

# **Appendix A: Handling of Federal and Selected State Legislation and Regulation in the Annual Energy Outlook**

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Legislation	Brief Description	AEO Handling	Basis
<b>Residential Sector</b>			
A. National Appliance Energy Conservation Act of 1987	Requires Secretary of Energy to set minimum efficiency standards for 10 appliance categories.	Included for categories represented in the AEO residential sector forecast.	
a. Room Air Conditioners		Current standard of 9.8 EER	Federal Register Notice of Final Rulemaking.
b. Other Air Conditioners (<5.4 tons)		Current standard 10 SEET for central air conditioners and heat pumps, increasing to 13 SEER in 2006.	Federal Register Notice of Final Rulemaking.
c. Water Heaters		Electric: Current standard .90 EF. Gas: Current standard .59 EF.	Federal Register Notice of Final Rulemaking.
d. Refrigerators/Freezers kWh/yr		Current standard of .51	Federal Register Notice of Final Rulemaking.
e. Dishwashers		Current standard of .46 EF.	Federal Register Notice of Final Rulemaking.
f. Fluorescent Lamp Ballasts		Current standard of .90 power factor	Federal Register Notice of Final Rulemaking.
g. Clothes Washers		Current standard of 1.18 EF, increasing to 1.04 MEF in 2004, further increasing to 1.26 MEF in 2007.	Federal Register Notice of Final Rulemaking.
h. Furnaces		Standard set at 78 AFUE for gas and oil furnaces.	Federal Register Notice of Final Rulemaking.
i. Clothes Dryers		Gas: Current standard 2.67 EF. Electric: Current standard 3.01 EF. The increase in MEF for clothes washers further increases the de facto standard for clothes dryers due to better extraction of water from clothes in washing process.	Federal Register Notice of Final Rulemaking.
<b>B. Energy Policy Act of 1992 (EPACT92)</b>			
a. Building Codes	For the IECC 2006, specifies whole house efficiency minimums.	Assumes that all States adopt the IECC 2006 code by 2017.	Trend of States adoption to codes, allowing for lead times for enforcement and builder compliance.
b. Energy-Efficient Mortgages	Allow homeowners to qualify for higher loan amounts if the home is energy-efficient, as scored by HERS.	Efficiency of equipment represented in technology choice parameters. Efficiency of shell represented in HVAC choice.	No way to separate out these purchases from others. Assumes historical effect in the forecast, with cost-reducing learning in the shell portion of HVAC choice.
<b>C. Energy Policy Act of 2005 (EPACT05)</b>			
a. Torchiere Lamp Standard		Sets 190 watt bulb limit in 2006.	EPACT05.
b. Ceiling Fan Light Kit Standard	Ceiling fans must be shipped with compact fluorescent bulbs or use no more than 190 watts per fixture in 2007.	Reduce lighting electricity consumption by appropriate amount.	Number of ceiling fan shipments and estimated kWh savings per unit determine overall savings.

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c. Dehumidifier Standard	Sets standard for dehumidifiers in 2007 and 2012.	Reduce miscellaneous electricity consumption by appropriate amount.	Number of dehumidifier shipments and estimated kWh savings per unit determine overall savings.
d. Energy-Efficient Equipment Tax Credit	Purchasers of certain energy-efficient equipment can claim tax credits in 2006 and 2007.	Reduce cost of applicable equipment by specified amount.	EPACT05.
e. New Home Tax Credit	Builders receive \$1000 or \$2000 tax credit if they build homes 30 or 50 percent better than code in 2006 and 2007.	Reduce shell package cost for these homes by specified amount.	Cost reductions to consumers are assumed to be 100 percent of the builder's tax credit.
f. Energy-Efficient Appliance Tax Credit	Producers of energy-efficient refrigerators, dishwashers, and clothes washers receive tax credits for each unit they produce that meets certain efficiency specifications.	Assume the cost savings are passed on to the consumer, reducing the price of the appliance by the specified amount.	Cost reductions to consumers are assumed to be 100 percent of the producer's tax credit.
<b>D. Energy Independence and Security Act of 2007 (EISA 2007)</b>			
a. General Service Incandescent Lamp Standard	Require less wattage for bulbs in 2012-2014 and 2020.	reduce wattage for new bulbs by 28 percent in 2013 and 67 percent in 2020.	EISA 2007
b. Dehumidifier Standard	Updates EPACT 2005 standard.	Reduce miscellaneous electricity consumption by appropriate amount.	Increase savings estimated for EPACT 2005 by appropriate amount.
c. Boiler Standard	Sets standards for boilers in 2013.	Require new purchases of boilers to meet the standard.	EISA 2007
d. Dishwasher Standard	Sets standards for dishwashers in 2010.	Require new purchases of dishwashers to meet the standard by 2010.	EISA 2007
e. External Power Supply Standard	Sets standards for external power supplies in 2008	Reduce miscellaneous electricity consumption by appropriate amount.	Number of shipments and estimated kWh savings per unit determine overall savings.
f. Manufactured Housing Code	Require manufactured homes to meet latest IECC in 2011.	Require that all manufactured homes shipped after 2011 meet the IECC 2006	EISA 2007
<b>E. Energy Improvement and Extension Act of 2008 (EIEA 2008)</b>			
a. Energy-Efficient Equipment Tax Credit	Purchasers of certain energy-efficient equipment can claim tax credits through 2016	Reduce the cost of applicable equipment by specified amount	EIEA 2008
b. Energy-Efficient Appliance Tax Credit	Producers of energy-efficient refrigerators, clothes washers, and dishwashers receive tax credits for each unit they produce that meets certain efficiency specifications, subject to an annual cap.	Assume the cost savings are passed on to the consumer, reducing the price of the appliance by the specified amount.	Cost reductions to consumers are assumed to be 100% of the producer's tax credit.
<b>Commercial Sector</b>			
A. National Appliance Energy Conservation Act of 1987	Requires Secretary of Energy to set minimum efficiency standards for 10 appliance categories.	Included for categories represented in the AEO commercial sector forecast.	
a. Room Air Conditioners		Current standard of 9.8 EER	Federal Register Notice of Final Rulemaking.
b. Other Residential-size Air Conditioners (<5.4 tons)		Current standard 10 SEER for central air conditioning and heat pumps, increasing to 13 SEER in 2006.	Federal Register Notice of Final Rulemaking.

