COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

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To: The Honorable Terence R. McAuliffe
Members of the General Assembly

Cc: The Honorable Terry G. Kilgore, Chair, House Commerce and Labor Committee
The Honorable Frank W. Wagner, Chair, Senate Commerce and Labor Committee
The Honorable Thomas K. Norment, Jr., Chair, Commission on Electric Utility Regulation

From: David K. Paylor

Date: December 1, 2017

Subject: Report on Implementation of Carbon Emission Guidelines for Existing Electric Power Generating Facilities

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I am pleased to provide you with the Department of Environmental Quality's Report on Implementation of Carbon Emission Guidelines for Existing Electric Power Generating Facilities." This report has been prepared in accordance with § 2.F.2 of Chapter 6 of the 2015 Acts of Assembly.

This report is being made available on DEQ's website at http://www.deq.virginia.gov/LawsRegulations/ReportstotheGeneralAssembly.aspx.

If you have any questions concerning this report or if you would like a hard copy of this report, please contact Angie Jenkins, Policy Director, at (804) 698-4268.

Implementation of Carbon Emission Guidelines for Existing Electric Power Generation Facilities

A Report to the Honorable Terence R. McAuliffe, Governor and the General Assembly of Virginia pursuant to § 2.F.2 of Chapter 6 of the 2015 Acts of Assembly

Virginia Department of Environmental Quality

December 2017

I. INTRODUCTION

This report is being submitted by the Department of Environmental Quality pursuant to Section 2,F 2 of Chapter 6 of the 2015 Acts of Assembly which provides that:

> [During the Transitional Rate Period:] . . . The Department of Environmental Quality shall submit a report and make recommendations to the Governor and the General Assembly annually on or before December 1 of each year concerning the implementation of carbon emission guidelines for existing electric power generation facilities that the U.S. Environmental Protection Agency has issued pursuant to § 111(d) of the federal Clean Air Act. The report shall include an analysis of, among other matters, the impact of such federal regulations on the operation of any investor-owned incumbent electric utility's electric power generation facilities and any changes, interdiction, or suspension of such regulations. The Department of Environmental Quality shall submit copies of such annual reports to the Chairmen of the House and Senate Committees on Commerce and Labor and the Chairman of the Commission on Electric Utility Regulation.

II. IMPACT OF FEDERAL REGULATIONS ON THE OPERATION OF INVESTOR-OWNED INCUMBENT ELECTRIC UTILITY ELECTRIC POWER GENERATION FACILITIES

THE EPA REGULATIONS

The U.S. Environmental Protection Agency (EPA) issued proposed emissions guidelines for the control of carbon dioxide (CO_2) from existing power plants (79 FR 34830) and for modified and reconstructed power plants (79 FR 34960), which are collectively known as the Clean Power Plan (CPP), on June 18, 2014. The proposed emission guidelines set a CO_2 reduction target for Virginia of 810 pounds per megawatt hour (lb/MWh). During the federal public comment period on the proposal, the Department of Environmental Quality (DEQ) provided EPA with detailed comments which pointed out various inequities among states and provided suggestions for improving the plan.

On August 3, 2015, EPA issued two final CPP regulations: emissions guidelines for existing power plants, Subpart UUUU of 40 CFR Part 60; and a New Source Performance Standard (NSPS) for new power plants, Subpart TTTT of 40 CFR Part 60. EPA also issued a proposed federal plan, Subpart MMM of 40 CFR Part 62, that EPA will implement in a state that fails to submit a plan, or fails to submit an approvable plan.

On February 9, 2016, the Supreme Court issued a stay of the emission guidelines pending disposition of the applicants' petitions for review in the United States Court of Appeals for the District of Columbia Circuit.

In Virginia, the 2016 General Assembly adopted budget amendment Item 369 #1c:

> Funding provided in this item is contingent upon no amount contained herein being used to prepare or submit to the Environmental Protection Agency (EPA) a state implementation plan, or other document with respect to the Environmental Protection Agency's "Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units," 80 Fed. Reg. 64,662 (October 23, 2015), unless the stay issued by the United States Supreme Court is released pending disposition of the applicants' petitions for review in the United States Court of Appeals for the District of Columbia Circuit and disposition of the applicants' petition for a writ of certiorari, if such writ is sought.

On October 16, 2017, EPA formally proposed to repeal the CPP regulation for existing electric utility generating units.

IMPACT ON POWER GENERATION FACILITIES IN VIRGINIA

Although the federal regulations have been stayed and EPA has proposed to repeal the CPP regulation, the 2016 report on Implementation of Carbon Emission Guidelines for Existing Electric Power Generation Facilities (Attachment A) is provided for informational purposes and includes a summary of the impact on power generation facilities in Virginia.

III. CHANGES, INTERDICTION, OR SUSPENSION OF REGULATIONS

Although the federal regulations are the subject of ongoing legal challenges, as of the date of this report, no applicable federal regulations have been changed, interdicted or suspended. As noted earlier in this report, on October 16, 2017, EPA formally proposed to repeal the CPP regulation for existing electric utility generating units.

ATTACHMENT A

Implementation of Carbon Emission Guidelines for Existing Electric Power Generation Facilities

A Report to the Honorable Terence R. McAuliffe, Governor and the General Assembly of Virginia pursuant to § 2.F.2 of Chapter 6 of the 2015 Acts of Assembly

Virginia Department of Environmental Quality

December 2016

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On February 9, 2016, the Supreme Court issued a stay of the emission guidelines pending disposition of petitions for review in the United States Court of Appeals for the District of Columbia Circuit.

Additionally, Item 369.C of Virignia's 2016 Budget includes the following:

> Funding provided in this item is contingent upon no amount contained herein being used to prepare or submit to the Environmental Protection Agency (EPA) a state implementation plan, or other document with respect to the Environmental Protection Agency's "Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units," 80 Fed. Reg. 64,662 (October 23, 2015), unless the stay issued by the United States Supreme Court is released pending disposition of the applicants' petitions for review in the United States Court of Appeals for the District of Columbia Circuit and disposition of the applicants' petition for a writ of certiorari, if such writ is sought.

IMPACT ON POWER GENERATION FACILITIES IN VIRGINIA

Although the federal regulations have been stayed as of this writing, the following summary is provided for informational purposes.

Overview

The final rule is designed to reduce carbon dioxide from the power sector by 32% nationwide below 2005 levels once the rule is fully implemented in 2030. To do this, the rule establishes CO_2 emission performance rates for two categories of fossil fuel-fired electric generating units (EGUs) as follows.

- A uniform performance rate of 1,305 lbs/MWh for Fossil fuel-fired steam generating units (coal and oil fired), and
- A uniform performance rate of 771 lbs/MWh for natural gas combined cycle units.

The EPA applied the 111(d) concept of best system of emission reduction (BSER) to develop the performance standards that was comprised of three building blocks that reduce CO_2 emissions from the power sector.

- Building Block 1 – increase the operational efficiency of existing coal-fired EGUs.
- Building Block 2 – shift generation from coal and oil-fired EGUs to lower emitting and more efficient natural gas-fired EGUs.
- Building Block 3 – increase generation from renewable sources of energy such as solar and wind power.

The rule goes on to provide state specific overall interim, interim step-down, and final goals based on these performance rates that are expressed as both rate and mass-based goals. Furthermore the state specific goals are based on a 2012 base year of CO_2 emissions and emission rates, combined with the fossil fuel generation mix between the two performance standard categories.

For Virginia, a final rate of 934 lbs/MWh is required in the final rule. This state specific rate is based on established emission standards for affected units along with the state

specific generation mix in 2012 as seen below.

Virginia CPP Goal: 2012 Coal/Oil generation % (1,305 lbs/MWh x 31%) + 2012 Natural Gas Combined Cycle generation % (771 lbs/MWh x 69%) = **934 lbs/MWh**

The rule identifies the following interim and final rate and mass-based goals for Virginia that are based on the final rate goal as shown in Table 1 below. In the case of the mass-based goals, the EPA has developed both existing source and existing and new source goals for states to consider and possibly adopt.

Table 1: Clean Power Plan Interim and Final Goals for Virginia

Interim and Final Goal Periods	Rate-Based Goal (lbs/MWh)	Mass-Based Goal (tons)	Mass-Based Goal (existing & new)
Interim Period (2022-2029)	1,047	29,290,072	29,967,912
Interim Step 1 (2022-2024)	1,120	31,290,209	31,438,854
Interim Step 2 (2025-2027)	1,026	28,990,999	29,542,302
Interim Step 3 (2028-2029)	966	27,898,475	28,399,914
Final Goal (2030)	934	27,433,111	27,735,010

Source: Final EPA Clean Power Plan

The EPA rate and mass goals for Virginia in the final Clean Power Plan are presented graphically below in Figures 1 and 2. Please note that while the interim mass emission goals are higher than actual emissions levels in 2012, actual emissions have increased in more recent years (2013 & 2014) and are now above the interim goals as shown later in the report (Figure 5).

Figure 1: Final Clean Power Plan Emission Rate Goals for Virginia

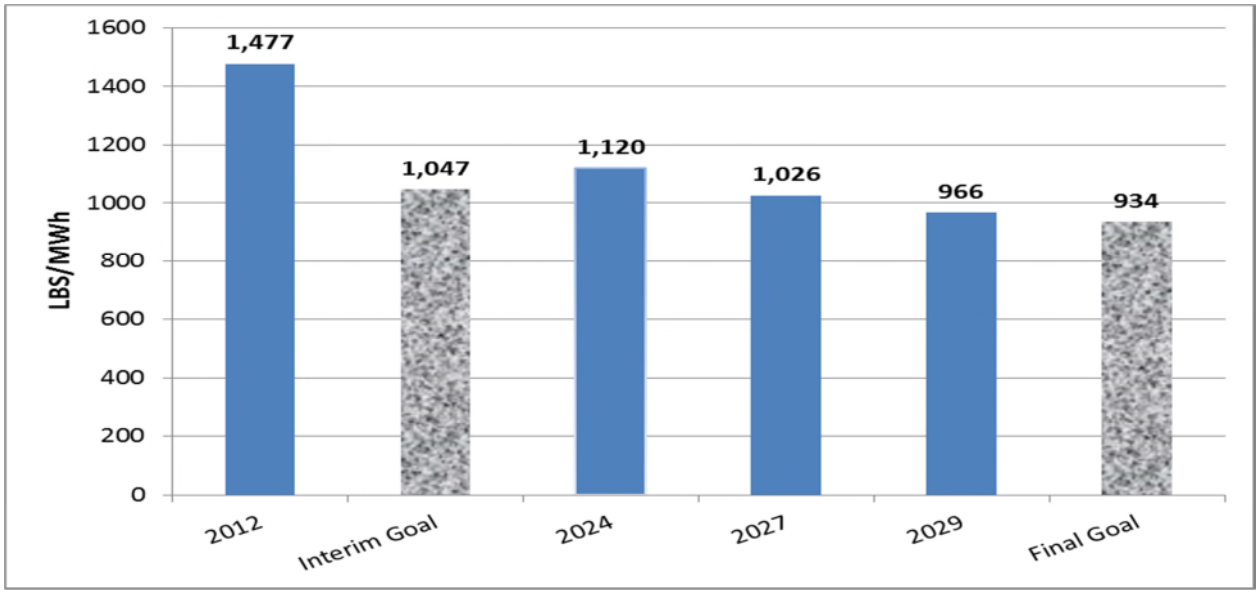
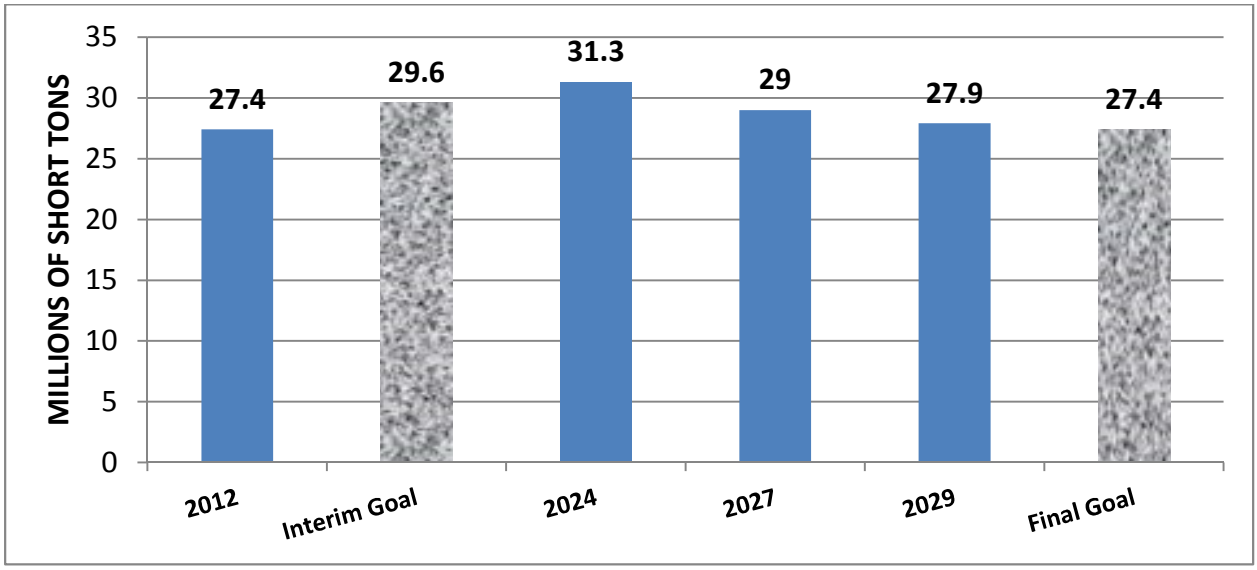


