

Legislation and Regulations

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Introduction

The Reference case projections in *AEO2010* generally assume that current laws and regulations affecting the energy sector remain unchanged throughout the projection period (including the implication that laws which include sunset dates do, in fact, become ineffective at the time of those sunset dates). The potential impacts of pending or proposed legislation, regulations, and standards—or of sections of legislation that have been enacted but that require regulations for which the implementing agency will exercise major discretion, or require appropriation of funds that are not provided or specified in the legislation itself—are not reflected in the Reference case projections. However, sensitivity cases that incorporate alternative assumptions about the future of existing policies subject to periodic updates also are included. The Federal and State laws and regulations included in *AEO2010* are based on those in effect as of the end of October 2009. In addition, at the request of the Administration and Congress, EIA has regularly examined the potential implications of proposed legislation in Service Reports (see box on page 7).

Examples of Federal and State legislation that has been enacted over the past few years and incorporated in earlier *Annual Energy Outlooks (AEOs)* include:

- The provisions of the ARRA (Public Law 111-5), enacted in mid-February 2009 [1]. ARRA provides significant new Federal funding, loan guarantees, and tax credits to stimulate investments in energy efficiency and renewable energy (see details below).
- The tax provisions of the Energy Improvement and Extension Act of 2008 (EIEA2008), signed into law on October 3, 2008, as part of Public Law 110-343, the Emergency Economic Stabilization Act of 2008 [2], which extends the residential and business tax credits for renewable energy; removes the cap on the tax credit for purchases of residential solar photovoltaic (PV) installations; increases the tax credit for residential ground-source heat pumps; adds a business investment tax credit (ITC) for combined heat and power (CHP), small wind systems, and commercial ground-source heat pumps; creates a tax credit for the purchase of new, qualified, plug-in electric drive motor vehicles; extends the income and excise tax credits for biodiesel and renewable diesel to the end of 2009 and increases the amount

of the tax credit for biodiesel and renewable diesel produced from recycled feedstock; establishes a tax credit for the production of liquid petroleum gas, LNG, compressed natural gas (CNG), and aviation fuels from biomass; creates an additional tax credit for the elimination of CO₂ emissions that would otherwise be released into the atmosphere in enhanced oil recovery (EOR) and non-EOR operations; extends and modifies key renewable energy tax provisions that were scheduled to expire at the end of 2008, including PTCs for wind, geothermal, landfill gas, and certain biomass and hydroelectric facilities; and expands the PTC-eligible technologies to include plants that use energy from offshore, tidal, or river currents (in-stream turbines), ocean waves, or ocean thermal gradients.

- The biofuel provisions of the Food, Conservation, and Energy Act of 2008 (Public Law 110-234) [3], which reduce the existing ethanol excise tax credit in the first year after U.S. ethanol production and imports exceed 7.5 billion gallons and add an income tax credit for the production of cellulosic biofuels.
- The provisions of the Energy Independence and Security Act of 2007 (EISA2007, Public Law 110-140), including: an RFS requiring the use of 36 billion gallons of biofuels by 2022; an attribute-based minimum CAFE standard for cars and trucks of 35 miles per gallon (mpg) by 2020; a program of CAFE credit trading and transfer; various appliance efficiency standards; a lighting efficiency standard starting in 2012; and a number of other provisions related to industrial waste heat or natural gas efficiency, energy use in Federal buildings, weatherization assistance, and manufactured housing.
- State RPS programs, representing laws and regulations of 30 States and the District of Columbia that require renewable electricity generation.

Examples of recent Federal and State regulations, as well as earlier provisions that have been affected by court decisions that have been considered in earlier *AEOs*, include the following:

- Decision by the U.S. Court of Appeals for the District of Columbia Circuit on December 23, 2008, to remand, but not vacate, the Clean Air Interstate Rule (CAIR) [4]. The decision, which overrides a previous decision by the D.C. Circuit Court on February 8, 2008, to vacate and remand

CAIR, allows CAIR to remain in effect, and provides time for the U.S. Environmental Protection Agency (EPA) to modify CAIR to address the objections raised by the Court in its earlier decision while leaving the rule in place (see details below).

- Decisions by the D.C. Circuit Court on February 8, 2008, to vacate and remand the Clean Air Mercury Rule (CAMR).
- Release by the California Air Resources Board (CARB) in October 2008 of updated regulations for reformulated gasoline (RFG) that went into effect on August 29, 2008, allowing a 10-percent ethanol blend, by volume, in gasoline.

Detailed information on more recent Federal and State legislative and regulatory developments that are considered in *AEO2010* is provided below.

American Recovery and Reinvestment Act of 2009: Summary of provisions

ARRA, signed into law in mid-February 2009, provides significant new Federal funding, loan guarantees, and tax credits to stimulate investments in energy efficiency and renewable energy. The provisions of ARRA were incorporated initially as part of a revision to the *AEO2009* Reference case that was released in April 2009 [5], and they also are included in *AEO2010*. However, provisions that require

EIA Service Reports released since January 2009

The table below summarizes EIA Service Reports completed in 2009. Those reports, and others that were completed before 2009, can be found on the EIA web site at www.eia.doe.gov/oiaf/service_rpts.htm.

Title	Date of release	Requestor	Availability on EIA web site	Focus of analysis
Energy Market and Economic Impacts of H.R. 2454, the American Clean Energy and Security Act of 2009	August 2009	Congressmen Henry Waxman and Edward Markey	www.eia.gov/oiaf/servicerpt/hr2454/index.html	Analysis of H.R. 2454, the American Clean Energy and Security Act of 2009 (ACESA). ACESA, as passed by the House of Representatives on June 26, 2009, is a bill that regulates emissions of greenhouse gases through market-based mechanisms, efficiency programs, and economic incentives.
Impacts of a 25-Percent Renewable Electricity Standard as Proposed in the American Clean Energy and Security Act Discussion	April 2009	Congressman Edward Markey	www.eia.doe.gov/oiaf/servicerpt/acesa/pdf/sroiaf(2009)04.pdf	Analysis of a 25-percent Federal renewable electricity standard (RES). The RES proposal analyzed in this report is included in the discussion draft of broader legislation—ACESA, issued on the Energy and Commerce Committee web site at the end of March 2009. The analysis presented in this report starts from an updated version of the <i>Annual Energy Outlook 2009</i> (<i>AEO2009</i>) Reference case, which reflects the projected impacts of the ARRA, enacted in February 2009, and revised economic assumptions.
An Updated <i>Annual Energy Outlook 2009</i> Reference Case Reflecting Provisions of the American Recovery and Reinvestment Act and Recent Changes in the Economic Outlook	April 2009	NA	www.eia.doe.gov/oiaf/servicerpt/stimulus/pdf/sroiaf(2009)03.pdf	Updates the <i>AEO2009</i> Reference case released in December 2008, based on recently enacted legislation and the changing macroeconomic environment.
Light-Duty Diesel Vehicles: Efficiency and Emissions Attributes and Market Issues	February 2009	Senator Jeff Sessions	www.eia.doe.gov/oiaf/servicerpt/lightduty/pdf/sroiaf(2009)02.pdf	Analysis of the environmental and energy efficiency attributes of light-duty diesel vehicles. Specifically, the inquiry asked for a comparison of the characteristics of diesel-fueled vehicles with those of similar gasoline-fueled, E85-fueled, and hybrid vehicles, as well as a discussion of any technical, economic, regulatory, or other obstacles to increasing the use of diesel-fueled vehicles in the United States.
State Energy Data Needs Assessment	January 2009	Required by EISA2007	www.eia.doe.gov/oiaf/servicerpt/energydata/pdf/sremeu(2009)01.pdf	Response to EISA2007 Section 805(d), requiring EIA to assess State-level energy data needs and submit to Congress a plan to address those needs.