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c. Fluorescent Lamp Ballasts		Current standard if .90 power factor and minimum efficacy factor for F40 and F96 lamps based on lamp size and wattage, increasing to higher efficacy factor in 2005 that limits purchases to electronic ballasts.	Federal Register Notice of Final Rulemaking.
<b>B. Energy Policy Act of 1992 (EPACT92)</b>			
a. Buildings Codes		Incorporated in commercial building shell assumptions. Efficiency of new relative to existing shell represented in shell efficiency indices. Assume shell efficiency improves 5 and 7 percent by 2030 for existing buildings and new construction, respectively.	Based on Science Applications International Corporation commercial shell indices for 2003 developed for EIA in 2008.
b. Window labeling	Designed to help consumers determine which windows are more energy efficient.	Incorporated in commercial building shell assumptions. Efficiency of new relative to existing shell represented in shell efficiency indices. Assume shell efficiency improves 5 and 7 percent by 2030 for existing buildings and new construction, respectively.	Based on Science Applications International Corporation commercial shell indices for 2003 developed for EIA in 2008.
c. Commercial Furnaces and Boilers		Gas-fired furnaces and boilers: Current standard is 0.80 thermal efficiency. Oil furnaces and boilers: Current standard is 0.81 thermal efficiency for furnaces, 0.83 thermal efficiency for boilers.	Public Law 102-486: EPACT92. Federal Register Notice of Final Rulemaking.
d. Commercial Air Conditioners and Heat Pumps		Air-cooled air conditioners and heat pumps less than 135,000 Btu: Current standard of 8.9 EER. Air-cooled air conditioners and heat pumps greater than 135,000 Btu: Current standard of 8.5 EER.	Public Law 102-486: EPACT92.
e. Commercial Water Heaters		Natural gas and oil: EPACT standard .78 thermal efficiency increasing to .80 thermal efficiency for gas units in 2003.	Public Law 102-486: EPACT92. Federal Register Notice of Final Rulemaking.
f. Lamps		Incandescent: Current standard 16.9 lumens per watt. Fluorescent: Current standard 75 and 80 lumens per watt for 4 and 8 foot lamps, respectively.	
g. Electric Motors	Specifies minimum efficiency levels for a variety of motor types and sizes.	End-use services modeled at the equipment level. Motors contained in new equipment must meet the standards.	Public Law 102-486: EPACT92.
h. Federal Energy Management	Requires Federal agencies to reduce energy consumption 20 percent by 2000 relative to 1985.	Superseded by Executive Order 13123, EPACT05, and EISA07.	Superseded by Executive Order 13123.
i. Business Investment Energy Credit	Provides a permanent 10 percent investment tax credit for solar property.	Tax credit incorporated in cash flow for solar generation systems. Investment cost reduced 10 percent for solar water heaters.	Public Law 102-486: EPACT92.

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C. Executive Order 13123, "Greening the Government Through Efficient Energy Management	Requires Federal agencies to reduce energy consumption 30 percent by 2005 and 35 percent by 2010 relative to 1985 through life-cycle cost-effective energy measures.	Superseded by EPACT05 and EISA07.	Superseded by EPACT05 and EISA07.
D. Energy Policy Act of 2005 (EPACT05)			
a. Commercial Package Air Conditioners and Heat Pumps	Sets minimum efficiency levels in 2010.	Air-cooled air conditioners/heat pumps less than 135,000 Btu: standard of 11.2/11.0 EER and heating COP of 3.3. Air-cooled air conditioners/heat pumps greater than 135,000 Btu: standard of 11.0/10/6 EER and heating COP of 3.2.	Public Law 109-58: EPACT05.
b. Commercial Refrigerators, Freezers, and Automatic Ice makers	Sets minimum efficiency levels in 2010 based on volume.	Set standard by level of improvement above stock average efficiency in 2003.	Public Law 109-58: EPACT05.
c. Lamp Ballasts	Bans manufacture or import of mercury vapor lamp ballasts in 2008. Sets minimum efficacy levels for T12 energy saver ballasts in 2009 and 2010 based on application.	Remove mercury vapor lighting system from technology choice menu in 2008. Set minimum efficacy of T12 ballasts at specified standard levels.	Public Law 109-58: EPACT05.
d. Compact Fluorescent Lamps	Sets standard for medium base lamps at Energy Star requirements in 2006.	Set efficacy level of compact fluorescent lamps at required level.	Public Law 109-58: EPACT05.
e. Illuminated Exit Signs and Traffic Signals	Set standards at Energy Star requirements in 2006.	Reduce miscellaneous electricity consumption by appropriate amount.	Number of shipments, share of shipments that currently meet standard, and estimated kWh savings per unit determine overall savings.
f. Distribution Transformers	Sets standard as National Electrical Manufacturers Association Class I Efficiency levels in 2007.	Effects of the standard are included in estimating the share of miscellaneous electricity consumption attributable to transformer losses.	Public Law 109-58: EPACT05.
g. Prerinse Spray Valves	Sets maximum flow rate to 1.6 gallons per minute in 2006.	Reduce energy use for water heating by appropriate amount.	Number of shipments, share of shipments that currently meet standard, and estimated kWh savings per unit determine overall savings.
h. Federal Energy Management	Requires Federal agencies to reduce energy consumption 20 percent by 2015 relative to 2003 through life-cycle cost-effective energy measures.	The Federal "share" of the commercial sector uses the 10 year treasury bond rate as a discount rate in equipment purchase decisions as opposed to adding risk premiums to the 10 year treasury bond rate to develop discount rates for other commercial decisions.	Public Law 109-58: EPACT05. Superseded by EISA07.
i. Business Investment Tax Credit for Fuel Cells and Microturbines	Provides a 30 percent investment tax credit for fuel cells and a 10 percent investment tax credit for microturbines installed in 2006 through 2008.	Tax credit incorporated in cash flow for fuel cells and microturbines.	Public Law 109-58: EPACT05. Extended through 2008 by Public Law 109-432. Extended through 2016 by EIEA08.