Figure 2: Final Clean Power Plan Mass Emission Goals for Virginia



Sources Affected in Virginia

A total of 26 electric generating facilities in Virginia are identified as affected sources in the final EPA rule. The combined capacity of these facilities is just over 16,000 megawatts (MWs) and their combined emissions in 2012 were 27.4 million tons of CO_2. However, two of affected sources, Dominion's Warren and Brunswick facilities had no emissions in 2012 as they were not yet constructed. In terms of fuel specific generation, 6,782 MWs of coal-fired generation emitted 16,596,275 tons of CO_2, 7,500 MWs of natural gas-fired combine cycle generation emitted 10,605,052 tons of CO_2, and 1,764 MWs of oil-fired generation emitted 164,110 tons of CO_2.

For comparison purposes, coal-fired generation emitted 19,305,791 tons of CO_2, natural gas-fired combined cycle generation emitted 13,262,484 tons of CO_2, and oil-fired generation emitted 754,126 tons of CO_2 for a total of 33.3 million tons of CO_2 from all affected sources in 2015. The emissions from the Dominion Altavista, Hopewell, and Southampton facilities are not included due to their conversion from coal to biomass.

A list of all affected sources and their 2012 and 2015 CO_2 emissions is presented in Table 2, and a map of these sources is shown in Figure 3. A graph of source specific CO_2 emissions for 2012 and 2015 is shown in Figure 4.

Table 2: Clean Power Plan – Affected Sources in Virginia

	County	Plant Name	2012 CO_2 Emissions (Tons)	2015 CO_2 Emissions (Tons)
1	Campbell	Altavista Power Station	61	Biomass conversion
2	Buckingham	Bear Garden	1,698,810	1,478,620
3	Richmond	Bellmeade Power Station	618,235	657,391
4	King George	Birchwood Power	454,865	600,889
5	Fluvanna	Bremo Bluff	368,693	139,980
6	Brunswick	Brunswick County Power Station	0	235
7	Chesapeake	Chesapeake	1,539,544	563
8	Chesterfield	Chesterfield	4,986,812	8,283,540
9	Russell	Clinch River	918,331	502,212
10	Halifax	Clover	4,897,875	5,948,442
11	Hanover	Doswell Energy Center	1,660,973	2,074,958
12	Giles	Glen Lyn	98,133	79,487
13	Louisa	Gordonsville Energy LP	667,150	605,707
14	Hopewell	Hopewell Cogeneration	684,730	854,588
15	Hopewell	Hopewell Power Station	34,941	Biomass conversion
16	Hopewell	James River Genco LLC	463,570	474,729
17	Mecklenburg	Mecklenburg Power Station	253,910	482,910
18	Portsmouth	Portsmouth Genco LLC	52,908	98,815
19	Prince William	Possum Point	1,880,680	1,693,805
20	Alexandria	Potomac River	434,300	Shutdown
21	Southampton	Southampton Power Station	75,806	Biomass conversion
22	Richmond	Spruance Genco LLC	1,062,686	1,085,651
23	Fluvanna	Tenaska Generating Station	2,272,787	2,172,633
24	Wise	Virginia City Hybrid Energy Center	1,465,830	2,981,738
25	Warren	Warren County VA	0	2,485,796
26	York	Yorktown	773,808	612,821

Figure 3: Clean Power Plan – Affected Sources in Virginia

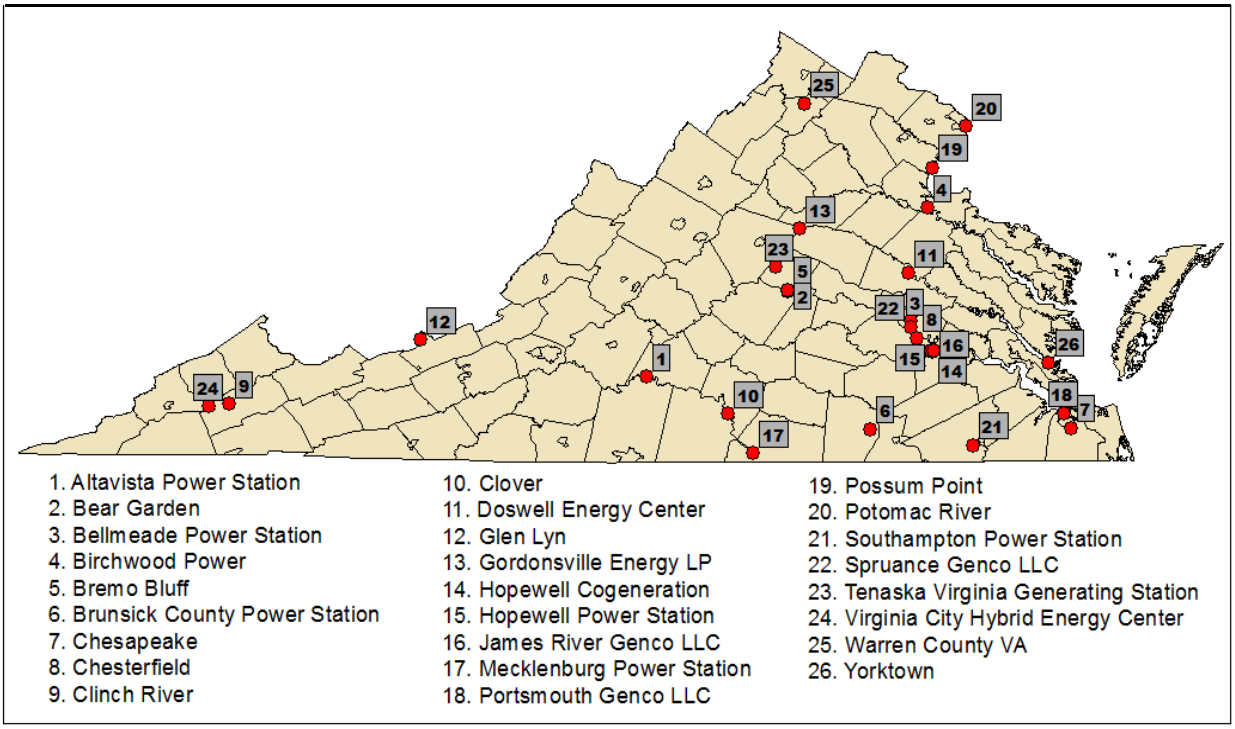
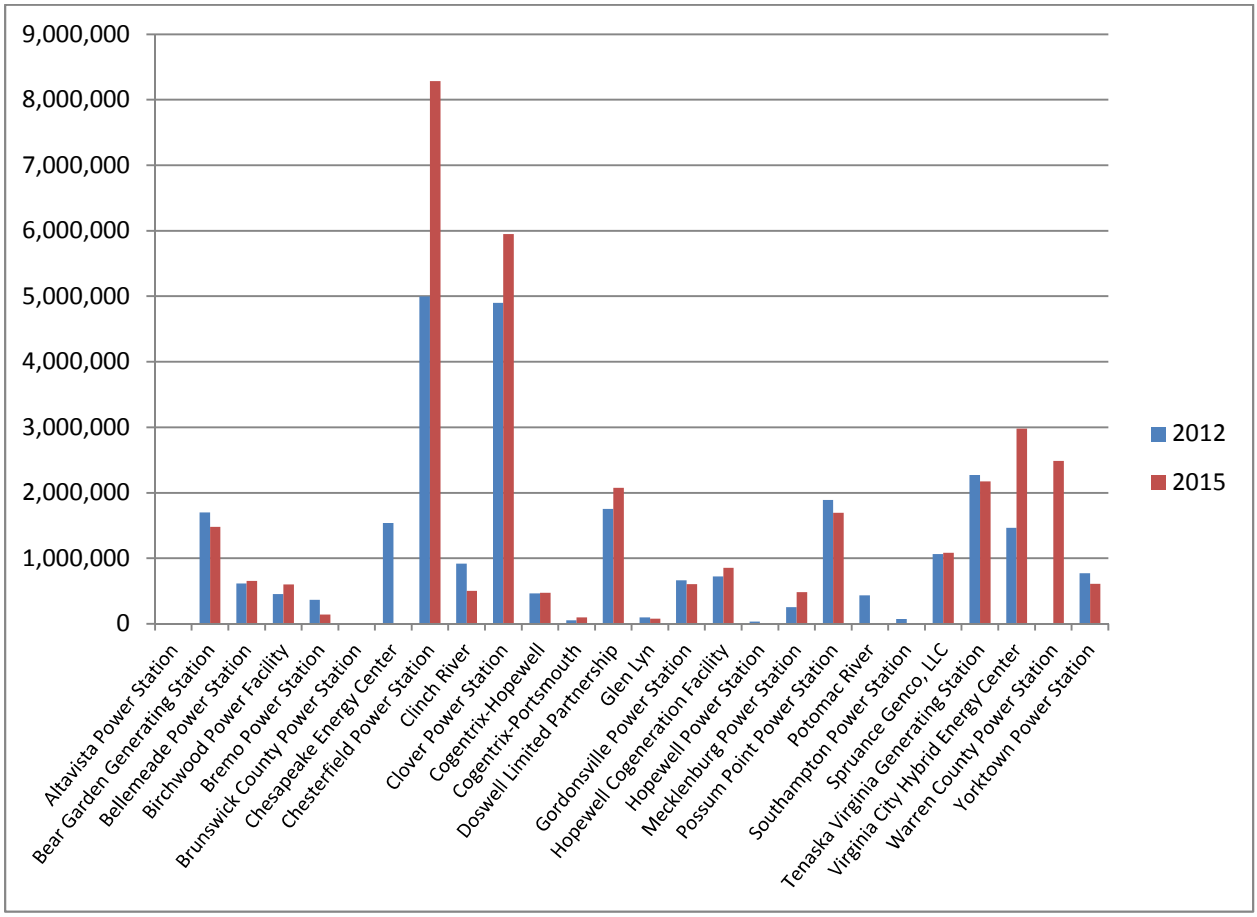


Figure 4: 2012 and 2015 Facility Specific CO_2 Emissions



Source: EPA Greenhouse Gas Reporting Program (GHGRP)

Changes in the Virginia Power Sector

Since 2012 is just a snapshot of conditions during the EPA selected base year, changes in the fleet of affected sources to the present time should be considered. A number of changes have occurred in the Virginia fleet of affected sources that will impact current and future emissions and generation trends. A number of closures and fuel conversions have occurred at these sources as presented below in Table 3.