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funding appropriations to be implemented, whose impact is highly uncertain, or that require further specification by Federal agencies or Congress, are not included. Moreover, *AEO2010* does not include any provision that addresses a level of detail beyond that modeled in NEMS.

This section provides a summary of the ARRA provisions and highlights those specific provisions incorporated in *AEO2010*, including:

- Weatherization and assisted housing programs
- Energy efficiency and conservation block grant programs
- State energy programs
- Tax credits for plug-in hybrid electric vehicles (PHEVs)
- Tax credits for electric vehicles
- Updated tax credits for renewables
- Loan guarantees for renewables and biofuels
- Support for carbon capture and storage (CCS)
- Smart grid expenditures.

The following discussion provides a summary of the ARRA provisions included in *AEO2010* and some of the provisions that could be included if more complete information were available about their funding and implementation. This discussion is not a complete summary of all the sections of ARRA.

ARRA end-use demand provisions

Residential and commercial buildings

Many of the provisions of ARRA target energy efficiency and renewable energy use associated with residential and commercial buildings. Federal funding is provided to assist State and local governments in implementing energy efficiency programs; to improve energy efficiency and renewable energy use in Federal buildings and facilities; and to encourage renovations of schools and college facilities. ARRA also includes provisions that expand and revise tax credits for renewable and energy-efficient property purchased and installed in residential and commercial buildings.

Weatherization, assisted housing, and energy efficiency and conservation block grants

ARRA Title IV, “Energy and Water Development,” allocates a total of \$9.45 billion to weatherize and/or

increase the energy efficiency of low-income housing and assist local governments in implementing energy efficiency programs, with a total of \$4.75 billion specifically for weatherization. The regional impacts of weatherization funds are estimated on the basis of DOE’s State allocation formula [6] and Oak Ridge National Laboratory’s weatherization impact analysis. Local governments also are allowed, and assumed, to use some of the Conservation Block Grant funding for PV and wind turbine installations.

State energy programs

ARRA Title IV, “Energy and Water Development,” allocates \$3.1 billion for States to implement or enhance energy efficiency programs. Although the money can be spent on a variety of programs, Section 410 specifically mentions the adoption of building codes, citing the International Energy Conservation Code (IECC) 2009. To account for the impact of the funding in *AEO2010*, it is assumed that States will adopt and enforce the IECC 2006 code by 2011 and the IECC 2009 code by 2018. Likewise, States are assumed to adopt and enforce the ASHRAE 90.1-2007 standard for nonresidential construction by 2018. States and local governments also are assumed to use the 10-year Treasury Note rate (3.7 percent in 2011) when purchasing energy-using equipment for government-owned facilities during years when ARRA funding is available. It is also assumed that part of the funding for State energy programs will be used for PV and wind turbine installations.

Federal buildings and green schools

ARRA Division A allocates \$4.5 billion to the U.S. General Services Administration (GSA) for measures to convert GSA facilities to high-performance green buildings, \$2.3 billion for military construction, and \$4.3 billion for U.S. Department of Defense (DOD) energy efficiency projects and modernization of facilities. Additional DOD funding is provided for energy efficiency technology demonstrations and research. Under the various titles included in ARRA, money is also allocated to virtually every major Federal agency for construction, repair, and/or modernization of facilities. To account for the funding in *AEO2010*, schools and Federal facilities are assumed to use the 10-year Treasury Note rate as a hurdle rate for new construction and replacement of equipment in years when ARRA funding is available. The 10-year Treasury Note rate already was assumed for new construction of Federal facilities, based on earlier legislation. ARRA funding also broadens its use to include

replacement equipment as well. Photovoltaic installations, wind turbines, and fuel cells also are added where specified in expenditure plans.

Updated tax credits for renewables and energy-efficient technologies

ARRA Division B expands and revises tax credits for the purchase of renewable and energy-efficient property purchased and installed in residential and commercial buildings. Section 1103 removes the cap on the 30-percent business ITC for small wind property that was established in EIEA2008. Sections 1121 and 1122 extend by 1 year the tax credits for energy-efficient nonbusiness property while increasing the tax-deductible amount to \$1,500. For renewable technologies, such as geothermal heat pumps and solar water heaters, the tax deductible amount is unlimited, up to 30 percent of the cost.

Transportation sector

ARRA contains several changes to the PHEV tax credit originally included in EIEA2008. Title I, “Tax Provisions,” Section 1141, allows a \$2,500 tax credit for the purchase of qualified PHEVs with battery capacity of at least 4 kilowatthours. Starting at a battery capacity of 5 kilowatthours, PHEVs earn an additional battery credit of \$417 per kilowatthour, up to a maximum of \$5,000. The maximum total PHEV credit that can be earned is capped at \$7,500 per vehicle.

The PHEV tax credit eligibility and phaseout are tied to the sales of individual vehicle manufacturers. The credits are phased out once a manufacturer’s cumulative sales of qualified vehicles reach 200,000. The phaseout period begins two calendar quarters after the first date in which a manufacturer’s sales reach the cumulative sales maximum after December 31, 2009. The credit is reduced to 50 percent of its total value for the first two calendar quarters of the phaseout period, and then to 25 percent for the third and fourth calendar quarters, before being phased out entirely thereafter. The credit applies to vehicles with gross vehicle weight rating (GVWR) less than 14,000 pounds. To capture the phaseout period in *AEO2010*, the PHEV tax credit has been incorporated across representative manufacturer groups.

ARRA Title I, “Tax Provisions,” Section 1142, also allows a tax credit of 10 percent against the cost of a qualified electric vehicle with a battery capacity of at least 4 kilowatthours, subject to the same phaseout

schedule applied to PHEVs. The new electric vehicle tax credit has also been incorporated in *AEO2010* by manufacturer group.

