



MEMORANDUM

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Subject: Comparison of Selected Senate Energy and Climate Change Proposals

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This memorandum was prepared to enable distribution to more than one congressional office.

This memorandum provides a short summary and comparison of four legislative proposals that may receive attention in the Senate. This memorandum will not be updated.

While all four proposals fall within the broad category of energy and climate change policy, the specifics of the proposals vary significantly, and their approaches vary in many ways.

- S. 1462, the American Clean Energy Leadership Act (ACELA) of 2009, was introduced by Senator Bingaman and reported by the Senate Committee on Energy and Natural Resources on July 16, 2009 (S.Rept. 111-48). S. 1462 is a broad energy bill aimed at promoting the development of clean energy technologies, increasing energy efficiency, and promoting domestic energy resources.¹ Incentives for new technology include a renewable energy standard (RES) for electric utilities. The bill does not directly address greenhouse gas emissions: provisions for a greenhouse gas cap-and-trade system were instead included in S. 1733, the Clean Energy Jobs and American Power Act, sponsored by Senators Kerry and Boxer, and reported by the Senate Committee on Environment and Public Works on February 2, 2010.²
- S. 2877, the Carbon Limits and Energy for America's Renewal (CLEAR) Act, was introduced by Senators Cantwell and Collins on December 11, 2009 and has been referred to the Senate Committee on Finance. S. 2877 would establish a program to control only carbon dioxide (CO₂) emissions (covering 80% of U.S. GHG emissions), requiring fossil fuel producers (e.g., coal mines, gas wellheads) and importers to submit "carbon shares" for the CO₂ emissions related to the fossil fuels they produce or import. The President would limit (or cap) the quantity of carbon shares available for submission

¹ For a more detailed analysis of S. 1462, see CRS Report R40837, *Summary and Analysis of S. 1462: American Clean Energy Leadership Act of 2009, As Reported*, coordinated by Mark Holt and Gene Whitney.

² For a comparison of the greenhouse gas provisions in S. 1733 with other proposals in the 111th Congress, see CRS Report R40556, *Market-Based Greenhouse Gas Control: Selected Proposals in the 111th Congress*, by Larry Parker, Brent D. Yacobucci, and Jonathan L. Ramseur.

each year, and the Department of Treasury would distribute all of the carbon shares through monthly auctions.

- S. 3464, the Practical Energy and Climate Plan Act of 2010, was introduced by Senators Lugar, Graham, and Murkowski on June 9, 2010 and has been referred to the Senate Committee on Finance. S. 3464 is a broad energy bill aimed at promoting the development of clean energy technologies, increasing energy efficiency, and promoting domestic energy resources. Instead of a renewable energy standard (RES) like that contained in S. 1462, S. 3464 contains a “Diverse Energy Standard” which would permit the use of a broad range of electric generation technologies including renewables, but also including nuclear energy and advanced coal generation with carbon capture and storage. Other provisions include building and vehicle efficiency standards and nuclear energy loan guarantees. The bill does not contain a mandatory scheme to limit greenhouse gas emissions.
- A discussion draft of the American Power Act (APA) was released on May 12, 2010 by Senators Kerry and Lieberman. A comprehensive energy and climate change policy proposal, the draft would set GHG reduction goals similar to those in H.R. 2454 (the bill most comparable to the APA draft),³ which passed the House in June 2009. The APA employs a market-based cap-and-trade scheme for electric generators and industry with a separate price mechanism to cover emissions from transportation fuels. The draft proposal would allocate a significant amount of allowance value to energy consumers, low-income households, and the promotion of low-carbon energy technologies. In addition, the draft would provide incentives for the expansion of nuclear power, carbon capture and storage technology, and advanced vehicles.

CRS has selected nine key topics relevant to some or all of the proposals. For each topic, a short summary and comparison of the proposals’ provisions is included. The nine topics are listed below, along with the author’s contact information:

1. Mandatory Carbon Dioxide/Greenhouse Gas Emissions Controls—Larry Parker, Specialist in Energy and Environmental Policy, x7-7238 and Brent Yacobucci, x7-9662;
2. Carbon Capture and Sequestration—Peter Folger, Specialist in Energy and Natural Resources Policy, x7-1517;
3. Nuclear Energy—Mark Holt, Specialist in Energy Policy, x7-1704;
4. Oil and Gas—Neelesh Nerurkar, Specialist in Energy Policy, x7-2873;
5. Renewable Energy / Clean Energy Standards—Richard Campbell, Specialist in Energy Policy, x7-7905;
6. Energy Efficiency—Fred Sissine, Specialist in Energy Policy, x7-7039;
7. Vehicles and Transportation—Brent Yacobucci, x7-9662;
8. Tax Incentives—Molly Sherlock, Analyst in Economics, x7-7797; and
9. Jobs/Workforce Development—Richard Campbell, x7-7905.

³ CRS has written several reports on various aspects of H.R. 2454. For an overview, see CRS Report R40643, *Greenhouse Gas Legislation: Summary and Analysis of H.R. 2454 as Passed by the House of Representatives*, coordinated by Mark Holt and Gene Whitney. Reports on specific topics include cap-and-trade provisions, carbon capture and sequestration, electricity and natural gas, and climate change adaptation (search “H.R. 2454” on the crs.gov website).