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j. Business Solar Investment Tax Credit	Provides a 30 percent investment tax credit for solar property installed in 2006 through 2008.	Tax credit incorporated in cash flow for solar generation systems, investment cost reduced 30 percent for solar water heaters.	Public Law 109-58: EPACT05. Extended through 2008 by Public Law 109-432. Extended through 2016 by EIEA08.
<b>E. Energy Independence and Security Act of 2007 (EISA07)</b>			
a. Commercial Walk-in Coolers and Walk-in Freezers	Requires use of specific energy efficiency measures in equipment manufactured in or after 2009.	Set standard by equivalent level of improvement above stock average efficiency in 2003.	Public Law 110-140: EISA97.
b. Incandescent and Halogen lamps	Sets maximum allowable wattage based on lumen output starting in 2012.	Remove incandescent and halogen general service lighting systems that do not meet standard from technology choice menu in 2012.	Public Law 110-140: EISA97.
c. Metal Halide Lamp Ballasts	Sets minimum efficiency levels for metal halide lamp ballasts starting in 2009.	Remove metal halide lighting systems that do not meet standard from technology choice menu in 2009. Set minimum system efficiency to include specified standard levels for ballasts - ranging from 88 to 94 percent based on ballast type.	Public Law 110-140: EISA97.
d. Federal Use of Energy Efficient Lighting	Requires use of energy efficient lighting fixtures and bulbs in Federal buildings to the maximum extent possible starting in 2009.	Increase proportion of sector using 10 year treasury bond rate for lighting purchase decisions to represent all existing and new Federal floorspace in 2009.	Public Law 110-140: EISA97.
e. Federal Energy Management	Requires Federal agencies to reduce energy consumption per square foot 30 percent by 2015 relative to 2003 through life-cycle cost-effective energy measures.	The Federal "share" of the commercial sector uses the 10 year treasury bond rate as a discount rate in equipment purchase decisions as opposed to adding risk premiums to the 10 year treasury bond rate to develop discount rates for other commercial decisions.	Public Law 110-140: EISA97.
<b>F. Energy Improvement and Extension Act of 2008 (EIEA08)</b>			
a. Business Solar Investment Tax Credit	Extends the EPACT05 30-percent investment tax credit for solar property through 2016.	Tax credit incorporated in cash flow for solar generation systems, investment cost reduced 30 percent for solar water heaters.	Public Law 110-343: EIEA08.
b. Business Investment Tax Credit for Fuel Cells and Microturbines	Extends the EPACT05 30-percent investment tax credit for fuel cells and 10-percent investment tax credit for microturbines through 2016.	Tax credit incorporated in cash flow for fuel cells and microturbines.	Public Law 110-343: EIEA08.
c. Business Investment Tax Credit for CHP Systems	Provides a 10-percent investment tax credit for CHP systems installed in 2009 through 2016.	Tax credit incorporated in cash flow for CHP systems.	Public Law 110-343: EIEA08.
d. Business Investment Tax Credit for Small Wind Turbines	Provides a 30-percent investment tax credit for wind turbines installed in 2009 through 2016.	Tax credit incorporated in cash flow for wind turbine generation systems.	Public Law 110-343: EIEA08.
e. Business Investment Tax Credit for Geothermal Heat Pumps	Provides a 10-percent investment tax credit for geothermal heat pump systems installed in 2009 through 2016.	Investment cost for geothermal heat pump systems reduced 10 percent.	Public Law 110-343: EIEA08.

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<b>Industrial Sector</b>			
A. Energy Policy Act of 1992 (EPACT92)			
a. Motor Efficiency Standards	Specifies minimum efficiency levels for a variety of motor types and sizes.	New motors must meet the standards.	Standard specified in EPACT92. 10 CFR 431.
b. Boiler Efficiency Standards	Specifies minimum combustion efficiency for package boilers larger than 300,000 Btu/hr. Natural Gas boilers: 80 percent, oil boilers: 83 percent.	All package boilers are assumed to meet the efficiency standards. While the standards do not apply to field-erected boilers, which are typically used in steam-intensive industries, we assume they meet the standard in the AEO.	Standard specified in EPACT92. 10 CFR 431.
B. Clean Air Act Amendments (CCCA90)			
a. Process Emissions	Numerous process emissions requirements for specified industries and/or activities.	Not modeled because they are not directly related to energy projections.	CAAA90, 40 CFR 60.
b. Emissions related to hazardous/toxic substances	Numerous emissions requirements relative to hazardous and/or toxic substances.	Not modeled because they are not directly related to energy projections.	CAAA90, 40 CFR 60.
c. Industrial SO <sub>2</sub> emissions	Sets annual limit for industrial SO <sub>2</sub> emissions at 5.6 million tons. If limit is reached, specific regulations could be implemented.	Industrial SO <sub>2</sub> emissions are not projected to reach the limit (Source: EPA, National Air Pollutant Emissions Trends: 1990-1998, EPA-454/R-00-002, March 2000, p. 4-3.)	CAAA90, Section 406 (42 USC 7651)
d. Industrial boiler hazardous air pollutants	Requires industrial boilers and process heaters to meet emissions limits on HAPs to comply with the Maximum Achievable Control Technology (MACT) floor.	Not explicitly modeled because new boilers are expected to meet the standards in the absence of the rule and retrofit costs should be relatively small.	Environmental Protection Agency, National Emissions Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters, 40 CFR Part 63.
e. Emissions from stationary diesel engines	Requires engine manufacturers to meet the same emission standards as nonroad diesel engines. Fully effective in 2011.	New stationary engines meet the standards.	40 CFR Parts 60, 85, 89, 94, 1039, 1065, and 1068.
C. Energy Policy Act of 2005 (EPACT 05)			
a. Physical Energy Intensity	Voluntary commitments to reduce physical energy intensity by 2.5 percent annually for 2007-2016.	Not modeled because participation is voluntary; actual reductions will depend on future, unknown commitments.	EPACT2005, Section 106 (42 USC 15811)
b. Mineral components of cement of concrete	Increase in mineral component of Federally procured cement or concrete.	Not modeled.	EPACT2005, Section 108 (42 USC 6966).
c. Tax credits for coke oven	Provides a tax credit of \$3.00 per barrel oil equivalent, limited to 4000 barrels per day average. Applies to most producers of coal coke or coke gas.	Not modeled because no impact on U.S. coke plant activity is anticipated.	EPACT2005, Section 1321 (29 USC 29).

