Critical drivers and model updates

Many factors influenced the results presented in AEO2020, including model improvements, new and existing laws and regulations since AEO2019, and varying assumptions about global oil prices, macroeconomic growth, domestic energy resources and production technology, and technology costs for renewable electricity generation.

Critical drivers and uncertainty

- Future oil prices are highly uncertain and are subject to international market conditions influenced by factors outside of the National Energy Modeling System. The High Oil Price and Low Oil Price cases represent international conditions that could drive prices to extreme, sustained deviations from the Reference case price path. In the High Oil Price case, non-U.S. demand for petroleum and other liquids is higher and non-U.S. supply of liquids is lower; in the Low Oil Price case, the opposite is true.

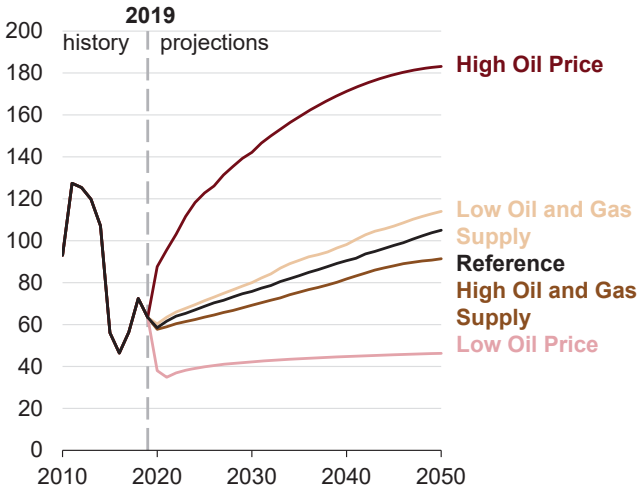
- Projections of tight oil and shale gas production are uncertain because large portions of known formations have relatively little or no production history and extraction technologies and practices continue to evolve rapidly. In the High Oil and Gas Supply case, lower production costs and higher resource availability allow higher production at lower prices. In the Low Oil and Gas Supply case, EIA applied assumptions of lower resources and higher production costs. EIA did not extend these assumptions to outside the United States.

- Economic growth drives energy consumption. The High Economic Growth and Low Economic Growth cases address these effects by modifying population growth and productivity assumptions throughout the projection period to yield higher or lower compound annual growth rates for U.S. gross domestic product (GDP).

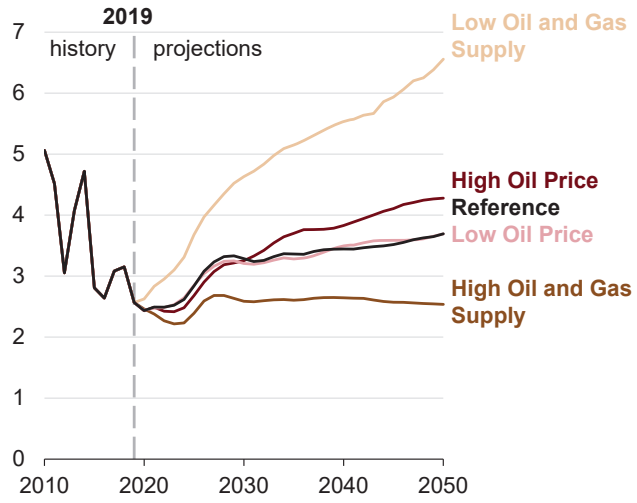
- Costs for renewables such as wind and solar have continued to decline as experience is gained with more builds. How long these high cost reduction rates can be sustained is highly uncertain. The High Renewables Cost case assumes no further cost reduction for renewables, and the Low Renewables Cost case assumes a sustained high rate of cost reduction. The Reference case assumes that cost reduction rates gradually taper off.