Mandatory Carbon Dioxide/Greenhouse Gas (GHG) Emission Controls⁴

S. 1462 does not set mandatory greenhouse gas emission reduction targets or include a mandatory greenhouse gas emission reduction scheme. S. 2877 would create a program that seeks to combine emission limits and price controls. The President would limit (or cap) the quantity of carbon shares available to covered entities for submission each year, and the Department of Treasury would distribute all of the carbon shares through monthly auctions. The auctions would have a price floor and a price ceiling (i.e., safety valve). If the price ceiling were reached in a given auction, additional carbon shares would be sold to accommodate all bids, and the additional funds collected would be used to buy domestic emission offsets. S. 3464 does not set mandatory greenhouse gas emission reduction targets or include a mandatory greenhouse gas emission reduction scheme. The draft American Power Act would set GHG reduction goals similar to those of H.R. 2454. The American Power Act proposal would employ a market-based cap-and-trade scheme for electric generators and industry with a separate price mechanism to cover emissions from transportation fuels. Key features of the emissions reduction schemes are described below.

Emissions Reduction/ Limitation Scheme

- S. 1462 does not set mandatory greenhouse gas emission reduction targets or include a mandatory greenhouse gas emission reduction scheme.
- S. 2877 creates a hybrid cap/tax approach requiring fossil fuel producers (e.g., coal mines, wellheads) and importers to submit “carbon shares” for the CO₂ emissions associated with the use of the fossil fuels. The mandatory scheme only covers carbon dioxide emissions from these sources. The President is directed to establish (in 2011) a 2012 CO₂ emissions limit for the covered entities that equals the expected emissions for 2012; the annual limit begins to decline in 2015 at an increasing rate each year; in 2020, the CO₂ limit would be approximately 9% below 2005 CO₂ levels; in 2030, 32% below 2005 levels; in 2050, 83% below 2005 levels.
- S. 3464 does not set mandatory greenhouse gas emission reduction targets or include a mandatory greenhouse gas emission reduction scheme.
- The APA draft creates a cap-and-trade allowance scheme similar to H.R. 2454 that covers about 85% of all emissions of seven greenhouse gases,⁵ including carbon dioxide. Emissions caps for the covered entities are specified in the bill as follows: In 2013, 4.75% below 2005 emissions from covered sources; in 2020, 17% below 2005 emissions from covered sources; in 2030, 42% below 2005 emissions from covered sources; in 2050, 83% below 2005 emissions from covered sources. Transportation fuel producers may not participate in the allowance market, but must instead purchase allowances at a set price (the prevailing auction price from the previous quarter) from a designated pool of allowances set aside for that purpose.

⁴ This section was written by Larry Parker and Brent Yacobucci. For a more detailed comparison of proposals in the 111th Congress to control greenhouse gases, see CRS Report R40556, *Market-Based Greenhouse Gas Control: Selected Proposals in the 111th Congress*, by Larry Parker, Brent D. Yacobucci, and Jonathan L. Ramseur.

⁵ Carbon dioxide, methane, nitrous oxide, hydrofluorocarbons emitted as a byproduct, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride, as well as any other substance subsequently designated by EPA.

Cost Control Mechanisms

- S. 1462 does not set mandatory greenhouse gas emission reduction targets or include a mandatory greenhouse gas emission reduction scheme.
- S. 2877 would allocate its carbon shares or allowances solely by auction. The auction would have a price ceiling (and price floor), starting at \$21/share in 2012; the ceiling would increase annually by a rate related to inflation and capital investment; if the price ceiling is reached in a given auction, additional carbon shares would be sold to accommodate all bids. This is commonly known as a safety valve mechanism.
- S. 3464 does not set mandatory greenhouse gas emission reduction targets or include a mandatory greenhouse gas emission reduction scheme.
- The APA draft contains no specific provision to control prices overall, but the draft includes a cost containment reserve of allowances available at a set price. Allowances from the cost containment reserve, a pool of allowances borrowed from future years, would be sold at \$25/allowance in 2013 (in \$2009); the cost containment price grows at 5% real (adjusted for inflation) annually thereafter. A covered entity may meet up to 15% of its allowance obligation using allowances from this reserve, with certain other restrictions.

Distribution of Allowance Value/Auction Revenues

- S. 1462 does not set mandatory greenhouse gas emission reduction targets or include a mandatory greenhouse gas emission reduction scheme.
 - S. 2877 would allocate 75% of auction revenue (subject to the appropriations process) to a Carbon Refund Trust Fund, which would be used to distribute monthly (non-taxable) dividends to all (legally residing) individuals in the United States. The remaining 25% would be allotted (subject to the appropriations process) to the Clean Energy Reinvestment Trust Fund (CERT Fund), which could be used to support a myriad of policy objectives: e.g., worker transition assistance, adaptation, technology development, energy efficiency, biological sequestration, and deficit reduction. Revenue from carbon shares purchased at the price ceiling (“safety valve”) would be devoted to supporting (1) efforts to reduce non-CO₂ GHG emissions; and (2) domestic biological sequestration activities, such as agriculture or forestry projects.
 - S. 3464 does not set mandatory greenhouse gas emission reduction targets or include a mandatory greenhouse gas emission reduction scheme.
 - The APA draft would allocate allowances and/or auction revenues to various purposes with the precise allocations changing in future years. In 2016, allowance value is allocated as follows: 30% (at minimum) to electric Local Distribution Companies (LDCs); 9% for natural gas LDCs; 1.5% to states for home-heating oil and propane consumers; 12.3% directly to low-income consumers; 15% to trade-exposed industries; up to 0.5% to merchant coal units; 3.75% to petroleum refineries; up to 4.5% to long-term power contract operators; 2% to states to support renewable energy and energy efficiency efforts; 4% to promote technological advances; 9.2% to support transportation infrastructure and efficiency; 6.75% for deficit reduction; and 1.5% auctioned to help mitigate against high allowance prices.
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Carbon Capture and Sequestration⁶

S. 1462 would authorize the Secretary of Energy to enter into cooperative agreements to provide financial and technical assistance to large-scale carbon capture and sequestration (CCS) demonstration projects. The demonstration projects would focus on the sequestration stage of CCS to foster the commercial application of long-term geologic storage of CO₂. S. 1462 would also authorize the Secretary to indemnify the operator from liability for up to \$10 billion per project, except in instances of gross negligence or willful misconduct, in addition to financial assurances and protections provided by the operator of a sequestration project.

