. U.S. production decreases from a record-high 13.3 million b/d in 2024 to 7.5 million b/d by 2050. As a result, U.S. net imports of crude oil increase through 2044, reaching 6.8 million b/d, before decreasing to 6.3 million b/d in 2050 (Figure 2).

In the AEO2025 High Oil Price case, the Brent crude oil price increases to $118/b in 2025 and $157/b by 2050. As a result, U.S. production increases through 2030 to 17.7 million b/d, followed by a steady decrease through 2050 to 13.8 million b/d. U.S. net imports of crude oil decline to a negative point in 2027, indicating that gross exports exceed gross imports. Net imports continue to decline through 2030. This decline is followed by a steady increase to 2.4 million b/d by 2050 (Figure 2).

Figure 2. U.S. net crude oil imports in three cases, 2000–2050



Data source: U.S. Energy Information Administration, *Annual Energy Outlook 2025*, National Energy Modeling System Runs ref2025.d032025a, highprice.d032525b, lowprice.d032125a