Notes and Sources

Text Notes

Legislation and Regulations

[*1*] For the complete text of the Energy Policy Act of 2005, see web site http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=109_cong_public_laws&docid=f:publ058.109.pdf.

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[*5*] Other States that have adopted the California emission standards include Connecticut, Maine, Massachusetts, New Jersey, New York, Rhode Island, Vermont, and Washington.

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Issues in Focus

[*16*] The USGS provides three point estimates of undiscovered and inferred resources: the mean, a 5-percent confidence interval, and a 95-percent confidence interval with no price relationship. *AEO2006* assumes that proven reserves are not subject to much uncertainty.

[*17*] For readers interested in the international effects of higher oil prices, an International Energy Agency paper, "Impact of Higher Oil Prices on the World Economy" (2003) is available from web site www.iea.org/Textbase/publications/free_new_Desc.asp? PUBS_ID=886.

[*18*] The more that is spent back in the U.S. economy, the lower will be the net effect. If the receivers of the extra income, domestic oil companies and oil-exporting countries, do not spend it back in the U.S. economy, aggregate demand for goods and services will be reduced in the short term. Even if all additional oil revenues are spent back in the United States, there still will be distribution effects involving a move toward different categories of consumption. There will also be an indirect impact on demand for U.S. goods and services through third-country effects; when higher oil prices have negative effects on economic growth in other countries, their demand for imports from the United States will be reduced.

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[*22*] Results of Global Insight's Macroeconomic Model of the U.S. Economy are from N. Gault, "Impacts on the U.S. Economy: Macroeconomic Models," Presented at the Energy Modeling Forum Workshop on Macroeconomic Impacts of Oil Shocks (Arlington, VA, February 8, 2005), web site www.stanford.edu/group/EMF/research/doc/gault.pdf. Federal Reserve Bank macroeconomic model results are from D. Reifschneider, R. Tetlow, and J. Williams, "Aggregate Disturbances, Monetary Policy, and the Macroeconomy: The FRB/US Perspective," *Federal Reserve Bulletin* (January 1999), web site www.federalreserve.gov/pubs/bulletin/1999/0199lead.pdf. Results from the NiGEM global macroeconomic model are from R. Barrell and O. Pomerantz, "Oil Prices and the World Economy," National Institute of Economic and Social Research Discussion Paper 242 (London, UK, December 2004), web site www.niesr.ac.uk/pubs/dps/dp242.pdf.

[23] R. Jimenez-Rodriguez and M. Sanchez. "Oil Price Shocks and Real GDP Growth: Empirical Evidence for Some OECD Countries," *Applied Economics*, Vol. 37, No. 2 (February 2005), pp. 201-228.

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Market Trends

[84] The energy-intensive manufacturing sectors include food, paper, bulk chemicals, petroleum refining, glass, cement, steel, and aluminum.

[85] EIA collects aggregate data on total energy consumption in the industrial sector and detailed energy consumption in the manufacturing sector. The difference between the aggregate industrial sector energy data and the detailed manufacturing sector data is nonmanufacturing industrial energy consumption. Nonmanufacturing energy consumption is allocated to the agriculture, mining, and construction sectors on the basis of information from the Energy Information Administration, the U.S. Census Bureau, and the U.S. Department of Agriculture.

[86] The alternative technology cases change technology characterizations only for sectors represented in the NEMS industrial model. Consequently, refining values are unchanged from those in the reference case projections. The reference case projections for the refining sector include considerable cogeneration capacity additions associated with coal-to-liquids production. Excluding the refining sector, cogeneration capacity increases by 2.4 percent per year in the high technology case, as compared with 1.8 percent per year in the reference case.

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[89] Avoided cost estimates the incremental cost of fuel and capacity displaced by a unit of the specified resource and more accurately reflects its as-dispatched energy value than comparison to the levelized cost of other individual technologies. It does not reflect system reliability cost, nor does it necessarily indicate the lowest cost alternative for meeting system energy and capacity needs.

[90] *AEO2006* does not include off-grid photovoltaics (PV). Based on annual PV shipments from 1989 through 2003, EIA estimates that as much as 149 megawatts of remote electricity generation PV applications (i.e., off-grid power systems) were in service in 2003, plus an additional 414 megawatts in communications, transportation, and assorted other non-grid-connected, specialized applications. See Energy Information Administration, *Annual Energy Review 2004*, DOE/EIA-0384 (2004) (Washington, DC, August 2005), Table 10.6, "Photovoltaic Cell and Module Shipments by End Use and Market Sector, 1989-2003." The approach used to develop the estimate, based on shipment data, provides an upper estimate of the size of the PV stock, including both grid-based and off-grid PV. It overestimates the size of the stock, because shipments include a substantial number of units that are exported, and each year some of the PV units installed earlier are retired from service or abandoned.