ARRA electricity provisions

ARRA establishes Federal loan guarantees for certain renewable fuel, biofuel, and electricity transmission projects. The provisions for renewable projects are included in the electricity modeling for *AEO2010*. ARRA also extends and modifies Federal tax credit incentives for new renewable generation capacity. The NEMS electricity module also represents the funding provided in ARRA for smart grid demonstration projects.

Extension of renewable production and investment tax credits

ARRA Division B, Title 1, “Tax Provisions,” extends and significantly modifies the Federal tax credits for new renewable generation capacity. Before enactment of ARRA, wind, geothermal, landfill gas, and certain hydroelectric and biomass technologies were eligible to receive a PTC of up to 2.1 cents per kilowatthour generated over the first 10 years of plant operation [7]; wind was eligible to receive the PTC for plants constructed before January 1, 2010; and other eligible plants received the PTC if construction was completed before January 1, 2011. ARRA Section 1101 extends those in-service deadlines to January 1, 2013, for wind and January 1, 2014, for other eligible technologies.

In addition, under Section 1102, ARRA allows projects that are eligible for the PTC to instead receive a 30-percent ITC on plant investment costs. Section 1603 also allows the owners of projects choosing the ITC to receive the payment in the form of an after-tax grant of equivalent value rather than as a tax credit, which presumably will allow project owners with limited tax liabilities to claim the full value of the credit.

Solar technologies are not eligible for the ARRA PTC, but EIEA2008 established a 30-percent ITC for solar projects built through 2016, and the Energy Policy Act of 1992 provided a permanent 10-percent ITC.

AEO2010 incorporates the ARRA provisions cited above and generally assumes that renewable electricity projects will claim the more favorable tax credit or grant option available to them during the eligibility period. Provisions extending tax credits for marine-based technologies are not reflected in *AEO2010*,

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because EIA assumes that those technologies will not be in significant commercial use by 2035. ARRA also extends funding for Clean Renewable Energy Bonds (CREBs) used to fund renewable energy projects at publicly owned utilities that do not pay taxes and cannot take advantage of tax credits. Because *AEO2010* assumes that all new renewable capacity is developed and owned by taxable entities, CREBs are not included in NEMS.

Loan guarantees for renewables and transmission projects

ARRA Title IV, “Energy and Water Development,” Section 406, provides \$6 billion to pay the cost of guarantees for loans authorized by the Energy Policy Act of 2005 (EPACT2005). The purpose of the loan guarantees is to stimulate the deployment of conventional renewable technologies, conventional transmission technologies, and innovative biofuels technologies. To qualify, eligible projects must be under construction by September 30, 2011, meaning that projects with a long-term construction horizon are unlikely to qualify. The face value of the loans that may be guaranteed by the appropriation will depend on the subsidy costs assigned to the projects eventually selected. For example, if the average subsidy cost were 10 percent of the face value of the loans, the \$6 billion appropriated would support loan guarantees on \$60 billion of debt financing. The Section 406 provision is represented in *AEO2010* by a lower cost of financing (by 2 percentage points) for all eligible renewable projects brought on line by 2015. The 2015 date, 4 years after the September 30, 2011, cutoff date for start of construction, was chosen to allow for the construction period associated with most renewable generating technologies.

Smart grid expenditures

ARRA Title IV, “Energy and Water Development,” Section 405, provides \$4.5 billion to modernize, secure, and improve the reliability of electric energy and storage infrastructure and to develop a Smart Grid. While somewhat difficult to define, smart grid technologies generally include a wide array of storage, measurement, communications, and control equipment employed throughout the generation, transmission, and distribution system to enable real-time monitoring of the production, flow, and use of power from generator to consumer. Among other things, smart grid technologies, once deployed, are expected to enable more efficient use of the transmission and distribution grid and lower line losses,

facilitate greater use of renewables, and provide information to utilities and their customers that will lead to greater investment in energy efficiency and reduction of peak load demands. The funds provided will not cover the cost of widespread implementation of smart grid technologies but could stimulate more rapid investment than otherwise would occur.

Several changes were made throughout NEMS to represent the impacts of the smart grid funding provided in ARRA. For the electricity module, it was assumed that line losses would decrease slightly, peak loads would fall as customers shifted their usage patterns, and customers would be more responsive to price signals. Historically, line losses (expressed as the percentage of electricity lost in transmission) have fallen as utilities have made investments to expand the grid or replace aging or failing equipment. That trend was incorporated in previous *AEO* Reference cases. After passage of ARRA, the time period for improvements was extended, allowing for greater declines in line losses. *AEO2010* assumes that line losses will be reduced from roughly 6.9 percent in 2008 to 5.3 percent in 2025.

Smart grid technologies also have the potential to reduce peak demand through the increased deployment of demand response programs. *AEO2010* assumes that efforts stimulated by Federal expenditures on smart grid technologies will reduce peak demands in 2035 by 3 percent from what they otherwise would be. Because the load shifted to off-peak hours is not eliminated, net energy consumed remains largely constant.

It is also assumed that increased investment in smart grid technologies—particularly, smart meters on buildings and homes—will make consumers more responsive to changes in electricity prices. Accordingly, the price elasticity of demand for residential and commercial electricity is increased for certain uses.

Coal

ARRA Title IV, “Energy and Water Development,” provides \$3.4 billion for additional research and development of fossil energy technologies, including \$800 million to fund projects under the Clean Coal Power Initiative program focusing on capture and sequestration of GHGs [8]. In July 2009, a total of \$408 million was allocated to two projects—the Basin Electric Power Cooperative’s Antelope Valley Station in North Dakota and the Hydrogen Energy Project in California—to demonstrate the capability to

capture 3 million tons of CO₂ per year. In December 2009, two additional project awards were announced through the Clean Coal Power Initiative program, which will be funded in part through ARRA. The projects include American Electric Power's Mountaineer plant in West Virginia (235-megawatt flue gas stream) and a new plant to be built by Summit Texas Clean Energy in Texas. To reflect the impact of this provision, the *AEO2010* Reference case assumes that an additional 1 gigawatt of coal-fired capacity with CCS will be built by 2017.

Other ARRA provisions

Additional appropriations under ARRA Title IV, totaling \$2.6 billion, are not included in *AEO2010*, because the activities funded have only indirect or unknown impacts on energy use, or because insufficient program detail has been provided. The additional appropriations include \$1 billion for research and development projects to be established by the Secretary of Energy; \$80 million for geologic sequestration projects covering site characterization, training, research grants, and other administrative costs; and \$1.52 billion for industrial carbon capture and energy efficiency projects or those developing innovative uses for CO₂. As of October 2009, \$112 million of the \$1.52 billion had been allocated to 14 industrial projects demonstrating various combinations of carbon capture technologies, CO₂ transport activities, sequestration, and EOR.

Liquid fuels taxes and tax credits

This section provides a review of the treatment of Federal fuels taxes and tax credits in *AEO2010*.

