



Policy Brief 2.14

The Clean Power Plan: Regulating Carbon Dioxide Emissions from Existing Power Plants

Mary R. English, PhD
Fellow for Energy and Environmental Policy
Howard H. Baker Jr. Center for Public Policy
University of Tennessee

August 2014



Baker Center Board

Cynthia Baker
Media Consultant
Washington, DC

Sam M. Browder
Retired, Harriman Oil

Patrick Butler
CEO, Assoc. Public Television Stations
Washington, DC

Sarah Keeton Campbell
Attorney, O'Melveny & Myers, LLP
Washington, DC

Jimmy G. Cheek
Chancellor, The University of Tennessee, Knoxville

AB Culvahouse Jr.
Attorney, O'Melveny & Myers, LLP
Washington, DC

The Honorable Albert Gore Jr.
Former Vice President of The United States
Former United States Senator
Nashville, TN

Thomas Griscom
Communications Consultant
Former Editor, *Chattanooga Times Free Press*
Chattanooga, TN

James Haslam II
Chairman and Founder, Pilot Corporation
The University of Tennessee Board of Trustees

Joseph E. Johnson
Former President, University of Tennessee

Fred Marcum
Senior Advisor to Senator Baker
Huntsville, TN

The Honorable George Cranwell Montgomery
Former Ambassador to the Sultanate of Oman

Regina Murray
Knoxville, TN

Lee Riedinger
Vice Chancellor, The University of Tennessee, Knoxville

Don C. Stansberry Jr.
The University of Tennessee Board of Trustees
Huntsville, TN

The Honorable Don Sundquist
Former Governor of Tennessee
Townsend, TN

William H. Swain
The University of Tennessee Development Council
Huntsville, TN

The Honorable Fred Thompson
Former United States Senator
Washington, DC

Robert Waller
Former President and CEO, Mayo Clinic
Memphis, TN

Baker Center Staff

Matt Murray, PhD
Director

Nissa Dahlin-Brown, EdD
Associate Director

Jay Cooley
Business Manager

Elizabeth Woody
Office Manager

William Park, PhD
Director of Undergraduate Programs
Professor, Agricultural and Resource Economics

Charles Sims, PhD
Energy & Environmental Policy
Asst. Professor, Economics

Krista Wiegand, PhD
Global Security Policy
Assoc. Professor, Political Science

About the Baker Center

The Howard H. Baker Jr. Center for Public Policy is an education and research center that serves the University of Tennessee, Knoxville, and the public. The Baker Center is a nonpartisan institute devoted to education and public policy scholarship focused on energy and the environment, global security, and leadership and governance.

Howard H. Baker Jr. Center for
Public Policy
1640 Cumberland Avenue
Knoxville, TN 37996-3340

bakercenter.utk.edu
865.974.0931
bakercenter@utk.edu

Disclaimer

Findings and opinions conveyed herein are those of the author(s) only and do not necessarily represent an official position of the Howard H. Baker Jr. Center for Public Policy or the University of Tennessee.

The Clean Power Plan: Regulating Carbon Dioxide Emissions from Existing Power Plants

Mary R. English, Ph.D.

Fellow for Energy and Environmental Policy

Howard H. Baker Jr. Center for Public Policy, The University of Tennessee
Knoxville, Tennessee

August 2014

Introduction

On June 2, 2014, the U.S. Environmental Protection Agency (EPA) unveiled its Clean Power Plan – a proposed rule to limit carbon dioxide (CO₂) emissions from existing fossil fuel-fired power plants in the United States. The goal of the rule is to achieve an aggregate 30 percent reduction in carbon emissions from existing power plants in the United States by 2030, compared with 2005 emissions. The rule is a key part of the Climate Action Plan that President Obama introduced in June 2013. EPA expects to release the final “Clean Power Plan” rule in June 2015.