S. 2877 would provide carbon shares—in excess of the aggregate quantity established under subsection (a)(2) of the bill—to an operator of a CCS facility in a quantity that corresponds to the quantity of fossil carbon that is verifiably sequestered in compliance with appropriate laws and regulations. S. 2877 would also provide excess carbon shares to operators of oil and gas reinjection projects, and to manufacturers who embed fossil carbon in products that prevent the embedded carbon from reaching the atmosphere and having a negative impact.

S. 3464 would define new or existing coal-fired electricity generating plants as “advanced coal generation” if the plant captured and permanently sequestered, stored, or reused⁷ at least 80% of the greenhouse gases produced by the facility. Advanced coal generation plants would qualify as a type of “diverse energy,” and thus be eligible to receive diverse energy credits as specified in the bill.

The draft American Power Act would create a funding mechanism to support the development and deployment of CCS technologies for mid- and large-scale projects (at least 100 megawatts). The proposal would also promote the commercial deployment of CCS technologies, similar to H.R. 2454, by distributing emission allowances from the cap and trade program to qualifying electric generating plants and industrial facilities.

Funding for Development and Demonstration of CCS Technologies

- S. 1462 would authorize funding for the Department of Energy (DOE) to support up to 10 CCS projects to demonstrate large-scale integrated capture, transportation, and sequestration of CO₂ from industrial sources. To qualify for selection, applicants would need to demonstrate that they meet all the qualifications to geologically sequester CO₂ over the long term, including possessing the land or interests in the land, permits and authorizations for constructing and operating injection wells, monitoring the injected CO₂, and meeting the long-term care requirements after injection has ceased.
- S. 2877 does not establish a demonstration program for CCS.
- S. 3464 would issue diverse energy credits to coal-fired electricity generating plants, between the years 2015 and 2029, for “demonstration coal generation” if the facility captured, permanently sequestered, stored, or reused at least 65% of the greenhouse gases produced. Credits would be issued per kilowatt hour according to a formula whereby the

⁶ This section was written by Peter Folger. For more information on CCS, see CRS Report RL33801, *Carbon Capture and Sequestration (CCS)*, by Peter Folger.

⁷ The legislation specifies that “reuse” must provide the equivalent long-term sequestration as from sequestration or storage.

number of kilowatt hours generated in a year are multiplied by the ratio of CO₂ captured to the total CO₂ generated by the facility.⁸

- The APA discussion draft would establish a funding mechanism for large scale demonstration CCS projects by assessing a “wires charge” on the amount of electricity provided by fossil fuel-based electricity generators. The “wires charge” would collect approximately \$2 billion per year over 10 years. The charge would be proportional to the amount of CO₂ released per unit of energy produced (i.e., highest charge for coal, lowest charge for natural gas). The Secretary, through the program director, would make the funds available for grants, contracts, cooperative agreements, and other awards to eligible entities.

Incentives for the Commercial Deployment of CCS

- S. 1462 is limited to demonstration projects and does not include revenues or allowances from a cap and trade program to support the commercial deployment of CCS.
- S. 2877 provides carbon shares, in excess of the aggregate quantity established in the bill, to the operator of a CCS facility that would correspond to the quantity of fossil carbon sequestered by the CCS facility. These “bonus shares” could be considered as an incentive for commercial deployment of CCS, although the CCS facility would have to be already established and in compliance with appropriate laws and regulations.
- S. 3464 would provide an incentive for commercialization of CCS by issuing diverse energy credits to coal-fired electricity generating plants that capture, sequester, store, or reuse at least 80% of the greenhouse gases generated at the facility.
- The APA discussion draft would create a program that would distribute emission allowances from the cap and trade provisions to qualifying electric generating plants (200 megawatts or more) and industrial facilities (that emit 50,000 tons of CO₂ per year or more) that capture and sequester CO₂. Eligible facilities would be required to capture 50% or more of the emissions from the electric generating unit or emission point at the industrial facility. The higher the rate of capture, the greater the number of emission allowances awarded, together with a bonus for “early movers.” Emission allowances would be awarded to up to 72 gigawatts of total cumulative electric generating capacity that employs CCS.

Legal and Regulatory Framework for CCS

- S. 1462 would require financial assurances from the operator of the CCS facility during injection, closure, and post-closure activities. The bill would require that the operator meet all post-closure requirements, and maintain the financial assurances and protection, such as insurance, before the federal government would accept title and long-term stewardship responsibilities for the site. In addition to these financial assurances, the legislation would authorize the Secretary to indemnify the operator from liability arising from a project that is in excess of the liability covered by the operator. The legislation would authorize up to \$10 billion per project, except for instances of liability from gross negligence or intentional misconduct.

⁸ For example, a facility that generates 100 kilowatt hours and captures 50% of the CO₂ generated would receive 50 credits.