Table 3: Changes to Affected Sources in Virginia (Post-2012)

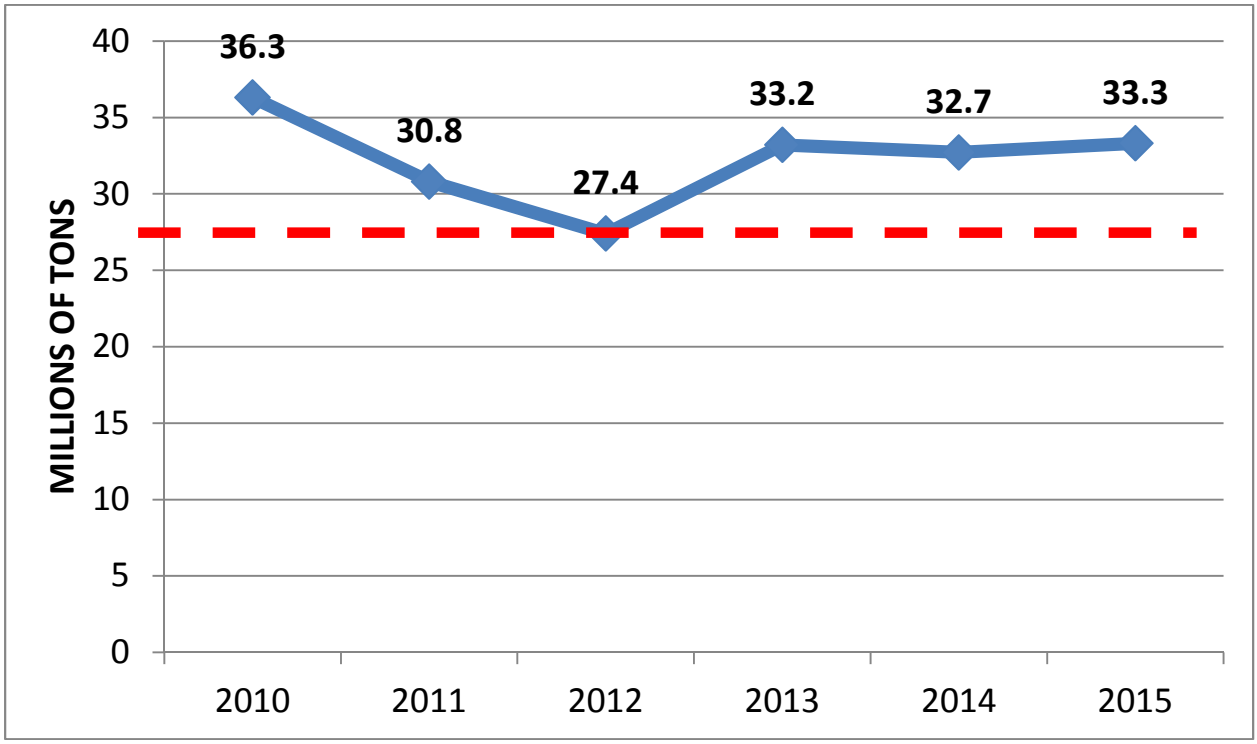
Plant Name	Change In Operation/Fuel	Year
Altavista Power Station	Converted to biomass (wood)	2012
Bremo Bluff	Converted to natural gas	2014
Brunswick County Power Station	Constructed and began operation	2016
Chesapeake	Coal units permanently shut down	2015
Clinch River	1 coal unit shut down/2 converting to gas	2015

Glen Lyn	Facility permanently closed	2015
Hopewell Power Station	Converted to biomass (wood)	2013
Portsmouth Genco LLC	Facility closed – possible biomass conversion	2015
Potomac River	Facility permanently closed	2012
Southampton Power Station	Converted to biomass (wood)	2013
Warren County VA	Constructed and began operation	2014
Yorktown Power Station	Pending Shutdown	2017

Recent Trends in Virginia

CO_2 mass emissions trends in recent years have been variable for many reasons including total generation and the yearly generation mix. This trend in CO2 emissions is shown in Figure 5 with total power sector emissions from 2010 to 2015 from sources covered by the rule.

Figure 5: Virginia CO_2 Mass Emissions Trends (2011-2014)



Source: EPA Greenhouse Gas Reporting Program (GHGRP)

CLEAN POWER PLAN MILESTONES

Although the federal regulations have been stayed as of this writing, the following milestones are summarized for informational purposes.

MILESTONE I: Either submit a final state plan or an initial submission/request for extension containing:

- Identification of final plan approach under consideration
- Explanation of why the state needs additional time
- Description of meaningful engagement with community stakeholders
- Non-binding statement of intent to participate in the optional Clean Energy Incentive Program (CEIP)

MILESTONE II: Submit a progress report if an extension was requested, including:

- Summary of the status of each component of the final plan
- Commitment to a plan approach
- Updated comprehensive roadmap with a schedule and milestones for completing the final plan

MILESTONE III: Submit a final state plan if an extension was requested, including:

- Identification of affected electric generating units (EGUs)
- Identification of emission standards for each affected EGU, compliance periods for each emission standard, and demonstration that the emission standards are sufficiently protective to meet the emission performance rates or CO_2 emission goals
- If a state plan is submitted, a federally enforceable backstop that includes emission standards for affected EGUs that will be put into place if there is a triggering event
- Applicable monitoring, reporting, and recordkeeping requirements
- Description of the process, contents, and schedule for annual state reporting to EPA about plan implementation and progress
- Description of plan approach and geographic scope
- Identification of CO_2 emission performance rates or equivalent statewide CO_2 emission goals that affected EGUs will achieve
- Demonstration that affected EGUs are projected to achieve the CO_2 emission performance rates or CO_2 emission goals
- Demonstration that each emission standard is quantifiable, non-duplicative, permanent, verifiable, and enforceable
- Demonstration that reliability of the electrical grid has been considered
- A timeline with all programmatic milestone steps
- Demonstration of state's legal authority and funding
- Demonstration that each interim step goal will be met
- Certification of public participation
- Documentation of community outreach and community involvement

If Virginia fails to submit a plan, or fails to submit an approvable plan, EPA will impose the federal plan.

ONGOING OUTREACH ACTIVITIES

During 2015, a stakeholders group was established to advise and assist the Commonwealth on elements that could be included in the state compliance plan. Members were invited on the basis of the potential impact that the plan may have on their interests or on those whom they represent, and include the following:

Advanced Energy Economy (AEE): Malcolm Woolf, Senior Vice President, Policy and Government Affairs, Advanced Energy Economy
American Electric Power (AEP): John Hendricks, Director of Air Quality Services, AEP
Alpha Natural Resources: Donald Ratliff, President of Commonwealth Connections Inc.
Birchwood: Will Poleway, Birchwood Power Partners, L.P.
Cogentrix: Kris Gaus, EHS Manager at Power Plant Management Services
Covanta: Michael Van Brunt, Director of Sustainability, Covanta
Dominion: Lenny Dupuis, Manager of Environmental Policy, Dominion Resources
Doswell/LS Power: Kathy French, Vice President, Environmental Management, LS Power Development, LLC
Natural Resource Defense Council (NRDC): Walton Shepherd, Energy Staff Attorney, Natural Resources Defense Counsel
Old Dominion Electric Cooperative(ODEC): Laura Rose, Environmental Health and Safety Coordinator, Old Dominion Electric Cooperative
Tenaska: Greg Kunkel, Tenaska
Virginia Association of Counties(VACO): John Morrill, Energy Manager, Arlington Initiative to Rethink Energy
Virginia Manufacturers Association (VMA): Irene Kowalczyk, Director Global Energy, WestRock Company for Virginia Manufacturers Association
We Act: Dr. Jalonne White-Newsome, Environmental Justice Federal Policy Analyst, We Act for Environmental Justice

The stakeholders group met on November 12, 2015, December 15, 2015, February 12, 2016, February 19, 2016, and March 11, 2016. DEQ coordinated and facilitated the discussions of this group in an effort to find common ground and elements that could be included in the state compliance plan for the CPP. DEQ sought input on the following specific questions.

- Question 1: What are the benefits and issues of each approach (source performance standards plan or state measures plan) and what is the preferred path?

- Question 2: What general mechanism should be used to implement the preferred compliance plan (mass-based versus rate-based)?

- Question 3: What specific mechanisms should be included in the compliance plan?
- Question 4: What other issues should be addressed and how?

Although the group did not reach consensus as to what general mechanism should be used to implement the compliance plan, the group did reach consensus or general agreement on a number of broad principals. The final group report is attached. Additionally, DEQ meets with interested stakeholders to stay current with evolving issues and to foster open and informed communications. These stakeholders include interested state agencies, affected electric utilities, the business community, environmental organizations, environmental justice organizations, and electric power generation facilities, including electric cooperatives.

III. CHANGES, INTERDICTION, OR SUSPENSION OF REGULATIONS

Although the federal regulations are the subject of ongoing legal challenges, as of the date of this report, no applicable federal regulations have been changed, interdicted or suspended.

ATTACHMENT A

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY

INTRA AGENCY MEMORANDUM

TO: File

FROM: Karen G. Sabasteanski
Office of Regulatory Affairs

SUBJECT: Final Activity Report - Stakeholder Group Concerning the Clean Power Plan for Greenhouse Gases

DATE: April 18, 2016

INTRODUCTION

A stakeholder group (see Attachment A) was established by the Department of Environmental Quality (DEQ) on October 23, 2015. The purpose of this group was to discuss possible alternatives and compliance paths that the Commonwealth of Virginia may consider to meet the final U.S. Environmental Protection Agency (EPA) Clean Power Plan (CPP) rule. Members were invited due to the impact that this rule may have on their interests or on those whom they represent.

DEQ coordinated and facilitated the discussions of this group in an effort to find common ground and elements that could be included in the state compliance plan for the CPP. Meetings of the stakeholder group were held at the DEQ central office building, 629 East Main Street, Richmond, Virginia on the following dates:

- November 12, 2015, from 1:30 to 3:30 p.m.
- December 15, 2015, from 9:00 a.m. to 3:00 p.m.
- February 12, 2016, from 9:00 a.m. to 3:00 p.m.
- February 19, 2016, from 9:00 a.m. to 3:00 p.m.
- March 11, 2016, from 9:00 a.m. to 3:00 p.m.

At the time of this report, no further meetings have been planned; however, at a later date DEQ will evaluate whether additional meetings are needed, particularly after several utility integrated resource plans (IRPs) and studies become available in May 2016.

Meeting minutes are found in Attachment B. A prioritized list of issues developed by the group, and summaries of meeting notes taken by facilitating staff are included as Attachment C and Attachment D.

PROCEDURES

This group is a public body under the Freedom of Information Act (FOIA), and must comply with FOIA requirements for conducting state business in the open and the availability of public records. Members were advised of FOIA requirements, including the need for members to circulate information to the group via staff. Lists of documents provided by members to the group are found in the meeting minutes (see Appendix B).

The group was polled from time to time by the facilitator in order to determine if consensus existed on a particular issue, or to better define specific areas of agreement or disagreement. "Consensus" was considered to have been achieved when the group voted unanimously in favor of a specific subject. "General agreement" was the result of the group voting primarily in favor of a subject, with some members expressing reservations or outstanding questions that prevented them reaching consensus. "No consensus" was reached if there were any negative votes, or a mixture of positive/negative/unsure votes.

SPECIFIC DISCUSSION ISSUES

DEQ sought input on the following specific questions.

- Question 1: What are the benefits and issues of each approach (source performance standards plan or state measures plan) and what is the preferred path?

- Question 2: What general mechanism should be used to implement the preferred compliance plan (mass-based versus rate-based)?

- Question 3: What specific mechanisms should be included in the compliance plan?

- Question 4: What other issues should be addressed and how?

RECOMMENDATIONS/UNRESOLVED ISSUES

Below is a summary of the results of the work of the group. The first is a list of recommended elements of the plan on which the panel developed consensus (complete agreement) or general agreement (some reservations or uncertainty). The second is a list of the issues on which the panel failed to develop consensus or general agreement. Finally, other issues that were identified and discussed that did not necessarily fall into a plan recommendation are summarized. Attachments B through D provide further details on the group's discussions.

Recommended Plan Elements

Question 1: The group came to **consensus** that a source performance standards plan was preferred over a state measures plan.

Question 3: There was general agreement that Virginia should wait until additional studies are released (anticipated in May 2016) before making a decision about mass vs. rate (e.g., release of IRPs from Dominion and American Electric Power, the PJM Regional Transmission Organization study, etc.). Although the group did not come to consensus as to whether the compliance plan should be mass- or rate-based (see Question 2 discussion below), there was consensus/general agreement on specific mechanisms for either approach.

A mass-based plan should contain or consider the following:

- Program should be trading-ready (**consensus**).
- Must address leakage (i.e., shifting generation to new plants).
- Allowance allocation should be based on historical generation or emissions.
- Allow early retired units to keep allowances through their useful life to ensure coverage for rate payers.
- Include trading, banking and borrowing of allowances.
- Provide some set aside of allowances.
- Recognize the importance of renewables in the allowance allocation method, e.g., performance-based allocation system that updates annually and is technology neutral.
- Predicting future load growth is difficult.
- Look into ways to address uncertainty.

A rate-based plan should contain or consider the following:

- Program should be trading-ready (**consensus**).
- A reliability safety valve (**consensus**).
- A national registry for generating verifiable allowances and credits (**consensus**).
- Price transparency.
- Include EPA model rule safety valve language.
- Include biomass and combined heat and power; include all types of renewable and low-emission sources.