In March 2012, EPA proposed a rule limiting CO₂ emissions from new fossil fuel-fired power plants. In response, over 2.5 million comments were submitted. In light of those comments and other information, EPA withdrew the 2012 proposed rule in September 2013 and proposed a revised rule. It is not yet final.

Will EPA’s June 2014 proposed rule for *existing* power plants – i.e., the Clean Power Plan – be as controversial as its March 2012 proposal for new power plants? That remains to be seen. This policy brief summarizes the Clean Power Plan, its implications for TVA and the Tennessee Valley region, the rationale behind regulating carbon emissions from power plants¹, and the legal basis for doing so.

What Is the Clean Power Plan?

The proposed rule, called the “Clean Power Plan,” sets out a framework for states to regulate carbon emissions from existing coal-fired, oil-fired, and natural gas-fired power plants. The Clean Power Plan includes a mandatory component – carbon emission reduction goals tailored to each state – combined with a good deal of flexibility about how these reductions can be realized.

¹ See also a related Baker Center policy brief by Charles Sims on the social cost of carbon emissions.

With a few exceptions – mainly, electricity generating units² (EGU) that are small or don't sell a large portion of their electricity to the grid – the Clean Power Plan applies to all fossil fuel-fired EGUs that were in operation or under construction on January 8, 2014. EGUs that are reconstructed or significantly modified also are excluded from the Clean Power Plan. In a separate June 2014 action, EPA proposed a rule limiting their CO₂ emissions. (For more detail on that rule, see <http://www2.epa.gov/carbon-pollution-standards/proposed-carbon-pollution-standards-modified-and-reconstructed-power>.)

Section 111(d)

In issuing the proposed Clean Power Plan, EPA drew upon its authority under Section 111(d) of the Clean Air Act (CAA), codified as 42 U.S.C. Section 7411(d). Section 111(d) directs EPA to adopt “standards of performance” for existing sources of an air pollutant that is not regulated under other sections of the act but that *is* regulated for new sources under Section 111(b). The proposed rules for new power plants and for modified or reconstructed power plants are based on Section 111(b) of the CAA.

For the purposes of Section 111, a “standard of performance” means a standard that reflects the emission limitations achievable through a “best system of emission reduction” (BSER). BSER is a term of art in the CAA for an approach that takes into account not only air quality but also cost, energy requirements, and non-air quality impacts on health and the environment.

EPA has proposed that the BSER for carbon emissions from existing EGUs is a combination of emission rate reductions and limitations on overall emissions, accomplished through one or more of four “building blocks.”³ As with other sections of the CAA, states are responsible for preparing implementation plans that will meet the EPA-determined emission standards. These plans must be submitted to EPA for approval and must include verification and enforcement measures.

State-by-state emission goals

Under the proposed rule, all states except Vermont, which has no existing fossil fuel-fired power plants, are responsible for achieving interim annual emission reduction goals by 2020 and ultimate annual emission reduction goals by 2030. The goals are expressed as percentage reductions in intensity-based emission rates – in other words, pounds of CO₂ emitted per megawatt-hour produced. The core idea is not to limit the amount of power generated, but rather to reduce its carbon intensity.

² The rule uses the term “electricity generating unit” (EGU) in referring to affected sources. Power plants and the utilities operating them may have more than one EGU, but the term EGU generally will be used in this policy brief.

³ In the proposed rule, EPA notes that the BSER for Section 111(d) is a combination of measures from all four building blocks; however, it is soliciting comment on using only the first two building blocks as the basis for the BSER. See Section 2.a. of the proposed rule’s Executive Summary at <https://www.federalregister.gov/articles/2014/06/18/2014-13726/carbon-pollution-emission-guidelines-for-existing-stationary-sources-electric-utility-generating>

EPA has stressed that the Clean Power Plan does not use fixed baselines in its targeted emission reduction goals. Nevertheless, in establishing each state's emission reduction goal, EPA used the state's 2012 CO₂ emissions and power generation data as a key starting point.⁴

EPA developed state-specific emission reduction goals based on factors such as the state's mix of electricity sources and opportunities in the state to achieve reductions by 2030. The states' stipulated goals vary widely: from Washington, with a 72% reduction as its 2030 target, to North Dakota, with a target reduction of 11%. The 2030 reduction goals for most states fall within a range of 25% to 50%.

