



Independent Statistics & Analysis
U.S. Energy Information
Administration

Summary of Legislation and Regulations included in the Annual Energy Outlook 2019

March 2019



This report was prepared by the U.S. Energy Information Administration (EIA), the statistical and analytical agency within the U.S. Department of Energy. By law, EIA's data, analyses, and forecasts are independent of approval by any other officer or employee of the United States Government. The views in this report therefore should not be construed as representing those of the U.S. Department of Energy or other federal agencies.

The version of National Energy Modeling System (NEMS) used for the *Annual Energy Outlook 2019* (AEO2019) generally represents current legislation, environmental regulations, and international protocols including recent government actions for which implementing regulations were available as of the end of September 2018. The potential effects of proposed federal and state legislation, regulations, or standards—or of sections of legislation that have been enacted but require funds and implementing regulations that have not been provided or specified—are not reflected in NEMS. A list of the specific federal and selected state legislation and regulations included in AEO2019, including how they are incorporated, is provided in each module’s Assumptions document. This document provides an overview of all the relevant regulations and includes summary tables that represent both new and existing legislation and regulations represented in NEMS.

New laws and regulations reflected in the Reference case

Federal

The Clean Power Plan (CPP) is not included in the AEO2019 Reference case. EIA will continue to monitor rulemaking by the U.S. Environmental Protection Agency and will include any new rules, once they become final, in subsequent AEOs.

International

International Convention for the Prevention of Pollution from Ships (MARPOL)

Legislation and regulations requiring decreased emissions and lower levels of airborne pollutants have been put into place around the world. In March 2010, the International Maritime Organization (IMO) amended the International Convention for the Prevention of Pollution from Ships (MARPOL) to designate specific portions of U.S., Canadian, and French territorial waters as Emission Control Areas (ECA). The North American ECA includes waters adjacent to the Pacific, Atlantic, and Gulf coasts, and the eight main Hawaiian Islands. The ECAs extend up to 200 nautical miles from the coasts of the United States, Canada, and the French territories, but they do not extend into marine areas subject to the sovereignty or jurisdiction of other countries. Compliance with the North American ECA became enforceable in August 2012. In October 2016, IMO members agreed to the 2008 MARPOL amendments that implement a new global limit in 2020 for sulfur emissions from ships. Under the new requirement, vessel operators must use *fuel oil on board* (which includes main and auxiliary engines and boilers) with a sulfur content of no more than 0.5% mass/mass. The current limit is 3.5%, which has been in effect since January 1, 2012. Some ships limit the air pollutants by installing exhaust gas cleaning systems, also known as *scrubbers*. This option is accepted under MARPOL as an alternative means to meet the sulfur limit requirement. These scrubbers are designed to remove sulfur oxides from the ship's engine and boiler exhaust gases. A ship fitted with a scrubber can use higher sulfur fuels because the sulfur oxide emissions will be reduced to the required fuel oil sulfur limit.

State

A number of state-level policies, including the Illinois Future Energy Jobs Act, the New York Clean Energy Standard, and the Maryland Clean Energy Jobs Act, as well as regional initiatives such as the Regional Greenhouse Gas Initiative, are reflected in the AEO2019 Reference case. Their inclusion affects the projections of the electricity generation mix.

Two general categories of state regulations are implemented in the AEO2019 Reference case—state energy efficiency programs and state renewable portfolio standards.

Renewable Portfolio Standards

To the extent possible, AEO2019 reflects state laws and regulations signed into law as of October 19, 2018, that require levels of renewable generation or capacity for utilities doing business in the state. These requirements are known as renewable portfolio standards (RPS). AEO2019 projections do not include laws and regulations with either voluntary goals or targets that can be substantially satisfied with nonrenewable resources.

The AEO2019 Reference case assumes that states will meet their ultimate RPS target, but they will not necessarily meet targets for interim years. RPS compliance constraints in most regions are estimated; however, because NEMS is not a state-level model and each state generally represents only a portion of one of the NEMS electricity regions. In general, EIA has confirmed requirements for each state through original legislative or regulatory documentation, including the [Database of State Incentives for Renewables & Efficiency](#) (DSIRE).

Most states are meeting or exceeding their required levels of renewable generation, based on qualified generation or purchase of renewable energy credits.¹ A number of factors helped create an environment favorable for RPS compliance, including

- New RPS-qualified generation capacity timed to take advantage of federal incentives, some of which are set to phase out at the end of 2019
- Reductions in the cost of wind, solar, and other renewable technologies
- Complementary state and local policies that either reduce costs (for example, equipment rebates) or increase revenue streams (for example, net metering) associated with RPS-eligible technologies

The RPS requirements for each state, as modeled for AEO2019, are shown in Table 1.

Table 1. Aggregate RPS requirements as modeled for AEO2019

State	Target	Qualifying renewables	Qualifying other (thermal, efficiency, nonrenewable, distributed generation, etc.)	Compliance mechanisms
AZ	15% by 2025	Solar, wind, biomass, hydro, landfill gas (LFG), and anaerobic digestion built after January 1, 1997	Direct use of solar heat, ground-source heat pumps, renewable-fueled combined heat and power (CHP), and fuel cells using renewable fuels	Credit trading is allowed with some bundling restrictions. Includes distributed generation requirement, starting at 5% of target in 2007, growing to 30% by 2012 and beyond.
CA	60% electricity generation by 2030, 100% carbon-free by 2045	Geothermal electric, solar thermal electric, solar photovoltaics, wind (all), biomass, municipal solid waste, landfill gas, tidal, wave, ocean thermal, wind (small), hydroelectric (small), and anaerobic digestion	Energy storage and fuel cells using renewable energy. Nuclear and hydroelectric (large) qualify toward the 100% carbon-free electricity generation until 2045	Credit trading is allowed with some restrictions. Renewable energy credit prices capped at \$50 per megawatt-hour (MWh).
CO	30% by 2020 for investor-owned utilities, 20% by 2020 for large electric cooperatives, 10% by 2020 for other cooperatives and municipal utilities serving more than 40,000 customers	Solar, wind, biomass, hydro, biomass, and geothermal	Recycled energy, coal-mine methane, pyrolysis gas produced from MSW, and fuel cells	Credit trading is allowed. Renewable distributed generation requirement applies to investor-owned utilities (3% of sales by 2020) and electric cooperatives (0.75% or 1% of sales by 2020, depending on size). Generation is eligible to earn credit multipliers if it is associated with certain projects that have specific ownership or transmission ties with small utilities, entities or individuals.
CT	48% by 2030 (44% renewables, 4% efficiency and CHP)	Solar, wind, biomass, hydro (with exceptions),	CHP and fuel cells	Credit trading is allowed. Obligated providers may comply via an alternative compliance payment of

¹ G. Barbose, "U.S. Renewables Portfolio Standards: Overview of Status and Key Trends" (Berkeley, CA: July 2017).

State	Target	Qualifying renewables	Qualifying other (thermal, efficiency, nonrenewable, distributed generation, etc.)	Compliance mechanisms
		geothermal, LFG/MSW, anaerobic digestion, and marine		\$55 per MWh. The target is composed of three class tiers, with tier-specific targets.
DE	25% by 2026	Solar, wind, biomass, hydro, geothermal, LFG, anaerobic digestion, and marine	Fuel cells	Credit trading is allowed. Credit multipliers are awarded for several compliance specifications, including a 300% credit awarded for generation from in-state distributed solar and renewable-fueled fuel cells. Target increases for some suppliers can be subject to a cost threshold.
DC	50% by 2032	Solar, wind, biomass, hydro, geothermal, LFG/MSW, and marine	Direct use of solar and cofiring	Credit trading is allowed. The target includes a solar-specific set-aside, equivalent to 2.5% of sales by 2023. Obligated providers may also comply via a tier-specific alternative compliance payment.
HI	100% by 2045	Geothermal electric, solar thermal electric, solar photovoltaics, wind (all), biomass, hydroelectric, hydrogen, geothermal heat pumps, municipal solid waste, combined heat and power, landfill gas, tidal, wave, ocean thermal, wind (small), anaerobic digestion, and fuel cells using renewable fuels	Solar water heat, solar space heat, and solar thermal process heat	Credits cannot be traded. Eligibility of several of the <i>qualifying other</i> displacement technologies is restricted after 2015. Utility companies can calculate compliance over all utility affiliates.
IL	25% by 2026 (3,000 MW solar and 1,300 MW wind)	Solar, wind, biomass, hydro, anaerobic digestion, and biodiesel	None	Credit trading is allowed. Target includes specific requirements for wind, solar, and distributed generation. The procurement process is subject to a cost cap.
IA	105 MW of eligible renewable resources	Solar, wind, some types of biomass and waste, and small hydro	None	Iowa's investor-owned utilities are currently in full compliance with this standard, achieved primarily through wind capacity.
MA	35% by 2030 (and an additional 1% per year thereafter)	Solar, wind, hydro, some biomass technologies, LFG/MSW, geothermal electric, anaerobic digestion, and marine	Fuel cells	Credit trading is allowed. The target for new resources includes a solar-specific goal to achieve 400 MW of in-state solar capacity, which is translated into an annual target for obligated providers. Obligated providers may comply via an alternative compliance payment (ACP), which varies in level by the requirement class. The ACP is designed to be higher than the cost of other compliance options.
MD	25% by 2020	Solar, wind, biomass, geothermal, LFG/MSW, anaerobic digestion, and marine	Solar water heating, ground-source heat pumps, and fuel cells	Credit trading is allowed. The target includes minimum levels of compliance from solar and offshore wind. Utilities may pay an alternative compliance payment in lieu of procuring eligible sources, with a tier-specific compliance schedule.
ME	40% total by 2017, 10% by 2017 from new resources entering service in 2005 and beyond	Solar, wind, biomass, hydro, geothermal, LFG/MSW, and marine	CHP and fuel cells	Credit trading is allowed. The Maine Public Utilities Commission sets an annually adjusted alternative compliance payment. Community-