Unresolved Issues

Question 2: The group did not come to consensus as to what general mechanism should be used to implement the preferred compliance plan:

option	support	oppose	neutral/unsure
rate	4 members	7 members	1 member
mass - existing only	3 members	3 members	5 members
mass with new source component	5 members	5 members	1 member

Advantages and disadvantages identified by group members for both approaches are summarized below.

MASS-BASED APPROACH, PROS AND CONS			
existing only		**new and existing**	
pros	cons	pros	cons
Allowances are a known commodity--most clear approach to ensure transparent/efficient markets.	Increased energy costs without future new sources.	Load growth is built into the cap.	Limits growth especially if new sources are included.
More market transparency.	More expensive; cost increases.	Greater environmental certainty.	Finite amount of allowances tend to pit companies against each other.
More interstate trading.	Finite amount of allowances tend to pit companies against each other.	Equally open access to markets.	Price volatility is greater.
Low costs; leads to economic development/jobs.	Limits growth, especially if new source component is included.	Leakage is addressed.	Very difficult to generate CO_2 allowances.
Environmental certainty due to cap.	Including new sources reduces flexibility.	Equally open access to markets.	Price volatility is greater.
All technologies can participate.	Increased cost if an auction is used to allocate allowances.	Allowances are a known commodity--most clear approach to ensure transparent and efficient markets.	Surrounding states have bigger cap.
Economic development of renewable and energy efficiencies due to cap.			Load growth only for instate sources not importing energy; energy imports should be minimized.
Leakage can be addressed via allowance allocation method.			No direct incentives for renewable development (RE) or energy efficiency (EE).
Compliance easier--already familiar with compliance requirements due to previous programs.			

RATE-BASED APPROACH, PROS AND CONS	
pros	cons
No cap: new sources can be built.	Reduced market transparency: some emission reduction credits (ERCs) won't get to market.
Good for states with a diverse electricity generation portfolio.	Potential for limited market.
Credits can come from energy efficiency and renewables.	Compliance mechanism not as well understood.
No concerns about leakage.	Disadvantages resources needed for reliability and fuel diversity.
Combined-cycle units generate ERCs.	Doesn't recognize benefits of existing zero-carbon assets.
Lower cost.	ERCs may not be fungible.
Provides flexibility for economic development.	ERCs are generated after production.
	Validation of ERCs can be cumbersome for regulators; ERCs subject to legal challenge.
	"Buyer beware" - potential for litigation costs under ERC creation

Question 4: In regard to what other issues should be addressed, members mentioned permitting requirements, new technologies and the rate at which they are appearing and becoming available, and considering recycling as a form of energy efficiency. The role of biomass and waste-to-energy was addressed. The group also discussed whether or not Virginia should join the Regional Greenhouse Gas Initiative (RGGI); no consensus was reached. Additionally, the following issues were identified by group members:

1. Don't lock into current technology for long-term solutions.

2. In most states, energy efficiency is the least-cost method of delivering energy. The cost/need to build new sources and transmission for load growth can be mitigated by increasing demand.

3. Don't confuse grid modernization cost exclusively with the CPP.

4. Health benefits should be an overarching concern and inform all decisions.

5. The Clean Energy Incentive Program (CEIP)--given that it is not yet in its final form--is likely a positive program in which Virginia should consider participating. No consensus was reached, but general agreement was met for the following:

- Virginia should probably join the program.
- Expand the program to include renewables and energy efficiency measures to ensure least cost projects.
- Start the program earlier if possible.

6. The following general areas of agreement were put forth by group members as important factors to address in any plan regardless of what compliance option is chosen:

- Clearly define and address leakage.
- Encourage regulatory certainty.
- Encourage a well-functioning market (transparency/liquidity/efficiency); avoid creating market distortions.
- Minimize impacts/costs to consumers.
- Encourage diverse power sources.
- Avoid impeding economic development.
- Consider a low-carbon future.
- Use all available tools to get to low cost.
- Level the playing field among like units.
- Use performance to assess technologies.

Attachments

ATTACHMENT A

VIRGINIA CLEAN POWER PLAN FOR GREENHOUSE GASES
STAKEHOLDER GROUP MEMBERS

AEE	Malcolm Woolf, Senior Vice President, Policy and Government Affairs, Advanced Energy Economy
AEP	John Hendricks, Director of Air Quality Services, American Electric Power
Alpha Natural Resources	Donald Ratliff, President of Commonwealth Connections
Birchwood	Will Poleway, Birchwood Power Partners, L.P.
Power Plant Management Services	Kris Gaus, EHS Manager
Covanta	Michael Van Brunt, Director of Sustainability
Dominion	Lenny Dupuis, Manager of Environmental Policy
Doswell/LS Power	Scott Carver, LS Power Development, LLC
NRDC	Walton Shepherd, Energy Staff Attorney, Natural Resources Defense Counsel
ODEC	Laura Rose, Environmental Health and Safety Coordinator, Old Dominion Electric Cooperative
Tenaska	Greg Kunkel
VACO	John Morrill, Energy Manager, Arlington Initiative to Rethink Energy
VMA	Irene Kowalczyk, Director Global Energy, WestRock
We Act	Dr. Jalonne White-Newsome, Environmental Justice Federal Policy Analyst, We Act for Environmental Justice [participated October 2015 - January 2016]

ATTACHMENT B

MEETING MINUTES

The baseline meeting minutes follow. Attachments are not included; complete minutes with attachments are available from the DEQ Greenhouse Gas Web Page at http://deq.virginia.gov/Programs/Air/GreenhouseGasPlan.aspx.

COMMONWEALTH OF VIRGINIA
CLEAN POWER PLAN FOR GREENHOUSE GASES

STAKEHOLDER GROUP MEETING MINUTES

SECOND FLOOR CONFERENCE ROOM
629 EAST MAIN STREET, RICHMOND, VIRGINIA
NOVEMBER 12, 2015

Members Present:

Malcolm Woolf, Advanced Energy Economy	Scott Curver, Doswell/LS Power
John Hendricks, AEP	Walton Shepherd, NRDC
Donald Ratliff, Alpha Natural Resources	James Wright, ODEC
Julie Caiafa for Will Poleway, Birchwood	Greg Kunkel, Tenaska
Kris Gaus, Cogentrix	John Morrill, VACO
Michael Van Brunt, Covanta	Irene Kowalczyk, VMA
Lenny Dupuis, Dominion	Dr. Jalonne White-Newsome, We Act

Department of Environmental Quality:

David K. Paylor, Director	Michael G. Dowd, Air Division
Ann M. Regn, Office of Public Information	Karen Sabasteanski, Regulatory Affairs

The meeting began at approximately 1:35 p.m.

Meeting Purpose: This stakeholders group has been established to advise and assist the Commonwealth on elements that could be included in the state compliance plan to meet the final U.S. Environmental Protection Agency (EPA) Clean Power Plan (CPP) rule for the control of greenhouse gases. The purpose of this meeting is for DEQ to coordinate and facilitate discussions of this group in an effort to find common ground and elements that could be recommended to the Administration for consideration in the state compliance plan for the Commonwealth.

Welcome and Introductions: Mr. Paylor made a number of introductory remarks. The group's purpose is primarily advisory to the Administration. Every effort will be made to achieve consensus with the understanding that there are many options and choices. However, even if consensus is reached, the content of the final plan is nevertheless the Governor's prerogative. After today, alternates should not attend as continuity of discussion is important.

Ms. Regn welcomed the group. Members introduced themselves individually. Ms. Regn then provided general guidelines for discussions (see Attachment A).

FOIA Requirements: Ms. Berndt discussed Virginia Freedom of Information Act (FOIA) requirements as they pertain to this group's meetings (see Attachment B).

Clean Power Plan Overview: Mr. Dowd provided a broad overview of CPP basics: EPA's final plan requirements, how EPA addressed Virginia's comments, Virginia's goals, compliance options, a timeline, details on plan and plan components, and questions for the group to consider as it moves ahead (see Attachment A).

Work Plan/Group Discussion: The group discussed initial reactions to Question 1 (see Attachment B): What are the benefits and issues of each plan and what is the preferred path? Some needs for additional information to be provided by DEQ and group members were identified.

Next Steps/Future Meetings: Ms. Regn wrapped up the meeting. Future meetings are scheduled for December 15, 2015, January 22, 2016, February 12, 2016, and March 11, 2016.

The meeting adjourned at approximately 3:35 p.m.

Attachments

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COMMONWEALTH OF VIRGINIA
CLEAN POWER PLAN FOR GREENHOUSE GASES

STAKEHOLDER GROUP MEETING MINUTES

SECOND FLOOR CONFERENCE ROOM
629 EAST MAIN STREET, RICHMOND, VIRGINIA
DECEMBER 15, 2015

Members Present:

Malcolm Woolf, Advanced Energy Economy
John Hendricks, AEP
Donald Ratliff, Alpha Natural Resources
Will Poleway, Birchwood
Kris Gaus, Power Plant Management Services
Michael Van Brunt, Covanta
Lenny Dupuis, Dominion
Scott Carver, Doswell/LS Power
Walton Shepherd, NRDC
Laura Rose, ODEC
Greg Kunkel, Tenaska
John Morrill, VACO
Irene Kowalczyk, WestRock/VMA
Dr. Jalonne White-Newsome, We Act

Department of Environmental Quality:

David K. Paylor, Director
Ann M. Regn, Office of Public Information
Mary E. Major, Regulatory Affairs
Michael G. Dowd, Air Division
Thomas R. Ballou, Air Division
Karen Sabasteanski, Regulatory Affairs

The meeting began at approximately 9:00 a.m.

Meeting Purpose: This stakeholders group has been established to advise and assist the Commonwealth on elements that could be included in the state compliance plan to meet the final U.S. Environmental Protection Agency (EPA) Clean Power Plan (CPP) rule for the control of greenhouse gases. The purpose of this meeting is for DEQ to coordinate and facilitate discussions of this group in an effort to find common ground and elements that could be recommended to the Administration for consideration in the state compliance plan for the Commonwealth.

Welcome and Introductions: Mr. Paylor welcomed the group and made a number of introductory remarks. The group needs to understand the impacts of the Clean Power Plan throughout the Commonwealth. He reiterated that alternates should not attend as continuity of discussion is important, and that all materials should be disseminated to the group through DEQ staff.

Ms. Regn welcomed the group. Members introduced themselves individually. Ms. Regn then reviewed the agenda, provided a brief summary of the previous meeting, and reviewed the questions for group discussion, general guidelines for discussions, and the main factors to be considered. She also reviewed the discussion and consensus

process, and provided a brief description of what the final report will contain (see Attachment A).

Mr. Ballou then reviewed baseline data requested by the group at the previous meeting. He described the affected electric generating utilities (EGUs) covered under the 2012 baseline, including changes made to affected sources in Virginia that occurred after 2012. He also provided emission and rate trends for both carbon dioxide (CO_2) and for criteria pollutants (nitrogen dioxide and sulfur dioxide) for the 2000 through 2014 period (see Attachment A).

Work Plan/Group Discussion: The need to consider how health benefits tie into general environmental benefits, particularly with respect to communities and the potential for "hotspots" was raised. The group discussed initial reactions to Question 1 (see Attachment A): What are the benefits and issues of each type of plan and what is the preferred path? The first factor considered by the group was whether the plan should be an emissions performance standard plan, or a state measures plan, details of which were provided by Mr. Dowd. The group discussed the costs and benefits of either approach, and came to **consensus that the emission standards approach was preferred**.

Given the emissions standard approach as a starting point, the group then began to consider Question 2: whether a mass-based or rate-based program is preferable. The group discussed, in considerable detail, the pros and cons of the mass-based approach, with some overlap with respect to rate; there was also detailed discussion as to whether or not a new source complement should be considered should the program be mass-based. Attachment B is a brief summary of the primary discussion topics.

No formal consensus was reached on any issue, although the group generally agreed that the Clean Energy Incentive Program (CEIP)--given that it is not yet in its final form--was likely a positive program in which Virginia should consider participating.

When the group reconvenes in January, the likely topics of discussion will be:

- Continue discussion of issues with a mass-based program, including whether a new source complement should be included.
- Go into the rate-based program in greater detail.
- Discuss source-specific issues with respect to local impacts.
- Continue to consider available modeling tools. (Mr. Shepherd provided some examples of modeling outputs; see Attachment C.)

In advance of the January meeting:

- Mr. Ballou will provide source-specific data.
- Mr. Shepherd will provide more information on how the mass-based goals were developed.
- Mr. Woolf will review the Advanced Energy Economy State Tool for Electricity Emissions Reduction (STEER) modeling tool in a more Virginia-specific context.