Excise taxes on highway fuel

The treatment of Federal highway fuel taxes remains unchanged from the previous year's *AEO*. Gasoline is taxed at 18.4 cents per gallon, diesel fuel at 24.4 cents per gallon, and jet fuel at 4.4 cents per gallon, consistent with current laws and regulations. Consistent with Federal budgeting procedures, which dictate that excise taxes dedicated to a trust fund, if expiring, are assumed to be extended at current rates, these taxes are maintained at their present levels, without adjustment for inflation, throughout the projection [9]. State fuel taxes are calculated on the basis of a volume-weighted average for diesel, gasoline, and jet fuels. The State fuel taxes were updated as of July 2009 [10] and are held constant in real terms over the projection period, consistent with historical experience.

Biofuels tax credits and tariffs

No changes have been made in the treatment of biofuels taxes and credits in *AEO2010*. The existing ethanol excise tax credit of \$0.45 per gallon, as specified in the Food, Conservation, and Energy Act of 2008 [11], is still scheduled to expire at the end of 2010. In addition, the PTC of \$1.01 per gallon for cellulosic biofuels [12], also specified in the Food, Conservation, and Energy Act of 2008, remains set to expire on January 1, 2013.

The \$1.00-per-gallon excise tax credit for biodiesel established in the Emergency Economic Stabilization Act of 2008 [13] expired on December 31, 2009. The credit applies to biodiesel made from recycled vegetable oils or recycled animal fats, as well as renewable diesel (e.g., diesel derived from biomass).

Low-carbon fuel standard

In April 2009, the CARB passed the world's first low-carbon fuel standard (LCFS), which is scheduled to go into effect on January 1, 2011 [14]. Because the rules for the LCFS had not been finalized as of October 2009, they are not included in *AEO2010*. The regulation aims to reduce the carbon content of transportation fuels sold in California by 10 percent in 2020. The reductions will be applied to gasoline and diesel fuel pools, as well as a number of their substitutes as defined by CARB's eligible fuel pathways [15], with providers of transportation fuels being the regulated parties. Regulated parties will be able to meet the LCFS by using a combination of fuel blends, alternative fuels, and LCFS credits. By the end of 2010, the baseline carbon intensities for gasoline, diesel fuel, and their substitutes will be calculated and finalized in a full-life-cycle fuel analysis, which will consider indirect land-use effects for certain biofuels.

CAFE standards

Pursuant to the President's announcement of a National Fuel Efficiency Policy, the National Highway Traffic Safety Administration (NHTSA) and the EPA have promulgated nationally coordinated standards for tailpipe CO₂-equivalent emissions and fuel economy for light-duty vehicles (LDVs) [16], which includes both passenger cars and light-duty trucks. In the joint rulemaking, EPA is enacting CO₂-equivalent emissions standards under the Clean Air Act (CAA), and NHTSA is enacting companion CAFE standards under the Energy Policy and Conservation Act, as amended by EISA2007.

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The initial harmonized standards will affect model year (MY) 2012 vehicles, and compliance requirements will increase in stringency through MY 2016, building on NHTSA's enacted CAFE standard for MY 2011. NHTSA has estimated the impact of the new CAFE standards and has projected that the proposed fleet-wide standards for LDVs will increase fuel economy from 27.3 mpg in MY 2011 to 34.1 mpg in MY 2016, an average annual increase of 4.3 percent. EPA projects a fleet-wide reduction in CO₂-equivalent emissions from 295 grams per mile for MY 2011 to 250 grams per mile for MY 2016 (Table 1).

Although the two separate standards were issued jointly, there are important differences between them. In lieu of increasing vehicle fuel economy, EPA's vehicle CO₂-equivalent emissions standard allows manufacturers to generate CO₂-equivalent credits by reducing emissions of hydrofluorocarbons by improving air conditioner systems and alternative fuel use capabilities. NHTSA estimates that adoption of cost-effective technologies will enable manufacturers to achieve a fleet-wide minimum fuel economy requirement of 34.1 mpg by 2016. Because the CO₂-equivalent standards cover all vehicle emissions related to GHGs, manufacturers who do not implement technologies that address non-fuel-related emissions will have to comply with a fuel economy standard of 35.5 mpg by 2016.

The fuel standards use an attribute-based methodology to determine the minimum fuel economy requirements and CO₂-equivalent emissions standards for vehicles based on footprint, defined as the wheelbase (the distance from the center of the front axle to the center of the rear axle) times the average track width (the distance between the center lines of the tires) in square feet.

Table 1. Estimated average fleet-wide fuel economy and CO₂-equivalent emissions compliance levels, model years 2012-2016

Model year	Passenger car	Light truck	Combined
NHTSA CAFE standard (miles per gallon)			
2012	33.3	25.4	29.7
2013	34.2	26.0	30.5
2014	34.9	26.6	31.3
2015	36.2	27.5	32.6
2016	37.5	28.8	34.1
EPA CO₂-equivalent emissions standard (grams per mile)			
2012	263	346	295
2013	256	337	286
2014	247	326	276
2015	236	312	263
2016	225	298	250

For example, a passenger car with a footprint of 44 square feet in MY 2016 will face a fuel economy standard of 38.8 mpg and a CO₂-equivalent emission standard of 218.6 grams per mile. Standards are revised in subsequent model years to ensure improvement in fuel economy and a reduction in CO₂-equivalent emissions over time. Separate mathematical functions are established for passenger cars and light trucks, reflecting their different design capabilities (Figures 5 and 6). As required by EISA2007, *AEO2010* assumes that CAFE standards will be increased, so that the combined fuel economy of new LDVs will achieve the required minimum of 35 mpg by 2020.

Manufacturer compliance is determined for CAFE by a harmonically weighted average of sales of cars and light trucks and for CO₂-equivalent emissions by a

Figure 5. Projected average fleet-wide fuel economy and CO₂-equivalent emissions compliance levels for passenger cars, model year 2016 (miles per gallon equivalent)

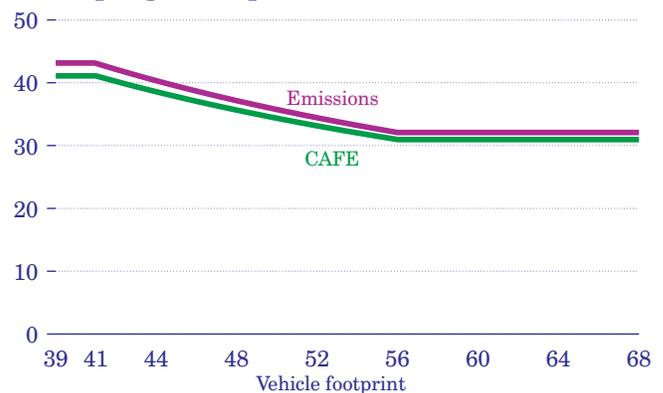
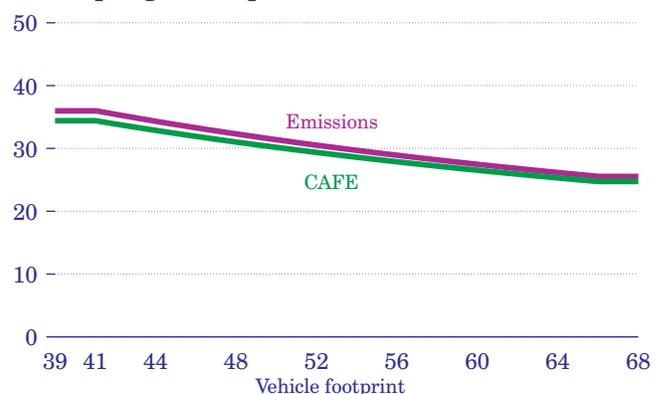