That's the rigorous part of the proposed rule. Now comes the flexible part.

Implementation plans

States must submit plans for how their reduction goals will be achieved, but they have a menu of options. The proposed rule describes four groups of measures that can be taken to reduce CO₂ emissions from existing EGUs in the state. In the Clean Power Plan, these four groups – called “building blocks” – include

Building Block 1: Make EGUs more efficient by improving their heat rates – i.e., the amount of energy used to generate a kilowatt-hour of electricity.

Building Block 2: Preference less carbon-intensive EGUs (e.g., natural gas combined-cycle units) over more carbon-intensive EGUs (e.g., traditional coal-fired units).

Building Block 3: Emphasize low- or zero-carbon generation capability (e.g., wind, solar, nuclear) in the utility's fleet of EGUs.

Building Block 4: Reduce the demand for electricity through energy efficiency programs.

To reach the state's specified goal, any combination of measures from these building blocks can be used in the state plan. The plan also can include other measures – for example, improving the efficiency of electricity transmission and distribution, retrofitting existing EGUs with carbon capture and storage, substituting biomass-based fuels for more carbon-intensive fuels, etc.

Each state must submit a plan to EPA by June 30, 2016 that describes measures for reducing CO₂ emissions from affected EGUs in the state. Taken together, the measures must result in projected achievement of the state's emission reduction goal. The measures must be quantifiable, verifiable, and enforceable.⁵ If a state needs more time to submit a complete plan, it can, if justified, submit an initial plan by the June 2016 deadline and the complete plan a year later.

⁴ For an explanation of EPA's nuanced approach to goal-setting, see <http://blog.epa.gov/epaconnect/2014/06/understanding-state-goals-under-the-clean-power-plan/> and <http://blog.epa.gov/epaconnect/2014/06/the-clean-power-plan-following-a-consistent-approach-to-setting-state-goals/>.

⁵ For details on criteria for approving plans and for the required plan components, see the proposed rule's Sec. VIII.C and VIII.D respectively. <https://www.federalregister.gov/articles/2014/06/18/2014-13726/carbon-pollution-emission-guidelines-for-existing-stationary-sources-electric-utility-generating>

States have the option of teaming together and submitting multi-state plans. For multi-state approaches, the participating states' individual goals would be aggregated. Multi-state plans must be submitted by June 30, 2018.

Allocation of responsibility

According to the proposed rule, states would submit plans that either (1) hold the EGUs solely responsible for achieving the target emissions reduction, or (2) include measures involving entities other than the EGUs (e.g., some renewable energy or energy efficiency measures). EPA refers to the latter option as a "portfolio approach." With either option, all measures used to achieve the target reduction would be included in the state implementation plan, and inclusion in that plan would make the measures federally enforceable.

EPA is, however, seeking comments on a different approach, called the "state commitment" alternative. Under this alternative, measures that place requirements on entities other than the affected EGUs would not be components of the state plan. As such, those measures would not be federally enforceable. Instead, the plan would include a commitment by the state to make state-enforceable all non-EGU measures that achieve a portion of the target emissions reduction.

How Does the Proposed Rule Affect TVA and the Tennessee Valley Region?

State boundaries are likely to play an out-sized role in compliance with the proposed rule. As with stationary source rules promulgated under other sections of the CAA, the proposed Section 111(d) rule targets where power is *generated*, not where it is consumed. As discussed below, this has major implications for TVA and the states in its power service territory.