- DEQ staff will review Information Handling Services (IHS) modeling for any applicability to Virginia.
- DEQ staff will report on any additional modeling information from PJM/Nicholas Institute as available.

Next Steps/Future Meetings: Ms. Regn wrapped up the meeting. Future meetings are scheduled for January 22, 2016, February 12, 2016, and March 11, 2016.

The meeting adjourned at approximately 2:30 p.m.

Attachments

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COMMONWEALTH OF VIRGINIA
CLEAN POWER PLAN FOR GREENHOUSE GASES

STAKEHOLDER GROUP MEETING

SECOND FLOOR CONFERENCE ROOM
629 EAST MAIN STREET, RICHMOND, VIRGINIA
FEBRUARY 12, 2016

Members Present:

Malcolm Woolf, Advanced Energy Economy
John Hendricks, AEP
Walton Shepherd, NRDC
Will Poleway, Birchwood
Kris Gaus, Power Plant Management Services
Lenny Dupuis, Dominion
Irene Kowalczyk, WestRock/VMA
Laura Rose, ODEC
Greg Kunkel, Tenaska
John Morrill, VACO
Michael Van Brunt, Covanta

Members Absent:

Scott Carver, Doswell/LS Power
Donald Ratliff, Alpha Natural Resources

Department of Environmental Quality:

David K. Paylor, Director
Ann M. Regn, Office of Public Information
Michael G. Dowd, Air Division
Karen Sabasteanski, Regulatory Affairs
Mary E, Major, Regulatory Affairs

The meeting began at approximately 9:40 a.m.

Meeting Purpose: This stakeholders group has been established to advise and assist the Commonwealth on elements that could be included in the state compliance plan to meet the final U.S. Environmental Protection Agency (EPA) Clean Power Plan (CPP) rule for the control of greenhouse gases. The purpose of this meeting is for DEQ to coordinate and facilitate discussions of this group in an effort to find common ground and elements that could be recommended to the Administration for consideration in the state compliance plan for the Commonwealth.

Welcome and Introductions: Mr. Paylor welcomed the group and made a number of introductory remarks. Although the Supreme Court has stayed the federal emissions guidelines on which the plan will be based, the guidelines have not been struck, so the group will continue to consider the pros and cons of elements of a potential plan, and determine what would be the best plan for Virginia.

Ms. Regn welcomed the group. Members introduced themselves individually. Ms. Regn then reviewed the agenda, provided a brief summary of the previous meeting, the questions for group discussion, general guidelines for discussions, and the main factors to be considered. She also reviewed the discussion and consensus process (see

Attachment A). The focus of today's meeting was Question 2: What general mechanism should be used to implement the preferred compliance plan?

Members were then asked to individually state the pros and cons of the two primary compliance options: (i) a mass-based program (either limited to existing sources, or including existing and new sources), and (ii) a rate-based program. Although the group did not reach consensus of any specific recommendations, the following general areas of agreement were put forth as important factors in any plan regardless of what compliance option is chosen:

- Regulatory certainty
- A well-functioning market (transparency/liquidity/efficiency)
- Minimize impacts/costs to consumers
- Encourage diverse power sources
- Avoid impeding economic development
- Consider a low-carbon future
- Use all available tools to get to low cost
- Level the playing field among like units
- Use performance to assess technologies
- Avoid creating market distortions

Mr. Woolf provided the group with a copy of *Modeling a low-cost approach to Clean Power Plan Compliance for Virginia*, and Mr. Shepherd provided a copy of a white paper on *Guidance Principles for Clean Power Plan Modeling* (see Attachment B). The group also discussed several modeling options previously sent to the group by Ms. Kowalczyk.

Ms. Regn polled the group and found the members supported compliance approaches as follows:

option	support	oppose	neutral/unsure
rate	4 members	4 members	3 members
mass - existing only	2 members	3 members	6 members
mass with new source component	3 members	6 members	2 members

In advance of the next meeting, the group was asked to consider the following elements, assuming a neutral stance on which approach to take, but providing detail on what each type of approach should contain:

- What are the important operational details for each plan type
- How to handle allocation of allowances
- Steps that could be taken beyond the EPA plan

The meeting adjourned at approximately 2:15 p.m.

COMMONWEALTH OF VIRGINIA
CLEAN POWER PLAN FOR GREENHOUSE GASES

STAKEHOLDER GROUP MEETING

SECOND FLOOR CONFERENCE ROOM
629 EAST MAIN STREET, RICHMOND, VIRGINIA
FEBRUARY 19, 2016

Members Present:

Malcolm Woolf, Advanced Energy Economy
John Hendricks, AEP
Lenny Dupuis, Dominion
Will Poleway, Birchwood
Irene Kowalczyk, WestRock/VMA
Michael Van Brunt, Covanta
Scott Carver, Doswell/LS Power
Walton Shepherd, NRDC
Laura Rose, ODEC
Greg Kunkel, Tenaska
John Morrill, VACO

Members Absent:

Donald Ratliff, Alpha Natural Resources
Kris Gaus, Power Plant Management Services

Department of Environmental Quality:

David K. Paylor, Director
Ann M. Regn, Office of Public Information
Mary M. Major, Regulatory Affairs
Michael G. Dowd, Air Division
Karen Sabasteanski, Regulatory Affairs

The meeting began at approximately 9:05 a.m.

Meeting Purpose: This stakeholders group has been established to advise and assist the Commonwealth on elements that could be included in the state compliance plan to meet the final U.S. Environmental Protection Agency (EPA) Clean Power Plan (CPP) rule for the control of greenhouse gases. The purpose of this meeting is for DEQ to coordinate and facilitate discussions of this group in an effort to find common ground and elements that could be recommended to the Administration for consideration in the state compliance plan for the Commonwealth.

Welcome and Introductions: Mr. Paylor welcomed the group and made a number of introductory remarks. He reminded the group that the goal is a detailed understanding of issues and concerns related to the CPP, and that today's emphasis would be on organizing and synthesizing information for the administration in order that the final plan be the best for Virginia.

Ms. Regn welcomed the group. Members introduced themselves individually. Ms. Regn then reviewed the agenda, provided a recap of the previous meeting, and stated that the current meeting's primary task was to address Question 3: What specific

mechanisms should be included in the compliance plan? The group was reminded of the factors to be considered. The current status of the members' stance on each compliance option was reiterated. (See Attachment 1.)

The group, which was organized according to members' general stance on each compliance option, was then asked to consider the advantages and disadvantages of each approach, including compliance, costs, benefits, and impacts. Displays summarizing the pros and cons of (i) mass-based, existing sources, (ii) mass-based with new source compliment, and (iii) rate-based were presented, and members were asked to rate each issue according to importance in order to focus on priorities. Issues where there was uncertainty or outstanding questions were also flagged. Once the group had prioritized the pros and cons for each compliance option, members then individually discussed why those choices were made.

The group then discussed what should be the prescribed elements of a mass-based compliance plan, for both existing-only and with a new source compliment. Members were asked to consider what they would prefer to see in a mass-based program regardless of whether or not they favor mass or rate, in order that the best possible mass-based plan can be developed.

Although the group did not reach consensus on any specific items, several areas of general areas of general agreement were identified:

- A trading ready program is likely something that everyone would want to see
- Leakage ought to be clearly defined and addressed
- It is difficult to predict future load requirements
- It is difficult to predict the benefits associated with new technology
- Need to look into ways to address uncertainty
- Given that the program is not yet finalized, CEIP will probably be a good option for Virginia

Ms. Regn polled the group and found the members supported compliance approaches as follows:

option	support	oppose	neutral/unsure
rate	4 members	7 members*	1 members
mass - existing only	3 members	3 members	5 members
mass with new source component	5 members	5 members	1 member

*Although Mr. Gaus did not attend, his handout indicated that Spruance Genco would be opposed to rate; see below.

The group also agreed that for the forthcoming discussion of rate, a dual approach would be discussed but not a blended approach.

Although Mr. Gaus was unable to attend, he provided the group with a paper briefly summarizing issues specific to Spruance Genco (see Attachment B). Mr. Woolf also provided the group with *A Performance-Based Approach to Allowance Allocation for Clean Power Plan Compliance* (see Attachment C).

The following items were identified for discussion at the March 11, 2016 meeting:

- The prescribed elements of a dual-approach rate-based compliance plan
- How to treat biomass, waste-to-energy, etc.
- Define least cost: to whom, and what elements should be considered
- Whether the plan should go beyond the EPA plan--are there other ways to achieve emissions reductions at a reasonable cost
- CEIP
- Other cost mitigation measures

Ms. Regn reminded members that all materials and group communications must be sent through Ms. Sabasteanski.

Mr. Paylor noted that the final meeting of the group is scheduled for March 11, 2016; after this meeting, DEQ will evaluate where we are and then make a determination as to how to proceed. He also suggested the possibility of the group meeting again once several utility IRPs and a PJM study become available in May.

The meeting adjourned at approximately 3:00 p.m.

COMMONWEALTH OF VIRGINIA
CLEAN POWER PLAN FOR GREENHOUSE GASES

STAKEHOLDER GROUP MEETING

SECOND FLOOR CONFERENCE ROOM
629 EAST MAIN STREET, RICHMOND, VIRGINIA
MARCH 11, 2016

Members Present:

Malcolm Woolf, Advanced Energy Economy
John Hendricks, AEP
Michael Van Brunt, Covanta
Will Poleway, Birchwood
Kris Gaus, Power Plant Management Services
Lenny Dupuis, Dominion
Scott Carver, Doswell/LS Power
Walton Shepherd, NRDC
Laura Rose, ODEC
Greg Kunkel, Tenaska
John Morrill, VACO
Irene Kowalczyk, WestRock/VMA

Members Absent:

Donald Ratliff, Alpha Natural Resources

Department of Environmental Quality:

David K. Paylor, Director
Ann M. Regn, Office of Public Information
Michael G. Dowd, Air Division
Karen Sabasteanski, Regulatory Affairs
Mary E. Major, Regulatory Affairs

The meeting began at approximately 9:05 a.m.

Meeting Purpose: This stakeholders group has been established to advise and assist the Commonwealth on elements that could be included in the state compliance plan to meet the final U.S. Environmental Protection Agency (EPA) Clean Power Plan (CPP) rule for the control of greenhouse gases. The purpose of this meeting is for DEQ to coordinate and facilitate discussions of this group in an effort to find common ground and elements that could be recommended to the Administration for consideration in the state compliance plan for the Commonwealth.

Welcome and Introductions: Mr. Paylor welcomed the group and made a number of introductory remarks. These meetings have been very helpful to us. Although this meeting is the last one scheduled, it is clear that there is more to learn. The collaborative process will continue; we will provide a schedule once we have reported to the Administration and we have a clearer framework on which to proceed. We also expect that a number of forthcoming studies will be useful in informing future activities.

Ms. Regn welcomed the group. Members introduced themselves individually. Ms. Regn then reviewed the agenda, provided a recap of the previous meeting, and stated

that the current meeting's primary task was to finish addressing Question 3 (What specific mechanisms should be included in the compliance plan?) with respect to a rate-based program, and to address Question 4: What other issues should be addressed and how? (See Attachment A.)

The group then discussed what should be the prescribed elements of a rate-based compliance plan. Members were asked to consider what they would prefer to see in a rate-based program regardless of whether or not they favor mass or rate, in order that the best possible rate-based plan can be developed.

The group reached consensus on the following specific items:

- A trading-ready program is preferred.
- A national registry for generating verifiable allowances and credits--whether standalone or as a marketplace--is important.

The following areas of general agreement were identified:

- A reliability safety valve is important.
- Price transparency is important.

The group then discussed potential ways of treating biomass, waste-to-energy and other sources under each compliance approach. There was some interest in how waste heat recovery from low quality steam could become economically attractive.

The Clean Energy Incentive Plan (CEIP) was then discussed. Although the members generally agree that the CEIP is a positive program in which the state should participate, and given that the program is not yet final, there was some discussion about when and how to participate, and how to best address impacts to low income communities. Mr. Shepherd added that the group representative for environmental justice had provided a document, *Environmental Justice State Guidance*, and asked that it be sent to the group (see Attachment B).

There was a discussion of other measures to reduce CO_2 emissions--that is, the group was given the opportunity to discuss any other ideas or concerns that had not otherwise been addressed throughout the stakeholder process. Although not necessarily part of the immediate CPP, members mentioned permitting requirements, new technologies and the rate at which they are appearing and become available, and considering recycling as a form of energy efficiency. The group also discussed whether or not Virginia should join the Regional Greenhouse Gas Initiative (RGGI); no consensus was reached.

