MACROECONOMIC ACTIVITY MODULE

The Macroeconomic Activity Module (MAM) links NEMS to the rest of the economy by providing projections of economic driver variables for use by the supply, demand, and conversion modules of NEMS. The derivation of the baseline macroeconomic forecast lays a foundation for the determination of the energy demand and supply forecast. MAM is used to present alternative macroeconomic growth cases to provide a range of uncertainty about the growth potential for the economy and its likely consequences for the energy system. MAM is also able to address the macroeconomic impacts associated with changing energy market conditions, such as alternative world oil price assumptions. Outside of the Annual Energy Outlook setting, MAM represents a system of linked modules which can assess the potential impacts on the economy of changes in energy events or policy proposals. These economic impacts then feed back into NEMS for an integrated solution. MAM consists of five modules:

- Global Insight Model of the U.S. Economy
- Global Insight Industry Model
- Global Insight Employment Model
- Global Insight Regional Model
- Energy Information Administration (EIA) Commercial Floorspace Model

The Global Insight Model of the U.S. Economy (Macroeconomic Model) is the same model used by Global Insight, Inc. (formerly DRI-WEFA) to generate the economic forecasts behind the company's monthly assessment of the U.S. economy. The Industry, Employment, and Regional Models are derivatives of Global Insight's industry, employment, and regional models. The models have been tailored in order to provide the industry and regional detail required by NEMS. The Commercial Floorspace Model was developed by EIA to complement the set of Global Insight models. This system of models provides a fully integrated approach to forecasting economic activity at the national, industry and regional levels. The set of models is designed to run in a recursive manner (see Figure 3).

Global Insight's Macroeconomic Model determines the national economy's growth path and final demand mix. The Macroeconomic Model provides forecasts of over 1300 concepts spanning final demands, aggregate supply, prices, incomes, international trade, industrial detail, interest rates and financial flows.

The Industry Model takes the final demand projections from the Macroeconomic Model as inputs to provide projections of output and other key indicators for 130 sectors, covering the entire economy. This is later aggregated to 45 sectors to provide information to NEMS. The Industry Model insures that supply by industry is consistent with the final demands (consumption, investment, government spending, exports and imports) generated in the Macroeconomic Model.