Most of the coal-fired units scheduled by TVA for continued operation are in Tennessee. In the Clean Power Plan, EPA has proposed a 39% emission reduction goal for Tennessee.

Coal-fired plants in TVA's power service territory

TVA's power service territory includes virtually all of Tennessee; significant parts of Kentucky, Mississippi, and Alabama; and small slices of Georgia, North Carolina, and Virginia – in all, a total of about 80,000 square miles. (For more detail, see http://www.tva.com/power/power_customer.htm.)

Most of TVA's power is generated by coal-, natural gas-, and nuclear-fired EGUs. Hydroelectric dams – the central feature of the TVA system 70 years ago – now provide roughly 10 percent of its power generation. After World War II, coal-fired power generation became the mainstay of the TVA system, expanding rapidly between 1950 and the early 1970s. TVA has 11 coal-fired plants, most with multiple EGUs.⁶ As noted below, not all of them are active.

How would the Clean Power Plan affect TVA and the states in its service territory? Coal-fired EGUs have high levels of CO₂ emissions per unit of electricity generated – about twice the CO₂ emitted by a

⁶ For the location of these plants and other parts of TVA's power generation system, see http://www.tva.com/sites/sites_ie.htm.

comparable gas-fired combined-cycle EGU. For this reason, TVA's coal-fired plants are a determining factor in meeting the goals stipulated in the proposed rule.

Coal-fired plants are notorious for their emission of not only CO₂ but also nitrogen oxide, sulfur dioxide, and particulate matter – “conventional” pollutants which have been subject to increasingly stringent emission standards under other sections of the CAA. A new rule setting standards for mercury and other air toxics emissions is also putting pressure on coal-fired plants. While coal-fired EGUs can be retrofitted to curb these emissions, the retrofits are very expensive. In light of these costs as well as an April 2011 settlement with EPA, four states (AL, KY, NC, and TN), and three environmental advocacy organizations, TVA made plans to idle or retire several of its coal-fired EGUs. (TVA refers to the settlement as the Clean Air Act Agreement. See <http://www.tva.com/news/keytopics/cleanairagreement.htm> for their summary.)

Seven of TVA's coal-fired plants are in Tennessee. The remaining four are in Kentucky and Alabama. At its peak, TVA's fleet of coal-fired plants had a total of 59 EGUs at these 11 plants. Under the April 2011 settlement TVA agreed that it would, over the next few years, permanently retire 12 units in Tennessee (all ten units at its Johnsonville plant and two units at its John Sevier plant) as well as six units at its Widows Creek plant in Alabama. TVA also planned to idle (i.e., shut down with the possibility of restarting) the two other coal-fired units at John Sevier. In November 2013, the TVA Board announced plans for more coal-fired units to be retired: an additional unit at Widows Creek, all five units at the Colbert plant in Alabama, and two units at the Paradise plant in Kentucky. The two Paradise units are to be replaced with gas-fired units (http://www.tva.com/news/releases/octdec13/board_111413.html). In early July 2014, TVA released a draft environmental assessment recommending that the coal-fired units at its Allen plant in Tennessee be replaced with gas-fired units. The TVA board approved this recommendation at its August 2014 quarterly meeting.

At this point, it appears that TVA may continue operation of one coal-fired unit at Widows Creek in Alabama, ten coal-fired units in Kentucky – a single large unit at its Paradise plant and nine of the ten units at its Shawnee plant – and four coal-fired plants with a total of 16 units in Tennessee. The units vary greatly in their electricity generation capacities.

With TVA's current plans for its coal-fired units, would it be able to comply with the proposed rule?

All told, TVA's announced decisions to date will reduce its coal-fired electricity generation capacity by roughly one-third: down from about 18,000 megawatts to 12,000 megawatts. The planned retirements of coal-fired units won't all happen immediately, but they are likely to have occurred well before the 2020 interim goal specified in the proposed rule.

