Assumptions to the Annual Energy Outlook 2026: Macroeconomic Activity Module

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Macroeconomic Activity Module

The Macroeconomic Activity Module (MAM) represents interactions between the U.S. economy and energy markets. Economic growth, as measured by changes in real GDP, drives energy demand. Associated economic factors, such as interest rates and disposable income, also strongly influence supply and demand for energy. In addition to the economy's impact on energy markets, this module also captures how energy markets affect the aggregate economy. For example, increasing energy prices can slow down economic growth. This document details key modeling assumptions in our MAM module.

Key Assumptions

We expect the U.S. economy, measured by GDP, to increase by 1.7% per year from 2025 to 2050 in the Counterfactual Baseline case. Breaking our projection horizon into decades, real GDP grows by:

- 1.8% from 2025 to 2030
- 1.8% from 2031 to 2040
- 1.5% from 2041 to 2050

The GDP growth rate is determined, in part, by both the growth rate of nonfarm employment and the productivity (output per hour in nonfarm business) change rate associated with employment. Nonfarm employment grows by 0.4% from 2025 to 2050 in the Counterfactual Baseline case.

Productivity in the Counterfactual Baseline case grows by 1.9% from 2025 to 2050, unchanged when compared with growth from 2000 to 2025. We anticipate steady growth in labor productivity to contribute to long-term GDP growth. Improvement in labor productivity reflects the positive effects of a growing capital stock and technological change over time. We expect annual growth for nonfarm labor productivity to remain between 0.8% and 2.4% throughout the projection period.

We expect nominal business-fixed investment as a share of nominal GDP to decline from 2025 to 2050. However, additions to the capital stock—and the technology base of that capital stock—help sustain productivity growth of 1.9% from 2025 to 2050 in the Counterfactual Baseline case.

Another part of the macroeconomy that can strongly influence energy consumption is population. In the Counterfactual Baseline case, we assume the U.S. population will grow at a compound annual rate of 0.26% per year from 2025 to 2050. In addition, the share of the population aged 65 and older will increase over time, and this demographic's share of the labor force will also rise. We produce the population projections in the *Annual Energy Outlook 2026* (AEO2026) using a cohort component model. The assumptions that determine the level of births, deaths, and net immigration are obtained from external sources. Assumptions regarding the level of net immigration in the near term (2025–2030), are taken from *An Update to the Demographic Outlook, 2025 to 2055*, published by the Congressional Budget Office (CBO). We use the underlying assumptions from the 2023 National Population Projections, published by the U.S. Census Bureau, for our assumptions concerning age-specific fertility rates for women, the male-to-female ratio at birth, mortality rates by age and sex, the age and sex distribution of net immigrants, and the level of net immigration in the long term (2030–2050). The 2023 National Population Projections were the most recent population projections from the U.S. Census Bureau at the time that AEO2026 assumptions were finalized. The U.S. Census Bureau also publishes alternative—high

and low—population projections. The assumptions that underlie those projections were used as input to the cohort component model that generated our population projections for the High Economic Growth and Low Economic Growth cases, respectively.

We assume that U.S. commercial floorspace (in square footage) will grow at an equivalent of 1.0% per year between 2025 to 2050. Commercial floorspace projections are based on an internal model using commercial floorspace data provided by Dodge Data and Analytics, Inc., and macroeconomic projections from the S&P Global Market Intelligence U.S. Macroeconomic Model.

Since U.S. economic growth is uncertain, AEO2026 includes the High Economic Growth and Low Economic Growth cases—in addition to the Counterfactual Baseline case—to project how alternative economic growth assumptions may affect energy markets (Table 1). The High Economic Growth case incorporates higher population, labor force, investment, capital stock, and productivity growth rates than the Counterfactual Baseline case. Higher productivity helps reduce production costs, which is passed on to consumers as lower prices. Lower prices, in turn, promote higher demand, greater output, and more employment. We project economic output in the High Economic Growth case to increase by 2.2% per year from 2025 to 2050. In this case, real GDP grows 0.5 percentage points per year faster than in the Counterfactual Baseline case from 2025 to 2050. Annual growth in nonfarm employment in the High Economic Growth case is 0.1 percentage points more than in the Counterfactual Baseline case, averaging 0.5% per year from 2025 to 2050.

The Low Economic Growth case assumes lower population, labor force, investment, capital stock, and productivity gains that result in higher production costs and consumer prices and lower output and employment. In this case, we expect economic output to increase by 1.2% per year during the projection period. In this case, real GDP grows 0.5 percentage points per year slower relative to the Counterfactual Baseline case. In the Low Economic Growth case, nonfarm employment is less than in the Counterfactual Baseline case by 0.1 percentage points, averaging 0.3% per year from 2025 to 2050.

Table 1. Average annual economic growth in GDP, nonfarm employment, and productivity

Assumptions	2025–2030	2031–2040	2041–2050	2025–2050
Real GDP (billion chain-weighted 2012$)				
High Economic Growth Case	2.3%	2.3%	2.0%	2.2%
Reference Case	1.8%	1.8%	1.5%	1.7%
Low Economic Growth Case	1.2%	1.4%	1.1%	1.2%
Nonfarm employment				
High Economic Growth Case	1.0%	0.5%	0.3%	0.5%
Reference Case	0.4%	0.5%	0.3%	0.4%
Low Economic Growth Case	-0.3%	0.5%	0.3%	0.3%
Productivity				
High Economic Growth Case	2.1%	2.3%	2.8%	2.4%
Reference Case	1.7%	1.8%	2.1%	1.9%
Low Economic Growth Case	1.2%	1.2%	1.6%	1.4%

Data source: U.S. Energy Information Administration, AEO2026 National Energy Modeling System, runs: cb2026.d021826b, hm2026.d021826b, and lm2026.d021826b
Note: Minor discrepancies with published data are a result of independent rounding.