State	Target	Qualifying renewables	Qualifying other (thermal, efficiency, nonrenewable, distributed generation, etc.)	Compliance mechanisms
MI	15% by 2021, with specific new capacity goals for utilities that serve more than 1 million customers	Solar, wind, hydro, biomass, LFG/MSW, geothermal electric, anaerobic digestion, and marine	CHP, coal with carbon capture and sequestration, and energy efficiency measures for up to 10% of a utility's sales obligation	based generation projects are eligible to earn credit multipliers. Credit trading is allowed. Solar power receives a credit multiplier; other generation and equipment features—such as peak generation, storage, and use of equipment manufactured in-state—can earn bonus credits.
MN	31.5% by 2020 (Xcel), 26.5% by 2025 (other investor-owned utilities), or 25% by 2025 (other utilities)	Solar, wind, hydro, biomass, LFG/MSW, and anaerobic digestion	Cofiring and hydrogen	Credit trading is allowed. Target includes 1.5% solar standard for investor-owned utilities; Xcel's target also includes 25% of sales specifically from wind and solar (with a 1% maximum for solar). State regulators can penalize noncompliance at the estimated cost of compliance.
MO	15% by 2021	Solar, wind, hydro, biomass, LFG/MSW, anaerobic digestion, and ethanol	Fuel cells	Credit trading is allowed. Noncompliance payments are set at double the market rate for renewable.
MT	15% by 2015	Solar, wind, hydro, geothermal, biomass, and LFG	Compressed air energy storage	Credit trading is allowed, with a price cap of \$10 per MWh. Community-based projects have specific targets.
NC	12.5% by 2021 for investor-owned utilities, 10% by 2018 for municipal and cooperative utilities	Solar, wind, small hydro, biomass, geothermal, LFG, and marine	Direct use of solar heat, CHP, hydrogen, and demand reduction	Credit trading is allowed. Impacts on customer costs are capped at specified levels. Solar and certain animal waste projects have specific targets.
NH	24.8% by 2025	Solar, wind, small hydro, marine, and LFG	Fuel cells, CHP, microturbines, direct use of solar heat, ground-source heat pumps	Credit trading is allowed, and utilities may pay into a fund in lieu of holding credits. The target has four separate compliance classes by technology type.
NJ	50% by 2030 with the solar carve-out reaching 5.1% in 2021 before gradually decreasing to 1.1% by 2033	Solar, wind, hydro, geothermal, LFG/MSW, and marine	None	Credit trading is allowed, with an alternative compliance payment set by state regulators. Solar and offshore wind are subject to separate requirements and have separate enforcement provisions.
NM	20% by 2020 for investor-owned utilities, 10% by 2020 for cooperatives	Solar, wind, hydro, geothermal, and LFG	Zero-emission technology, not including nuclear	Credit trading is allowed. The program cannot increase consumer costs beyond a threshold amount, increasing to 3% of annual costs by 2015. Technology minimums are established for wind, solar, and certain other resources.
NV	25% by 2025	Solar, wind, hydro, geothermal, biomass, and LFG/MSW	Waste tires, direct use of solar and geothermal heat, and efficiency measures (which can account for one-quarter of the target in any given year)	Credit trading is allowed. Solar PV receives a credit premium, with an additional premium for customer-sited systems.
NY	50% by 2030	Solar, wind, hydro, geothermal, biomass, LFG, anaerobic digestion, certain biofuels, and marine	Direct use of solar heat, CHP, and fuel cells	Credit trading is not allowed. Compliance is achieved through purchases by state authorities, funded by a surcharge on investor-owned utilities. Government-owned utilities may have their own similar programs.

State	Target	Qualifying renewables	Qualifying other (thermal, efficiency, nonrenewable, distributed generation, etc.)	Compliance mechanisms
OH	12.5% renewable energy resources by 2026, 0.5% solar by 2026	Solar, wind, hydro, biomass, geothermal, and LFG/MSW	CHP, fuel cells, anaerobic digestion, microturbines	Credit trading is allowed. Alternative compliance payments are set by law and adjusted annually. Solar electricity generation has a separate target.
OR	5% by 2025 for utilities with less than 1.5% of total sales, 10% by 2025 for utilities with less than 3% of total sales, 50% by 2040 for all others	Solar, wind, hydro, biomass, geothermal, LFG/MSW, anaerobic digestion, and marine	Hydrogen	Credit trading is allowed, with an alternative compliance payment and a limit on expenditures of 4% of annual revenue. Solar receives a credit multiplier.
PA	18% by 2020	Solar, wind, hydro, biomass, geothermal, and LFG/MSW	CHP, certain advanced coal technologies, certain energy efficiency technologies, fuel cells, direct use of solar heat, and ground-source heat pumps	Credit trading is allowed, with an alternative compliance payment. Separate targets are set for solar and two different combinations of renewable, fossil, and efficiency technologies.
RI	38.5% by 2035	Solar, wind, hydro, biomass, geothermal, anaerobic digestion, LFG, biodiesel, and marine	Fuel cells	Credit trading is allowed, with an alternative compliance payment. A separate target exists for 90 MW of new renewable capacity.
TX	10,000 MW by 2025	Solar, wind, hydro, biomass, geothermal, LFG, and marine	Direct use of solar heat and ground-source heat pumps	Credit trading is allowed, with capacity targets converted to generation equivalents. State regulators may cap credit prices, and 500 MW must be from resources other than wind.
VT	75% by 2032	Geothermal, solar, wind, biomass, hydro, LFG, marine, anaerobic digestion, and fuel cells using renewable fuels	Ground-source heat pumps and CHP	The purchase of RECs from plants whose energy is capable of delivery within New England is allowed, with an alternative compliance payment of \$0.01/Kwh.
WA	15% by 2020	Solar, wind, hydro, biomass, geothermal, LFG, anaerobic digestion, biodiesel, and marine	CHP	Credit trading is allowed, with an administrative penalty for noncompliance.
WI	10% by 2015	Solar, wind, hydro, biomass, geothermal, LFG/MSW, small hydro, anaerobic digestion, and marine	CHP, pyrolysis, synthetic gas, direct use of solar or biomass heat, ground-source heat pumps, and fuel cells	Credit trading is allowed.

One factor that could result in states missing their RPS goals is slow or no growth in electricity demand. Reduced need for new generation would have the most significant effects on sources that are on the margin. To date, slowing demand has not affected these marginal sources, but the situation could change if demand is flat for an extended period.

Further, although more qualifying generation in aggregate is now available than needed to meet the targets, states with technology-specific goals could still have shortages of certain technologies. In addition, the projected pattern of aggregate surplus does not necessarily imply that projected generation would be the same without state RPS policies, which may encourage investment in places where it would not occur otherwise or in the amounts projected, even as other parts of the country see substantial growth above state targets or the absence of targets. The results do suggest,

however, that state RPS programs will not be the sole motivation for future growth in renewable generation.

Currently, 29 states and the District of Columbia have enforceable RPS or similar laws (Table 1).² Under such standards, each state determines its own levels of renewable generation, eligible technologies,³ and noncompliance penalties. A number of modifications have been made to existing programs in recent years, building on state implementation experience and changing market conditions.

In 2018, a number of proposed legislative modifications were made to existing RPS programs, but only a small subset were enacted.

Four states made major changes to their RPS programs in 2018:

California

In September 2018, California enacted SB 100, which increased its RPS target to 60% renewable generation by 2030 and to 100% carbon-free power by 2045. California's move to 100% carbon-free power made California the second state to have a 100% RPS (Hawaii being the first in 2015), but California differs in that it allows the last 40% of its RPS to include carbon neutral technologies, namely older hydroelectric plants (not usually included in RPS) and nuclear plants.⁴

Connecticut

In May 2018, Connecticut enacted SB 9, Public Act No. 18-50, increasing its overall RPS target to 48% by 2030, with 40% Class I resources, 4% Class I or Class II resources, and 4% Class III resources.^{5,6}

² Summaries of state RPS policies may vary from source to source. The policies vary significantly from state to state, with no universal definition. Previous discussions of state RPS policies by EIA have included a policy in West Virginia that allowed several types of fossil-fueled generators to be built instead of renewable generators to meet the portfolio requirement. That policy is not included as an RPS in AEO2019.

³ Eligible technologies and even the definitions of technologies or fuel categories vary by state. For example, one state's definition of renewables may include hydropower, while another's may not. Table 1 provides more detail on how the technology or fuel category is defined by each state.

⁴ California Legislator, [SB 100](#), (September 10, 2018).

⁵ Class I resources include electricity derived from solar power, wind power, fuel cells, geothermal, landfill methane gas, anaerobic digestion or other biogas derived from biological sources, thermal electric direct energy conversion, ocean thermal power, wave or tidal power, low-emission advanced renewable energy conversion technologies, run-of-the-river hydropower facilities not exceeding 30 megawatts (MW) in capacity, and biomass facilities that use sustainable biomass fuel and meet certain emissions requirements. Hydropower facilities that received a new license after January 1, 2018, also are eligible as Class I energy source. Class II resources include trash-to-energy facilities. Class III resources include (1) CHP systems, with a minimum operating efficiency of 50%, installed at commercial or industrial facilities in Connecticut on or after January 1, 2006; (2) electricity savings from conservation and load management programs that started on or after January 1, 2006, and (3) systems that recover waste heat or pressure from commercial and industrial processes installed on or after April 1, 2007.

⁶ Connecticut Legislator, [Public Act No. 18-50](#), (May 24, 2018).

Massachusetts

In August 2018, Massachusetts enacted HB 4857, An Act to Advance Clean Energy, which increased its overall RPS target to 35% by 2030.⁷

New Jersey

In May 2018, New Jersey enacted A.B. 3723, which increased its [RPS target](#) to 50% by 2030. Under the new target, New Jersey moved from a gradual year-to-year increase to a three-step target of 21% by 2021, 35% by 2025, and 50% by 2030. New Jersey also required a solar carve-out of their RPS, in which a certain share of the overall target must be met with solar technologies. Under the new legislation, this solar carve-out slowly increases annually with a target of 5.1% of total electricity generation coming from solar technologies by 2021. This target gradually falls over time again to 1.1% by 2033.⁸

Light-Duty Vehicle Combined Corporate Average Fuel Economy (CAFE) Standards

The AEO2019 Reference case includes the attribute-based CAFE standards for light-duty vehicles (LDV) for model year (MY) 2011 and the joint attribute-based CAFE and vehicle greenhouse gas (GHG) emissions standards for MYs 2012 through 2016 and for MYs 2017 through 2025. CAFE standards are then held constant in subsequent model years, although the fuel economy of new LDVs continues to rise modestly over time.

State Energy Efficiency Resource Standards and Goals

AEO2019 does not explicitly include state energy efficiency resource standards (EERS)—defined as mandatory, long-term reduction targets (at least three years) that are sufficiently funded to allow covered entities to meet their targets, use financial incentives or non-performance penalties, and usually increase over time. Nevertheless, these standards do inform modeling of utility and state energy efficiency incentives.

Of the 30 states that have mandatory or voluntary efficiency goals, 24 meet the definition of an EERS. Efficiency policies for utilities complement efficiency gained from structural changes, federal appliance standards, and enhanced building codes. The extent of the change in demand varies by region and sector.

State legislatures and public utility commissions (PUC) both create energy efficiency (EE) policies. Savings targets are set as reductions from a single base year or as an average of previous years, as a cumulative reduction during a compliance period, or as a percentage of projected electricity sales. As with the RPS, EIA has confirmed EERS requirements for each state through original legislative or regulatory documentation, using DSIRE and the Advanced Energy Economy (AEE) PowerSuite tool to support those efforts.

⁷ Massachusetts Legislator, [H.B. 4857](#), (August 9, 2018).

⁸ New Jersey Legislator, [A.B. 3723](#), (May 23, 2018).

Table 2. Characteristics of state efficiency mandates or goals (as of November 2017)

State	Type [⁹]	Targeted electricity savings (requirements and goals) [¹⁰]	% sales covered [¹¹]	Current savings period (from-to)		2017 Incremental Savings Inc'l annual (MWh) [¹²]	% retail sales[¹³]
AR	E&G	1.2% saving from 2018 retail sales	53	2020	2022	324,865	0.70
AZ	E&G	2.6% annual saving and 22% cumulative savings by 2020; lower for co-ops	59	2016	2020	1,210,793	1.56
CA	E&G	Doubling energy efficiency savings by 2030	78	2015	2030	3,580,801	1.39
CO	E&G	5% of 2018 sales by 2028, plus peak reductions	57	2019	2028	134,765	0.25
CT	E&G	Average 1.1% reduction from forecasted sales	94	2019	2021	466,317	1.66
DC	E&G	Approximately 5% cumulative savings by 2021 from 2016	100	2017	2021	93,958	0.86
DE	E&G	1% incremental electricity savings 2019	100	2017	2019	8,108	0.07
HI	Elec	Approximately 1.4% annual incremental savings by 2030, from 2009	100	2009	2030	159,785	1.71
IA	E&G	1.2% of sales	75	2014	2018	580,575	1.19
IL	E&G	Varies by IOU; cumulative savings of 16% or 21.5%	88	2018	2030	3,252,205	2.37
LA	Elec	Quick Start EE Pilot	81	2014	ongoing	82,338	0.09
MA	E&G	17.7 trillion British thermal units (Btu) from 2019–2021	86	2019	2021	1,610,739	3.07
MD	Elec	2% of sales by 2023 in 0.2% annual increments	99	2018	2020	608,044	1.03

⁹ If an EERS covers electric utilities only, abbreviated as *Elec*; if both electric and natural gas utilities, as *E&G*.