- S. 2877 does not address legal or regulatory aspects of CCS.
- S. 3464 does not address legal or regulatory aspects of CCS.
- The APA discussion draft requires a report from the EPA Administrator, within one year of enactment, that establishes a unified and comprehensive strategy to address key legal, regulatory, and other barriers to the commercial-scale deployment of CCS. In addition, the legislation would establish a task force to conduct a study of existing laws that apply to CCS, including environmental laws that apply to sites where CO₂ was used for enhanced oil recovery. Also, the bill would require a study of how the laws for which EPA has responsibility would apply to CCS activities.

Nuclear Energy⁹

S. 1462 would establish a Clean Energy Deployment Administration (CEDA) to provide loan guarantees and other assistance to energy technologies that would reduce greenhouse gas emissions, such as nuclear power, and establish a National Commission on Nuclear Waste. S. 2877 would broadly authorize funding for energy technologies that reduce greenhouse gas emissions with no specific mention of nuclear energy. S. 3464 would increase nuclear energy loan guarantees and include new nuclear power plants in a federal requirement for diverse electricity generation. The APA discussion draft would provide extensive incentives for new nuclear power plants, including increased loan guarantees, regulatory risk insurance, licensing modifications, and tax credits.

Loan Guarantees

- S. 1462 would require the Secretary of Energy to transfer authority over energy loan guarantees established by Title XVII of the Energy Policy Act of 2005 (P.L. 109-58) to CEDA, which would receive increased flexibility in implementing the program.
- S. 2877 would authorize funding from the Clean Energy Reinvestment Trust Fund for CEDA activities.
- S. 3464 would appropriate \$360 million for the “cost” (potential losses) of nuclear loan guarantees. Under Congressional Budget Office scoring rules, the \$360 million would support a \$36 billion increase in the total loan guarantee ceiling for nuclear power plants, which is currently at \$18.5 billion. That is the same as the increase in the President’s FY2011 budget request.
- The APA discussion draft would increase the ceiling on nuclear power plant loan guarantees by \$35.5 billion and establish a fee to encourage refinancing of guaranteed loans after plants are completed.

Other Assistance

- S. 1462 would authorize CEDA to provide broader assistance to “clean” energy technologies, in addition to the loan guarantee authority transferred from the Secretary of Energy. CEDA assistance would include “direct loans, letters of credit, loan guarantees, insurance products, or other credit enhancements.”

⁹ This section was written by Mark Holt. For more information, see CRS Report RL33558, *Nuclear Energy Policy*, by Mark Holt.

- S. 2877 authorizes direct funding of projects that would reduce greenhouse gas emissions.
- S. 3464 would include new nuclear power plants under a “federal diverse energy standard,” which would require an increasing percentage of U.S. electricity to be generated by new nuclear power plants or other qualifying energy sources. The minimum amount of “diverse energy” would start at 15% in 2015 and rise to 50% in 2050.
- The APA discussion draft would increase the existing Standby Support Program, which provides insurance coverage for regulatory delays in licensing new nuclear plants, from six to 12 reactors, allow payments of up to \$500 million for each reactor, and allow unused coverage from a completed plant to be “rolled over” to the next plant in line for coverage. Changes in the licensing process would include removal of mandatory hearings on non-contested issues. Import duties on certain nuclear plant components not available in the United States would be suspended for an additional 10 years. Tax incentives for nuclear plants would include a five-year accelerated depreciation period, a 10% investment tax credit, expansion of the existing nuclear energy production tax credit, and grants to public power providers in lieu of tax credits.

Nuclear Waste

- S. 1462 would create a National Nuclear Waste Commission to study alternative waste management strategies, including spent fuel reprocessing and recycling. A similar commission, the Blue Ribbon Commission on America’s Nuclear Future, was established by the Secretary of Energy in March 2010 at the direction of the White House. S. 1462 would also establish new requirements for DOE’s spent nuclear fuel recycling research program.
- S. 2877 does not have any specific provisions on nuclear waste.
- S. 3464 does not have any specific provisions on nuclear waste.
- The APA discussion draft would require the Secretary of Energy to designate a national laboratory as a “spent fuel recycling research and development center of excellence.”

Oil and Gas¹⁰

S. 1462 deals most extensively with oil and gas topics, including measures addressing offshore drilling, the Strategic Petroleum Reserve (SPR), and oil and gas markets. The APA discussion draft also addresses offshore drilling issues including revenue sharing and state control of nearby leasing. It includes place holders for a series of issues that have come under greater focus in the wake of the Deepwater Horizon incident such as new offshore safety measures and drilling liability. (The APA Draft was released May 12, 2010, soon after the April 20 incident). S. 2877 would impact oil and gas as part of broader climate measures discussed above. S. 3464 focuses on reducing foreign oil imports through efficiency and alternative fuel measures discussed below. To the extent that any of the proposals reduces oil and gas consumption, that could lead to lower oil and gas prices. However, there are many uncertainties and potential offsetting market risks.

¹⁰ This section was written by Neelesh Nerurkar.

Offshore Drilling

- S. 1462 would open parts of the eastern Gulf of Mexico (GOM), mostly areas 45 miles and further from the Florida coastline, to oil and gas leasing. It requires seismic study of potential resources in the eastern GOM, Atlantic, and Alaska. It would also repeal royalty relief for shallow water deep gas and for deepwater oil and gas (sections 344 and 345 of the Energy Policy Act of 2005).
- S. 2877 does not include offshore provisions.
- S. 3464 does not include offshore provisions.
- The APA draft would create a temporary moratorium on offshore drilling, and give states the right to cancel oil and gas development within 75 miles of their shore. It would set up federal revenue sharing with coastal states for new areas opened to leasing, and direct some of the remaining revenue towards deficit reduction. The bill includes place holders for new safety, liability, remediation, and accident preparedness mechanisms related to offshore drilling.