Finally, the group initiated a discussion on cost: what least cost/cost mitigation measures should be considered. The group talked more about the concept of leakage as it affects cost, and who pays for transmission costs and stranded assets.

Prior to the meeting, Mr. Morrill provided the group with two ACEEE white papers (*Best practices in developing state lead-by-example programs and considerations for Clean Power Plan Compliance* and *Energy Efficiency and the Clean Power Plan: Steps to Success*), and an AJW document (*Simplifying energy efficiency for states: utilizing and incentivizing energy efficiency-related greenhouse gas reductions under the Clean Power Plan's mass-based approach*). (See Attachments C, D and E.)

Mr. Paylor and Ms. Regn then wrapped up the meeting. Mr. Paylor reiterated that the discussion will continue once we have developed a structure for moving forward.

The meeting adjourned at approximately 3:00 p.m.

ATTACHMENT C

ISSUES PRIORITIZED AND WEIGHTED BY THE GROUP

At the fourth meeting, which was held on February 19, 2016, the group was organized according to members' general stance on each compliance option, and was then asked to consider the advantages and disadvantages of each approach, including compliance, costs, benefits, and impacts. Displays summarizing the pros and cons of (i) mass-based, existing sources, (ii) mass-based with new source compliment, and (iii) rate-based were presented, and members were asked to rate each issue according to importance in order to focus on priorities. Issues where there was uncertainty or outstanding questions were also flagged. Once the group had prioritized the pros and cons for each compliance option, members then individually discussed why those choices were made.

- A red mark indicates opposition.
- A green mark indicates agreement.
- A yellow mark indicates uncertainty/outstanding issues to be addressed.

Mass-based (with new sources) approach Worksheet

Pros/Advantages

1. Leakage is addressed
2. Allowances are a known commodity (i.e., come from VA) - most clear approach to ensure transparent and efficient markets.
3. Equally open access to markets
4. Allowance allocation process for M-B easier
5. Cost to state would be lower; especially if funding is involved.
6. Load growth is built-in to the cap.
7. Multiple demonstrated successful M-B trading platforms
8. Market liquidity
9. More control for regulators
10. More transparency
11. More experience in implementing M-B programs
12. More interstate trading
13. Greater environmental certainty
14. Each reduction is recognized
15. More flexibility in recognizing reductions in green house gases
16. Compliance is straight forward
17. Low cost, leads to economic development/jobs
18. Compliance process already established under EPA through CAMD

Cons:

a. Finite amount of allowances tent to pit companies against
b. More open access to markets under R-B
c. Including new source component reduces flexibility
d. No direct incentive for renewable development or EE
e. More expensive; cost increases under M-B.
f. R-B discriminates against coal facilities but one really need to consider reliability issue
g. New source complement will impact coal and gas-fired plants; not efficient
h. How to deal with load growth and incentives for certain technologies
i. M-B limits growth especially if the new source complement is included
j. Very difficult to generate allowances for green house gases
k. Less incentive for renewable (R-B generate ERCs)
l. Surrounding states have a bigger cap
m. Costs could be higher
n. Not sure how solar projects will be handled;
o. Con: Greater risk especially if auction is used to distribute allowances-that will increase cost to customers
p. Con: price volatility is greater under M-B than it would be under R-B

Mass-based (no new, future) approach Worksheet

Pros/Advantages

1. Allowances are a known commodity (i.e., come from VA) - most clear approach to ensure transparent and efficient markets.
2. Equally open access to markets
3. Allowance allocation process for M-B easier
4. Cost to state would be lower; especially if funding is involved.
5. Load growth is built-in to the cap.
6. Multiple demonstrated successful M-B trading platforms
7. Market liquidity
8. More control for regulators
9. More transparency
10. More experience in implementing M-B programs
11. More interstate trading
12. Greater environmental certainty
13. Each reduction is recognized
14. More flexibility in recognizing reductions in green house gases
15. Compliance is straight forward
16. Low cost, leads to economic development/jobs
17. Compliance process already established under EPA through CAMD

Cons:

a. Finite amount of allowances tent to pit companies against
b. More open access to markets under R-B
c. Including new source component reduces flexibility
d. No direct incentive for renewable development or EE
e. More expensive; cost increases under M-B.
f. R-B discriminates against coal facilities but one really need to consider reliability issue
g. New source complement will impact coal and gas-fired plants; not efficient
h. How to deal with load growth and incentives for certain technologies
i. M-B limits growth especially if the new source complement is included
j. Very difficult to generate allowances for green house gases
k. Less incentive for renewable (R-B generate ERCs)
l. Surrounding states have a bigger cap
m. Costs could be higher if future sources not included
n. Not sure how solar projects will be handled;
o. Con: Greater risk especially if auction is used to distribute allowances-that will increase cost to customers
p. Con: price volatility is greater under M-B than it would be under R-B

Rate-based Worksheet

Pros/Advantages

1. Not subject to cap
2. Not worried about leakage
3. Not dependant on EPA
4. Can take advantage of low emitting combined-cycle units to generate ERCs
5. Easier to track compliance costs
6. Requires a "lighter lift" to meet compliance requirements, i.e. lower generation cost, perhaps higher administrative cost but unclear at this time
7. Better at addressing inequalities between combined-cycle facilities
8. No cap. New sources can be built. Very important if new generation is required to replace nuclear facilities.
9. No need to address leakage; more equitable treatment of existing and new sources
10. More flexibility as to how to treat new sources as they come online
11. Lower cost/more flexibility
12. NO CAP
13. For states with a diverse portfolio, R-B better
14. Perhaps the ERC will be more credible; APX is developing a registry
15. More flexibility for economic growth
16. Finite number of allowances
17. Transparency; one can verify the development and the validation of ERCs
18. ERC can come from efficiency and renewables

Disadvantages/Cons

a. Potential for a limited market (not big enough) if can't trade with M-B states
b. Bigger expense for regulatory agency; very complex program to develop
c. Could need more ERCs for compliance than are generated
d. Market mechanism not as well demonstrated
e. Less real-time certification of ERC
f. ERCs are generated after production; can be cumbersome
g. No cap under R-B; green house gas emission can increase.
h. Some ERCs won't make it to market; i.e., peer-to-peer ERC transactions
i. Complex market for ERCs; can't accurately predict how markets will work leading to potential unintended consequences
j. Not all ERCs are fungible
k. Validation will be cumbersome for regulator; subject to case decision and litigation
l. Buyer of ERC has liability
m. Don't see new renewables/efficiencies being realized under R-B approach. Process leaves stranded assets
n. Doesn't recognize benefits of existing low/zero carbon assets
o. Disadvantages resources need for reliability and fuel diversity

ATTACHMENT D

FACILITATOR NOTES

Staff took notes on flip charts during each meeting. Summaries of these notes follow.

Note that flip charts were not used during the first group meeting on November 12, 2015.

Clean Power Plan Meeting 12/13/2015 Flip chart summary.

- Identifies issues to be revisited

Consensus Achieved: Emission Standard Approach

Other issues to be addressed at a later time:

- Don't lock into 2012 technology for 2030 solutions
- Ensure motivation for state to move toward energy efficiency
- 40% of Dominion capacity is currently supplied by nuclear energy. Those facilities are up for re-licensing in 2030; if not renewed, the replacement of that generation capacity will be very difficult to achieve instate.
- How can we ensure that the modeling that is being conducted but not yet completed can be incorporated into the process?
- Health issues for communities near sources and low-income communities; new permitted sources will need to meet NSPS and BACT
- Need to include health costs and a method to quantify reductions at the source
- Need to assess the role of biomass in the program even though EPA doesn't include them in the program VA has several biomass facilities
- Are new units included in the program or does it only apply to existing units
- Need to develop an approach that utilizes all resources
- Need to have sufficient time to include modeling information that will be available sometime in 2016.
- Need to define an approach that provides the lowest cost to consumer with maximum flexibility for the sources.
- More in-depth discussion of the CEIP participation in future meetings

General Discussion of Mass vs Rate-based approach.

Will VA be "flush" with CO2 emissions?

Many states are leaning toward mass-based; however, states with nuclear tend to lean for rate-based

REGGI states tending toward mass-based

The EPA FIP will be a massed-based.

To the best of our knowledge, Regional Transmissions Organizations (RTO's) like PJM don't have a preference.

For coal units, the mass-based approach would allow for them to compete as the rate-based approach set a limit they can't meet. In addition, it will be very difficult for them to generate Emission Reduction Credits (ERCs). The point was made that the coal units could purchase credits if they are

unable to achieve the rate. That point was countered with the argument that the ERC market carries too many uncertainties. It becomes extremely difficult for sources that don't have a large energy portfolio.

Mass-based approach utilizes a cap.

Discussion of ERC vs Allowance

ERC= emission rate credit and are generated in the future....are created base upon a units past operation.

NGCC units have a rate limit of ?????/ coal units have a rate limit of 13 lbs/MWh (megawatt per hour)

Units that emit above the rate must buy ERCs; units that operate below the rate limit generate ERCs that can then be sold or utilized within the company system.

Significant uncertainty in the actual value of an ERC.

Significant concern that there may not be sufficient ERC for compliance demonstration.

Two types of ERCs: Gas-shifting ERCs that can only be used by coal units within own system will need to be validated; how will that be accomplished? Gas-shifting ERCs may have a different value than "regular" ERCs. "Regular" ERCs can be generated by renewable or zero emitting energy generation such as solar, wind, or nuclear power generation or energy efficiency.

Rate based approach provides many opportunities (motivation) for energy efficiency and generation fo ERCs.

Rate-based approach could allow for the complete development of NGCC in the PJM system

Allowances: EPA sets an emissions cap in tons of emissions; One allowance = one ton of emissions. allowances are distributed up front so a source knows exactly how many tons they are allocated.

Emissions are measured at the stack

If the unit emits more emissions than it is allocated, it must buy additional allowances. If it operates below its allocation level, it generates extra allowances that can be sold or traded.

Market is very stable; everyone know exactly how many allowances there are upfront as opposed to ERCs that are determined after a period of operation. One is unsure just how many ERCs might be generated within a specific time period. . There is some comfort in utilizing allowances as the industry has previous experience with them under NOX SIP Call and CAIR programs. Others argue that the comfort of the "old ways" doesn't lend itself to push for new markets, energy efficiency , etc.

There will be some sort of market response to the generation of ERCs; a registry will probably be developed. This registry could be used for either a mass based or rate-based program. There will need to be some mechanism to determine the lowest cost allowance or the value of the ERC.

New sources under the allowance approach will have a new source set aside. How big, how its distributed are details yet to be determined.

For "zero" emitting sources there is the possibility of flooding the ERC market.

Some perceived "pros" of the mass=based approach (allowances)

Already have experience with that approach

Will have certainty regarding the cost of allowances even though they may raise or fall in price depending on market forces

Large market size for allowances, very robust market

Market issues of ERCs

Question: Is there something inherently unstable about the ERC and the potential ERC market?

Markets will develop prior to the mandated compliance date; the first interim period for compliance is 3 years. There will be some knowledge of the renewable energy development market. In VA the supply of ERCs will be contingent on the operation of NGCC and one will be able to estimate that operation.

Models are also being developed that will estimate the ERC market

Discussion of including new sources

Benefits: easy to do, levels the playing field, locks in environmental benefits. If not included it creates a special class of sources not subject to the same program restrictions of existing sources- could cause distortions in the dispatch of power generation

Cons: If new units included under a mass approach it could restrict growth as that approach sets a cap on all emissions, including the set aside for new units. Some suggest that the EPA growth factors and not sufficient. Some existing models suggest a very large demand for new power in VA that will need to come from NGCC units. Including new units under a defined cap make the possibility of meeting that demand very problematic.

Bigger discussion includes the issue of leakage between existing sources and new units.

Requirements under 111(b) provide "less stringent" compliance requirements for new sources compared to the requirements for existing sources under 111(d); however, all new sources will need to meet BACT so how much leakage will there really be?

No consensus for either mass based approach vs rate based

No consensus for including new units in a mass-based approach.

Clean Power Plan Meeting 02/12/2015 Flip Chart Summary

Abbreviations:

- Mass-Based: M-B
- Rate-Based: R-B

Discussion of Pro/Con of Mass- Based (M-B) Program

Comments from NRDC Rep:

- Pro: Allowances under M-B are a known commodity (i.e., come from VA) - most clear approach to ensure transparent and efficient markets.
- Pro: Equally open access to markets.
- Pro: Allowance allocation process for M-B easier than issuing emission reduction credits (ERCs) for R-B.
- Pro: Cost to state would be lower than for a R-B program; especially if trading is involved
- Load growth built-in to the cap.
- Pro: Market liquidity.