¹⁰ Sales reductions refer to reductions in retail sales of electricity. Unless otherwise noted, they are incremental annual reductions, rather than cumulative savings. Base year indicates year (or average of previous years) against which targeted savings are measured.

¹¹ American Council for an Energy-Efficient Economy, "The 2018 State Energy Efficiency Scorecard, Report U1808" (ACEEE 2018), Appendix D, pages 155–161. The percent of affected retail sales in an EERS depends on what entities are covered by an EERS, which differs by state. EIA calculated percentages for states not included in ACEEE2018 (DE, LA, MO, MS, VA), using state EE filings and U.S. Energy Information Administration, Form EIA-861, "Annual Electric Power Industry Report," (November 6, 2017). Information on DC's targets is from a phone interview with Dan Cleverdon, Public Service Commission of the District of Columbia, January 21, 2018.

¹² Incremental annual energy efficiency savings (defined as changes in energy use caused in the current reporting year by 1) new participants in DSM programs that operated in the previous reporting year or 2) participants in new DSM programs that operated for the first time in the current reporting year), reported in megawatthours (MWh), on Form EIA-861, "Annual Electric Power Industry Report," (October 12, 2018). Savings as a percent of retail sales are calculated based on utility retail sales data reported on Form EIA-861.

¹³ Incremental annual electricity savings divided by total retail electricity sales for 2017, as reported to the U.S. Energy Information Administration on Form EIA-861, "Annual Electric Power Industry Report." *State Electricity Profiles*, (January 8, 2019).

State	Type [⁹]	Targeted electricity savings (requirements and goals) [¹⁰]	% sales covered [¹¹]	Current savings period (from-to)		2017 Incremental Savings Inc'l annual (MWh) [¹²]	% retail sales[¹³]
ME	E&G	20% savings by 2020 from 2007 baseline	100	2007	2020	113,687	1.01
MI	E&G	1.0% of previous-year's sales, with tiered performance incentives for up to 1.5% savings	100	2008	2021	1,415,547	1.39
MN	E&G	2% of previous three-year weather-normalized average (Xcel); other IOUs 1.5%	97	2010	no end	999,787	1.49
MO	Elec	9.9% cumulative annual savings by 2020	68	2012	2020	657,244	0.86
MS	Elec	Quick Start EE program	76	2014	ongoing	104,244	0.22
NC	Elec	5% of 2021 sales from 2008 base; EE is an eligible renewable portfolio standard (RPS) resource	100	2009	2021	1,219,878	0.93
NH	E&G	3.1% cumulative electric savings by 2020	100	2018	2020	88,989	0.82
NJ	E&G	2% annual reduction from previous three-year average	100	2018	n.a.	508,547	0.69
NM	Elec	Cumulative 8% reduction from 2005 sales	68	2014	2020	128,292	0.56
NV	Elec	20% RPS, of which 20% of the requirement may be met with EE measures	62	2015	2019	231,294	0.63
NY	E&G	353 gigawatthours (GWh) combined annual target for utilities, 2019–20. Overall Reforming the Energy Vision goal for buildings of 23% from 2012 levels by 2030	100	2019	2020	1,778,141	1.23
OH	Elec	22% EE target by 2025, and peak load reduction goal	89	2009	2025	1,756,818	1.20
OR	E&G	Approximately 1.4% of forecasted electricity sales per year	70	2015	2019	655,742	1.31
PA	Elec	Varies by utility; average cumulative savings of 3.7%	93	2016	2021	1,593,877	1.11
RI	E&G	Annual average incremental savings target of 2.6%	99	2018	2020	255,622	3.46
TX	Elec	30% reduction in demand growth (approximately 0.1% annual)	73	2013	no end	699,304	0.17
UT	Elec	1% annual reduction in electricity	80	2009	no end	315,214	1.03
VA	Elec	10% by 2022 relative to 2006 sales	100	2007	2022	142,436	0.13

State	Type [⁹]	Targeted electricity savings (requirements and goals) [¹⁰]	% sales covered [¹¹]	Current savings period (from-to)		2017 Incremental Savings Inc'l annual (MWh) [¹²]	% retail sales[¹³]
VT	Elec	2.1% incremental electricity sales savings, and seasonal peak demand reductions	100	2018	2020	167,326	3.09
WA	Elec	Varies by utility; approximately 1.2% incremental for IOUs	81	2018	2019	941,449	1.02
WI	E&G	Lifecycle goal of 22.8 terawatt-hours (TWh) over four years	100	2019	2022	718,078	1.04

Selected state policy profiles

California

California has an all cost-effective energy efficiency requirement, which requires utilities to invest in the maximum amount of cost-effective energy efficiency opportunities feasible. In September 2015, the legislature enacted Senate Bill 15-350, which requires a cumulative doubling of statewide energy efficiency by January 1, 2030. This change amounts to about a 20% reduction in energy consumption from the mid-case projection in 2030, as projected by the California Energy Demand Updated Forecast 2015–2025 and extended to 2030 using an average annual growth rate.¹⁴

In 2013, the California Public Utilities Commission (CPUC) allocated \$1 billion per year for energy efficiency activities from 2015 to 2025. Current energy efficiency targets for investor-owned utilities start at 0.5% incremental annual electricity savings as a percentage of forecasted sales in 2018 and escalate to 0.8% by 2030.¹⁵

Connecticut

Connecticut has an all cost-effective energy efficiency requirement. Its 2019–2021 triennial Conservation and Load Management Plan set investor-owned electric utility targets to 1.1% (2019–21).¹⁶ Connecticut offers performance incentives to investor-owned utilities (IOU) that help them achieve their goals.¹⁷

¹⁴ California Legislature, SB-350, “Clean Energy and Pollution Reduction Act of 2015” (September 11, 2015). According to the bill, the approximate 20% reduction figure is calculated based on a “doubling of the midcase estimate of additional achievable energy efficiency savings, as contained in the California Energy Demand Updated Forecast, 2015-2025...extended to 2030 using an average annual growth rate.”

¹⁵ Navigant, “Energy Efficiency Potential and Goals Study for 2018 and Beyond” (August 23, 2017). See also AEE PowerSuite on California Public Utilities Commission (CPUC), “Order Instituting Rulemaking Concerning Energy Efficiency Rolling Portfolios, Policies, Programs, Evaluation, And Related Issues,” (CA R1311005). On August 25, 2017, the administrative law judge issued a proposed decision adopting EE goals for 2018 to 2030 based on the “modified TRC with GHG adder 2” scenario in the Navigant report.

¹⁶ Connecticut Department of Energy & Environmental Protection, “Approval with Conditions of the Conservation and Load Management Plan for 2019 through 2021” (December 20, 2018).

¹⁷ The American Council for an Energy-Efficient Economy, [2017 State Energy Efficient Scorecard](#).

Illinois

The Illinois *Future Energy Jobs Act*, enacted in December 2016, extended and increased its EERS.¹⁸ Targets, which vary by utility, were extended from 2018 to 2030 and contain interim goals. ComEd's cumulative savings goals were raised to 21.5% in 2030, while Ameren's cumulative targets were increased to 16% in 2030. Savings are calculated relative to average weather-normalized electric power sales in 2014, 2015, and 2016.¹⁹

Maryland

A 2017 law requires Maryland's five largest IOUs to achieve 2% annual incremental energy savings relative to 2016 weather-normalized sales from 2018–2023.²⁰ The legislation extends Maryland's goal to reduce per capita electricity consumption by 15% from 2007 levels by 2015.²¹ Utilities must create three-year plans for each customer class to reduce electricity and natural gas consumption.

Massachusetts

Massachusetts has an all cost-effective energy efficiency requirement. Its 2019–2021 *Three Year Energy Efficiency Plan* sets a three-year annual savings goal of 17.7 trillion British thermal units (Btu), equivalent to an average incremental annual saving of 3.3% of 2017 sales.²² Massachusetts' plan continues to represent the highest electricity reduction target of any state with an EERS.

Michigan

Michigan passed a bill in 2016 that extended the state's RPS and EERS, originally adopted in 2008, through 2021.²³ The EERS continues to require that all utilities achieve 1% annual incremental savings and allows them to earn tiered performance incentives for savings exceeding this minimum requirement.²⁴

Nevada

In 2017, Nevada enacted two bills that promote electric utility energy efficiency programs.²⁵ The bills established efficiency goals through a regulatory process led by the Public Utility Commission;

¹⁸ State of Illinois, Senate Bill 2814, "[Future Energy Jobs Act](#)" (December 7, 2016).

¹⁹ State of Illinois, SB2814, "[Future Energy Jobs Bill](#)" (December 7, 2016).

²⁰ State of Maryland, "Energy Efficiency Programs - Calculation of Program Savings and Consideration of Cost-Effectiveness" "[2017 Md. Laws, ch. 780](#)", passed into law without signature (April 6, 2017 or May 27, 2017), effective June 1, 2017.

²¹ State of Maryland, "[EmPOWER Maryland Energy Efficiency Act of 2008](#)" (April 24, 2008); Maryland Public Service Commission, Order No. 87082, Case 9153, "[In the matter of \[6 utility\] Energy Efficiency, Conservation and Demand Response Programs Pursuant to the EmPOWER Maryland Energy Efficiency Act of 2008](#)" (July 16, 2016).

²² Massachusetts Department of Public Utilities, "[Joint Statewide Electric and Gas Three-Year Energy Efficiency Plan 2019–2021](#)," (approved April 30, 2018).

²³ State of Michigan, Public Act No. 342, "[The clean and renewable energy and energy waste reduction Act](#)," (December 21, 2016).

²⁴ State of Michigan, [Public Act No. 341](#) (December 21, 2016).

²⁵ State of Nevada, Assembly Bill 223, "[An Act relating to energy efficiency programs; requiring an integrated resource plan filed by an electric utility with the Public Utilities Commission of Nevada to include a proposal for the expenditure of certain amounts on energy efficiency and conservation programs directed to low-income customers of the electric utility...](#)", (May 26, 2017); and Senate Bill 150, "[An Act relating to energy efficiency programs; requiring the Public Utilities Commission of Nevada to establish for each electric utility in this State annual goals for energy savings resulting from the implementation of energy efficiency programs...](#)", (June 15, 2017).

allowed utility financial incentives, such as decoupling; and established a floor of at least 5% of expenditures directed to programs for low-income customers. Nevada had encouraged energy efficiency sooner by including energy efficiency as a resource in its Energy Portfolio Standard but began phasing out its eligibility in 2013.²⁶

New Hampshire

In August 2016, New Hampshire adopted an EERS with a long-term goal of achieving all cost-effective energy efficiency.²⁷ The standard sets a 3.1% cumulative electricity savings target in 2020 relative to 2014 delivered sales, with annual electricity savings targets of 0.8%, 1.0%, and 1.3%, respectively, for 2018, 2019, and 2020. Natural gas utilities have separate targets.²⁸

New York

New York's governor launched the Reforming the Energy Vision (REV) strategy in 2014, which, among other goals, aims to decrease buildings' energy consumption by 23% from 2012 levels by 2030.²⁹ In March 2018, under the REV Framework Order, the New York Public Service Commission (PSC) approved 2019–2020 energy efficiency budgets and targets for utilities. Combined, these budgets amount to a \$128 million budget and a 353 GWh annual savings target.³⁰

Ohio

In December 2016, Ohio's governor vetoed a bill that would have extended a two-year freeze of the state's renewable and efficiency standards, allowing both standards to resume in January 2017.³¹ The EERS created cumulative electricity energy savings targets of 5.2% in 2017; they now increase to 22.2% in 2027, relative to 2008 electricity sales. Ohio's EERS also includes peak demand reduction targets.³² Ohio's EERS allows utilities to claim all efficiency savings—also called gross savings—achieved in a utility's territory. These include savings from federal appliance standards and efficiency actions that utility customers undertake independently of rebates or incentives.³³

²⁶ State of Nevada, Senate Bill 252, "An Act Relating to Renewable Energy ... (revises provisions relating to the portfolio standard for providers of electric service)" (March 15, 2013), <https://www.leg.state.nv.us/Session/77th2013/Bills/SB/SB252.pdf>.