Legislation	Brief Description	AEO Handling	Basis
D. The Energy Independence and Security Act of 2007			
Motor Efficiency Standards	Supersedes EPAAct1992 Efficiency Standards no later than 2011	Motor purchases must meet the EPAAct1992 standards through 2010; afterwards purchases must meet the EISA2007 standards	EISA2007
E. The Energy Improvement and Extension Act of 2008			
Combined heat and power tax incentive	Provides an investment tax credit for combined heat and power systems up to 50 megawatts through 2016	Costs of systems adjusted to reflect the credit	EIEA2008, Title I, Sec.103
<b>Transportation Sector</b>			
A. Energy Policy Act of 1992 (EPACT92)	Increases the number of alternative fuel vehicles and alternative fuel use in Federal, State, and fuel provided fleets.	Assumes Federal, State and fuel provider fleets meet the mandated sales requirements.	Energy Policy Act of 1992, Public Law 102-486-Oct. 24, 1992.
B. Low Emission Vehicle Program (LEVP)	The Clean Air Act provides California the authority to set vehicle criteria emission standards that exceed Federal standards. Apart of that program mandates the sale of zero emission vehicles by manufacturers, other nonattainment. States are given the option of opting into the Federal or California emission standards.	Incorporates the LEVP program as amended on August 4, 2005. Assumes California, Connecticut, Maine, Massachusetts, New Jersey, New York, Rhode island, Vermont, Oregon, and Washington adopt the LEVP program as amended August 4, 2005 and that the proposed sales requirements for hybrid, electric, and fuel cell vehicles are met.	Section 177 of the Clean Air Act, 42 U.S.C. sec. 7507 (1976) and CARB, California Exhaust Emissions Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, August 4, 2005.
C. Light Vehicle GHG Emission Standards	California has enacted light vehicle GHG emission standards as part of the Low Emission Vehicle Program (A.B. 1493), which requires that GHG emissions from new light vehicles be significantly reduced from 2009 to 2016.	AEO2008 does not incorporate. EPA has denied the California claim.	EPA to reconsider previous decision denying California permission to set standards.
D. Corporate Average Fuel Economy (CAFÉ) Standard	Requires manufacturers to produce vehicles whose average fuel economy meets a minimum Federal standard. Cars and light trucks are regulated separately.	The current CAFÉ standard for cars is 27.5 mpg. The car standard is unchange through 2011. The current CAFÉ standard for light trucks is 22.5 mpg, increasing to 23.1 mpg in 2009, 23.5 mpg in 2010 and 24.0 mpg in 2011. The assumed standard increases to 41.0 mpg for cars and 30.5 mpg for light trucks in 2020.	Energy Policy Conservation Act of 1975; Title 49 United States Code, Chapter 329; Federal Register, Vol. 68, No. 66, Monday, April 7, 2003; and Federal Register, Vol. 71, No. 66, April 6, 2006. For model years 2011 through 2015, U.S. Department of Transportation, National Highway Traffic Safety Administration, <i>Preliminary Regulatory Impact Analysis: Corporate Average Fuel Economy for MY 2011-2015 Passenger Cars and Light Trucks</i> (Washington, DC, April 2008). For model year 2016 and beyond, EISA 2007, Title 1, Section 102.
E. Electric, Hybrid, and Alternative Fuel Vehicle Tax Incentives	Federal tax incentives are provided to encourage the purchase of electric, hybrid and or alternative fuel vehicles. For example, tax incentives for hybrid vehicles in the form of a \$2,000 income tax deduction.	Incorporates the Federal tax incentives for hybrid and electric vehicles.	IRS Technical Publication 535; Business Expenses.

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F. Plug-in Hybrid Vehicle Tax Credit	EIEA2008 grants a tax credit of \$2,500 for PHEVs with at least 4KWh of battery capacity, with larger batteries earning an additional \$417 per kWh up to a maximum of \$7,500 for light-duty PHEVs. The credit will apply until 250,000 eligible PHEVs are sold or until 2015, whichever comes first.	Incorporates the Federal tax credits for PHEVs.	Energy Improvement and Extension Act of 2008, H.R. 6049.
G. The Working Families Tax Relief Act of 2004	The Act repeals the phase out of the credits which were allowed for qualified electric and clean fuel vehicles for property acquired in 2004 and 2005. The credit is reduced by 75 percent for vehicles acquired in 2006. This will provide an incentive to purchase electric and clean fuel vehicles.	The federal tax incentives are embodied in the code. This will provide an incentive to purchase electric and clean fuel vehicles but little impact is realized on projections of total highway energy use.	Sections 318 and 319 of the Working families Tax Relief Act of 2004.
H. State Electric, Hybrid, and Alternative Fuel Vehicle Tax and other incentives	Approximately 20 States provide tax and other incentives to encourage the purchase of electric, hybrid and or alternative fuel vehicles. The tax incentives are in the form of income reductions, tax credits, and exemptions. Other incentives include use of HOV lanes and exemptions from emissions inspections from emissions inspections and licensing fees. The incentives offered and the mix varies by state. For example, Georgia offers a tax credit of \$5,000 for electric vehicles and Oklahoma offers a tax credit of \$1,500 for hybrid and alternative fuel vehicles.	Does not incorporate State tax and other incentives for hybrid, electric, and other alternative fuel vehicle.	State laws in Arizona, Arkansas, California, Colorado, Delaware, Florida, Georgia, Iowa, Kansas, Louisiana, Maine, Maryland, Michigan, New Hampshire, New York, Oklahoma, Pennsylvania, Utah, Virginia, and Washington.
I. Energy Policy Act of 2005	Provides tax credits for the purchase of vehicles that have a lean burn engine or employ a hybrid or fuel cell propulsion system. The amount of the credit received for a vehicle is based on the vehicle's inertia weight, improvement in city tested fuel economy relative to an equivalent 2002 base year value, emissions classification, type of propulsion system, and number of vehicles sold.	Incorporates the Federal tax incentives for hybrid and fuel cell vehicles.	Title XIII, Section 1341 of the Energy Policy Act of 2005.
<b>Electric Power Generation</b>			
A. Clean Air Act Amendment of 1990	Established a national limit on electricity generator emissions of sulfur dioxide to be achieved through a cap and trade program.	Sulfur dioxide cap and trade program is explicitly modeled, choosing the optimal mix of options for meeting the national emissions cap.	Clean Air Act Amendments of 1990, Title IV, Sections 401 through 406, Sulfur Dioxide Reduction Program, 42 U.S.C. 7651a through 7651e.
	Set boiler type specific nitrogen oxide emissions limits for electricity generators.	Assumes each boiler installs the options necessary to comply with their nitrogen oxide emissions limit.	Clean Air Act Amendments of 1990, Title IV, Sections 407, Nitrogen Oxide Emission Reduction Program, 42 U.S.C. 7651f.