Figure 6. Projected average fleet-wide fuel economy and CO₂-equivalent emissions compliance levels for light trucks, model year 2016 (miles per gallon equivalent)



production-weighted average compliance across each manufacturer's fleet. Individual manufacturers face different CAFE and CO₂ equivalent compliance stringencies to the extent that their sales and production distributions differ by footprint.

The NHTSA-EPA standards also include flexibility provisions for compliance by individual manufacturers, such as: (1) allowing credit trading among manufacturers who exceed their standards and those who do not; (2) allowing credit transfers among vehicle fleets for a single manufacturer; (3) allowing manufacturers to "carry forward" credits earned from exceeding the standards in earlier model years and "carry back" credits earned in later years to meet shortfalls from earlier model years; and (4) allowing manufacturers to earn CAFE credits by producing AFVs, with credits for flex-fuel vehicles (FFVs) being phased out by MY 2019, and earn CO₂-equivalent credits for FFVs until MY 2015 unless the manufacturer can prove that the vehicle is actually using an alternative fuel. NHTSA and the EPA also differ in their compliance flexibility provisions, such as EPA's air conditioner credits and a temporary lead-time allowance for manufacturers who sell fewer than 400,000 vehicles in MY 2009.

The flexibility provisions do not, however, allow manufacturers to deviate significantly from their annual fuel economy targets. NHTSA retains a required minimum fuel economy level for passenger cars. Before any credit can be applied by a manufacturer, its passenger car fleet for the model year must meet an average fuel economy standard—either 27.5 mpg or 92 percent of the CAFE for the industry-wide combined fleet of domestic and nondomestic passenger cars for that model year, whichever is higher. Based on NHTSA's current market projection, its estimate of the minimum standard is 34.8 mpg in 2016. It is important to note that EPA and NHTSA's joint proposal is subject to change in future rulemakings. Although the final CAFE standards have been enacted, only the proposed CAFE standards and compliance schedule were available when *AEO2010* was finalized. At that time, the proposal offered the best available insight into future regulations implementing EISA2007 CAFE requirements through 2016. *AEO2010* increases the MY 2016 fuel economy standards to ensure that the EISA2007 mandated minimum requirements are met through 2020.

New EPA guidelines for review of surface coal mining operations in Appalachia

On April 1, 2010, the EPA issued a set of new guidelines to several of its Regional offices regarding the compliance of surface coal mining operations in Appalachia with the provisions of the Clean Water Act (CWA), the National Environmental Policy Act, and the environmental justice Executive Order (E.O. 12898). The stated purpose of the guidance was to explain more fully the approach that the EPA will be following in permit reviews, and to provide additional assurance that its Regional offices use clear, consistent, and science-based standards in reviewing the permits. Although the new guidelines go into effect immediately, they will be subjected to review both by the public and by the EPA's Science Advisory Board, with a set of final guidelines to be issued no later than April 1, 2011.

Issuance of the new EPA guidelines is related primarily to the ongoing controversy over use of the mountaintop removal method at a number of surface coal mining operations in Central Appalachia—primarily in southern West Virginia and eastern Kentucky. Although the guidelines propose a more rigorous review for all new surface coal mines in Appalachia, the EPA indicates that the practice of valley fills, primarily associated with the mountaintop removal method, is the aspect of Appalachian coal mining that will be most scrutinized. In particular, the EPA points to new scientific evidence that dissolved solids in drainage from existing valley fills in Central Appalachia are adversely affecting downstream aquatic systems.

Although the proposed use of valley fills at mining sites will not necessarily preclude the issuance of permits for surface mines under CWA Sections 402 and 404, the EPA guidelines recommend that all practicable efforts be made to minimize their use. Section 402 of the CWA pertains to the issuance of National Pollution Discharge Elimination System permits. Section 404 relates to the issuance of permits for the discharge of dredge or fill material into the waters of the United States, including wetlands. Issuance of Section 404 permits comes under the authority of the U.S. Army Corps of Engineers, but is subject to EPA oversight.

Two recent actions by the EPA related to its review of Section 404 permits for proposed mountaintop

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mining operations in West Virginia indicate the agency's heightened concern with regard to valley fills. In January 2010, the EPA announced its approval for the issuance of a Section 404 permit for Patriot Coal's proposed Hobet 45 mountaintop mining operation. The EPA indicated that the company was able to eliminate the need for any valley fills and, as a result, reduce the estimated adverse downstream impact by 50 percent. In contrast, in March 2010, the EPA was not able to extend approval of a Section 404 permit for Arch Coal Company's proposed Spruce No. 1 mountaintop mining operation, because the mine plan proposed the burial of 7.5 miles of healthy headwater streams under the spoil of six separate valley fills.

The EPA's new guidelines for surface coal mining operations are not represented in the *AEO2010* projections, because they were issued after the cutoff date for model simulations. The likely impact of representing the more intensive reviews of new mining operations would be higher projected prices and lower production for surface-mined coal from Central Appalachia. In the *AEO2010* Reference case, coal production at surface mines in Central Appalachia is projected to decline from 115 million tons in 2008 to 71 million tons in 2020 and 63 million tons in 2035.

Clean Air Interstate Rule: Changes and modeling in *AEO2010*

On December 23, 2008, the D.C. Circuit Court remanded but did not vacate CAIR [17], overriding its previous decision on February 8, 2008, to remand and vacate CAIR. The December decision, which is reflected in *AEO2010*, allows CAIR to remain in effect, providing time for the EPA to modify the rule in order to address objections raised by the Court in its earlier decision. A similar rule, referred to as the CAMR, which was to set up a cap-and-trade system for reducing mercury emissions by approximately 70 percent, is not represented in the *AEO2010* projections, because it was vacated by the D.C. Circuit Court in February 2008.