Cost and Price Related Measures

- S. 1462 includes a series of measures improving energy market transparency aimed at moderating oil and gas costs, including creation of new groups to address challenges such as price volatility and oil import dependence. It would also direct the SPR to hold 30 million barrels in refined products, and permit use of the SPR when a severe price increase could damage the economy. Also, the Federal Energy Regulatory Commission (FERC) would be given new authorities to address emergencies and market manipulation.
 - S. 2877 includes distributions from the Carbon Refund Trust Fund in S. 2877 to help offset the higher costs for using oil and other fossil fuels due to the pricing carbon emissions. The bill's allowance price ceiling (i.e., safety valve) limits cost risks to oil and gas producers who must buy carbon shares to cover the GHG emissions from the burning of their products.
 - S. 3464 could indirectly reduce oil and gas costs and potentially also reduce prices if it successfully reduces oil demand through transport efficiency and other measures. When considering fuel efficiency standards, the Secretary of Transportation would be required to weigh the broad costs of oil import dependence, including oil price levels, oil price volatility, and other security risks and costs.
 - The APA draft would provide emissions allowances for the benefit of residential and commercial users of heating oil, propane, and natural gas that might otherwise face higher energy costs from pricing of GHG emissions. To cover GHG emissions from combustion of transportation fuels, petroleum refiners and importers would have sufficient allowances provided to them at a set price. Petroleum refiners would also receive an allocation of allowances to help cover their direct GHG emissions.
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Renewable Energy / Clean Energy Standards¹¹

S. 1462 would establish a federal Renewable Electricity Standard (RES) for electric utilities selling power to end-use customers. These utilities must obtain an annual percentage of their supplies from renewable energy sources or energy efficiency ranging from 3% in 2011 to 15% by 2021. Renewable sources are defined as wind, solar, geothermal, and ocean energy; biomass, landfill gas, qualified hydropower (i.e., incremental additions since 1992), marine and hydrokinetic energy, coal-bed methane, and qualified waste-to-energy. S. 2877 supports the concept of federal renewable energy and energy efficiency standards but does not propose an RES, or offer specific goals to advance such programs.

S. 3464 would create a federal Diverse Energy Standard (DES) for electric utilities selling power to end-use customers. Utilities must obtain minimum annual percentages of the electricity they sell from energy efficiency, renewable energy or other [clean] energy sources of 15% in 2015 through 2019; 20% from 2020 to 2024; 25% from 2025 to 2029; 30% from 2030 to 2049; and 50% by 2050. These diverse energy sources can include advanced coal generation, biomass, coal mine methane, end-user energy efficiency, efficiency savings in power generation, geothermal energy, landfill and biogas, marine and hydrokinetic energy, qualified hydropower (i.e., incremental capacity or efficiency improvements made up to three years prior to enactment), qualified nuclear (i.e., placed in service on or after date of enactment), solar, waste-to-energy, wind, and any other energy source that results in at least an 80% reduction in greenhouse gas emissions compared to average emissions in the prior year from “freely emitting sources.”

The APA discussion draft proposes a number of state and local programs to forward goals for energy efficiency and renewable energy development but does not contain an RES. The APA draft details several “findings” of Congress, but does not propose a comprehensive program for promotion of renewable energy and energy efficiency.

Federal Clean Energy Standards

- S. 1462 would establish an RES for electric utilities selling power to end-use customers, requiring energy efficiency measures or renewable energy sources to range from 3% in 2011, rising to 15% of all resources by 2021. S. 1462 excludes from the base quantity (to which RES requirements apply) electricity generated by electric utility-owned hydropower, incineration of municipal solid waste, and electricity from fossil fuel units proportional to greenhouse gas emissions captured and geologically sequestered. Only incremental hydropower, efficiency improvements or powering of non-hydroelectric dams is allowed for the definition of “Qualified Hydropower” in S. 1462. The bill would allow an alternative compliance payment of 2.1 cents per kilowatt-hour (kWh). S. 1462 does not clearly define the basis for issuance or award of a federal renewable energy credit (REC): a REC appears to be issued for each megawatt-hour (MWh) of renewable electricity but the bill associates such credits with a kWh of electricity “used only once” for compliance purposes.
- S. 2877 does not contain an RES.
- S. 3464 would create a DES for electric utilities selling electricity to end-use customers, requiring energy efficiency or clean energy sources to range from 15% by 2015, rising to 50% of all sources by 2050. S. 3464 only excludes hydropower from the base quantity of

¹¹ This section was written by Richard Campbell.

the DES. The definition of “Qualified Hydropower” in S. 3464 also allows for new hydroelectric dams to be included. The bill would allow an alternative compliance payment of 5 cents per kWh (higher than the alternative compliance payment in S. 1462’s RES). Like S. 1462’s RES, there is some ambiguity as to whether diverse energy credits (DECs) represent one kWh or one MWh of electricity generated.

- The APA draft does not contain an RES.