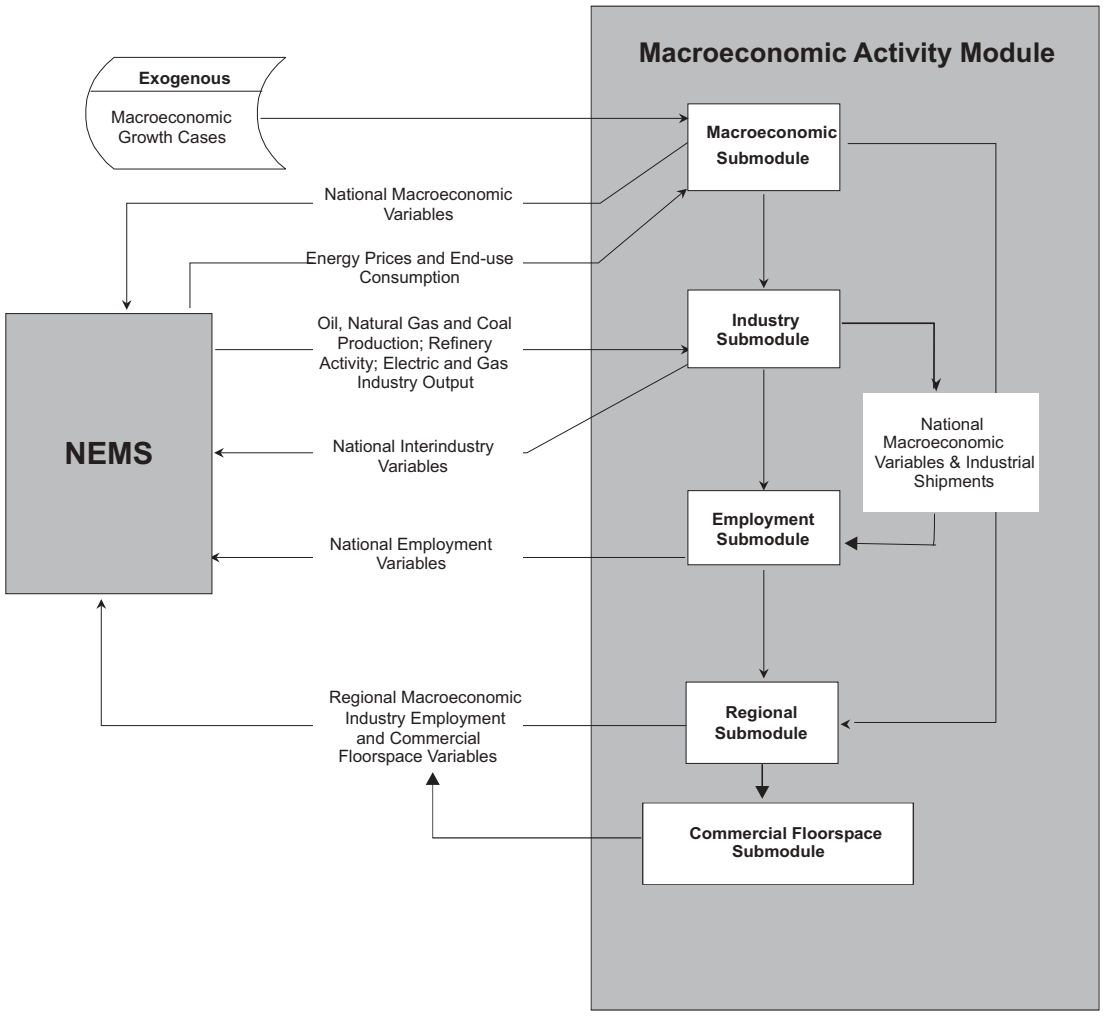
The Employment Model takes the industry output projections from the Industry Model and national wage rates, productivity trends and average workweek trends from the Macroeconomic Model to project employment for the 45 NEMS industries. The sum of non–agricultural employment is constrained to sum to the national total projected by the Macroeconomic Model.

The Regional Model determines the level of industry output and employment, population, incomes, and housing activity in each of nine Census regions. The Commercial Floorspace Model calculates regional floorspace for 13 types of building use by Census Division.

Integrated forecasts of NEMS center around estimating the state of the energy-economy system under a set of alternative energy conditions: Typically,

MAM Outputs	Inputs from NEMS	Exogenous Inputs
Gross domestic product Other economic activity measures, including housing starts, commercial floorspace growth, vehicle sales, population Price indices and deflators Production and employment for manufacturing Production and employment for nonmanufacturing Interest rates	Petroleum, natural gas, coal, and electricity prices Oil, natural gas, and coal production Electric and gas industry output Refinery output End-use energy consumption by fuel	Macroeconomic variables defining alternative economic growth cases

Figure 3. Macroeconomic Activity Module Structure



the forecasts fall into the following four types of integrated NEMS simulations:

- Baseline Projection
- Alternative World Oil Prices
- Proposed Energy Fees or Emissions Permits
- Proposed Changes in Combined Average Fuel Economy (CAFE) Standards

In these integrated NEMS simulations, forecast period baseline values for over 240 macroeconomic and demographic variables from MAM are passed to NEMS which solves for demand, supply and prices of energy for the forecast period. These energy prices and quantities are passed back to MAM and solved in the Macroeconomic Model, the Industry Model and the Employment Model in the EViews environment.[20] The Regional Model and the Commercial Floorspace Model and NEMS are run in the FORTRAN environment.

[20] Eviews is a model building and operating software package maintained by QMS (Quantitative Micro Software.)