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	Under section 126, Northeast states petitioned the EPA arguing that generators in other states contributed to the nitrogen oxide emissions problems in their states. EPA established a summer season nitrogen oxide emission cap and trade program covering 22 states (three were removed by the courts) to start in May 2003 (delayed until May 2004).	The 19-state summer season nitrogen oxide cap and trade program is explicitly modeled, allowing electricity generators to choose the optimal mix of control options to meet the emission cap.	Section 126 Rule: Revised Deadlines, Federal Register: April 30, 2002 (volume 67, Number 83). Rules and Regulations, Pages 21521-21530.
	Requires the EPA to establish national ambient air quality standards (NAAQS). In 1997, EPA set new standards for ground level ozone and fine particulates. EPA is currently determining which areas of the country are not in compliance with the new standards. Area designations will be made in December 2004. States will then have until December 2007 to submit their compliance plans, and until 2009-2014 to bring all areas into compliance.	For planning purposes, the AEO2009 assumes the NO <sub>x</sub> and SO <sub>2</sub> limits of the Clean Air Interstate Rule are still in effect although the rule was overturned on July 11, 2008. On December 23, 2008, a new ruling remanded but did not vacate CAIR, which would put the rule back in place. However, this occurred after the cutoff date for changes included in AEO2009. The cap and trade program from CAIR is not modeled, but it is assumed that generators will still need to make equipment choices that will reduce emissions enough to meet the NAAQS.	Clean Air Act Amendment of 1990, Title I, Sections 108 and 109, National Ambient Air Quality Standards for Ozone, 40 CFR Part 50, Federal Register, Vol 68, No 3, January 8, 2003. National Ambient Air Quality Standards for Particulate Matter, 40 CFR Part 50, Federal Register, Vol. 62, No. 138, July 18, 1997.
B. State Mercury Provisions	Many states have adopted stringent regulations to limit mercury emissions and require the best control technologies be in operation.	Although state plans vary, a general regional requirement compatible with NEMS was used to require specific mercury emission removal rates for electric generators.	Various state laws.
C. Energy Policy Act of 1992 (EPACT92)	Created a class of generators referred to as exempt wholesale generators (EWGs), exempt from PUCHA as long as they sell wholesale power.	Represents the development of Exempt Wholesale Generators (EWGs) or what are now referred to as independent power producers (IPPs) in all regions.	Energy Policy Act of 1992, Title VII, Electricity, Subtitle A, Exempt Wholesale Generators.
	Created a permanent investment tax credit (ITC) for solar and geothermal facilities.	The ITCs for renewables are explicitly modeled as stated in the law.	Energy Policy Act of 1992, Title XII, Renewable Energy, Section 1212, Renewable.
D. The Public Utility Holding Company Act of 1935 (PUCHA)	PUCHA is a US federal statute which was enacted to legislate against abusive practices in the utility industry. The act grants power to the US Securities and Exchange Commission (SEC) to oversee and outlaw large holding companies which might otherwise control the provision of electrical service to large regions of the country. It gives the SEC power to approve or deny mergers and acquisitions and, if necessary, force utility companies to dispose of assets or change business practices if the company's structure of activities are not deemed to be in the public interest.	It is assumed that holding companies act competitively and do not use their regulated power businesses to cross-subsidize their unregulated businesses.	Public Utility Holding Company Act of 1936.

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E. FERC Orders 888 and 889	<p>FERC has issued two related rules Orders 888 and 889 designed to bring low cost power to consumers through competition, ensure continued reliability in the industry, and provide for open and equitable transmission services by owners of these facilities. Specifically, Order 888 requires open access to the transmission grid currently owned and operated by utilities. The transmission owners must file nondiscriminatory tariffs that offer other suppliers the same services that the owners provide for themselves. Order 888 also allows these utilities to recover stranded costs (investments in generating assets that are unrecoverable due to consumers selecting another supplier). Order 889 requires utilities to implement standards of conduct and an Open Access Same-time Information System (OASIS) through which utilities and non-utilities can receive information regarding the transmission system. Consequently, utilities are expected to functionally or physically unbundle their marketing functions from their transmission functions.</p>	<p>These orders are represented in the forecast by assuming that all generators in a given region are able to satisfy load requirements anywhere within the region. Similarly, it is assumed that transactions between regions will occur if the cost differentials between them make it economic to do so.</p>	<p>Promoting Wholesale Competition Through Open Access, Non-discriminatory Transmission Services by Public Utilities; Public Utilities and Transmitting Utilities, ORDER NO. 888 (Issued April 24, 1996), 18 CFR Parts 35 and 385, Docket Nos. RM95-8-000 and RM94-7-001. Open Access Same-Time Information System (formerly Real-Time Information Networks) and Standards of Conduct, ORDER NO. 889, (Issued April 24, 1996), 18 CFR Part 37, Docket No. RM95-9-000.</p>
F. New Source Review (NSR)	<p>On August 28, 2003, the EPA issued a final rule defining certain power plant and industrial facility activities as routine maintenance, repair and replacement, which are not subject to new source review (NSR). As stated by EPA, these changes provide a category of equipment replacement activities that are not subject to Major NSR requirements under the routine</p>	<p>It is assumed that coal plants will be able to increase their output as electricity demand increases. Their maximum capacity factor is set at 84 percent. No increases in the capacity of existing plants is assumed. If further analysis shows that capacity uprates may result from the NSR rule, they will be incorporated in future AEOs. However, at this time, the NSR rule is being contested in the courts.</p>	<p>EPA, 40 CFR Parts 51 and 52, Prevention of Significant Deterioration (PSD) and Non-Attainment New Source Review (NSR): Equipment Replacement Provision of the Routine Maintenance, Repair and Replacement Exclusion; Final Rule, Federal Register, Vol. 68, No. 207, page 61248, October 27, 2003.</p>
	<p>maintenance, repair and replacement (RMRR) exclusion.[1] Essentially this means that power plants and industrial facilities engaging in RMRR activities will not have to get preconstruction approval from the State or EPA and will not have to install best available emissions control technologies that might be required if NSR were triggered.</p>		