²⁷ New Hampshire Public Utilities Commission, Order No. 25,932 (Docket No. DE 15-137), "Energy Efficiency Resource Standard: Order Approving Settlement Agreement" (August 2, 2016).

²⁸ Revenue decoupling is in effect in all other New England states to some extent; Maine is only for Central Maine Power; Vermont uses a per capita method. EIA analysis, based on information in *AEE PowerSuite* and maps on the [Natural Resources Defense Council](#) website.

²⁹ State of New York, "Reforming the Energy Vision" (March 2016).

³⁰ *AEE PowerSuite* on New York State Department of Public Service (NYSDPS), "In The Matter Of Utility Energy Efficiency Programs." (NY: 15-00990/15-M-0252).

³¹ State of Ohio, Veto Message regarding Substitute H.B. 554, (December 22, 2016). The Governor's message stated that extending the freeze "amounts to self-inflicted damage to both our state's near- and long-term economic competitiveness" and that efficiency "efforts [we]re succeeding in helping businesses and homeowners reduce their energy costs through increased efficiency" (p. 3).

³² State of Ohio, "To make changes to the renewable energy, energy efficiency, and peak demand reduction requirements ..." S.B. 310, (Sept 12, 2014).

³³ *Ibid.*, Section 4928.662.

Pennsylvania

In 2015, Pennsylvania’s PUC approved Phase III EERS targets for the 2016–21 period. The targets, which vary by utility, range from 2.6% to 5%, relative to the load forecast completed in 2010.³⁴ In 2017, Pennsylvania passed Act 36, which authorized the City of Philadelphia to adopt the 2018 International Code Council (ICC) Commercial codes and authorized the Pennsylvania Department of Labor to review the 2015 ICC codes and issue recommendations effective October 2018.³⁵

Rhode Island

Rhode Island has an all cost-effective energy efficiency requirement.³⁶ The PUC has increased the state's annual average electricity savings target to 2.60% and the annual average natural gas savings target to 1.03% from 2018–2020 as a percentage of 2015 retail sales.³⁷

Vermont

Vermont has an all cost-effective energy efficiency requirement.³⁸ Efficiency Vermont’s 2018–2020 Triennial Plan includes incremental energy savings targets of 357 GWh per year during the three-year period,³⁹ or approximately 2% of sales.⁴⁰

³⁴ Pennsylvania Public Utility Commission, “[Energy Efficiency and Conservation Program](#)” [Implementation Order](#), at Docket No. M-2014-2424864 (June 19, 2015).

³⁵ Commonwealth of Pennsylvania, H.B. 409, “[An Act amending the ... the Pennsylvania Construction Code Act, ...](#)” (October 25, 2017).

³⁶ American Council for an Energy Efficiency Economy (ACEEE), “[State and Local Policy Database](#).”

³⁷ Rhode Island Division of Public Utilities, “[Letter Regarding Three-Year Energy Efficiency and System Reliability Procurement \(2018-2020\)](#),” [Implementation Order](#), at Docket No 4684 (October 24, 2017).

³⁸ American Council for an Energy Efficiency Economy (ACEEE), “[State and Local Policy Database](#).”

³⁹ Efficiency Vermont, “[Triennial Plan, 2018–2020](#),” prepared for the Vermont Public Utility Commission (November 16, 2017).

⁴⁰ American Council for an Energy Efficiency Economy (ACEEE), “[State and Local Policy Database](#).”

Appendix A: Federal and selected state legislation and regulations in the *Annual Energy Outlook*

Residential sector

	Legislation	Brief description	AEO handling	Basis
A.	National Appliance Energy Conservation Act of 1987 (NAECA1987)	Requires Secretary of Energy to set minimum efficiency standards for various appliance categories with periodic updates	Appliances represented in the residential sector are included	Public Law 100-12
	a. Room air conditioners	Sets standards for room air conditioners in 2014	New purchases of room air conditioners required to meet the standards	Federal Register Notice of Final Rulemaking
	b. Central air conditioners and heat pumps	Sets standards for central air conditioners in 2015	New purchases of other air conditioners required to meet the standards	Federal Register Notice of Final Rulemaking
	c. Water heaters	Sets standards for water heaters in 2015	New purchases of water heaters required to meet the standards	Federal Register Notice of Final Rulemaking
	d. Refrigerators and freezers	Sets standards for refrigerators/freezers in 2014	New purchases of refrigerators/freezers required to meet the standards	Federal Register Notice of Final Rulemaking
	e. Dishwashers	Sets standards for dishwashers in 2010	New purchases of dishwashers required to meet the standards	Federal Register Notice of Final Rulemaking
	f. Fluorescent lamp ballasts	Sets standards for fluorescent lamp ballasts in 2014	New purchases of fluorescent lamp ballasts required to meet the standards	Federal Register Notice of Final Rulemaking
	g. Clothes washers	Sets standards for clothes washers in 2011	New purchases of clothes washers required to meet the standards	Federal Register Notice of Final Rulemaking
	h. Furnaces	Sets standards for furnaces in 2013	New purchases of furnaces required to meet the standards	Federal Register Notice of Final Rulemaking
	i. Clothes dryers	Sets standards for clothes dryers in 2015	New purchases of clothes dryers required to meet the standards	Federal Register Notice of Final Rulemaking
	j. Boilers	Sets standards for boilers in 2021	New purchases of boilers required to meet the standards	Federal Register Notice of Final Rulemaking
B.	Energy Policy Act of 1992 (EPACT1992)			Public Law 102-486
	a. Building codes	For the International Energy Conservation Code (IECC) 2006, specifies whole house efficiency minimums	All states assumed to adopt the IECC 2006 code by 2017	Trend of states' adoption of codes, allowing for lead times for enforcement and builder compliance
	b. Various lighting types	Sets standards for various lighting types in 2012	New purchases of various lighting types required to meet the standards	Federal Register Notice of Final Rulemaking
C.	Energy Policy Act of 2005 (EPACT2005)			Public Law 109-58

Legislation	Brief description	AEO handling	Basis
a. Torchiere lamp standard	Sets standards for torchiere lamps in 2006	Require new purchases of torchiere bulbs to meet the standards	Federal Register Notice of Final Rulemaking
b. Compact fluorescent lamp standard	Sets standards for compact fluorescent lamps in 2006	New compact fluorescent bulb purchases required to meet the standards	Federal Register Notice of Final Rulemaking
c. Ceiling fan and light kit standard	Sets standards for ceiling fans and ceiling fan light kits in 2019 and 2020	Miscellaneous and lighting electricity consumption reduced by appropriate amount	Overall savings determined by number of ceiling fan shipments and estimated kilowatthours (kWh) savings per unit
d. Dehumidifier standard	Sets standards for dehumidifiers in 2019	Dehumidifier electricity consumption reduced by appropriate amount	Overall savings determined by number of dehumidifier shipments and estimated kWh savings per unit
e. Energy-efficient equipment tax credit	Provides tax credits to purchasers of certain energy-efficient equipment in 2006 and 2007	Cost of applicable equipment reduced by specified amount	Federal Register Notice of Final Rulemaking
f. New home tax credit	Provides \$1,000 or \$2,000 tax credit to builders if they construct homes that are 30% or 50%, respectively, more efficient than code in 2006 and 2007	Shell package cost for these homes reduced by specified amount	Cost reductions to consumers are assumed to be 100% of the builder's tax credit
g. Energy-efficient appliance tax credit	Provides tax credits to producers of energy-efficient refrigerators, dishwashers, and clothes washers for each unit they produce that meets certain efficiency specifications	Cost savings are assumed to be 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
D.	Energy Independence and Security Act of 2007 (EISA2007)		Public Law 110-140
a. General service incandescent lamp (GSL) standard	Requires less wattage for bulbs in 2012–2014 and 2020. Incandescent bulbs are not expected to meet the 2020 standards. In January 2017, a rule expanded the definition of GSLs to include reflector and other bulbs.	Wattage for new bulbs is reduced by 28% in 2013 and 67% in 2020; incandescent lamps eliminated from consideration in residential technology menu after 2019	Federal Register Notice of Final Rulemaking
b. External power supply standard	Sets standards for external power supplies in 2016	Electricity consumption by external power supplies is reduced by appropriate amount	Overall savings on compact fluorescent bulbs determined by number of shipments and estimated kWh savings per unit
c. Manufactured housing code	Requires manufactured homes to meet latest IECC in 2011	All manufactured homes shipped after 2011 are required to meet the 2006 IECC	Federal Register Notice of Final Rulemaking

Legislation	Brief description	AEO handling	Basis
d. Miscellaneous refrigeration products	Sets minimum efficiency standards for wine coolers in 2019	Other electricity consumption is reduced by appropriate amount	Federal Register Notice of Final Rulemaking
E. Energy Improvement and Extension Act of 2008 (EIEA2008)			Public Law 110-343
a. Energy-efficient equipment tax credit	Purchasers of certain energy-efficient equipment can claim tax credits through 2016	Cost of applicable equipment is reduced by specified amount	Federal Register Notice of Final Rulemaking
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	Cost savings are assumed to be passed on to the consumer, reducing the price of the appliance by the specified amount	Cost reductions to consumer are assumed to be 100% of the producer's tax credit
F. American Recovery and Reinvestment Act of 2009 (ARRA2009)			Public Law 111-5
a. Energy-efficient equipment tax credit	Increases cap of energy-efficient equipment specified under Section E(a) of ARRA2009 to \$1,500; removes cap for solar photovoltaic (PV), wind, and ground-source (geothermal) heat pumps	Cost of applicable equipment is reduced by specified amount	Federal Register Notice of Final Rulemaking
b. Weatherization and State Energy Programs	Increases funding for weatherization and other programs to improve the energy efficiency of existing housing stock	Annual funding amount is applied to retrofit existing housing; base savings for heating and cooling on \$2,600 per-home investment as specified in weatherization program evaluation	Federal Register Notice of Final Rulemaking
G. Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010			Public Law 111-312
a. Energy-efficient equipment tax credit		Tax credits for some energy-efficient equipment are extended, generally to EISA2007 amounts	Reduces the cost of applicable equipment by specified amount
H. Clean Power Plan (issued under Section 111(d) of the Clean Air Act)			
a. Incentives for energy efficient residential technologies	Allows states to comply with emission standards by encouraging residential purchases of energy efficient technology and building shells	Subsidies to energy efficient technologies and building shells are applied and subsidy cost is forwarded to electric power sector	Federal Register Notice of Final Rulemaking