There's a catch, however. In the proposed rule, the starting point for calculating emission reductions is 2012. A drop in emissions *before* 2012 would not be factored into that calculation. Carbon dioxide emissions from TVA's plants dropped from nearly 87 million tons in 2010 to a little over 81 million tons in 2012 (<http://www.tva.com/environment/air/co2.htm>) – more than a 9 percent reduction. A number of factors, such as fluctuations in electricity sales, can cause emissions to rise or fall. In this case, however, shutting down coal-fired units during 2011 probably accounted for a large percentage of the drop.

The bottom line: As the proposed rule now stands, TVA may be well-positioned but compliance would not be a “slam-dunk.”

How will the states in TVA’s service territory be affected?

Like other large electric utilities, TVA operates as a system: its electricity flows across state boundaries within its service territory. As with some other utilities, TVA’s EGUs are unevenly distributed.

Tennessee has most of TVA’s remaining coal-fired EGUs and, of the seven states in which TVA operates, is likely to be the most profoundly affected by TVA’s ability to comply with the proposed rule. Kentucky, with a smaller but significant share of TVA’s coal-fired power, also may have cause for concern, especially when its other electric utilities are taken into account. According to the proposed rule, Tennessee’s 2030 emission reduction goal would be 39%; Kentucky’s, 18%.

With TVA’s announced retirements of its coal-fired units, Alabama will have only one of TVA’s remaining coal-fired units. In Mississippi, all of TVA’s EGUs are gas-fired units that use modern, low-emission technologies. In the remaining states (GA, NC, and VA), TVA has no fossil fuel-fired EGUs. In the proposed rule, the 2030 emission reduction goals for these five states are: Alabama, 27%; Mississippi, 39%; Georgia, 44%; North Carolina, 40%; and Virginia, 38%. The proposed Clean Power Plan may present compliance challenges for these states, but because of TVA? Probably not.

Why Bother Regulating Carbon Emissions from Power Plants?

By now, the argument that humans are causing significant climate change is well-substantiated. (See, e.g., the Intergovernmental Panel on Climate Change’s recent report, “Climate Change 2013: The Physical Science Basis” http://www.climatechange2013.org/images/report/WG1AR5_SPM_FINAL.pdf) Global climate change is, in today’s context, verbal shorthand for a general warming trend and a related trend toward more frequent and extreme weather events (e.g., storms and droughts). Both trends are expected to get worse throughout the 21st century, with potentially severe impacts globally and in the United States.

The effects of climate change

Some of the worst effects of climate change are occurring in the low-lying, heavily-populated island nations and coastal areas of Southeast Asia, where rising sea levels can require evacuation. In other parts of the world, such as Sub-Saharan Africa, protracted droughts are contributing to famine and political unrest. While these situations are especially dire, the United States is not immune to the human, environmental, and economic costs of climate change.

The U.S. Global Change Research Program, a federal multi-agency initiative, was mandated by Congress in 1990 to assess and predict climate change and its impacts, especially as they affect the United States. Its first formal assessment was released in 2000; its second, in 2009; its third, in May 2014 (<http://www.globalchange.gov/what-we-do/assessment>).

According to the most recent assessment, effects of greatest concern include, for example, risks of illness and death due to extreme heat; less rain and snow runoff in the already arid West; flooding of coastal areas due to sea rise, storm surges, and hurricanes; lower crop and livestock productivity; more

potentially devastating fires; more pest insects and insect-borne diseases ... the list goes on. People are affected, as is the ecological wealth of the environment. Wealth in the more usual sense also takes a hit with climate change, as discussed in *Risky Business: The Economic Risks of Climate Change in the United States* – the June 2014 report of a recently organized group of U.S. business leaders (<http://riskybusiness.org/>).

Predicted climate change impacts in the southeastern US

In the United States, the Southeast fares relatively well but by no means escapes the effects of climate change. The Third National Climate Assessment noted that between 1980 and 2012, the number of billion-dollar climate and weather disasters in the Southeast exceeded those in all other regions of the United States combined. Hurricanes in the coastal states and tornadoes and winter storms elsewhere have plagued the region. It also is susceptible to flooding as well as protracted droughts.