Legislation	Brief Description	AEO Handling	Basis
G. State RPS laws, mandates, and goals	Several States have enacted laws requiring that a certain percentage of their generation come from qualifying renewable sources.	The AEO reference case represents the renewable portfolio standard (RPS) or substantively similar laws from 27 states and the District of Columbia. As described in the Renewable Fuels Module chapter of this document, mandatory targets from the various states are aggregated at the regional level, and achievement of non-discretionary compliance criteria is evaluated for each region.	The 27 states with RPS or other mandates providing quantified projections are detailed in the Legislation and Regulations section of this report.
H. State Environmental Laws	Several States have enacted laws requiring emissions reductions from their generating plants.	Where compliance plans have been announced, they have been incorporated. In total 22 gigawatts of planned SO <sub>2</sub> scrubbers, 27 gigawatts of planned selective catalytic reduction (SCR) and 3 gigawatts of planned selective non-catalytic reduction (SNCR) are represented.	North Carolina's Clean Smoke Stacks Act, Session Law 2002-4, Senate Bill 1078, An Act to Improve Air Quality in the State by Imposing Limits on the Emission of Certain Pollutants from Certain Facilities that Burn Coal to Generate Electricity and to Provide for Recovery by Electric Utilities of the Costs of Achieving Compliance with those Limits.
I. Energy Policy Act of 2005	Extended and substantially expanded and modified the Production Tax Credit, originally created by EPACT 1992.	EPACT2005 also adds a PTC for up to 6,000 megawatts of new nuclear capacity and a \$1.3 billion investment tax credit for new or repowered coal-fired power projects.  The tax credits for renewables, nuclear and coal projects are explicitly modeled as specified in the law and subsequent amendments.	Energy Policy Act of 2005, Sections 1301, 1306, and 1307.
J. Energy Improvement and Extension Act of 2008	Extends the PTC to wind facilities constructed by December 31, 2009 and to other eligible renewable facilities constructed by December 31, 2010. Makes certain marine energy resources eligible for the PTC. Extends the 30 percent Investment Tax Credit (ITC) to solar facilities in service by December 31, 2016. Extends and expands the Clean and Renewable Energy Bonds (CREBs) program.	The extensions of the PTC and 30 percent ITC are represented in the AEO reference case as specified in the law. The AEO does not represent marine energy resources as specified in the law. CREBs are only useful to not-for-profit utilities, the reference case assumes all new capacity will be built by for-profit entities and cannot model the CREBs.	Energy Improvement and Extension Act of 2008, Sections 101, 102, 103, and 107.
<b>Oil and Gas Supply</b>			
A. The Outer Continental Shelf Deep Water Royalty Relief Act (DWRRA)	Mandates that all tracts offered by November 22, 2000, in deep water in certain areas of the Gulf of Mexico must be offered under the new bidding system permitted by the DWRRA. The Secretary of Interior must offer such tracts with a specific minimum royalty suspension volume based on water depth.	Incorporates royalty rates based on water depth.	43 U.S.C. SS 1331-1356 (2002).

Legislation	Brief Description	AEO Handling	Basis
B. Energy Policy and Conservation Act Amendments of 2000	Required the USGS to inventory oil and gas resources beneath Federal lands.	To date, the Rocky Mountain oil and gas resource inventory has been completed by the USGS. The results of this	Scientific Inventory of Onshore Federal Lands: Oil and Gas Resources and Reserves and the Extent and Nature of
		inventory have been incorporated in the technically recoverable oil and gas resource volumes used for the Rocky Mountain region.	Restrictions or Impediments to their Development: The Paradox/San Juan, Uinta/Piceance, Greater Green River, and Powder River Basins and the Montana Thrust Belt. Prepared by the Departments of Interior, Agriculture and Energy, January 2003.
E. Section 29 Tax Credit for Nonconventional Fuels	The Alternative Fuel Production Credit (Section 29 of the IRC) applies to qualified nonconventional fuels from wells drilled or facilities placed in service between January 1, 1980, and December 31, 1992. Gas production from qualifying wells could receive a 3 dollar (1979 constant dollars) per barrel of oil equivalent credit on volumes produced through December 31, 2002. The qualified fuels are: oil produced from shale and tar sands; gas from geopressurized brine, Devonian shale, coal seams, tight formations, and biomass; liquid, gaseous, or solid synthetic fuels produced from coal; fuel from qualified processed formations or biomass; and steam from agricultural products.	The Section 29 Tax Credit expired on December 31, 2002, and it not considered in new production decisions. However, the effect of these credits is implicitly included in the parameters that are derived from historical data reflecting such credits.	Alternative Fuel Production Credit (Section 29 of the Internal Revenue Code), initially established in the Windfall Profit Tax of 1980.
F. Energy Policy Act of 2005	Established a program to provide grants to enhance oil and gas recovery through CO <sub>2</sub> injection.	Additional oil resources were added to account for increased use of CO <sub>2</sub> -enhanced oil recovery.	Title III, Section 354 of the Energy Policy Act of 2005.
<b>Natural Gas Transmission and Distribution</b>			
A. Alaska Natural Gas Pipeline Act, Sections 101-116 of the Military Construction Hurricane Supplemental Appropriations Act, 2005.	Disallows approval for a pipeline to enter Canada via Alaska north of 68 degrees latitude. Also, provides Federal guarantees for loans and other debt obligations assigned to infrastructure in the United States or Canada related to any natural gas pipeline system that carries Alaska natural gas to the border between Alaska and Canada south of 68 degrees north latitude. This authority would expire 2 years after the final certificate of public convenience and necessity is issued. The guarantee will not exceed 1) 80 percent of the total capital costs (including interest during construction), 2) \$18 billion dollars (indexed for inflation at the time of enactment), or 3) a term of 30 years.	Assumes the pipeline construction cost estimate for the "southern" Alaska pipeline route in projecting when an Alaska gas pipeline would be profitable to build. With recent increased in cost estimates, well beyond \$18 billion, the loan guarantee is assumed to have a minimal impact on the build decision.	P.L. 108-324.