	Legislation	Brief description	AEO handling	Basis
I.	Consolidated Appropriations Act of 2016 (H.R.2029)			Public Law 114-113
	a. Residential solar investment tax credit	Extends the EPACT2005 30% investment tax credit for solar property through 2019, decreasing to 26% in 2020, 22% in 2021, and expiring after 2021	Tax credit is incorporated into cash flow for solar generation systems; investment cost for solar water heaters is reduced by appropriate percentage	Federal Register Notice of Final Rulemaking
J.	Bipartisan Budget Act (BBA) of 2018 (H.R.1892)			Public Law 115-123
	a. Residential energy efficiency and non-solar renewable energy tax credits	Retroactively extends existing federal 25C tax credits for home energy efficiency upgrades and equipment through 2017. Also extends the 25D credit for non-solar technology tax credits with the same ramp down as solar through 2021	Cost of applicable equipment is reduced by specified amount; tax credit is incorporated into cash flow for non-solar generation systems based on updated timeline	BBA2018, Section 40401-40402 (26 USC 25)
K.	Energy Policy and Conservation Act of 1975 (EPCA1975)			Public Law 94-163
	a. Dedicated-purpose pool pumps	Expands EPCA coverage of pump efficiency to pool pumps, effective 2021	Other electricity consumption is reduced by appropriate amount	Federal Register Notice of Direct Final Rulemaking

Commercial sector

	Legislation	Brief description	AEO handling	Basis
A.	National Appliance Energy Conservation Act of 1987 (NAECA1987)	Requires Secretary of Energy to set minimum efficiency standards for various appliance categories with periodic updates	Appliance categories represented in the commercial sector are included	Public Law 100-12
	a. Room air conditioners	Sets standards for room air conditioners in 2014	Room air conditioner efficiency, including metric, is changed from 9.8 Energy Efficiency Ratio (EER) to 10.9 Combined Energy Efficiency Ratio (CEER) in 2014	Federal Register Notice of Final Rulemaking
	b. Other residential-size air conditioners (<5.4 tons)	Sets standards for central air conditioners in 2015 with an update in 2023	Central air conditioning and heat pump efficiency is set to 10 Seasonal Energy Efficiency Ratio (SEER) before 2006, 13 SEER in 2006, 14 SEER in 2015, and 14.4 SEER in 2023	Federal Register Notice of Final Rulemaking
	c. Fluorescent lamp ballasts	Sets standards for fluorescent lamp ballasts in 2014	Purchases are limited to electronic ballasts by setting 0.90 power factor and minimum efficacy factor for F40 and F96	Federal Register Notice of Final Rulemaking

Legislation	Brief description	AEO handling	Basis
		lamps based on lamp size and wattage, increasing to higher efficacy factor in 2005	
B. Energy Policy Act of 1992 (EPACT1992)			Public Law 102-486
a. Building codes	Directs U.S. Department of Energy (DOE) to participate in development of model energy codes and help states adopt and implement more efficient energy codes	Incorporated into commercial building shell assumptions; efficiency of new shell is represented relative to existing shell in shell efficiency indices; shell efficiency is assumed to improve 6.9% and 15.0% by 2040 for existing buildings and new construction, respectively	Based on Science Applications International Corporation commercial shell indices for 2003 developed for EIA in 2008 and 2011
b. Window labeling	Helps consumers determine which windows are more energy efficient	Incorporated into commercial building shell assumptions; efficiency of new shell is represented relative to existing shell in shell efficiency indices; shell efficiency is assumed to improve 6.9% and 15.0% by 2040 for existing buildings and new construction, respectively	Based on Science Applications International Corporation commercial shell indices for 2003 developed for EIA in 2008 and 2011
c. Commercial furnaces and boilers	Sets standards for furnaces in 2023	Gas-fired furnace and boiler thermal efficiency is set to 80%; oil furnace thermal efficiency is set to 81%; oil boiler thermal efficiency is set to 83%	Federal Register Notice of Final Rulemaking
d. Commercial air conditioners and heat pumps	Sets standards for air conditioners and heat pumps	Not modeled; superseded by EPACT2005 standards	Federal Register Notice of Final Rulemaking
e. Commercial water heaters	Sets standards for water heaters in 2003	Gas and oil thermal efficiency is set to 78%, increasing to 80% thermal efficiency for gas units in 2003	Federal Register Notice of Final Rulemaking
f. Lamps	Sets standards for various lighting types in 2012	Incandescent efficacy is set to 16.9 lumens per watt and fluorescent efficacy to 75 and 80 lumens per watt for 4- and 8-foot lamps, respectively	Federal Register Notice of Final Rulemaking for fluorescent requirements; incandescent requirements superseded by EISA2007
g. Electric motors	Specifies minimum efficiency levels for a variety of motor types and sizes	End-use services are modeled at equipment level (motors contained in new equipment must meet the standards)	Federal Register Notice of Final Rulemaking

Legislation	Brief description	AEO handling	Basis
h. Federal energy management	Requires federal agencies to reduce energy consumption 20% by 2000 relative to 1985	Federal share of the commercial sector uses the 10-year Treasury note rate as a discount rate in equipment purchase decisions	Superseded by Executive Order 13123, EPACT2005, and EISA2007
i. Business investment tax credit for solar energy property	Provides a permanent 10% investment tax credit for solar property	Tax credit is incorporated into cash flow for solar generation systems; investment cost is reduced for solar water heaters by 10%	Federal Register Notice of Final Rulemaking
C. Executive Order 13123: Greening the Government Through Efficient Energy Management	Requires federal agencies to reduce energy consumption 30% by 2005 and 35% by 2010 relative to 1985 through cost-effective life-cycle energy measures	Federal share of the commercial sector uses the 10-year Treasury note rate as a discount rate in equipment purchase decisions	Superseded by EPACT2005 and EISA2007
D. Energy Policy Act of 2005 (EPACT2005)			Public Law 109-58
a. Commercial package air conditioners and heat pumps	Sets minimum efficiency levels in 2018 with an update in 2023	Air-cooled air conditioners/ heat pumps are set in technology menu (with assumed capacity of 90,000 Btu) to 12.4 integrated energy efficiency ratio (IEER) and heating coefficient of performance (COP) of 3.3 in 2018 and 14.4 IEER and heating COP of 3.4 in 2023	Federal Register Notice of Final Rulemaking
c. Lamp ballasts	Bans manufacture or import of mercury vapor lamp ballasts in 2008; sets minimum efficacy level for T12 energy saver ballasts in 2009 and 2010 based on application	Mercury vapor lighting system is removed from technology choice menu; minimum efficacy of T12 ballasts is set at specified standard levels	Federal Register Notice of Final Rulemaking
d. Compact fluorescent lamps	Sets standards for medium base lamps to ENERGY STAR specifications in 2006	Efficacy level of compact fluorescent lamps is set at required level	Federal Register Notice of Final Rulemaking
e. Illuminated exit signs and traffic signals	Sets standards to ENERGY STAR specifications in 2006	Miscellaneous electricity consumption is reduced 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 standards as National Electrical Manufacturers Association Class I Efficiency levels in 2007, with an update effective in 2016	Estimation of the share of miscellaneous electricity consumption attributable to transformer losses includes the effects of the standard	Federal Register Notice of Final Rulemaking
g. Pre-rinse spray valves	Sets maximum flow rate to 1.28 gallons per minute in 2019	Energy use for water heating is reduced by appropriate amount	Number of shipments, share of shipments that currently meet

Legislation	Brief description	AEO handling	Basis
			standard, and estimated kWh savings per unit determine overall savings
h. Federal energy management	Requires federal agencies to reduce energy consumption 20% by 2015 relative to 2003 through cost-effective life-cycle energy measures	Federal share of the commercial sector uses the 10-year Treasury note rate as a discount rate for equipment purchase decisions as opposed to adding risk premiums to the 10-year Treasury note rate	Superseded by EISA2007
i. Business investment tax credit for fuel cells and microturbines	Provides a 30% investment tax credit for fuel cells and a 10% investment tax credit for microturbines installed in 2006 through 2016	Tax credit is incorporated into cash flow for fuel cells and microturbines	Extended through 2008 by Public Law 109-432 and through 2016 by the Energy Improvement and Extension Act of 2008 (EIEA2008)
j. Business solar investment tax credit	Provides a 30% investment tax credit for solar property installed in 2006 through 2016	Tax credit is incorporated into cash flow for solar generation systems; investment cost for solar water heaters is reduced by 30%	Extended through 2008 by Public Law 109-432, through 2016 by EIEA2008, through 2019 then phase-out to 10% by Public Law 114-113
k. Vending machines	Sets standards to ENERGY STAR specifications in 2019	Vending machines that do not meet standards are removed from technology choice menu	Federal Register Notice of Final Rulemaking
E. Energy Independence and Security Act of 2007 (EISA2007)			
a. Commercial walk-in coolers and walk-in freezers	Requires use of specific energy efficiency measures in equipment manufactured in or after 2009, with an update effective in 2017	Walk-in refrigerator and freezer systems that do not meet standards are removed from technology choice menu	Federal Register Notice of Final Rulemaking
b. Incandescent and halogen lamps	Sets maximum allowable wattage based on lumen output in 2012-2014 with an update in 2020. Incandescent and halogen bulbs are not expected to meet the 2020 standard. In January 2017, a rule expanded the definition of GSLs to include reflector and other bulbs.	Incandescent and halogen general service lighting systems that do not meet standards are removed from technology choice menu in 2012. All incandescent and halogen general service systems are removed from technology choice menu in 2020.	Federal Register Notice of Final Rulemaking
c. Metal halide lamp ballasts	Sets minimum efficiency levels for metal halide lamp ballasts starting in 2009, with an update effective in 2017	Metal halide lighting systems that do not meet standards are removed from technology choice menu; minimum system efficiency includes	Federal Register Notice of Final Rulemaking

Legislation	Brief description	AEO handling	Basis
		specified standard levels for ballasts based on type	
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	All existing and new federal floorspace uses 10-year Treasury note rate for lighting purchase decisions in 2009	Federal Register Notice of Final Rulemaking
e. Federal energy management	Requires federal agencies to reduce energy consumption per square foot 30% by 2015 relative to 2003 through cost-effective life-cycle energy measures	Federal share of the commercial sector uses the 10-year Treasury note rate as a discount rate in equipment purchase decisions as opposed to adding risk premiums to the 10-year Treasury note rate to develop discount rates for other commercial decisions	Federal Register Notice of Final Rulemaking
F.	Energy Improvement and Extension Act of 2008 (EIEA2008)		Public Law 110-343
a. Business solar investment tax credit	Extends the EPACT2005 30% investment tax credit for solar property through 2016	Tax credit is incorporated into cash flow for solar generation systems; investment cost is reduced for solar water heaters by 30%	Federal Register Notice of Final Rulemaking
b. Business investment tax credit for fuel cells and microturbines	Extends the EPACT2005 30% investment tax credit for fuel cells and 10% investment tax credit for micro-turbines through 2016	Tax credit is incorporated into cash flow for fuel cells and microturbines	Federal Register Notice of Final Rulemaking
c. Business investment tax credit for Combined Heat and Power (CHP) systems	Provides a 10% investment tax credit for CHP systems installed in 2009 through 2016	Tax credit is incorporated into cash flow for CHP systems	Federal Register Notice of Final Rulemaking
d. Business investment tax credit for small wind turbines	Provides a 30% investment tax credit for wind turbines installed in 2009 through 2016	Tax credit is incorporated into cash flow for wind turbines	Federal Register Notice of Final Rulemaking
e. Business investment tax credit for geothermal heat pumps	Provides a 10% investment tax credit for geothermal heat pump systems installed in 2009 through 2016	Investment cost for geothermal heat pump systems is reduced by 10%	Federal Register Notice of Final Rulemaking
G.	American Recovery and Reinvestment Act of 2009 (ARRA2009)		Public Law 111-5
a. Business investment tax credit for small wind turbines	Removes the cap on the EIEA2008 30% investment tax credit for wind turbines through 2016	Tax credit is incorporated into cash flow for wind turbines	Federal Register Notice of Final Rulemaking
b. Stimulus funding to federal agencies	Provides funding for efficiency improvement in federal buildings and facilities	All existing and new federal floorspace uses the 10-year Treasury note rate for purchase decisions in years stimulus funding is available to	Federal Register Notice of Final Rulemaking