This picture is expected to get worse. Although temperature patterns varied in the Southeast during the 20th century, with a cool period during the 1960s and 1970s, the average annual temperature is on the rise and is expected to continue to go up. How much? That will depend on whether global greenhouse gas emissions are curbed or escalate (<http://nca2014.globalchange.gov/report/regions/southeast>).

Greenhouse gases and electricity generation

The triggers for today's anthropogenic (human-caused) climate change are collectively called "greenhouse gases" (GHGs), because they trap heat and make the planet warmer. The four most important GHGs are carbon dioxide, methane, nitrous oxide, and fluorinated gases (<http://www.epa.gov/climatechange/ghgemissions/>). While GHGs are similar in some respects to conventional air pollutants (e.g., sulfur dioxide, particulate matter), they are very different in others.

Conventional air pollutants typically have their greatest impacts on the region in which they are emitted; GHG emissions have global impacts. Conventional air pollutant emissions typically can be curbed by using "end of tailpipe" controls at the emitting facility; GHGs – especially CO₂ – are very difficult to capture. Measures for carbon capture and storage (CCS) are being tested and used on a limited basis, but at present CCS is difficult and costly. In addition, there is the question of where to store the CO₂. If geologic sequestration is used, it would have substantial regulatory hurdles to overcome. Carbon capture and storage may become more widely available in years to come, especially as concerns about climate change grow (http://www.ucsusa.org/clean_energy/our-energy-choices/coal-and-other-fossil-fuels/how-coal-works.html#How_Coal_is_Burned; <http://www.epa.gov/climatechange/ccs/>; <http://www.iea.org/topics/ccs/>). But will CCS be a viable option in the near future? Probably not.

Of the GHGs, CO₂ is the worst culprit, accounting for 57% of GHG emissions globally and 82% of GHG emissions in the United States. Most of the CO₂ emissions, globally and nationally, come from burning fossil fuels for electricity, heat, and transportation. In the United States, fossil fuel-fired electricity generation is the largest source of GHG emissions in the United States (<http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html>).

Conclusion: Will the Clean Power Plan Fly?

At this point, the Clean Power Plan is simply a proposed rule. It undoubtedly will be tweaked before it is made final. At that point, and only then, it will almost certainly face legal challenges. (Lawsuits can't be filed against proposed rules.) What are the Clean Power Plan's chances of withstanding a legal assault? On the face of it, they look good – sort of.

Over the past seven years, three key decisions by the U.S. Supreme Court have largely supported EPA's regulation of GHG emissions. The first case was in 2007; the second, in 2011; the third, in 2014.

The first case, *Massachusetts v. EPA*, concerned regulating tailpipe GHG emissions. Petitioners, including a number of states and environmental organizations as well as several cities, contended that EPA had the authority and responsibility under the CAA to regulate GHG emissions from new motor vehicles – an argument that EPA had rejected in 2003, during President George W. Bush's first term. The case wound its way slowly to the Supreme Court, which held in 2007 in a 5-4 decision that EPA had the required authority under the Clean Air Act, and that it needed to exercise its responsibility under the Act to determine whether GHGs endanger the public health and welfare. In late 2009, EPA issued this determination.

The second case, *American Electric Power Co. v. Connecticut*, concerned whether utilities could be sued under federal common law for their contribution to global climate change. The case was first brought to a federal district court in 2004 but did not reach the Supreme Court until seven years later. In a unanimous decision (with Justice Sotomayor recused), the court held in June 2011 that EPA's authority under the CAA to regulate CO₂ emissions displaced any right to seek abatement under federal common law.