CAIR, which was promulgated by the EPA in 2005, was designed to achieve further reductions in emissions of sulfur dioxide (SO₂) and nitrogen oxides (NO_x) beyond those established in the 1990 CAA Amendments. The emissions reductions mandated by the rule were put in place to assist States in meeting their National Ambient Air Quality Standards for ground-level ozone and particulate matter. The EPA

identified 28 States and the District of Columbia to participate in the program, because they either were not meeting the standards themselves or were contributing to emissions in downwind States that were out of compliance. When fully implemented, CAIR was designed to cap SO₂ emissions at 2.5 million tons and NO_x emissions at 1.3 million tons in the affected States [18]. States could comply with the limits either by participating in a cap-and-trade system or by developing their own strategies to achieve their required reduction shares.

The annual NO_x emissions trading program developed for CAIR commenced in 2009. SO₂ emissions caps under the rule will take effect in 2010. Meanwhile, the EPA is developing a new CAIR designed to address the shortcomings identified by the court. The EPA expects to release a proposal for the replacement CAIR in May 2010 [19]. There is also a possibility that legislative action could be taken to develop new standards, but because the *AEO* does not anticipate future laws or regulations, *AEO2010* assumes that the long-term reduction goals of CAIR will be met through the existing cap-and-trade system specified in the current rule.

State renewable energy requirements and goals: Update through 2009

To the extent possible, *AEO2010* incorporates the impacts of State laws requiring the addition of renewable generation or capacity by utilities doing business in the States. Currently, 30 States and the District of Columbia have enforceable RPS or similar laws (Table 2). Under such standards, each State determines its own levels of generation, eligible technologies, and noncompliance penalties. *AEO2010* includes the impacts of all laws in effect as of September 2009 (with the exception of Hawaii, because NEMS provides electricity market projections for the continental United States only).

In the *AEO2010* Reference case, States generally meet their ultimate RPS targets. RPS compliance in most regions is approximated, because NEMS is not a State-level model, and each State represents only a portion of one of the NEMS regions, which are composed of multiple States. Compliance costs in each region are tracked, and the projection for total renewable generation is checked for consistency with any State-level cost-control provisions, such as caps on renewable credit prices, limits on State compliance funding, or impacts on consumer electricity prices.

Table 2. Renewable portfolio standards in the 30 States with current mandates

State	Program mandate
AZ	Arizona Corporate Commission Decision No. 69127 requires 15 percent of electricity sales to be renewable by 2025, with interim goals increasing annually. A specific percentage of the target must be from distributed generation. Multiple credits may be provided to solar generation and in-State manufactured systems.
CA	Public Utilities Code Sections 399.11-399.20 mandate that 20 percent of electricity sales must be renewable by 2010. There are also goals for the longer term. Renewable projects with above-market costs will be funded by supplemental energy payments from a dedicated fund, possibly limiting renewable generation to less than the 20-percent requirement.
CO	House Bill 1281 sets the renewable target for investor-owned utilities at 20 percent by 2020. There is a 10-percent requirement in the same year for cooperatives and municipals. Moreover, 2 percent of total sales must come from solar power. In-State generation receives a 25-percent credit premium.
CT	Public Act 07-242 mandates a 27-percent renewable sales requirement by 2020, including a 4-percent mandate from higher efficiency or CHP systems. Of the overall total, 3 percent may be met by waste-to-energy facilities and conventional biomass.
DE	Senate Bill 19 required an RPS target of 20 percent of sales by 2019. There is a separate requirement for solar generation (2 percent of the total), and penalty payments for compliance failure. Solar technologies receive triple credits. Offshore wind receives 3.5 times the credit amount.
HI	Senate Bill 3185 sets the renewable mandate at 20 percent by 2020. All existing renewable facilities are eligible to meet the target, which has two interim milestones.
IL	Public Act 095-0481 created an agency responsible for overseeing the mandate of 25-percent renewable sales by 2025. There are escalating annual targets, and 75 percent of the requirements must be generated from wind. The plan also includes a cap on the incremental costs added from renewable penetration. In 2009, the rule was modified to cover sales outside a utility's home territory.
IA	In 1983, an RPS mandating 105 megawatts of renewable energy capacity was adopted. A voluntary goal of 1,000 megawatts of renewable energy was adopted in 2001.
KS	In 2009, House Bill 2369 established a requirement that 20 percent of installed capacity must use renewable resources by 2020.
ME	In 2007, Public Law 403 was added to the State's RPS requirements. The original mandate of 30 percent renewable generation by 2000 was set below renewable generation at the time. The new law requires a 10-percent increase from the 2006 level of renewable capacity by 2017, and that level must be maintained in subsequent years. The years leading up to 2017 also have new capacity milestones. Generation from eligible community-owned facilities counts as 1.1 kilowatthours for every kilowatthour of actual generation.
MD	In April 2008, House Bill 375 revised the preceding RPS to contain a 20-percent target by 2022, including a 2-percent solar target. H.B. 375 also raised penalty payments for "Tier 1" compliance shortfalls to 4 cents per kilowatthour.
MA	The RPS has a goal of a 15-percent renewable share of total sales by 2020. The State also has necessary payments for compliance shortfalls. As of December 2009, consideration of the eligibility of new biomass facilities was temporarily suspended while the State studies the issue of the sustainability of biomass resources.
MI	Public Act 295 established an RPS that will require 10 percent renewable generation by 2015. Bonus credits are given to solar energy.
MN	Senate Bill 4 created a 30-percent renewable requirement by 2020 for Xcel, the State's largest supplier, and a 25-percent requirement by 2025 for other suppliers. Also specified was the creation of a State cap-and-trade program that will assist the program's implementation. The 30-percent requirement for Xcel consists of 24 percent that must be from wind, 1 percent that can be from wind or solar, and 5 percent that can be from other resources.
MO	In November 2008, Missouri voters approved Proposition C, which mandates a 2-percent renewable energy requirement in 2011, which will increase incrementally to 15 percent of generation in 2021. Bonus credits are given to renewable generation within the State.
MT	House Bill 681, approved in April 2008, expanded the RPS provisions to all suppliers. Initially the law covered only public utilities. A 15-percent share of sales must be renewable by 2015. The State operates a renewable energy credit market.
NV	The State has an escalating renewable target, established in 1997 and revised in 2005 and again in 2009 by Senate Bill 358. The most recent requirement mandates a 25-percent renewable generation share of sales by 2025. Up to one-quarter of the 25-percent share may be met through efficiency measures. There is also a minimum requirement for photovoltaic systems, which receive bonus credits.
NH	House Bill 873, passed in May 2007, legislated that 23.8 percent of electricity sales must be met by renewables in 2025. Compliance penalties vary by generation type.
NJ	In 2006, the RPS was revised to increase renewable energy targets. Renewable generation is to provide 22.5 percent of sales by 2021, with interim targets. There are different requirements for different technologies, including a 2-percent solar mandate.
NM	Senate Bill 418, passed in March 2007, directs investor-owned utilities to derive 20 percent of their sales from renewable generation by 2020. The renewable portfolio must consist of diversified technologies, with wind and solar each accounting for 20 percent of the target. There is a separate standard of 10 percent by 2020 for cooperatives.
NY	The Public Service Commission issued RPS rules in 2005 that call for an increase in renewable electricity sales to 25 percent of the total by 2013, from the current level of 19 percent. The program is administered and funded by the State.
NC	In 2007, Senate Bill 3 created an RPS of 12.5 percent by 2021 for investor-owned utilities. There is also a 10-percent requirement by 2018 for cooperatives and municipals. Through 2018, 25 percent of the target may be met through efficiency standards, increasing to 40 percent in later years.