Legislation	Brief description	AEO handling	Basis
		account for new, replacement, and retrofit projects; some funding is assumed to be used for solar PV, small wind turbine, and fuel cell installations	
c. State Energy Program funding and energy efficiency and conservation block grants	Provides grants for state and local governments for energy efficiency and renewable energy purposes (State Energy Program funding conditioned on enactment of new building codes)	All public commercial sector buildings use the 10-year Treasury note rate for purchase decisions in years stimulus funding is available; new building shell efficiency is 10% better than 2003 by 2018 for improved building codes; some funding is assumed to be used for solar PV and small wind turbine installations	Federal Register Notice of Final Rulemaking
d. Funding for smart grid projects	Provides funding for smart grid demonstration projects	Consumers are assumed to become more responsive to electricity price changes resulting in higher price elasticity of demand for certain end uses	Federal Register Notice of Final Rulemaking
H. Clean Power Plan (issued under Section 111(d) of the Clean Air Act)			
a. Incentives for energy efficient commercial technologies	Allows states to comply with emission standards by encouraging commercial purchases of energy efficient technology	Subsidies are applied to energy efficient technologies and any subsidy cost is forwarded to electric power sector	Federal Register Notice of Final Rulemaking
I. Consolidated Appropriations Act of 2016 (H.R.2029)			Public Law 114-113
a. Business solar investment tax credit	Extends the EPACT2005 30% investment tax credit for solar property through 2019, decreasing to 26% in 2020, 22% in 2021, then remaining at 10% in 2022 and after	Tax credits are incorporated into the cash flow for solar generation systems; investment cost for solar water heaters are reduced by appropriate percentage	Federal Register Notice of Final Rulemaking
J. California Global Warming Solutions Act of 2006: emissions limit (SB-32)			
a. Limits California greenhouse gas	Limit equivalent to the statewide greenhouse gas emissions level in 1990 to be achieved by 2020	Additional subsidies are applied for energy efficient technologies in the Pacific Census division; all increase in	Apply assumptions of SB-350 as it sets a goal of doubling energy efficiency savings targets by 2030

Legislation	Brief description	AEO handling	Basis
		efficiency is attributed to California	
K. Tax Cuts and Jobs Act (TCJA) of 2017 (H.R. 1)			Public Law 115-97
a. 100% expensing for qualified renewable energy property	Introduces 100% expensing for qualified property, including geothermal heat pumps, solar PV, and solar thermal water heating placed in service by 2022. Qualified property placed in service from 2023–2026 receives 50% bonus depreciation.	100% expensing and 50% bonus depreciation for geothermal heat pumps and solar thermal water heating are incorporated, reducing the investment cost	TCJA2017, Section 13201 (26 USC 168)
L. Bipartisan Budget Act (BBA) of 2018 (H.R.1892)			Public Law 115-123
a. Commercial investment tax credit (ITC) for distributed and renewable technologies	Extends investment tax credit (ITC) provisions for several technologies not covered by the 2016 Consolidated Appropriations Act (see below), including geothermal heat pumps, qualified fuel cell and microturbine equipment, combined heat and power, and qualified small wind beginning construction before January 1, 2022.	The tax credits are incorporated into cash flow for applicable distributed generation systems; investment costs for geothermal heat pumps are reduced	BBA2018, Section 40411 (26 USC 48)

Industrial sector

Legislation	Brief description	AEO handling	Basis
A. Energy Policy Act of 1992 (EPACT1992)			
a. Motor efficiency standards	Specifies minimum efficiency levels for a variety of motor types and sizes	Not modeled because participation is voluntary; actual reductions will depend on future, unknown commitments	EPACT1992, Section 342 (42 USC 6313)
b. Boiler efficiency standards	Specifies minimum combustion efficiency for package boilers larger than 300,000 Btu/hour; Natural Gas boilers: 80%; Oil boilers: 83%	All package boilers are assumed to meet the efficiency standards. Although the standards do not apply to field-erected boilers, which are typically used in steam-intensive industries, we assume they meet the standards in the AEO	Standards specified in EPACT1992, 10 CFR 431
B. Clean Air Act Amendments of 1990 (CAAA1990)			
a. Process emissions	Numerous process emissions requirements for specified industries and activities	Not modeled because they are not directly	CAAA1990, 40 CFR 60

Legislation	Brief description	AEO handling	Basis
		related to energy projections	
b. Emissions related to hazardous/toxic substances	Numerous emissions requirements relative to hazardous and toxic substances	Not modeled because they are not directly related to energy projections	CAAA1990, 40 CFR 60
c. Industrial sulfur dioxide (SO ₂) emissions	Sets annual limit for industrial SO ₂ emissions at 5.6 million tons; If limit is reached, specific regulations could be implemented	Industrial SO ₂ 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.)	CAAA1990, Section 406 (42 USC 7651)
d. Industrial boiler hazardous air pollutants	Requires industrial boilers and process heaters to conduct periodic tune-ups or meet emissions limits on hazardous air pollutants to comply with the Maximum Achievable Control Technology (MACT) Floor; Regulations finalized December 2012	Costs of compliance that are not offset by efficiency gains (non-recoverable costs) are modeled as an additional capital cost in the Macroeconomic Activity Module (MAM) based on proposed regulations as of September 2012	U.S. Environmental Protection Agency, National Emissions Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers, Major Source (40 CFR 63, Subpart DDDDD) and Area Source (40 CFR 63 Part JJJJJJ)
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 (EPACT2005)			
a. Physical energy intensity	Voluntary commitments to reduce physical energy intensity by 2.5% annually for 2007–2016	Not modeled	EPACT2005, Section 106 (42 USC 15811)
b. Mineral components of cement or 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 4,000 barrels per day average; Applies to most producers of coal coke or coke gas	Not modeled; No impact on U.S. coke plant activity is anticipated	EPACT2005, Section 1321 (26 USC 45K)
D. The Energy Independence and Security Act of 2007 (EISA2007)			
a. Motor efficiency standards	Supersedes EPACT1992 Efficiency Standards no later than 2011	Purchases of motors must meet the EPACT1992 standards through 2010; afterwards purchases must meet the EISA2007 standards; Motors manufactured after June	EISA2007. 10 CFR Part 431 as amended

Legislation	Brief description	AEO handling	Basis
		1, 2016, are required to comply with higher efficiency standards	
E. The Energy Improvement and Extension Act of 2008 (EIEA2008)			
a. Combined heat and power tax incentive	Provides an investment tax credit for up to 15 megawatts of capacity in combined heat and power systems of 50 megawatts or less through 2016	System costs are adjusted to reflect the tax credit	EIEA2008, Title I, Sec. 103
F. California Global Warming Solutions Act of 2006 (AB-32); as amended, 2016 (SB-32)			
a. Limit statewide greenhouse gas (GHG) emissions level in 1990 to be achieved by 2020; SB-32 in 2016 requires a 40% reduction from 1990 GHG emission levels by 2030	The California Assembly Bill 32 (AB32) sets GHG reduction goals for 2020 for California; A cap-and-trade program applies to multiple economic sectors including electric power plants, large industrial facilities, suppliers of transportation fuel, and suppliers of natural gas	Prices of energy to Census Region 4 are increased based on GHG cap and trade prices and assumed emissions; The Industrial Demand Module is unable to model emissions at the state level	California Code of Regulations, "California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms," Subchapter 10 Climate Change, Article 5, Sections 95802 to 96022, Title 17, (Sacramento, CA: May 2014)

Transportation sector

Legislation	Brief description	AEO handling	Basis
A. Energy Policy Act of 1992 (EPACT1992)	Requires the number of alternatively- fueled vehicles and alternative fuel use in government, business, and fuel-provider fleets.	Composite mandates are created for government, electric power sector, and fuel provider fleets based on fleet vehicle stocks.	Energy Policy Act of 1992, Public Law 102-486-Oct. 24, 1992
B. California's Advanced Clean Cars program (ACCP), Zero Emission Vehicle (ZEV) Program, and the Low Emission Vehicle Program (LEVP)	The Clean Air Act allowed the state of California to implement vehicle emission standards that exceed federal standards, and includes a provision allowing other states to opt in to the California program. This program has been adopted by 13 other states. The ZEV program, affecting model year 2018 and later, requires a percentage of manufacturer's sales to be zero-emission vehicles with compliance met through the use of credits, which can be banked.	The ACCP which includes the Low Emission Vehicle Program as amended on March 22, 2012, and the Zero Emission Vehicle Program from July 10, 2014 are incorporated; Credit compliance requirements are met for California, Connecticut, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, and Vermont, through both sales and use of limited banking and traveling of these credits.	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, as amended March 22, 2012; Zero-Emission Vehicle Standards for 2018 and Subsequent Model Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, July 10, 2014

	Legislation	Brief description	AEO handling	Basis
C.	Corporate Average Fuel Economy (CAFE) Standards for Light Duty Vehicles	Requires manufacturers to produce vehicles that meet a minimum federal average fuel economy standard, promulgated jointly for model years 2012–16 and 2017–25 with an average greenhouse emissions standard; cars and light trucks are regulated separately.	CAFE standards are increased for model years 2011 through 2016 to meet the final CAFE rulemakings for model year 2011 and 2012 to 2016, respectively; CAFE standards are increased for model years 2017 to 2025 to meet final CAFE joint rulemakings for model year (MY) 2017 to 2021 and to meet augural CAFE standards for model year 2022 to 2025, which will undergo a midterm evaluation to finalize; CAFE standards are held constant through the end of the projection period.	Energy Policy Conservation Act of 1975; Title 49 USC, Chapter 329; Energy Independence and Security Act of 2007, Title 1, Section 102; Average Fuel Economy Standards Passenger Cars and Light Trucks Model Year 2011; Federal Register, Vol; 74, No. 59, March 2009; Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards, Final Rule, Federal Register, Vol. 75, No. 88, May 2010; 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards Federal Register, Vol. 77, No. 199, October 2012
D.	Alternative Fuel Vehicle Tax Credits	Federal tax credits are provided to encourage the purchase of electric, hybrid, and/or alternative fuel vehicles.	The tax credits for qualified plug-in electric drive motor vehicles and electric vehicles are included in the sales projections.	26 USC 30B, Energy Policy Act (Public Law 109-58, 2005), Energy Independence and Security Act (Public Law 110-140, 2007), Energy Improvement and Extension Act (Public Law 111-5, 2008)
E.	Plug-in Electric Drive Vehicle (PEV) Tax Credit	The American Recovery and Reinvestment Act of 2009 (ARRA2009) grants a tax credit of up to \$2,500 for PEVs with at least 4 kWh of battery capacity, with larger batteries earning an additional \$417 per kWh in excess of 5 kWh, up to a maximum of \$7,500 for light-duty PEVs. The credits are phased out once cumulative sales of qualified vehicles reach 200,000 for a manufacturer.	Federal tax credits for PEVs are incorporated.	26 USC 30D, Energy Improvement and Extension Act (Public Law 111-5, 2008), as amended by the ARRA2009 (Public Law 111-5, Section 1141, 2009)
F.	State electric, hybrid, and alternative fuel	More than 30 states provide incentives to encourage the purchase of electric, hybrid,	State taxes and other incentives for hybrid, electric, and other	Various state laws in place: Arizona, Arkansas, California,