Legislation	Brief Description	AEO Handling	Basis
B. American Jobs Creation Act of 2004, Sections 706 and 707.	Provides a 7 year cost-of-investment recovery period for the Alaska natural gas pipeline, as opposed to the currently allowed 15-year recovery period, for tax purposes. The provision would be effective for property placed in service after 2013, or treated as such. Effectively extends the 15-percent tax credit currently applied to costs related to enhanced oil recovery to construction costs for a gas treatment plant on the on the North Slope that would feed gas into an Alaska pipeline to Canada.	The change in the recovery period is assumed to have a minimal impact on the decision to build the pipeline. The assumed treatment costs are based on company estimates made after these tax provisions were enacted.	P.L. 108-357.
C. Pipeline Safety Improvement Act of 2002	Imposes a stricter regime on pipeline operators designed to prevent leaks and ruptures.	Costs associated with implementing the new safety features are assumed to be a small percentage of total pipeline costs and are partially offset by benefits gained through reducing pipeline leakage. It is assumed that the Act accelerates the schedule of repair work that would have been done otherwise.	P.L. 107-355, 116 Stat. 2985.
D. FERC Order 436 (Issued in 1985)	Order 436 changed gas transmission from a merchant business, wherein the pipeline buys the gas commodity at the inlet and sold the gas commodity at the delivery point, to being a transportation business wherein the pipeline does not take title to the gas. Order 436 permitted pipelines to apply for blanket transportation certificates, in return for becoming non-discriminatory, open-access transporters. Order 436 also allocated gas pipeline capacity on a first-com, first-serve basis, allowed pipelines to discount below the maximum rate, allowed local gas distributors to convert to transportation only contracts, and created optional expedited certificates for the construction of new facilities.	Natural gas is priced at the wellhead at a competitive rate determined by the market. The flow of gas in the system is a function of the relative costs and is set to balance supply, demand, and prices in the market. Transportation costs are based on a regulated rate calculation	50 F. R. 42408, FERC Statutes and Regulations Paragraph 30,665 (1985).

Legislation	Brief Description	AEO Handling	Basis
E. FERC Order 636 (Issued in 1992)	FERC Order 636 completed the separation of pipeline merchant services from pipeline transportation services, requiring pipelines to offer separate tariffs for firm transportation, interruptible transportation, and storage services. Order 636 also permitted pipelines to resell unused firm capacity as interruptible transportation, gave shippers the right to first refusal at the expiration of their firm transportation contracts, adopted Straight-Fixed-Variable rate methodology, and created a mechanism for pipelines to recover the costs incurred by prior take-or-pay contracts.	A straight-fixed-variable rate design is used to establish regulated rates. To reflect some of the flexibility built into the system, the actual tariffs charged are allowed to vary from the regulated rates as a function of the utilization of the pipeline. End-use prices are set separately for firm and interruptible customers for the industrial and electric generation sectors.	57 F.R. 13267, FERC Statutes and Regulations Paragraph 30,939 (1992)
F. Hackberry Decision	Terminated open access requirements for new onshore LNG terminals and authorized them to charge market-based rather than cost-of-service rates.	This is reflected in the structural representation of U.S. LNG imports in EIA's International Natural Gas Model, used to develop U.S. LNG import supply curves for the NGTDM.	Docket No. PL02-9, Natural Gas Markets Conference (2002).
G. Maritime Security Act of 2002 Amendments to the Deepwater Port Act of 1974	Transfers jurisdiction over offshore LNG facilities from FERC to the Maritime Administration (MARAD) and the Coast Guard, both under the Department of Transportation (DOT), provides these facilities with a new, streamlined application process, and relaxes regulatory requirements (offshore LNG facilities are no longer required to operate as common carriers or to provide open access as they did while under FERC jurisdiction).	This is reflected in the structural representation of U.S. LNG imports in EIA's International Natural Gas Model, used to develop U.S. LNG import supply curves for the NGTDM.	P.L. 107-295.
H. Energy Policy Act of 2005	Allowed natural gas storage facilities to charge market-based rates if it was believed they would not exert market power.	Storage rates are allowed to vary from regulation-based rates depending on market conditions.	Title III, Section 312 of the Energy Policy Act of 2005.
<b>Petroleum Refining</b>			
A. Ultra-Low-Sulfur Diesel (ULSD) regulations under the Clean Air Act Amendment of 1990	80 percent of highway diesel pool must contain 15 ppm sulfur or less starting in fall 2006. By mid-2010, all highway diesel must be 15 ppm or less. All nonroad, locomotive, and marine diesel fuel produced must contain less than 500 ppm starting mid-2007. By mid-2010 nonroad diesel must contain less than 15 ppm. Locomotive and marine diesel must contain less than 15 ppm by mid-2012.	Reflected in diesel specifications	40 CFR Parts 69, 80, 86, 89, 94, 1039, 1048, 1065, and 1068