(continued on page 16)

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Table 2. Renewable portfolio standards in the 30 States with current mandates (continued)

State	Program mandate
OH	Senate Bill 221, passed in May 2008, requires 25 percent of electricity sales to be produced from alternative energy resources by 2025, including low-carbon and renewable technologies. One-half of the target must come from renewable sources. Municipals and cooperatives are exempt.
OR	Senate Bill 838 (signed into law in June 2007) required renewable targets of 25 percent by 2025 for large utilities and 5 to 10 percent by 2025 for smaller utilities. Renewable electricity on line after 1995 is considered eligible. Compliance penalty caps have not yet been determined.
PA	The Alternative Energy Portfolio Standard, signed into law in November 2004, has an 18-percent requirement by 2020. Most of the qualifying generation must be renewable, but there is also a provision that allows waste coal resources to receive credits.
RI	The Renewable Energy Standard was signed into law in 2004. The program requires that 16 percent of total sales be renewable by 2019. The interim program targets escalate more rapidly in later years. If the target is not met, a generator must pay an alternative compliance penalty. State utilities must also procure 90 megawatts of new renewable capacity, including 3 megawatts of solar, by 2014.
TX	Senate Bill 20, passed in August 2005, strengthened the State RPS by mandating 5,880 megawatts of renewable capacity by 2015. There is also a target of 500 megawatts of renewable capacity other than wind.
WA	In November 2006, Washington voters approved Initiative 937, which specifies that 15 percent of sales from the State's largest generators must come from renewable sources by 2020. There is an administrative penalty of 5 cents per kilowatthour for noncompliance. Generation from any facility that came on line after 1999 is eligible.
WV	House Bill 103, passed in June 2009, established a requirement that 25 percent of sales must come from alternative energy resources by 2025. Alternative energy was defined to include various renewables, along with several different fossil energy technologies.
WI	Senate Bill 459, passed in March 2006, strengthened the State RPS with a requirement that, by 2015, each utility must generate 10 percent of its electricity from renewable resources, up from the previous requirement of 2.2 percent in 2011. The renewable share of total generation must be at least 6 percentage points above the average renewable share from 2001 to 2003.

States that have enacted new laws include the following:

Kansas. House Bill 2369 [20] established a capacity-based renewable electricity goal that requires 20 percent of capacity to be from renewable resources by 2020. In-State renewable capacity resources will count as 1.1 megawatts of capacity for every megawatt of nameplate capacity. Although other States, such as Texas and Iowa, have had capacity-based renewable targets before, Kansas specifies the capacity goal as a fraction of installed capacity rather than as a fixed quantity of capacity. Most of the RPS programs included in *AEO2010* are based on electricity generation; however, for modeling purposes EIA converted the capacity targets to approximate generation equivalents, assuming that wind will be the primary compliance resource.

West Virginia. In June 2009, the West Virginia legislation enacted House Bill 103 [21], an "alternative and renewable energy portfolio standard." The law allows certain types of coal or coal-based gases to compete to meet the same target as wind and other renewable resources. Eligible resources must meet 25 percent of electricity sales by 2025. Although other States have included nonrenewable resources in their policies, they have a separate "tier" or target schedule for the fossil resources. Because it lacks a distinct renewable energy target and presents capacity expansion requirements largely consistent with the

underlying assumptions for *AEO2010*, the legislation is not specifically reflected in *AEO2010*.

States with significant modifications to existing laws include the following:

Illinois. The Illinois Commerce Commission issued additional regulations in implementing the existing Illinois RPS [22] with Order 09-0432 [23] and now applies the renewable targets to sales outside an energy service provider's territory, not just to sales by default service providers.

Maine. With the passage of LD 1075 [24], Maine now counts generation from eligible community-owned resources toward meeting the RPS requirements, at a rate of 1.5 kilowatthours for every kilowatthour of actual generation.

Massachusetts. On December 3, 2009, the Massachusetts Department of Energy Resources [25] placed a temporary hold on the consideration of certain new biomass plants to meet the State's RPS requirement. Because the action occurred after the *AEO2010* Reference case results were finalized, and because it is a temporary measure, EIA did not include it in the current projections. Currently, the Massachusetts Department of Energy Resources is studying concerns that have been raised over the sustainability of biomass resources; future consideration of biomass generation will be based on the results of that study.

Minnesota. Among other changes resulting from the passage of SF 550 [26], Minnesota now allows limited amounts of solar generation to be included in the wind-only generation provision applied to the State's largest utility. Whereas the prior law [27] required the largest utility in Minnesota to produce 25 percent of sales from wind generation and 5 percent from other eligible resources, now it may produce 24 percent from wind, 1 percent from wind or solar, and 5 percent from other eligible resources.

Nevada. In May 2009, Nevada enacted Senate Bill 358 [28], which increased the renewable electricity target to 25 percent of sales by 2025, of which 6 percent (1.5 percent of sales) must come from solar.

Rhode Island. In addition to its existing generation-based RPS schedule, with the enactment of H 5002 [29] Rhode Island will now require utilities to procure 90 megawatts of new renewable capacity, of which 3 megawatts must be solar.

Updated State air emissions regulations

Regional Greenhouse Gas Initiative

The Regional Greenhouse Gas Initiative (RGGI) is a program that includes 10 Northeast States that have agreed to curtail and reverse growth in their CO₂ emissions. The RGGI program includes all electricity generating units with a capacity of at least 25 megawatts and requires an allowance for each ton of CO₂ emitted [30]. The first year of mandatory compliance was in 2009.

Each participating State was provided a CO₂ budget consisting of a history-based baseline with a cushion for emissions growth, so that meeting the cap is expected to be relatively easy initially and become more stringent in subsequent years. The requirements are expected to cover 95 percent of CO₂ emissions from the region's electric power sector. Overall, the RGGI States as a whole must maintain covered emissions at a level of 188 million tons CO₂ for the next 4 years, after which a mandatory 2.5-percent annual decrease in CO₂ emissions through 2018 is expected to reduce the total for covered CO₂ emissions in the RGGI States to 10 percent below the initial calculated budget. Although each State was given its own emissions budget, allowances are auctioned at a uniform price across the entire region.