[91] Stranded Arctic natural gas and resources in areas where drilling is officially prohibited are not included in Table 17.

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Notes and Sources

Table Notes and Sources

Note: Tables indicated as sources in these notes refer to the tables in Appendixes A, B, C, and D of this report.

Table 1. Total energy supply and disposition in the *AEO2006* reference case: summary, 2003-2030: AEO2006 National Energy Modeling System, run AEO2006.D111905A. **Notes:** Quantities are derived from historical volumes and assumed thermal conversion factors. Other production includes liquid hydrogen, methanol, supplemental natural gas, and some inputs to refineries. Net imports of petroleum include crude oil, petroleum products, unfinished oils, alcohols, ethers, and blending components. Other net imports include coal coke and electricity. Some refinery inputs appear as petroleum product consumption. Other consumption includes net electricity imports, liquid hydrogen, and methanol.

Table 2. CARB emissions standards for light-duty vehicles, model years 2009-2016: California Air Resources Board, *California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles* (Sacramento, CA, August 4, 2005).

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Table 4. Key projections for light truck fuel economy in the alternative CAFE standards case, 2011-2030: AEO2006 National Energy Modeling System, runs AEO2006.D111905A and ALTCAFE.D121505A.

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Table 6. Major changes in existing State renewable energy requirements and goals since 2003: Energy Information Administration, Office of Integrated Analysis and Forecasting.

Table 7. New U.S. renewable energy capacity, 2004-2005: Energy Information Administration, Office of Integrated Analysis and Forecasting.

Table 8. Estimates of national trends in annual emissions of sulfur dioxide and nitrogen oxides, 2003-2020: EPA Data: U.S. Environmental Protection Agency, *Regulatory Impact Analysis for the Final Clean Air Interstate Rule*, EPA-452/R-05-002 (Washington, DC, March 2005), Table 7-2, p. 196. **Projections:** AEO2006 National Energy Modeling System, run AEO2006.D111905A.

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Table 11. Summary of U.S. oil price-GDP elasticities: H.G. Huntington, *The Economic Consequences of Higher Crude Oil Prices*, EMF SR 9 (Stanford, CA, October 2005), web site www.stanford.edu/group/EMF/publications/doc/EMFSR9.pdf.

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Table 13. Technologies expected to have significant impacts on new light-duty vehicles: Energy Information Administration, Office of Integrated Analysis and Forecasting.

Table 14. Nonconventional liquid fuels production in the AEO2006 reference and high price cases, 2030: AEO2006 National Energy Modeling System, runs AEO2006.D111905A and HP2006.D113005A.

Table 15. Projected changes in U.S. greenhouse gas emissions, gross domestic product, and greenhouse gas intensity, 2002-2020: AEO2006 National Energy Modeling System, run AEO2006.D111905A.

Table 16. Costs of producing electricity from new plants, 2015 and 2030: AEO2006 National Energy Modeling System, run AEO2006.D111905A.

Table 17. Technically recoverable U.S. natural gas resources as of January 1, 2004: Energy Information Administration, Office of Integrated Analysis and Forecasting.

Table 18. Technically recoverable U.S. crude oil resources as of January 1, 2004: Energy Information Administration, Office of Integrated Analysis and Forecasting.

Figure Notes and Sources

Note: Tables indicated as sources in these notes refer to the tables in Appendixes A, B, C, and D of this report.

Figure 1. Energy prices, 1980-2030: History: Energy Information Administration, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). **Projections:** Table A1.

Figure 2. Delivered energy consumption by sector, 1980-2030: History: Energy Information Administration, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). **Projections:** Table A2.

Figure 3. Energy consumption by fuel, 1980-2030: History: Energy Information Administration, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). **Projections:** Tables A1 and A18.

Figure 4. Energy use per capita and per dollar of gross domestic product, 1980-2030: History: Energy Information Administration, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). **Projections: Energy use per capita:** Calculated from data in Table A2. **Energy use per dollar of GDP:** Table A19.

Figure 5. Electricity generation by fuel, 1980-2030: History: Energy Information Administration (EIA), Form EIA-860B, "Annual Electric Generator Report—Nonutility"; EIA, *Annual Energy Review 2004*, DOE/EIA-0384 (2004) (Washington, DC, August 2005); and Edison Electric Institute. **Projections:** Table A8.

Figure 6. Total energy production and consumption, 1980-2030: History: Energy Information Administration, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). **Projections:** Table A1.

Figure 7. Energy production by fuel, 1980-2030: History: Energy Information Administration, *Annual Energy Review 2004*, DOE/EIA-0384(2004) (Washington, DC, August 2005). **Projections:** Tables A1 and A17.

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