The third case, *Utility Air Regulatory Group v. EPA*, concerned the regulation of stationary sources, especially power plants. In May 2010, EPA issued a final rule, informally called the "Tailoring Rule," to specify which new and existing facilities would be required to obtain CAA permits for GHG emissions. Under the rule, only large emitters would be required to do so (<http://www.epa.gov/NSR/documents/20100413fs.pdf>). This rule was challenged by the Utility Air Regulatory Group, a coalition made up largely of power companies. On June 23, 2014, in a 7-2 decision, the Supreme Court upheld the *basis* for the rule, if not its particulars. It held that EPA had reasonably interpreted the CAA to require that sources needing permits for conventional air pollutants would need controls for their GHGs (<http://www.law.cornell.edu/supremecourt/text/12-1146>).

The Supreme Court has affirmed and reaffirmed EPA's regulation of GHG emissions under the CAA. Problems still may arise, however. While the legal basis for using Section 111(d) of the CAA for the Clean Power Plan is sound it has little precedent, especially in the manner proposed by EPA. As proposed, emissions standards vary by state, and the states have considerable compliance flexibility. Both features, while innovative and appealing, may make the rule vulnerable to successful legal challenges. The "tried and true," even if rigid, is often more impregnable.

Comments on the Proposed Rule

EPA is taking comments on the proposed rule until **October 16, 2014** and has requested input on a number of issues in the rule. For a list of these issues, see

<http://www2.epa.gov/sites/production/files/2014-08/documents/clean-power-plan-comment-categories.pdf>.

To submit a comment on the proposed rule, click on this link to the Federal Register and then on “Submit a Formal Comment”:

<https://www.federalregister.gov/articles/2014/06/18/2014-13726/carbon-pollution-emission-guidelines-for-existing-stationary-sources-electric-utility-generating>

For other ways to comment, click on this link to EPA:

<http://www2.epa.gov/carbon-pollution-standards/how-comment-clean-power-plan-proposed-rule>

For More Information

Ceronsky, Megan, and Tomás Carbonell. October 2013 (rev. February 2014). Section 111(d) of the Clean Air Act. Environmental Defense Fund.

http://www.edf.org/sites/default/files/section-111-d-of-the-clean-air-act_the-legal-foundation-for-strong-flexible-cost-effective-carbon-pollution-standards-for-existing-power-plants.pdf

Federal Register. Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units. Proposed rule as published 6/18/14.

<https://www.federalregister.gov/articles/2014/06/18/2014-13726/carbon-pollution-emission-guidelines-for-existing-stationary-sources-electric-utility-generating>

Georgetown Climate Center. Detailed Summary of the EPA's Proposed Rule to Limit Carbon Pollution from the Power Sector.

<http://www.georgetownclimate.org/detailed-summary-of-the-epas-proposed-rule-to-limit-carbon-pollution-from-the-power-sector>

Tennessee Valley Authority. Website on carbon dioxide.

<http://www.tva.com/environment/air/co2.htm>

U.S. Environmental Protection Agency. Website on carbon pollution standards for power plants.

<http://www2.epa.gov/carbon-pollution-standards>

Van Atten, Christopher. October 2013. Structuring Power Plant Emissions Standards Under Section 111(d) of the Clean Air Act—Standards for Existing Power Plants. M.J. Bradley & Associates LLC.

<http://www.mjbradley.com/sites/default/files/Options%20for%20Regulating%20Power%20Plants%20Under%20Section%20111%20Final.pdf>

Wallach, Philip. October 2012. U.S. Regulation of Greenhouse Gas Emissions. Brookings Institution, Governance Studies.

<http://www.4cleanair.org/Documents/26climatechangewallach.pdf>

Abbreviations

BSER	best system of emission reduction
CAA	Clean Air Act
CCS	carbon capture and storage
CO ₂	carbon dioxide
EGU	electricity generating unit
EPA	U.S. Environmental Protection Agency
GHGs	greenhouse gases
TVA	Tennessee Valley Authority