To preserve the program's integrity, several rules were agreed to by the participating States:

- Auctions are held quarterly and follow a single-round, sealed-bid format.
- Allowances are sold at a uniform price, which is the highest price of the rejected bids.
- States may hold a small number of allowances for their own use (however, most have decided to auction all their allowances).
- Each emitter must buy one allowance for every ton of CO₂ emitted.
- Future allowances are made available for purchase up to 4 years before their official vintage date, as a way to reduce price volatility.
- A reserve price floor of \$1.86 per allowance [31] in real dollars is in effect for each auction, as a way to preserve allowance prices in auctions where demand is low and to avoid collusion among emitters that could threaten a fair market. The floor price is subject to change at the discretion of RGGI officials.
- Revenue from the auctions can be spent at the State's discretion, but at least 25 percent must go into a fund that benefits consumers and promotes low-carbon energy development.

Since the first auction in September 2008, there have been five subsequent RGGI auctions. At the most recent, in December 2009, 28.6 million allowances were offered and sold at a clearing price of \$2.05 [32].

RGGI's impact on electricity markets is included in the *AEO2010* Reference case. Its impact on actual emissions, especially in the early years, is minimal because of its relatively generous emissions budget. Also, it is difficult to capture the nuances of initiatives that cover only single States or groups of States that do not correspond to the regions used in NEMS. Therefore, EIA estimated generation for the Mid-Atlantic region and capped emissions from those facilities. Pennsylvania's emissions were not restricted, because Pennsylvania is an observing member and is not participating in the cap-and-trade program or subject to any mandatory emission reductions.

Western Climate Initiative

The Western Climate Initiative (WCI) [33] is a separate regional GHG emissions reduction program. Participants include seven U.S. States (Arizona, California, Montana, New Mexico, Oregon, Utah, and Washington) and four Canadian Provinces (British

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Columbia, Manitoba, Ontario, and Quebec), as well as additional observer States and Provinces in the United States, Canada, and Mexico. Unlike RGGI, the WCI and California regulations are not included in the *AEO2010* Reference case, because their rules still are subject to change.

The initiative seeks to reduce GHG to levels 15 percent below 2005 emissions by 2020. Although the original plan was to achieve the reductions through an allowance cap-and-trade program, the current economic environment and changing political landscape have led some of the States to reevaluate their participation. Each State must provide legislative authority for the cap-and-trade system, and currently only California has the required authority in place. Consequently, the WCI has recently formed a complementary policy committee that will examine moving beyond cap and trade to explore issues such as tightening building codes, instituting appliance efficiency standards, and adopting RPS programs.

The WCI cap-and-trade structure is similar to RGGI but with some important differences. For example, the first phase of the program (2012-2015) would not cover emissions produced by the combustion of fossil fuels from smaller facilities or mobile sources, but all fuels would be covered by 2015, including fuels used in the residential, commercial, industrial, and transportation sectors. All fuels will be regulated at the point where they enter commerce, which generally is at a fuel distributor. This may vary, however, and the exact point will be determined before 2015.

The 2015 fuel cap is an expansion in scope over the first phase, which applies only to facilities emitting more than 25,000 CO₂-equivalent metric tons per year. Although the second phase covers fuels at the distributor level, the first phase regulates the larger, stationary facilities at the emissions source. The WCI recommends that States begin mandatory emissions monitoring this year, so that reporting can begin in 2011. As of January 2010, Arizona and Montana had not committed to the WCI reporting goals.

Another distinction between RGGI and WCI is that the latter would cover emissions of nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride in addition to CO₂. Emissions of the additional gases would be measured in terms of their CO₂-equivalent global warming potentials, and allowances would be issued accordingly. WCI documents estimate that 90 percent of the region's GHG

emissions would be subject to regulation after combustion fuels are included in 2015.

As noted above, California's Assembly Bill (A.B.) 32 gives the CARB authority to regulate GHG emissions and reduce them to 1990 levels by 2020. The Board recently released its draft regulations, which were open to comment until January 2010 [34]. A public report is expected to be issued in spring 2010, and a final version is due to be released in fall 2010. The State will use a cap-and-trade program to cover 85 percent of its GHG emissions—equivalent to covering the 600 largest stationary emissions sources as well as suppliers of residential, commercial, industrial, and transportation fuels. Imported power also is subject to the regulations.

Currently, three compliance periods are proposed: 2012-2014, 2015-2017, and 2018-2020. The first period will cover electricity generation and industrial sources emitting more than 25,000 metric tons CO₂ equivalent per year. The second period will begin a phase-in of smaller industrial sources and fuels. The third period will have a lower GHG ceiling that will extend beyond 2020. It is important to note, however, that this is tentative, and the compliance period may be shortened to one year rather than the current three. As of January 2010, the GHG caps for each period had not been met.

Midwestern Greenhouse Gas Reduction Accord

The Midwestern Greenhouse Gas Reduction Accord [35] is another regional initiative that seeks to curtail emissions. Six States (Illinois, Iowa, Kansas, Michigan, Minnesota, and Wisconsin) and one Canadian province (Manitoba) are members, and there are four additional observer States. Its advisory group released a draft of final recommendations in June 2009 [36]. The program is similar in structure to the WCI, and it seeks a 20-percent reduction from 2005 GHG emission levels by 2020 and an 80-percent reduction by 2050.

Although its final recommendations strongly urge Federal action, the committee has stated that it will proceed with a regional cap-and-trade system in the absence of Federal legislation. Finalized rules for the Accord have been delayed and are expected to be released sometime in 2010. The draft rules for the Midwestern Greenhouse Gas Reduction Accord are detailed [37], but because they are preliminary they are not included in *AEO2010*.

Endnotes for Legislation and Regulations

1. For complete text of the ARRA, see web site http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_public_laws&docid=f:publ005.111.
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7. Certain types of biomass, municipal waste, and hydroelectric generation are eligible for only one-half of the 2.1-cent credit. The ITC alternative is not limited in value for those technologies.
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11. 110th Congress, H.R. 2419, Food, Conservation, and Energy Act of 2008, Sec. 15331, Modification of Alcohol Credit (January 2008), web site http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=110_cong_bills&docid=f:h2419enr.txt.pdf.
12. The cellulosic biofuels represented in NEMS are cellulosic ethanol, biomass-to-liquids (BTL) diesel, and naphtha.
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14. California Air Resources Board, *Proposed Regulation to Implement the Low Carbon Fuel Standard*, Volume I (March 5, 2009), web site www.arb.ca.gov/fuels/lcfs/030409lcfs_isor_vol1.pdf.
15. California Air Resources Board, "Low Carbon Fuel Standard Program," Lifecycle Analysis, web site www.arb.ca.gov/fuels/lcfs/lcfs.htm.
16. Vehicles with GVWR of 8,500 pounds or less.
17. U.S. Court of Appeals for the District of Columbia Circuit, No. 05-1244, web site www.epa.gov/airmarkets/progsregs/cair/docs/CAIRRemandOrder.pdf.
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37. For further information, see Midwestern Greenhouse Gas Reduction Accord, web site <http://midwesternaccord.org>.