Other Renewable or Clean Energy Provisions

- S. 1462 would modify the requirement established in the Energy Policy Act of 2005 that federal agencies purchase and/or produce and use renewable electricity. The bill also promotes renewable energy development on federal lands and requires the establishment of Renewable Energy Permit Coordination Offices in field offices of the Bureau of Land Management in a pilot project to coordinate federal permits for renewable energy and electricity transmission.
- S. 2877 would allow the use of Clean Energy Reinvestment Trust Fund (CERT) monies (see above) for renewable projects, among other purposes. CERT would be empowered to finance programs of a Clean Energy Deployment Administration, provide incentives, or make grants and loans. (The bill does not establish a Clean Energy Deployment Administration. It appears to assume that one already exists, for example, as proposed in S. 1462).
- S. 3464 also takes the additional step in Section 302 of establishing an incentive program to permanently retire conventional coal plants with the “largest pollution-related liabilities” by January 1, 2019. Regulatory relief would be granted for “early retirement,” authorizing an alternative compliance mechanism which would exempt these plants from compliance with specific federal environmental regulations.
- The APA discussion draft allocates emissions allowances to states for renewable energy, energy efficiency, smart grid and other programs. The draft also requires a report to Congress from the Comptroller General (within two years of enactment) on the “efficacy” of voluntary renewable energy markets in promoting renewable energy and reducing carbon dioxide emissions. The draft requires a study of the use of renewable biomass, and gas or fuel derived from renewable biomass regarding the quantity of greenhouse gas (GHG) emissions, net GHG benefits from renewable biomass, and other related issues in each region of the United States. A National Academy of Sciences report is also required within one year of enactment to evaluate how sources of renewable biomass contribute to U.S. energy independence, environmental protection, and reduction of GHG pollution.

Energy Efficiency¹²

S. 1462 has a broad array of energy efficiency provisions that include a major financing agency and a variety of programs that cover several sectors.¹³ S. 2877 includes two energy efficiency provisions: a

¹² This section was written by Fred Sissine.

¹³ For more information on the energy efficiency provisions in S. 1462, see CRS Report R40837, *Summary and Analysis of S. 1462: American Clean Energy Leadership Act of 2009, As Reported*, coordinated by Mark Holt and Gene Whitney.

consumer loan program and a trust fund that may be used for energy efficiency projects. S. 3464 has provisions for buildings (codes, retrofits, and federal buildings), federal procurement, a consumer loan program, vehicles (see section below on vehicles and transportation), and a manufacturing loan program. The APA draft proposes to use emission control allowances to support consumer-oriented energy efficiency provisions – offered mainly through states and energy utility companies.

Clean Energy Deployment Administration

- S. 1462 would establish a Clean Energy Deployment Administration (CEDA), as a quasi-independent agency at the Department of Energy (DOE). The new agency would promote the commercial deployment of clean energy technologies (including energy efficiency) by modifying the Loan Guarantee Program (LGP) and increasing DOE's authority to offer additional financial incentives. CEDA would draw upon a new Clean Energy Investment Fund, which would be simultaneously established as a \$10 billion revolving fund at the Department of the Treasury.
- S. 2877 would allow the use of Clean Energy Reinvestment Trust Fund (CERT) monies (see above) for energy efficiency projects, among other purposes.
- S. 3464 would not create a CEDA-type entity. However, it would provide \$360 million to leverage \$36 billion in LGP authority for advanced nuclear energy power plants. (See section on Nuclear Energy).
- The APA discussion draft has no provision related to a CEDA-type entity.

Energy Efficiency in Buildings

- S. 1462 contains the most extensive building efficiency provisions. First, S. 1462 would require that DOE update the residential and commercial energy codes every three years with increasing energy savings targets. Federal training and funding assistance would be available to states that adopt advanced building efficiency codes. Appropriations of \$100 million per year would be authorized for five years. Second, the bill would direct EPA to establish a broad program of criteria and financial support for retrofits of residential buildings and direct DOE to establish a parallel program for commercial buildings. Third, the bill would provide a low-income rebate for energy-efficient manufactured housing. S. 1462 also proposes a zero-net-energy initiative for residential buildings, federal facility energy efficiency requirements, and several other buildings policies. It does not have a provision for building energy labeling.
 - S. 2877 has no similar provisions.
 - S. 3464 would create three building efficiency programs. First, provisions to update model energy codes, and to create incentives for states to attain those codes, are very similar to provisions in S. 1462. Some standard reference dates and target implementation dates differ. S. 3464 would authorize \$300 million per year for five years. Second, where practicable, federal buildings designed after the end of 2011 would have to exceed national performance standards and those designed after the beginning of 2020 would have to achieve net-zero energy use by 2030. Third, an energy retrofit program would be established at DOE to improve the efficiency of residential and commercial buildings. Broad provisions of financial assistance would support the retrofit program, with \$2 billion authorized.
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- The APA discussion draft would direct the EPA Administrator to distribute allowances to states (2% in 2016) and Indian tribes (0.01% in 2016) that would be used for energy efficiency and renewable energy purposes. The energy efficiency purposes include programs for building energy codes, manufactured homes, building energy performance labeling, and retrofits of existing buildings. Cost-effective energy efficiency programs administered by local governments and entities may also be eligible.

Energy Efficiency Consumer Loan Programs

- S. 1462 does not create a consumer loan program.
- S. 2877 would establish an Energy Efficiency Consumer Loan Program. Under the program, any qualified individual (a lawful resident of the United States) would be allowed to borrow against any future energy security dividend (an individual's pro-rated share of carbon rebate auction proceeds) to invest in energy efficiency or clean energy technologies and services that would reduce energy bills and greenhouse gas emissions.
- S. 3464 would direct USDA's Rural Utility Service (RUS) to make loans and grants to eligible entities (public power districts and electric cooperatives) which, in turn, would make loans to qualified consumers (able to repay the loan) for energy efficiency measures that reduce energy use or energy costs. Loan terms would not exceed 10 years and would be repaid through charges added to the electric bill. Also, RUS would be empowered to support loan demonstration programs conducted by eligible entities and groups of eligible entities. An authorization of \$993 million would be provided in 2010, to remain available until expended.
- The APA discussion draft would direct the RUS Administrator to distribute allowances to eligible entities (public power companies and electric cooperatives) that would preserve or create jobs by providing loans to qualified consumers that will use the loans to implement energy efficiency measures to reduce energy costs, energy use, or greenhouse gas emissions. The Administrator would also be empowered to establish agreements with eligible entities to conduct energy efficiency loan demonstration projects. Such sums as necessary would be authorized for this section.