EIA develops oil and natural gas price assumptions by considering international supply and demand and the development of U.S. shale resources—

AEO2020 North Sea Brent crude oil price
2019 dollars per barrel



AEO2020 natural gas price at Henry Hub
2019 dollars per million British thermal unit



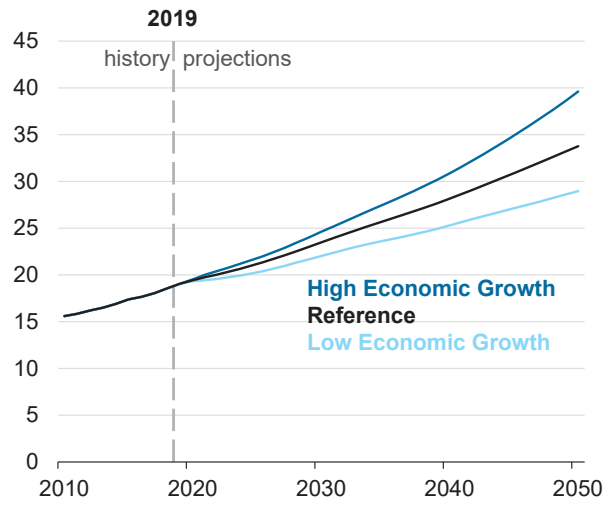
—however, global conditions are more important for oil prices and assumptions about resource and technology are more important for natural gas prices

- EIA's assumed crude oil prices in AEO2020 are influenced more by assessments of international markets than by assumptions about domestic resources and technological advances. In the High Oil Price case, EIA projects the price of Brent crude oil in 2019 dollars to reach $183 per barrel (b) by 2050 compared with $105/b in the Reference case and $46/b in the Low Oil Price case.

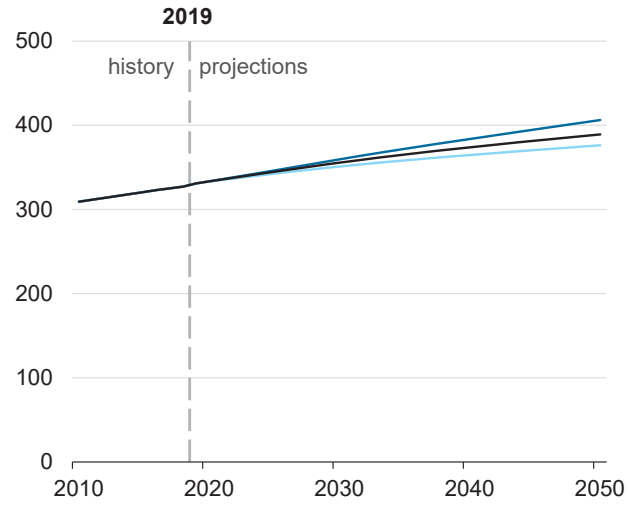
- Natural gas prices are highly sensitive to factors that drive supply, such as domestic resource and technology assumptions, and are less dependent on the international conditions that drive oil prices. In the High Oil and Gas Supply case, Henry Hub natural gas prices remain lower than $3 per million British thermal units ($/MMBtu) throughout the projection period, but in the Low Oil and Gas Supply case, they rise to more than $6/MMBtu during the same period.

Economic growth side cases explore the uncertainty in macroeconomic assumptions inherent in future economic growth trends—

AEO2020 gross domestic product assumptions
trillion 2012 dollars



AEO2020 U.S. population assumptions
millions



—which also affect important drivers of energy demand growth

- The AEO2020 Reference, High Economic Growth, and Low Economic Growth cases illustrate three possible paths for U.S. economic growth. In the High Economic Growth case, average annual growth in real GDP during the projection period is 2.4%, compared with 1.9% in the Reference case. The Low Economic Growth case assumes a lower rate of annual growth in real GDP of 1.4%.

- Differences among the cases reflect different assumptions for growth in the labor force, capital stock, and productivity. These changes affect capital investment decisions, household formation, industrial activity, and amount of travel.

- All three economic growth cases assume smooth economic growth and do not anticipate business cycles or large economic shocks.

The High Renewables Cost and Low Renewables Cost cases assume different rates of cost reduction for renewable technologies compared with the Reference case; non-renewables assume the same rates

AEO2020 overnight installed cost by technology
2019 dollars per kilowatt