Legislation	Brief Description	AEO Handling	Basis
B. Mobile Source Air Toxics (MSAT) controls under the Clean Air Act Amendment of 1990	Establishes a list of 21 substances emitted from motor vehicles and known to cause serious human health effects, particularly benzene, formaldehyde, 1,3 butadiene, acetaldehyde, diesel exhaust organic gases, and diesel particulate matter. Establishes anti-backsliding and anti-dumping rules for gasoline.	Modeled by updating gasoline specifications to most current EPA gasoline survey data (2005) representing anti-backsliding requirements.	40 CFR Parts 60 and 86.
C. Low-Sulfur Gasoline Regulations under the Clean Air Act Amendment of 1990	Gasoline must contain an average of 30 ppm sulfur or less by 2006. Small refiners may be permitted to delay compliance until 2008.	Reflected in gasoline specifications.	40 CFR Parts 80, 85 and 86
D. MTBE Bans in 25 States	23 States ban the use of MTBE in gasoline by 2007	Ethanol assumed to be the oxygenate of choice in RFG where MTBE is banned.	State laws in Arizona, California, Colorado, Connecticut, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Michigan, Minnesota, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New York, North Carolina, Ohio, Rhode Island, South Dakota, Vermont, Washington, and Wisconsin.
E. Regional clean fuel formulations under the Clean Air Act Amendments of 1990	States with air quality problems can specify alternative gasoline or diesel formulations with EPA's permission. California has long had authority to set its own fuel standards.	Reflected in PADD-level gasoline and diesel specifications.	State implementation plans required by the Clean Air Act Amendments of 1990, as approved by EPA.
F. Federal Motor Fuels Excise Taxes	Taxes are levied on each gallon of transportation fuels to fund infrastructure and general revenue. These taxes are set to expire at various times in the future but are expected to be renewed, as they have been in the past.	Gasoline, diesel, and ethanol blend tax rates are included in end-use prices and are assumed to be extended indefinitely at current nominal rates.	26 USC 4041 Extended by American Jobs Creation Act of 2004
G. State Motor Fuel Taxes	Taxes are levied on each gallon of transportation fuels. The assumption that State taxes will increase at the rate of inflation supports an implied need for additional highway revenues as driving increases.	Gasoline and diesel rates are included in end-use prices and are assumed to be extended indefinitely in real terms (to keep pace with inflation).	Determined by review of existing State laws performed semi-annually by EIA's Office of Oil and Gas.
H. Diesel Excise Taxes	Phases out the 4.3 cents excise tax on railroads between 2005 and 2007.	Modeled by phasing out.	American Jobs Creation Act of 2004, Section 241.
I. Energy Policy Act of 2005 (EPACT05)			
a. Ethanol/biodiesel Tax Credit	Petroleum product blenders may claim tax credits for blending ethanol into gasoline and for blending biodiesel into diesel fuel or heating oil. The credits may be claimed against the Federal motor fuels excise tax or the income tax. The tax credits are 51 per gallon of nonvirgin biodiesel, and \$1.00 per gallon of virgin biodiesel. The ethanol tax credit expires in 2010. The biodiesel tax credits expire after 2008.	The tax credits are applied against the production costs of the products into which they are blended. Ethanol is used in gasoline and E85. Virgin biodiesel is assumed to be blended into highway diesel, and nonvirgin biodiesel is assumed to be blended into nonroad diesel or heating oil.	26 USC 40, 4041 and American Jobs Creation Act of 2004. Biodiesel tax credits extended to 2008 under Energy Policy Act of 2005.

Legislation	Brief Description	AEO Handling	Basis
b. Renewable Fuels Standard (RFS)	This section has largely been redefined by EISA07 (see below) however EPA rulemaking completed for this law was assumed to contain guiding principles for the rules and administration of EISA07.		Energy Policy Act of 2005, Section 1501.
c. Elimination of Oxygen Content Requirement in Reformulated Gasoline	Within 270 days of enactment of the Act, except for California where it is effective immediately.	Oxygenate waiver already in option of the model. MTBE is assumed to phase out in 2006 resulting from the petroleum industry's decision to discontinue use. AEO projection may still show use of ethanol in gasoline based on the economics between ethanol and other gasoline blending components.	Energy Policy Act of 2005, Section 1504.
d. Coal Gasification Provisions	Investment tax credit program for qualifying advanced clean coal projects including Coal to Liquids Projects.	Two CTL units are available to build with lower capital costs reflecting the provision's funding.	Energy Policy Act of 2005, Section 1307.
<b>J. Energy Independence and Security Act of 2007 (EISA07)</b>			
a. Renewable Fuels Standard (RFS)	Requires the use of 36 billion gallons of ethanol per year by 2022, with corn ethanol limited to 15 billion gallons. Any other biofuel may be used to fulfill the balance of the mandate, but the balance must include 16 billion gallons per year of cellulosic biofuel by 2022 and 1 billion gallons per year of biodiesel by 2012.	The RFS is included in AEO2008, however it is assumed that the schedule for cellulosic biofuel is adjusted downward consistent with waiver provisions contained in the law.	

Source: Energy Information Administration, Office of Integrated Analysis and Forecasting.

**Abbreviations:**

AEO: Annual Energy Outlook  
AFUE: Average Fuel Use Efficiency  
Btu: British Thermal Unit  
CAFE: Corporate Average Fuel Economy  
CBECs: Commercial Building Energy Consumption Survey  
CFR: Code of Federal Regulations  
DOE: Department of Energy  
DOT: Department of Transportation  
DWRRA: Deep Water Royalty Relief Act  
EER: Energy Efficient Ratio  
EF: Energy Efficiency  
EIA: Energy Information Administration  
EPA: Environmental Protection Agency  
EPACT92: Energy Policy Act of 1992  
EPACT05: Energy Policy Act of 2005  
EWGs: Exempt Wholesale Generators  
FERC: Federal Energy Regulatory Commission  
HERS: Home Energy Efficiency Rating  
HVAC: Heating, Ventilation, and Air Conditioning IECC: International Energy Conservation Code ITC: Investment Tax Credit  
kWh: Kilowatthour  
LBNL: Lawrence Berkeley National Laboratory  
LEVP: Low Emission Vehicle Program  
LNG: Liquefied Natural Gas  
MARAD: Maritime Administration  
MEF: Modified Energy Factor  
MSAT: Mobile Source Air Toxics MTBE: Methyl-Tertiary-Butyl-Ether  
OASIS: Open Access Same-Time Information System  
PADD: Petroleum Administration for Defense Districts  
P.L.: Public Law  
PPM: Parts Per Million  
PTC: Production Tax Credit  
PUCHA: Public Utility Holding Company Act of 1935  
RECS: Residential Energy Consumption Survey  
RPS: Renewable Portfolio Standard  
SCR: Selective Catalytic Reduction  
SEER: Seasonal Energy Efficiency Rating  
SO<sub>2</sub>: Sulfur Dioxide  
SNCR: Selective Non-Catalytic Reduction  
ULSD: Ultra-Low Sulfur Dioxide  
U.S.C.: United States Code  
USGS: United States Geological Survey  
ZEV: Zero Emission Vehicle