Energy Efficiency Programs with Cost-Effectiveness Criteria

- S. 1462 does not create specific cost-effectiveness criteria for energy efficiency programs.
 - S. 2877 does not create specific cost-effectiveness criteria for energy efficiency programs.
 - S. 3464 does not create specific cost-effectiveness criteria for energy efficiency programs.
 - The APA discussion draft would establish a formula to allocate emission allowances to natural gas distribution companies and to states for the benefit of residential and commercial home heating oil and propane users. A share of allowances allocated to those groups (at least 20% for natural gas and at least 50% for heating oil and propane) would be required to be used for "cost-effective" energy efficiency programs for energy consumers. The draft would require that allowances allocated to electricity distribution companies be used for the benefit of residential ratepayers. The provision does not directly call for the establishment of an energy efficiency program. However, it calls on
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the Government Accountability Office to prepare an audit report that includes a description of how local distribution companies meet, or fail to meet, the benefit requirement – including investments made in cost-effective end-use energy efficiency programs.

Appliance, Motor, and Manufacturing Efficiency Provisions

- S. 1462 contains several other energy efficiency provisions, including several appliance efficiency standards, motor efficiency standards and incentives, and manufacturing efficiency.
- S. 2877 does not have other energy efficiency provisions.
- S. 3464 contains other energy efficiency provisions, including an efficiency standard for computer monitors, a federal agency requirement to use Energy Star or FEMP-designated products, and a revolving loan program for manufacturers of energy-efficiency equipment.
- The APA draft does not have other energy efficiency provisions.

Vehicles and Transportation¹⁴

S. 1462 would establish grant programs and require federal studies in support of advanced technology vehicles, especially plug-in vehicles; the bill does not authorize a specific amount of appropriations for these programs but instead authorizes “such sums as are necessary.” S. 2877 allows the use of funds from sales of carbon shares to provide incentives, loans, and grants for improvements in energy efficiency and greenhouse gas reductions; although the bill does not specifically mention vehicles or transportation, some transportation projects would likely meet the bill’s general criteria. S. 3464 contains an entire title, Title I, directed at increasing vehicle fuel efficiency and promoting alternative fuels. Provisions include a requirement that passenger vehicle fuel economy standards increase at least 4% per year starting in model year 2017, a requirement that 90% of new automobiles produced by dual fuel vehicles by model year 2015, and a system of fuel economy tax “feebates”. The draft American Power Act would establish a separate program from the cap-and-trade system to address emissions from transportation fuels, requiring fuel providers to purchase allowances (at a set price) to cover the emissions from their fuels. The APA draft would also support advanced vehicles and clean transportation in several ways including: allocating auction revenue from the cap-and-trade system to automakers and parts suppliers for the production of advanced technology vehicles and to the Highway Trust Fund, states, metropolitan planning organizations for transportation sector emissions reductions and for transportation projects more generally; and providing incentives for the deployment of natural gas vehicles and infrastructure.

Transportation Sector Emissions Reductions

- S. 1462 does not directly control transportation sector greenhouse gas emissions, but would provide support for the deployment of electric vehicles and infrastructure.
- S. 2877 does not directly address the transportation sector emissions, but puts a price on the carbon content of fuels, and broadly promotes efficiency and emissions reductions.

¹⁴ This section was written by Brent Yacobucci.

- S. 3464 would amend existing Corporate Average Fuel Economy (CAFE) requirements, mandating that CAFE standards increase 4% annually starting in model year (MY) 2017. The bill would also codify the MY2016 standard of 34.1 miles per gallon established in regulation. S. 3464 would establish a fuel economy “feebate” system for new passenger vehicles: taxpayers who purchase a vehicle with lower fuel consumption than a vehicle’s target fuel consumption under the CAFE standards would qualify for a tax credit; automakers who produce vehicles with higher fuel consumption than a vehicle’s CAFE target would be required to pay a tax.
- The APA discussion draft would require petroleum refiners and importers to purchase allowances quarterly to cover the carbon emissions from fuels sold the previous quarter. Fuel providers would not be permitted to participate in the primary cap-and-trade allowance market but would instead pay a set price (determined based on the prior quarter’s allowance auction price) per ton of emissions. The proposal would also auction a significant share of cap-and-trade allowances (6.1% in 2016) and direct the proceeds to various transportation projects, including transportation sector emission reductions.

Advanced Technology Vehicle Development

- S. 1462 would provide incentives for the deployment of plug-in vehicle infrastructure, and would establish a pilot program to purchase plug-in vehicles for the federal fleet.
- S. 2877 does not directly address advanced vehicles but broadly promotes efficiency and emissions reductions.
- S. 3464 would require automakers to produce dual fueled automobiles (vehicles capable of operating on more than one fuel, usually gasoline and an alternative such as natural gas or 85% ethanol). The bill would mandate that 50% of new vehicles in MY2013-2014 be dual fuel vehicles; the mandate would increase to 90% for MY2015 and later. S. 3464 would also expand incentives for the production of cellulosic biofuels established in the Energy Policy Act of 2005 to include other feedstocks (e.g., algae).
- The APA discussion draft would auction a significant portion of cap-and-trade allowances (1% in 2016) to provide grants to automakers and parts suppliers to convert their facilities to produce advanced technology vehicles and components. The draft would also expand incentives for natural gas vehicles and infrastructure.

