

## Assumptions to the Annual Energy Outlook 2007

Table 1. Summary of AEO2007 Cases

| Case name                              | Description  | Integration mode |
|--|--|------------------|
| Reference                              | Baseline economic growth ( 2.9 percent per year from 2005-2030), world oil price, and technology assumptions.  | Fully integrated |
| Low Growth                             | Gross domestic product grows at an average annual rate of 2.3 percent from 2005 through 2030.  | Fully integrated |
| High Growth                            | Gross domestic product grows at an average annual rate of 3.4 percent from 2005 through 2030.  | Fully integrated |
| Low Price                              | More optimistic assumptions for worldwide crude oil and natural gas resources than in the reference case. World light, sweet crude oil prices are \$36 per barrel in 2030, compared with \$59 per barrel in the reference case (2005\$). | Fully integrated |
| High Price                             | More pessimistic assumptions for worldwide crude oil and natural gas resources than in the reference case. World light, sweet crude oil prices are about \$100 per barrel in 2030  | Fully integrated |
| Residential: 2006 Technology           | Future equipment purchases based on equipment available in 2006. Existing building shell efficiencies fixed at 2006 levels.  | With commercial  |
| Residential: High Technology           | Earlier availability, lower costs, and higher efficiencies assumed for more advanced equipment. Building shell efficiencies for new construction meet ENERGY STAR requirements after 2010.   | With commercial  |
| Residential: Best Available Technology | Future equipment purchases and new building shells based on most efficient technologies available. Building shell efficiencies for new construction meet the criteria for most efficient components after 2006.                          | With commercial  |
| Commercial: 2006 Technology            | Future equipment purchases based on equipment available in 2006. Building shell efficiencies fixed at 2006 levels.   | With residential |
| Commercial: High Technology            | Earlier availability, lower costs, and higher efficiencies assumed for more advanced equipment. Building shell efficiencies for new and existing buildings increase by 8.75 and 6.25 percent, respectively, from 2003 values by 2030.    | With residential |
| Commercial Best Available Technology   | Future equipment purchases based on most efficient technologies available. Building shell efficiencies for new and existing buildings increase by 10.5 and 7.5 percent, respectively, from 2003 values by 2030.                          | With residential |
| Industrial: 2006 Technology            | Efficiency of plant and equipment fixed at 2006 levels.  | Standalone       |
| Industrial: High Technology            | Earlier availability, lower costs, and higher efficiencies assumed for more advanced equipment.  | Standalone       |
| Transportation: 2006 Technology        | Efficiencies for new equipment in all modes of travel fixed at 2006 levels.  | Standalone       |
| Transportation: High Technology        | Reduced costs and improved efficiencies assumed for advanced technologies.   | Standalone       |
| Integrated: 2006 Technology            | Combination of the residential, commercial, industrial, and transportation 2006 technology cases, electricity low fossil technology case, low renewables case, and high nuclear cost case.   | Fully integrated |
| Integrated: 2006 Technology            | Combination of the residential, commercial, industrial, and transportation 2006 technology cases, electricity low fossil technology case, low renewables case, and high nuclear cost case.   | Fully integrated |
| Integrated: High Technology            | Combination of the residential, commercial, industrial, and transportation high technology cases, electricity high fossil technology case, high renewables case, and advanced nuclear cost case.   | Fully integrated |
| Low Nuclear Cost                       | New nuclear capacity assumed to have 10 percent lower capital and operating costs in 2030 than in the reference case.  | Fully integrated |

## Assumptions to the Annual Energy Outlook 2007

Table 1. Summary of AEO2007 Cases (cont.)