Comments from ODEC Rep.

- Con: Finite amount of allowances tend to pit companies against each other-ODEC prefers R-B approach
- Con: More open access to markets under R-B.
- Con: Including new source component reduces flexibility per unit operation.
- Con: No direct incentives for renewable development (RE) or energy efficiency (EE); R-B approach provides more incentives for RE and EE driving cost of down.
- Con: More expensive; cost increases under M-B.

Comments from AEE Rep:

- STEER Report demonstrates several least cost compliance options for VA (M-B and R-B)
- Both M-B and R-B will work if the playing field is level
- EPA's proposed allocation approach to affected EGUs on the basis of historical generation leads to market failure (i.e., discounts emission reduction measures beyond the fenceline (e.g., RE/EE) and distorts utility choices for compliance). A performance based allocation approach, based on previous year's performance fosters a technology neutral competition between all eligible emission reduction measures, both inside and outside of the fenceline of affected EGUs.
- New source complement should be included as it addresses the leakage issue.

Comments from Birchwood Rep.

- M-B approach preferred; at mercy of ERC markets under R-B.
- Concern about how ERC market will work e.g., transparency, liquidity, size, etc.

- R-B discriminates against certain technologies including coal facilities, which lead to a less diverse electric power generation mix and potential reliability issues.
- M-B approach would create a more level playing field than a R-B approach.
- EPA has suggested the Birchwood wouldn't be able to operate under a R-B approach.
- New source complement will impact coal and gas-fired plants; not efficient.

Comments from Covanta Rep:

- Pro: Multiple demonstrated successful M-B trading platforms.
- Pro: M-B provides more control for regulators.
- State of PA is leaning toward M-B; bigger trading platform.
- Pro: M-B provides more market transparency and certainty.
- Pro: More experience in implementing M-B programs
- Pro: More interstate trading.
- Pro: M-B provides greatest environmental certainty.
- Pro: Each emission reduction is recognized.
- Pro: More flexibility in recognizing reductions in CO_2 emissions.
- Con: How to deal with load growth and incentives for certain technologies.

Comments from AEP Rep.

- M-B preferred.
- Currently conducting IRP studies; state should wait until studies are completed; need to be submitted by 5/1/2016.

Comments from VACO Rep:

- Counties are first responders.
- Tend to look long term.
- Prefer M-B because the intent of the rule is to reduce CO_2 emissions.
- Assumptions on load growth are always proved to be too high.
- Pro: Compliance is straight forward; market will determine the cost of compliance.
- Must be aware of the difference between cost, i.e. the customer's bill which includes both the rate and usage.
- State of MD has indicated that the RGGI program (a M-B program) has been great for the state in terms of achieving CO_2 reductions and stimulating economic growth/jobs/ etc.
- Pro: Low cost, leads to economic development.

Comments from Dominion Rep.

- Also conducting IRP studies.
- R-B appears to be best for VA.
- M-B limits growth especially if the new source complement is included.

- The new source complement needs to be significant if nuclear facilities are not relicensed and that capacity needs to be replaced.
- The required generation to replace nuclear will be built elsewhere.
- M-B experience has been with programs addressing pollutants that the sources could retro-fit for reductions. Very difficult to generate allowances for greenhouse gases.
- Con: Less incentive for renewable. Under a R-B program they generate ERCs for renewable energy-more tangible benefits.
- R-B complements a more diverse generation profile; provides more flexibility.
- R-B provides the potential to generate and sell ERCs.
- Con: Under the M-B program, surrounding states have a bigger cap.

Comments from Tenaska Rep:

- Prefer R-B.
- Next preference is M-B if structured correctly.
- Last preference is M-B including new source complement particularly if new sources are treated differently from existing sources.
- Program should not disrupt existing market; old and new sources need to be treated the same.
- Cons: Under M-B energy costs could be higher.
- Con: Under M-B not sure how solar projects will be handled; under R-B they generate ERCs.

Comments from Cogentrix Rep.

- Only kind of facility in state.
- Current steam contracts do not allow for pass-through-costs. This applies with either M-B or R-B.
- Pro: Facility would receive a certain number of allowances under M-B.
- Pro: Compliance process already established under EPA through CAMD.

Comments from WestRock/VMA Rep:

- Rates will increase under either M-B or R-B program; estimated to be 1.5 Billion per year
- Determination of compliance approach should be data driven.
- Certain studies suggest that R-B will be lower cost than M-B.
- Con: Greater risk under M-B especially if auction is used to distribute allowances-that will increase cost to customers
- The diverse generation mix in VA suggests that the generation of ERCs is possible thus lowering costs to customers.
- Full trading is necessary for low costs; need to develop method to trade between M-B and R-B programs even though EPA closed the door on that in the final rule.
- Need to review modeling studies and reports.

Discussion of Areas of Agreement

- Need regulatory certainty
- Support diverse energy generation
- Need transparency in market/liquidity and efficiency
- Low cost for consumer now and in the future
- Don't impede growth
- Need to consider low-carbon future
- Use tech-neutral approach
- Need to consider cost for both electricity and gas when look at "low cost for consumer"
- Need level playing field for like-kind generators
- Need equal treatment under the law/regulation
- Don't create market distortions
- Need big market; robust participation
- Need to consider nuclear re-licensing issue

Discussion of Pro/Con of Rate- Based (R-B) Program

Comments from WestRock/ VMA Rep:

- Pro: Not subject to cap.
- Pro: Not worried about leakage.
- Pro: Can take advantage of VA's low emitting combined-cycle units to generate ERCs.
- Pro: Easier to track compliance e.g., you can see where every ERC comes from.
- Pro: Requires a "lighter lift" to meet compliance requirements, i.e., lower generation cost, perhaps higher administrative cost but unclear at this time.
- Con: Potential for a limited market (not big enough) if can't trade with M-B states.

Comments from Cogentrix Rep:

- Con: R-B means a much bigger expense for regulatory agency; very complex program to develop
- Con: Could need more ERCs for compliance than are generated.

Comments from Tenaska Rep:

- Globally, the U.S. is producing electricity at a very low cost of generation.
- VMA explained that there was concern that other commodities/companies may more offshore to countries with lower electricity costs.
- Con: Market mechanism not as well demonstrated as that for M-B program.
- Con: Less real-time certification of ERC, not like with M-B approach.
- Con: ERCs are generated after production; could be cumbersome.
- Pro: R-B better at addressing inequalities between combined-cycle facilities.

- Pro: No cap. New sources can be built. Very important if new generation is required to replace nuclear facilities.
- No need to address leakage; more equitable treatment of existing and new sources.

Comments from Dominion Rep:

- Pro: R-B provides more flexibility as to how to treat new sources as they come online.
- Timeline for Nuclear Re-Licensing: 4 units between 2032 – 2038.
- Concerned about 2030 and beyond; currently there is lot of regulatory and legal uncertainty.
- Pro: Lower cost and more flexibility.
- Very complex program, administration may be problematic, however, PMJ has developed and offered their Generation Attribute Tracking System (GATS) as a trading platform for ERCs. . ERCs could be issued monthly and GATS also addresses energy efficiency.

Comments from VACO Rep.

- DOE has issued grants to develop methods for easier interstate trading.
- Con: No cap under R-B; CO_2 emission can increase. This is contrary to the intent of the program.
- VA doesn't operate in a vacuum but is part of a large region. Other states can supply additional power if needed.
- Environmental regulation has spurred innovation and market solutions.
- Renewable energy and efficiency measures could replace current nuclear portion of generation (40%).
- Supports M-B approach.

Comments from AEP Rep:

- Pro: No Cap.
- Con: ERC market is uncertain.

Comments from Covanta Rep:

- Pro: For states with a diverse portfolio, R-B better.
- Pro vs Con discussion depends on purpose of discussion: If the issue is compliance, the R-B becomes favorable; however, if purpose is to lower CO_2, then M-B becomes more favorable.
- Con: Some ERCs won't make it to market i.e., peer-to-peer ERC transactions.
- Con: Complex market for ERCs; can't predict how markets will work leading to potential unintended consequences.
- Con: Not all ERCs are fungible.
- Con: EM&V for ERCs will be cumbersome for regulator; and are subject to case decision and litigation.
- Buyer of ERC has liability.
- Pro: Perhaps the ERC will be more credible; APX is developing a registry.

- EPA system set up "buyer beware" scenario; a third party registry could alleviate many problems of verifying ERCs.

Comments from Birchwood Rep:

- Don't agree that R-B is cheaper.
- Cap not necessarily restrictive for future load growth.

Comments from AEE Rep:

- Not convinced that it is easier to track ERCs or that R-B is the least cost compliance approach.
- Both R-B and M-B approaches need registry- especially M-B.
- M-B needs an allocation approach that ensures entities that invest in low or no carbon solutions directly benefit from such investments.

Comments from ODEC Rep:

- ODEC modeling suggests the R-B approach best for VA; current models include mixed trading for both M-B and R-B between states.
- DEQ needs to slow the process to allow current studies and analysis to be completed.
- Pro: R-B allows for more flexibility for economic growth.
- Pro/Con: Finite number of allowances.
- Current experience under RGGI suggests that states constantly run-up against the cap limit, this suggests that the price volatility is greater under M-B than it would be under R-B.
- Pro: Transparency; one can verify the development and the validation of ERCs.
- Pro: An ERC registry, i.e. third party validation would be very cost effective and minimize the cost to the state.

Comments from NRDC Rep.

- Pro: ERCs can come from energy efficiency, renewables, other sources and reward least-cost sources.
- Con: 600-800 MW of new NGCC plants expected to be built in VA: Existing gas plants cannot compete, which leads to leakage. R-B is a stranded asset plan. Favors M-B approach.

Clean Power Plan Meeting 02/19/2015 Flip Chart Summary

Abbreviations:

- M-B (Mass-Based)
- R-B (Rate-Based)

Prioritizing Pros/Cons of Mass- Based (M-B) with New Sources

*Results based upon red/green/yellow dots

Pros:

- Load growth is built into the cap
- Greater environmental certainty
- Equally open access to markets
- Leakage is addressed

Cons:

- Limits growth especially if the new source complement is included
- Finite amount of allowances tend to pit companies against each other
- Price volatility is greater under M-B than under R-B
- Surrounding states have bigger cap
- Load growth only for instate sources not importing energy; energy imports should be minimized
- No direct incentives for renewable development (RE) or energy efficiency (EE)

Discussion:

- Reliability is important; If you develop a goal the market will respond. Example: LED lights are significant in creating energy efficiency
- Can't accurately predict what load growth will be:
    - New technologies will have impact; can't predict what that will be
    - Reduced cost for renewable
    - Reduced cost for energy efficiencies
- How do the other "cap" states (RGGI) deal with caps
- Cost of carbon is very low now relative to cost of electricity
- Possibility of a hybrid plan:
    - Use cap approach until something significant occurs that would trigger allowing new sources
    - Issue of backsliding
- New source complement eliminates market distortions; without it you have leakage.
- EPA approach allowance allocation approach distorts markets
- Performance based output allowance allocation addresses leakage without market distortions

- RGGI states: average customer bill is cheaper than in VA even though the cost of electricity per kWh is higher
- Consequence of high carbon price: Residents of California use less energy than anywhere else in the country –however, very difficult to compare region fluctuations in energy use between parts of the country

Prioritizing Pros/Cons of Mass- Based (M-B) No New Sources

Pros:

- Allowance allocation easier-coal facilities can't generate ERCs
- Compliance easier-already familiar with compliance requirements due to previous programs
- Environmental certainty due to cap
- All technologies can participate
- Economic development of renewable and energy efficiencies due to cap
- Leakage can be addressed via allowance allocation method

Cons:

- Increased energy costs without future new sources
- Limits growth, especially if the new source complement is included
- Finite amount of allowances tend to pit companies against each other
- Increased cost if an auction is used to allocate allowances

Discussion:

- Existing plants subject to additional costs that new sources (those online after 2022) don't have
- Risk of stranded assets
- Need a level playing field
    - Need to treat new and existing sources the same
    - If not treated the same market distortions will occur
- Cost of entry for a new combine-cycle is very high
- SCC has traditionally made it difficult for energy efficiency to compete: SCC just responding to companies' proposals
- Let market determine lowest cost then the utility can take that to the SCC
- Need an allocation system that provides a way for each utility to capture the benefits of prior activity-historic approach of allocating leads to higher costs
- The big question is how will the state address leakage
    - One way is through output based allocation
- Carbon cost is reflected in cost of allowance-issue only with auction approach.
- To avoid additional costs, allocate to combine cycle first then existing coal and new sources compete on level playing field