Tax Incentives¹⁵

The APA discussion draft contains a number of tax incentives for nuclear power, would provide an additional allocation for the advanced energy project credit, and includes tax incentives for natural gas vehicles. S.3464 contains tax incentives for fuel-efficient motor vehicles. S. 1462 and S. 2877 do not contain comparable tax incentives.

Tax Incentives

- S. 1462 contains no tax provisions.

¹⁵ This section was written by Molly Sherlock.

- S. 2877 contains no tax provisions.
- S. 3464 would provide a fuel performance tax rebate to new qualified fuel-efficient motor vehicles while also imposing a tax on fuel-guzzler motor vehicles.
- The APA discussion draft includes several tax provisions. First, the draft would expand tax incentives for nuclear power. These provisions include a reduced depreciation period for nuclear investments, an investment tax credit for new nuclear plants, a provision allowing nuclear power to qualify for the advanced energy manufacturing credit, a modified credit for nuclear power production allowing a credit for private partnerships with public power, tax-exempt financing for public-private advanced nuclear projects, and a provision allowing nuclear facilities to qualify for the grant in lieu of tax credits. Aside from incentives for nuclear energy, the APA draft also contains a provision awarding an additional allocation for the advanced energy project credit. Tax incentives for natural gas vehicles in the APA draft include a credit for natural gas motor vehicles, tax credit bonds financing for natural gas vehicle projects, and expensing of natural gas vehicle manufacturing facilities.

Jobs/Workforce Development¹⁶

S. 1462 recognizes the need for skilled workers to fill jobs associated with energy production and energy efficiency efforts, and would make available funds for education and training purposes. S. 2877 also recognizes career opportunities from clean energy technologies, and provides for jobs training and transition for U.S. workers who may be impacted by “economic dislocations” due to efforts to mitigate climate change. S. 3464 has provisions for jobs training with regard to increasing building energy efficiency and energy savings projects. The APA discussion draft proposes job protection and growth programs in traditional U.S. energy-intensive industries, fossil energy production, and clean energy generation.

Jobs Training & Protection

- S. 1462 establishes competitive grants for states to create or expand energy career academic programs. Appropriations authorized are \$14 million for fiscal year 2009, \$22.5 million for fiscal year 2010, and \$30 million for fiscal year 2011. The program provides for renewable, competitive grants for as much as \$500,000 each year to community colleges for programs of up to five years in duration. DOE is also required to submit a study of energy workforce training programs funded by federal agencies, and a plan for filling future needs. Additional funding of up to \$100 million is authorized for fiscal years 2010 through 2015 for training in alternative energy technologies, energy efficiency, sustainable energy technologies, recycling and waste reduction, water and energy conservation, and other energy technologies. The bill establishes direct hire authority for the Secretary of Energy upon a determination that there is a severe shortage of highly qualified scientists, engineers, or critical technical personnel in the agency. Compensation and terms of employment for such employees must follow prescribed guidelines. The bill also directs the Secretary of the Interior to provide research funds for 10 years to assist development of academic programs producing workers for subsurface geosciences and engineering in energy (including geological carbon storage), petroleum,

¹⁶ This section was written by Richard Campbell.

groundwater, economic geology, mining, and mineral and geological engineering. The bill was amended to add an advisory committee on electric utility workforce development to help ensure that U.S. workers are prepared for jobs in the electric utility industry.

- S. 2877 establishes a “Clean Energy Reinvestment Trust Fund.” Funds may be used to provide targeted assistance to U.S. workers, communities, industries, and small businesses experiencing economic distress due to efforts under the bill to reduce greenhouse gas emissions. Training and development programs are targeted in clean energy industries to prepare workers for careers in renewable energy, energy efficiency, and other emerging clean technology industries.
- S. 3464 has funding of \$500,000 per state to help train state and local officials to implement the proposed National Building Performance Standards program. S. 3464 also has provisions for training workers in energy efficiency under the Homes and Buildings Energy Retrofits program. Additionally, under the Rural Energy Saving Program funding, provisions are included to train workers to perform energy audits, evaluate project options, or measure effectiveness of energy efficiency retrofits to decrease energy use or costs.
- The APA discussion draft sets aside cap-and-trade allowances under “Job Protection and Growth” for trade-exposed industries to “protect and promote” manufacturing jobs in the United States which may be subject to “carbon leakage” to other countries. The draft authorizes funds for competitive grants for eligible partnerships described in the Carl D. Perkins and Technical Education Act of 2006 (20 U.S.C. 2342) to develop programs of study at secondary institutions for clean energy careers. The draft also establishes a “clean energy construction careers demonstration project” to promote “middle-class careers” in green construction for “targeted workers.” These demonstration projects will be funded in part or whole by the federal government, and are to be evaluated by the Secretary of Labor.

Other Workforce Development Opportunities

- S. 1462 uses quality and number of jobs created as a criteria for awards for its State Energy Retrofit program. The bill also sees the potential for renewable energy development on brownfield sites and directs the U.S. Department of Energy to identify and prioritize such opportunities (focused on non-federal lands) in a report no later than one year after enactment. Allowances will be made available for such projects. Opportunities for jobs creation is a criterion for the study. S. 1462 also examines development of energy projects on U.S. “affiliated” islands, and carries a criterion for jobs creation.
 - S. 2877 contains no similar provisions.
 - S. 3464 contains no similar provisions.
 - The APA discussion draft’s Rural Energy Saving Program is designed to “create and save jobs” by providing loans to qualified consumers for energy efficiency projects to achieve “significant” energy savings and GHG emissions reductions.
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