Legislation	Brief description	AEO handling	Basis
vehicle tax and other incentives	and/or alternative fuel vehicles. The tax incentives are in the form of income reductions, tax credits, and exemptions. Other incentives include use of High Occupancy Vehicle lanes and exemptions from emissions inspections and licensing fees; The incentives offered and the mix varies by state, for example, Colorado offers a tax credit of up to \$5,000 for the purchase of qualified electric or plug-in hybrid electric vehicles through 2019.	alternative fuel vehicles are not incorporated.	Colorado, Connecticut, Delaware, District of Columbia, Florida, Georgia, Hawaii, Idaho, Illinois, Louisiana, Maryland, Massachusetts, Michigan, Missouri, Montana, Nevada, New Jersey, New York, North Carolina, Ohio, Oregon, Pennsylvania, Rhode Island, Tennessee, Texas, Utah, Virginia, Washington, and Wisconsin
G. Heavy-Duty (HD) National Program; Greenhouse Gas Emissions and Fuel Consumption Standards for Heavy-Duty Vehicles	Establishes greenhouse gas emissions and fuel consumption standards for on-road heavy-duty trucks and their engines. Standards begin for model year 2014 vehicles and engines and are fully phased in by model year 2018 (Phase I). A second round of standards for medium- and heavy-duty vehicles begins for model year 2021 vehicles and is fully implemented by model year 2027 (Phase II). The second round adds heavy-haul tractors and trailers.	HD National program Phase I and Phase II standards are modeled, with both engine and chassis technologies. Compliance is modeled among 13 heavy-duty vehicle V regulatory classifications that represent the discrete vehicle categories set forth in the rule. The standards are held constant in model years after 2027.	Section 202 of the Clean Air Act Title 49 USC, Chapter 32902[k]; Energy Independence and Security Act of 2007, Title 1, Section 102; Federal Register, Vol. 76, No. 179, September 2011; Federal Register, Vol 81, No. 206, October 2016
H. The International Convention for the Prevention of Pollution from Ships (MARPOL) Annex VI	Sets limits on sulfur oxides and oxides of nitrogen emissions from ship exhausts and prohibits deliberate emissions of ozone depleting substances; First entered into force on May 19, 2005; Requirements added on January 1, 2015, set a maximum of 0.1% sulfur fuel use or exhaust scrubber use in Emission Control Areas (ECA), from a previous 1% limit	MARPOL Annex VI fuel sulfur mandates are reflected in domestic and international shipping fuel choices starting in 2015	MARPOL 73/78, (33 U.S.C 1901(a) (4) & (5), 1902(a)(1)&(5), and 1907 (a), as amended by the Maritime Pollution Prevention Act of 2008 (MPPA), Public Law 110-280, 122 Stat 2611)

Electric power sector

Legislation	Brief description	AEO handling	Basis
A. Clean Air Act Amendments of 1990 (CAAA1990)	Establishes a national limit on electricity generator emissions of sulfur dioxide to	Sulfur dioxide cap-and-trade program is explicitly modeled, choosing the	Clean Air Act Amendments of 1990, Title IV, Sections 401

Legislation	Brief description	AEO handling	Basis
	be achieved through a cap-and-trade program	optimal mix of options for meeting the national emissions cap	through 406, Sulfur Dioxide Reduction Program, 42 U.S.C.7651a through 7651e
	Requires the EPA to establish National Ambient Air Quality Standards (NAAQS) for criteria pollutants; Currently two designation processes are underway: 1) for the sulfur dioxide (SO ₂) NAAQS issued in 2010 and 2) for the Ozone NAAQS 2015 issued in 2015; EPA is designating areas for the 2010 SO ₂ NAAQS in four rounds, of which the final three are court-ordered deadlines, with final round ending December 2020; States have until March 2026 to comply; For the Ozone NAAQS the EPA Administrator extended the deadline for final designations until October 2018; Areas falling into the designation of <i>moderate</i> nonattainment have until late 2023 to comply	These standards are not explicitly represented, but the Cross State Air Pollution Rule is incorporated (described below) and was developed to help states meet their 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
	Requires EPA to develop standards for emissions from new power plants; In October 2015, EPA specified carbon dioxide (CO ₂) emission rate standards for four types of new electric generating units: new fossil steam, modified fossil steam, reconstructed coal steam, and new combined-cycle combustion turbines	The AEO2019 assumes that new fossil plants built endogenously must meet the appropriate emission standard; New coal plants must include at least 30% carbon capture and sequestration to achieve the emission target specified; EIA does not represent modified or reconstructed power plants	Standards of Performance for Greenhouse Gas Emissions From New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units, 80 FR 64509, October 23, 2015
B. Cross-State Air Pollution Rule (CSAPR)	CSAPR requires states to reduce SO ₂ and/or nitrogen oxides (NO _x) emissions from power plants. CSAPR consists of four individual cap-and-trade programs, covering two different SO ₂ groups, an annual NO _x group, and a seasonal NO _x group; A total of 23 states are subject to annual limits, and 25 states are subject to seasonal limits; In September 2016, EPA finalized an update to the	Cap-and-trade programs for SO ₂ and NO _x are modeled explicitly, allowing the model to choose the best method for meeting the emission caps; Updated budgets and dates are incorporated in AEO2019	U.S. Environmental Protection Agency, "Cross-State Air Pollution Rule," website epa.gov/air transport . Federal Register, Vol. 70, No. 91 (May 12, 2005), 40 CFR Parts 51, 72, 73, 74, 77, 78 and 96

Legislation	Brief description	AEO handling	Basis	
C.	Mercury and Air Toxics Standards (MATS)	CSAPR ozone season program emission budgets and target dates	The EMM assumes that all coal-fired generating plants above 25 megawatts have complied by 2016; Plants are required to reduce mercury emissions by 90% relative to uncontrolled levels	U. S. Environmental Protection Agency, "Mercury and Air Toxics Standards," website epa.gov/mats
D.	Energy Policy Act of 1992 (EPACT1992)	Created a class of generators referred to as exempt wholesale generators (EWGs), exempt from Public Utility Holding Company Act as long as they sell wholesale power	Represents the development of 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
E.	The Public Utility Holding Company Act of 1935 (PUHCA)	PUHCA is a federal statute which was enacted to legislate against abusive practices in the utility industry; The act grants power to the U.S. 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 is 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

	Legislation	Brief description	AEO handling	Basis
F.	Federal Energy Regulatory Commission (FERC) Orders 888 and 889	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 as a result of 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	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, transactions between regions are assumed to occur if the cost differentials between them make it economic to do so	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

	Legislation	Brief description	AEO handling	Basis
G.	New Source Review (NSR)	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 maintenance, repair, and replacement (RMRR) exclusion; Essentially this facility's engagement 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 under the NSR process	It is assumed that coal plants will be able to increase their output as electricity demand increases; Their maximum capacity factor is set at 75%; No increases in the capacity of existing plants is assumed	EPA, 40 CFR Parts 51 and 52, Deterioration (PSD) and Non- Replacement Provision of the Vol. 68, No. 207, page 61248, Prevention of Significant Attainment New Source Review (NSR): Equipment Routine Maintenance, Repair and Replacement Exclusion; Final Rule, Federal Register, October 27, 2003
H.	State Renewable Portfolio Standards (RPS) Laws, Mandates, and Goals	Several states have enacted laws requiring that a certain percentage of their generation come from qualifying renewable sources; Among these states, some have implemented technology specific carve-outs, requiring that a certain percentage of required generation come from a specific energy technology source	The AEO reference case represents the Renewable Portfolio Standard (RPS) or substantively similar laws from states with established enforcement provisions for their targets; 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 nondiscretionary compliance criteria is evaluated for each region	The states with RPS or other mandates providing quantified projections are detailed in Table 1.

	Legislation	Brief description	AEO handling	Basis
I.	Regional and State Air Emissions Regulations	<p>The Northeast Regional Greenhouse Gas Initiative (RGGI) applies to fossil-fueled power plants over 25 megawatts in the Northeastern United States. New Jersey withdrew in 2011, leaving nine states in the program. The rule caps CO2 emissions and requires they account for CO2 emitted with allowances purchased at auction. In February 2013, program officials announced a tightening of the cap beginning in 2014; In December 2017, an Updated Model Rule was released, specifying a cap through 2030, modifications to the Cost Containment Reserves, and creation of an Emissions Containment Reserve</p>	<p>The impact of RGGI is included in the EMM, making adjustments when needed to estimate the emissions caps at the regional level used in NEMS; AEO2019 incorporates the latest model rule specifications</p>	<p>Regional Greenhouse Gas Initiative Model rule, www.rggi.org</p>
		<p>The California Assembly Bill 32 (AB32) sets GHG reduction goals for 2020 for California; A cap-and-trade program was designed to enforce the caps; The cap-and-trade program applies to multiple economic sectors including electric power plants, large industrial facilities, suppliers of transportation fuel, and suppliers of natural gas; Emissions resulting from electricity generated outside California but consumed in the state are also subject to the cap</p>	<p>The EMM models the cap-and-trade program explicitly for CO2 for California through an emission constraint that accounts for emissions from the other sectors; Limited banking and borrowing of allowances as well as an allowance reserve and offsets are incorporated as specified in the Bill</p>	<p>California Code of Regulations, Subchapter 10 Climate Change, Article 5, Sections 95800 to 96023, Title 17, "California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms," (Sacramento, CA: July 2011)</p>
		<p>The California Senate Bill 32 (SB32) sets GHG reduction goals for 2030 for California, at 40% below 1990 levels, requiring additional declines from the AB32 goals; The California Assembly Bill 398 (AB398), passed in July 2017, provided more clarification on how the new targets will be achieved</p>	<p>The AEO2019 assumes the cap-and-trade program developed for AB32 will continue, and it sets new annual targets through 2030 to achieve the SB32/AB398 goals; After 2030, the target remains flat</p>	<p>California Senate Bill 32, California Global Warming Solutions Act of 2006: emissions limit (September 8, 2016); California Assembly Bill 398, California Global Warming Solutions Act of 2006: market-based compliance mechanisms: fire prevention fees: sales and use tax manufacturing exemption (July 25, 2017)</p>

	Legislation	Brief description	AEO handling	Basis
J.	American Recovery and Reinvestment Act of 2009 (ARRA2009)	ARRA2009 provides \$4.5 billion for smart grid demonstration projects; These projects generally include a wide array of measurement, communications, and control equipment employed throughout the transmission and distribution system that will enable real-time monitoring of the production, flow, and use of power from generator to consumer	In the electricity module, it was assumed that line losses would fall slightly and customers would be more responsive to price signals	American Recovery and Reinvestment Act of 2009, Title IV, "Energy and Water Development," Section 405
		ARRA2009 provides \$800 million to fund projects under the Clean Coal Power Initiative program focusing on capture and sequestration of greenhouse gases	The AEO2019 does not assume any new coal with sequestration plants will come online directly from this initiative, as most of the demonstration projects selected have since had funding withdrawn or suspended	American Recovery and Reinvestment Act of 2009, Title IV, "Energy and Water Development"
K.	Consolidated Appropriations Act , 2016	As part of this act, Congress extended the qualifying deadlines for the production tax credit (PTC) and investment tax credit (ITC) for renewable generation technologies; The deadline for PTC-eligible technologies to receive the full production credit was extended by two years; Wind technologies are eligible to receive the PTC beyond the two-year extension, but the value of the PTC declines gradually over time before final expiration; This extension is unlike the treatment in previous years, in which the tax credit maintained a constant inflation-adjusted value; The five-year ITC extension for solar projects also includes a gradual reduction in the value of the credit, as well as a provision that allows it to begin when construction starts	AEO2019 explicitly models the revised dates for these tax credits	Consolidated Appropriations Act, 2016, Public Law 114-113, Sec. 187, December 2015
L.	New York (NY) Clean Energy Standard	The Clean Energy Standard creates two mechanisms to achieve the State's goal to reduce carbon emissions through greater use of renewable and other zero	In the electricity module, the renewable standard is modeled explicitly as for other state RPS programs; The nuclear ZECs are modeled by requiring the	State of New York Public Service Commission, Order Adopting a Clean Energy Standard, August 1, 2016