| Case name                                   | Description  | Integration mode |
|---|--|------------------|
| High Nuclear Cost                           | Costs for new nuclear technology are assumed not to improve over time from 2006 levels in the reference case.  | Fully Integrated |
| Electricity: Low Fossil Technology          | New advanced fossil generating technologies assumed not to improve over time from 2006.  | Fully Integrated |
| Electricity: High Fossil Technology         | Costs and efficiencies for advanced fossil-fired generating technologies improve by 10 percent in 2030 from reference case values.   | Fully Integrated |
| Low Renewables                              | New renewable generating technologies are assumed not to improve over time from 2006.  | Fully Integrated |
| High Renewables                             | Levelized cost of energy for non-hydropower renewable generating technologies declines by 10 percent in 2030 from reference case values.   | Fully Integrated |
| Renewables: Regional RPS                    | Represents various state renewable portfolio standards (RPS) programs, with targets aggregated on a regional basis. Assumes full compliance with targets, as limited by statutory authorizations for state funding, where applicable.  | Fully Integrated |
| Lower Cost Ethanol, Reference Energy Prices | Capital costs of cellulosic ethanol decline by 26 percent and operating costs decline by 20 percent by 2018 from reference case values in 2012. Biomass supply was assumed to have greater availability than the reference cases at reference case prices. Assumed policies enacted that make market penetration of FFV exceed 80 percent by 2016, and that E85 fuel dispensing availability increases as it becomes more competitive. Case uses energy prices from reference case.  | Fully Integrated |
| Lower Cost Ethanol, High Energy Prices      | Capital costs of cellulosic ethanol decline by 26 percent and operating costs decline by 20 percent by 2018 from reference case values in 2012. Biomass supply was assumed to have greater availability than the reference cases at reference case prices. Assumed policies enacted that make market penetration of FFV exceed 80 percent by 2016, and that E85 fuel dispensing availability increases as it becomes more competitive. Case uses energy prices from high price case. | Fully Integrated |
| Oil and Gas: Slow Technology                | Cost, finding rate, and success rate parameters adjusted for 50-percent slower improvement than in the reference case.   | Fully integrated |
| Oil and Gas: Rapid Technology               | Cost, finding rate, and success rate parameters adjusted for 50-percent more rapid improvement than in the reference case.   | Fully integrated |
| Oil and Gas: Low LNG                        | LNG imports exogenously set to 30 percent less than the results from the high price case, with remaining assumptions from the reference case.  | Fully integrated |
| Oil and Gas: High LNG                       | LNG imports exogenously set to 30 percent more than the results from the low price case, with remaining assumptions from the reference case.   | Fully Integrated |
| Oil and Gas: OCS Access                     | Drilling moratoria is assumed to expire in 2012 for oil and natural gas exploration and development in the Atlantic, Pacific, and Eastern Gulf of Mexico Outer Continental Shelf.  | Fully Integrated |
| Oil and Gas: ANWR                           | Federal oil and gas leasing permitted in the Arctic National Wildlife Refuge starting in 2007.   | Fully Integrated |
| Low Coal Cost                               | Productivity for coal mining and coal transportation assumed to increase more rapidly than in the reference case. Coal mining wages, mine equipment and coal transportation equipment costs assumed to be lower than in the reference case.  | Fully Integrated |
| High Coal Cost                              | Productivity for coal mining and coal transportation assumed to increase more slowly than in the reference case. Coal mining wages, mine equipment and coal transportation equipment costs assumed to be higher than in the reference case.  | Fully integrated |

## Assumptions to the Annual Energy Outlook 2007

**Table 2. Carbon Dioxide Emission Factors**

(million metric tons carbon dioxide equivalent per quadrillion Btu)

| Fuel Type                     | Carbon Dioxide Coefficient at Full Combustion | Combustion Fraction | Adjusted Emissions Factor |
|-------------------------------|---|---------------------|---------------------------|
| <b>Petroleum</b>              |   |                     |                           |
| Motor Gasoline                | 70.88   | 0.990               | 70.17                     |
| Liquefied Petroleum Gas       |   |                     |                           |
| Used as Fuel                  | 63.07   | 0.995               | 62.75                     |
| Used as Feedstock             | 61.67   | 0.500               | 30.83                     |
| Jet Fuel                      | 70.88   | 0.990               | 70.17                     |
| Distillate Fuel               | 73.15   | 0.990               | 72.42                     |
| Residual Fuel                 | 78.80   | 0.990               | 78.01                     |
| Asphalt and Road Oil          | 75.61   | 0.000               | 0.00                      |
| Lubricants                    | 74.21   | 0.500               | 37.11                     |
| Petrochemical Feedstocks      | 69.85   | 0.383               | 26.75                     |
| Kerosene                      | 72.31   | 0.990               | 71.58                     |
| Petroleum Coke                | 102.12  | 0.500               | 51.06                     |
| Petroleum Still Gas           | 64.20   | 0.995               | 63.88                     |
| Other Industrial              | 74.43   | 0.990               | 73.68                     |
| <b>Coal</b>                   |   |                     |                           |
| Residential and Commercial    | 95.48   | 0.990               | 94.53                     |
| Metallurgical                 | 93.98   | 0.990               | 93.04                     |
| Industrial Other              | 94.38   | 0.990               | 93.44                     |
| Electric Utility <sup>1</sup> | 95.26   | 0.990               | 94.31                     |
| <b>Natural Gas</b>            |   |                     |                           |
| Used as Fuel                  | 53.06   | 0.995               | 52.79                     |
| Used as Feedstocks            | 53.06   | 0.774               | 41.07                     |

<sup>1</sup>Emission factors for coal used for electricity generation are specified by coal supply region and types of coal, so the average carbon dioxide contents for coal varies throughout the forecast. The 2005 average is 94.31.

Source: Energy Information Administration, *Emissions of Greenhouse Gases in the United States 2005*, DOE/EIA-0573(2005), (Washington, DC, November 2006).