Legislation	Brief description	AEO handling	Basis
	emission generation; A renewable energy standard requires 50% of NY electricity to come from renewable energy sources by 2030; The zero emission credit (ZEC) program requires load serving entities to purchase ZECs based on their share of state sales; Certain existing nuclear units are eligible to receive the ZECs if their profitability is determined at risk because of low market prices	existing eligible units to remain operable during the program and by calculating any payment needed to keep them profitable; The calculated payment is passed through to retail prices	
M. Illinois Future Energy Jobs Bill	The Future Energy Jobs Bill revised the state's RPS program and created a zero emission credit program for existing nuclear units; The Illinois Power Agency must purchase ZECs to cover 16% of utility sales in 2014, existing nuclear units serving Illinois are eligible to receive the ZECs	In the electricity module, state RPS programs are modeled explicitly; The nuclear ZECs are modeled by requiring the existing eligible units to remain operable during the program and by calculating any payment needed to keep them profitable; The calculated payment is passed through to retail prices	State of Illinois, Future Energy Jobs Bill, Public Act 099-0906, June 1, 2017
N. New Jersey Zero Emission Certificate program for nuclear power plants	New Jersey Senate bill S2313 establishes a zero emission certificate (ZEC) program for existing nuclear power plants. A maximum of \$300 million dollars is available annually over 10 years to nuclear plants that demonstrate they make a significant contribution to New Jersey air quality and that they are at risk of closure within three years.	The nuclear ZECs are modeled by requiring the existing eligible units to remain operable during the program and by calculating any payment needed to keep them profitable, subject to the cap; The calculated payment is passed through to retail prices	State of New Jersey, Senate Bill No. 2313, May 23, 2018.

Oil and gas supply

Legislation	Brief description	AEO handling	Basis
A. The Outer Continental Shelf Deep Water Royalty Relief Act (DWRRA)	Requires that all tracts offered by November 28, 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 the Interior must offer such tracts with a specific minimum royalty	Incorporates royalty rates based on water depth	43 USC SS 1331-1356 (2002)

	Legislation	Brief description	AEO handling	Basis
B.	Energy Policy and Conservation Act Amendments of 2000	<p>suspension volume based on water depth</p> <p>Requires the United States Geologic Service (USGS) to inventory oil and gas resources beneath federal lands</p>	<p>To date, the Rocky Mountain oil and gas resource inventory has been completed by the USGS; The results of this inventory have been incorporated in the technically recoverable oil and gas resource volumes used for the Rocky Mountain region</p>	<p>Scientific Inventory of Onshore Federal Lands: Oil and Gas Resources and Reserves and the Extent and Nature of 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 U.S. Departments of Interior, Agriculture, and Energy, January 2003</p>
C.	Section 29 Tax Credit for Nonconventional Fuels	<p>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 (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</p>	<p>The Section 29 Tax Credit expired on December 31, 2002, and it is 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</p>	<p>Alternative Fuel Production Credit (Section 29 of the Internal Revenue Code), initially established in the Windfall Profit Tax of 1980</p>
D.	Energy Policy Act of 2005	<p>Establishes a program to provide grants to enhance oil and gas recovery through CO2 injection</p>	<p>Additional oil resources were added to account for increased use of CO2-enhanced oil recovery</p>	<p>Title III, Section 354 of the Energy Policy Act of 2005</p>

Natural gas market

	Legislation	Brief description	AEO handling	Basis
A.	Federal Motor Fuels Excise Taxes for Compressed Natural Gas and Liquefied Natural Gas in Vehicles. Liquefied natural gas tax changed as of January 1, 2016, under the Surface Transportation and Veterans Health Care Choice Improvement Act of 2015 (H.R. 3236)	Taxes are levied on each gasoline-gallon equivalent of compressed natural gas and each diesel-gallon equivalent of liquefied natural gas used in road vehicles and ships	Current federal motor fuels excise taxes on natural gas fuel for road vehicles and ships are included in retail prices and are assumed to be extended indefinitely in nominal dollars	26 USC 4041
B.	State Motor Fuels Taxes for Compressed Natural Gas and Liquefied Natural Gas in Vehicles	Taxes are levied on each gallon, gasoline-gallon equivalent, or diesel-gallon equivalent of natural gas for road vehicles	Current state motor fuels excise taxes on natural gas fuel for road vehicles are included in retail prices and are assumed to be extended indefinitely in nominal rates	Determined by review of existing state laws

Liquid fuels market

	Legislation	Brief description	AEO handling	Basics
A.	Ultra-Low-Sulfur Diesel (ULSD) regulations under the Clean Air Act Amendment of 1990	Since mid-2012, all diesel for domestic use (highway, non-road, locomotive, marine) may contain at most 15 parts per million (ppm) of sulfur	Reflected in diesel specifications	40 CFR Parts 69, 80, 86, 89, 94, 1039, 1048, 1065, and 1068
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.	Tier 3 Vehicle Emission and Fuel Standards Program	Gasoline must contain an average of 10 ppm sulfur or less by January 1, 2017; Small refiners may be permitted a three-year delay	Reflected in gasoline specifications beginning in 2017	40 CFR Parts 79, 80, 85, et. al., final rule: http://www.gpo.gov/fdsys/pkg/FR-2014-04-28/pdf/2014-06954.pdf

	Legislation	Brief description	AEO handling	Basics
E.	Methyl Tertiary Butyl Ether (MTBE) Bans in 25 states	25 states ban the use of MTBE in gasoline by 2007	Ethanol assumed to be the oxygenate of choice for all motor gasoline blends	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
F.	Regional Clean Fuel Formations	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 Petroleum Administration for Defense District (PADD)-level gasoline and diesel specifications	State implementation plans required by the Clean Air Act Amendments of 1990, as approved by EPA
G.	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
H.	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 Energy Statistics
I.	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
J.	Energy Policy Act of 2005 (EPACT2005)			
	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; Most recent tax credits are \$1.01 per gallon of cellulosic ethanol and \$1.00 per gallon of biodiesel; Both tax credits expired after 2016	The tax credits are applied against the production costs of the products into which they are blended; Ethanol is used in gasoline and E85; Biodiesel is assumed to be blended into highway diesel, and nonroad diesel or heating oil	26 USC 40, 26 USC 6426, and 26 USC40A; Tax credits extended through December 31, 2016, by Public Law 114-113)

Legislation	Brief description	AEO handling	Basics
b. Renewable Fuel Standard (RFS)	This section has largely been redefined by EISA2007 (see below); however, EPA rulemaking completed for this law was assumed to contain guiding principles of the rules and administration of EISA2007		Energy Policy Act of 2005, Section 1501
c. Elimination of oxygen content requirement in reformulated gasoline	Removes the 2% oxygen requirement for reformulated gasoline (RFG) nationwide	Oxygenate waiver already an option of the model; MTBE was phased out in 2006 resulting from the petroleum industry's decision to discontinue use	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 (CTL) projects	Two CTL units are available to build with lower capital costs reflecting the provision's funding	Energy Policy Act of 2005, Section 1307
K. Energy Independence and Security Act of 2007 (EISA2007)			
a. Renewable Fuel 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, however it is assumed that the schedule for cellulosic biofuel is adjusted downward consistent with waiver provisions contained in the law	40 CFR Part 80, Subpart M; " RFS Program: Standards for 2014, 2015, and 2016 and Biomass-Based Diesel Volume for 2017 ," page 4/100
L. State Heating Oil Mandates	A number of Northeastern states passed legislation that reduces the maximum sulfur content of heating oil to between 15 and 50 ppm in different phases through 2016	All state regulations included as legislated; 2013 EIA heating oil consumption data are used to calculate respective state Census Division shares for new consumption of low sulfur diesel as heating oil	Vermont Energy Act of 2011, Maine State Legislature HP1160, NJ State Department of Environmental Protection, Amendment N.J.A.C. 7:27-9.2, New York State Senate Bill 51145C
M. California Low Carbon Fuel Standard (LCFS)	California passed legislation which is designed to reduce the carbon intensity (CI) of motor gasoline and diesel fuels sold in California by 10% between 2012 and 2020 through the increased sale of alternative <i>low-carbon</i> fuels	The LCFS is included as legislated for gasoline and diesel fuel sold in California and for other regulated fuels	California Air Resources Board, " Final Regulation Order: Subarticle 7. Low Carbon Fuel Standard "
N. California Assembly Bill 32 (AB32)	The California Assembly Bill 32 (AB32), the Global Warming Solutions Act of 2006, authorized the	The AB32 cap-and-trade was more fully implemented in AEO2013, adding industrial facilities,	California Code of Regulations, Subchapter 10 Climate Change, Article 5,

Legislation	Brief description	AEO handling	Basics
	California Air Resources Board (CARB) to set GHG reduction goals for 2020 for California; A cap-and-trade program was designed to enforce the caps; The cap-and-trade program applies to multiple economic sectors including electric power plants, large industrial facilities, and suppliers of natural gas; Emissions resulting from electricity generated outside California but consumed in the state are also subject to the cap	refineries, fuel providers, and non-CO2 GHG emissions to the representation already in the electrical power sector of NEMS; In addition, limited banking and borrowing, as well as an allowance reserve and offset purchases, were modeled, providing some compliance flexibility and cost containment	Sections 95800 to 96023, Title 17, "California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms," (Sacramento, CA: July 2011)
O.	EPA ETS Waiver	EPA approved two waivers for the use of ethanol motor gasoline blends of up to 15% in vehicles 2001 and newer	These two waivers were included and modeled based on forecasted vehicle fleets and potential infrastructure and liability setbacks
P.	U.S. Department of Commerce, Bureau of Industry and Security (BIS): clarification on the export of crude oil under the Export Administration Regulations (EAR)	The definition of crude oil excludes hydrocarbon mixtures that have been processed through a crude oil distillation tower	Processed API 50+ crude oil is assumed to be processed condensate and is allowed to be exported
Q.	U.S. Congress, "H.R. 1314–Bipartisan Budget Act of 2015," Title IV – Strategic Petroleum Reserve, Sec. 401–403, 114th Congress (2015–2016)	Sec. 401–403 requires a test drawdown, actual drawdown, and sale of crude oil from the Strategic Petroleum Reserve during FY2018–FY2025	A definition of crude oil was set forth in Section 754.2 of the EAR on December 30, 2014 and was subsequently moved to Section 772.1 on May 12, 2016; see page 13
R.	U.S. Congress, "H.R. 22 – FAST Act," Sec. 32204, Strategic Petroleum Reserve drawdown and sale, 114th Congress (2015–2016)	Sec. 32204 requires drawdown and sale of crude oil from the Strategic Petroleum Reserve during a specified timeframe	Explicitly represents the crude withdrawals from the Strategic Petroleum Reserve (SPR) as specified by the act
S.	U.S. Congress, "H.R. 2029 – Consolidated Appropriations Act, 2016," Division O – Other matters, Title I – Oil Exports, Safety Valve, and Maritime Security, 114th Congress (2015–2016)	Title 1, Sec. 101 ends the ban on U.S. crude oil exports; however, under extenuating circumstances, the President may restrict U.S. crude oil exports for no more than one year	Explicitly represents the crude withdrawals from the Strategic Petroleum Reserve (SPR) as specified by the act

Source: U.S. Energy Information Administration, Office of Energy Analysis.