- Cost of carbon is relative to the stringency of the cap
- Less efficient units set price-they will have costs under both approaches

Prioritizing Pros/Cons of Rate- Based (R-B)

Pros:

- No cap: new sources can be built
- Good for utilities with a diverse portfolio
- Combined-cycle units generate ERCs
- Provides flexibility for economic development

Cons:

- Reduced market transparency: some ERCs won't get to market
- Potential for limited market
- Compliance mechanism not as well understood
- Doesn't recognize benefits of zero-carbon assets
- Additional resources needed for reliability and fuel diversity
- ERCs may not be fungible
- "Buyer beware" - potential for litigation costs under ERC creation –ERC created "after the fact" no certainty

Discussion:

- Pro/Cons of ERC development can lead to unintended consequences
- How will efficiency be rewarded:
    - State develops registry with EM&V
    - EGUs looks to the registry for ERCs
    - Seller is held accountable if fraud is detected
- Is there a different value for different quality of ERCs?
    - Renewable ERCs have a direct measurement; very straightforward
    - Energy Efficiency ERCs need a verification procedure; the registry would take on this responsibility
    - There are ways to certify and verify ERCs
- ERCs comparable to carbon offsets
- Litigation cost associated with defending ERCs
- Costs for ERCs: verification costs; financing with ERCs becomes problematic as finance folks question true value
- Need to build generation into IRP for when renewable are not operating

Design Elements of a M-B Program

****Must address leakage

*Needs to be trading ready-need to trade with other states

****Allocation base on historical generation or emissions

***Early retired units keep allowances through useful life to ensure coverage for rate payers

There are never enough free allowances

Leakage can be addressed through allowance allocation

New combined cycle units need more allowances as they can't rely upon historic operation (these are presumably the units that we want to operate more; i.e. cleaner, more efficient)

If new units are included, new source set aside could be short and create market distortions

*Include combined heat, include all types of renewable and low emission sources i.e. **biomass (round wood considered carbon neutral)

Don't distort wood market

Approach will have impact on all manufacturing

**Need to include trading, ***banking and borrowing

Borrowing may not be necessary if means to convert between rate and mass

No shell life for allowances

Avoid protracted allocation method

**Auction best choice for allocating allowances in long term; insures transparency

Provide allowances to entities based on load-then pass savings on to rate payers

Could use a consignment auction: 1st initial auction determines price; conduct auction then return revenue

Under auction scenario the rich get richer; small guys can't compete

Historic approach can adversely impact some operators

***Need to provide some set aside

*Need to recognize the importance of renewable in allowance allocation method

*Concern that state just selects "winners" and "losers" if just allocation of allowances

Don't include borrowing

Energy efficiency needs to be competitive with renewable energy generation

Don't use 3-year historical data; some operate under PPA so allocation would be based on contracts-too limiting

Market can be manipulated by holding allowances; need to place a limit on how much one can hold

Who can buy allowances-Goldman Sachs?

Provide market innovation

Align incentives to meet program goals: Don't allocate base on historic data

*Performance-base allocation system that updates annually

*Tech neutral

2010-2012 not representative of historical operations

* *indicates number of times comment mentioned*

Clean Power Plan Meeting 03/11/2016 Flip Chart Summary

Abbreviations:

- M-B (Mass-Based)
- R-B (Rate-Based)
- * means issue mentioned several times

Key Elements of a Rate- Based (R-B) Program

- AEP: Awaiting IRP study (to be completed May 1)
- NRDC: GAS-shift ERCs need to be clarified
- *Rules for the market operation must be able to aggregate various methods to capture ALL efficiencies
- *Registry is necessary
- VA needs to be involved in the development of the registry: Mr. Dowd affirmed that VA had been invited to participate in the development.
- State needs to continue to participate in capture of energy efficiencies beyond the registry
- For some particulate projects (combined heat and power for example) there should be no third party verification required provided that specific criteria is followed; keep it simple
- These issues are appropriate for M-B approach as well
- Allowance distribution needs to be verified; any beyond the fence measures verification needs to be similar for R-B approach
- SCC currently verifies energy efficiency for allowances; rule requires that that responsibility be under DEQ – could involve consultation with SCC.
- Verification is much easier under a metered approach; cost of verification related to complexity of the project
- Energy efficiency measures "what isn't there"; Easier to isolate and quantify consumption – approaches are available to do that
- Verify and Quantify
- Some projects have already demonstrated that they work and what the efficiencies are; need to be able to utilize those approaches without third party verification.
- Verification process needs to keep costs down; need to create the program in such a way that verification costs are minimal
- Verification costs are vey project dependent
- Create standardized protocols to make reviews very straight forward

Registry Discussion

4 Requirements:

- Is the project eligible?
- Is it a real project, not just a paper exercise?
- Did they follow protocol?
- Need a market-clearing house to match buyers with sellers

- Need to ensure that what is entered into the registry conforms with interstate trading
- Difference between registry and clearinghouse: registry tracks all transactions, the clearinghouse would provide market price
- Clearinghouse becomes the market: Brokers will be involved with the market and match buyers with sellers
- Clearinghouse; private sector: registry; government over site
- *Registry needs to be trading ready with common currency
- Mandate that sources participate in clearinghouse, i.e. disclose price?
- Can't compel participation in clearinghouse, can mandate participation in registry
- Auction of allowances provides a reconciliation of market prices; provides a method to determine fair- market value of ERCs
- *Price must be transparent
- Problem becomes how to determine the price of ERCs with the state only responsible for verification that they are real
- State has more policy control under M-B plan because they determine who get allowances
- How does one make price transparent under R-B approach?
- *Big markets (multiple states participating) provides an easier method to discover price of ERCs

Discussion of Carbon Policy

- The key issues is how to ensure that emissions don't increase; R-B not the best approach to meet that goal
- Goal of CPP is to address EXISTING SOURCES; it is under §111d which addresses existing sources, new sources must meet BACT
- Is it important to VA to reduce carbon emissions?
- Can we create some sort of backstop if it is determined that carbon emission are increasing?
- Any backstop measure will kill market
- Should we include a review to address any unintended consequences?
- Review would not be good for sources that need certainty as they do long-term planning
- It's only a regulation; they get reviewed and changed all the time; this is not unique to VA and it is something we deal with all the time
- Certainty issue should be taken into consideration in any policy decisions

Vote Regarding Inclusion of Backstop Provisions

Yes (green) - 1 No (red) - 8 Unsure (yellow) - 3

Continued Discussion on Key elements of R-B Program:

- Need to include a reliability safety valve; be able to suspend program if costs become prohibitive for consumers, i.e. meets some 5 increase threshold
- *VA plan needs to follow EPA model rule so that it is trading ready
- Needs to include biomass, nuclear, energy efficiencies
- Have unlimited banking
- Adopt multiple year averages
- Reliability safety valve will also impact market in a negative way; the provisions for catastrophic circumstances are addressed in model rule
- Need to develop method to contest ERCs
- Need a method to include existing renewables
- *Must be trading ready
- *Must be inclusive
- Need to protect small players; R-B favors the big sources with a broad portfolio
- Under a R-B plan coal facilities would require some sort of set aside
- *Need to ensure that the market has ERCs for facilities to use, get ERCs into market
- *Market liquidity
- Need a rule that is trading ready; need consistency throughout region, need a big market to ensure price transparency. Most simple approach would be to follow EPA model rule
- Model rule might have unintended consequences
- *Can have a trading ready program that isn't the exact EPA model rule
- *Need to include the EPA proposed language for emergencies
- Markets change rapidly, need flexibility
- Will program include other types of zero-emitting sources?
- Need to create a MOU (or similar vehicle) to coordinate activities of SCC, DMME, DEQ
- *Need to include energy efficiencies

Vote on 6 issues

1.Program needs to be trading ready: Yes (green) - 12 No (red) - 0 Unsure (yellow) - 0

2. Program required a registry: Yes (green) -12 No (red) - 0 Unsure (yellow) - 0

3. Price transparency: Yes (green) - 10 No (red) - 0 Unsure (yellow) - 2

4. Include EPA model rule safety valve language: Yes (green) - 11 No (red) - 0 Unsure (yellow) - 1

5. Allow all renewables: Yes (green) - 11 No (red) - 1 Unsure (yellow) - 0

6. Need a form of protection for energy intensive industries: Yes (green) - 5 No (red) - 3 Unsure (yellow) - 4

Need additional discussion regarding role of clearinghouse

Discussion of biomass/waste energy:

- Not required under the EPA model rule; want them both to be included in the VA program
- Need to be included in either M-B or R-B program
- Need to have a preapproved list of which types of biomass would be included
- Allow flexibility for additional types to be included; CHP facilities, anaerobic digestion, agricultural byproducts
- Proposal addresses only new sources; doesn't address existing sources
- Value of existing renewable sources needs to be included
- EPA will be holding a meeting regarding biomass on April 7
- Co-firing of biomass needs to be included
- Pyrolysis –bio char, heat waste, waste water creating resource recovery all need to be included
- Don't utilize resources used by paper industry
- *EPA doesn't include ERCs created behind the meter; distributed solar must be included
- Allowances provided to existing renewable increases costs to rate payers
- *Renewables need to have a mechanism that includes the cost of the overall benefit of carbon reduction they provide
- *Maintaining exiting renewable is cheaper than replacing with new

Discussion of Clean energy Incentive Plan (CEIP):

DEQ finds the concept very complex: looking for input from members

- Program provides an opportunity for efficiencies
  1. It targets most common definition of low income communities
  2. Early adoption credits can be used for future compliance
  3. Rural areas provide many opportunities
- Downside of not participating; could disrupt current market- a delay could impact whether sources implement reductions now
- CEIP picks winners and losers- need to expand the program
- There is no demonstration that it is the least cost for consumers
- Need to conduct assessments
- Many rural members of co-ops are below poverty level
- Need to clearly understand what the least cost components are
- Venerable communities –NRDC provided an environmental Justice report
- Program need to be more robust

- *Program need to be started prior to 2021; earlier the program starts the lower the compliance costs
- If not all renewable set asides are used then allow them to be used energy efficiency and vice versa
- There is double counting in low income areas; can the program be expanded to include areas not considered low income?
- Can state propose to use credits differently?

Vote Regarding CEIP

Should VA include the program: Yes (green) -9 No (red) - 0 Unsure (yellow) - 3

Expand to include more than wind and solar: Yes (green) - 8 No (red) - 0 Unsure (yellow) - 4

Should the program start earlier: Yes (green) - 9 No (red) - 0 Unsure (yellow) - 3

Discussion on why folks voted yellow under CEIP Vote:

- Not convinced that more incentives are required
- Projects in 2021 can generate ERCs, if started earlier it will be easier to meet state reduction goals
- **Need time to process implications for

Other Discussion points:

- Mechanism to convert ERCs to allowances not going to be addressed by EPA
- Need measures to streamline permitting
- Many opportunities; the cost of solar decreasing; renewable are cheaper
- Recycling is a form of energy efficiency; how can that be calculated
- ERCs must be available for non-utilities

Discussion on whether VA should join RGGI:

- NO: Cap hinders growth
- Changes would go beyond Clean Power Plan (CPP); biomass would be subject to RGGI, not CPP
- Power make-up very different than that of VA: North East (N.E.) is shutting down nuclear, gets much hydro from Canada
- Don't want to give-up control of program

- Auction based; expensive to rate payers. If an auction is used, proceeds should be funneled back to rate-payers
- Benefits: Carbon emission have decreased while rates have not gone up; Money generated used for economic development, State determines what happened to auction proceeds
- Don't need to join RGGI to trade with other states
- Residential bills in N.E. are 32% higher, industrial costs 45% higher
- Rates in N.E. have always been higher than VA...cost increase the further north one goes-this is not a function of RGGI
- Why is a carbon cap perceived to be a hindrance to economic development when it's been proven in other states that it isn't the case?
- The cap proposed for VA isn't appropriate give the estimates for growth for VA

Vote Regarding RGGI

Should VA join RGGI: Yes (green) -2 No (red) - 8 Unsure (yellow) - 2

Preliminary cost Discussion:

What are the drivers for costs:

- Modeling results will be helpful when available (estimate sometime in May)
- How efficient is the compliance instrument: Cost of compliance: ERCs or allowances
- Technology
- Cap: increase cost
- Include more units ; increase cost
- Program consistent with other states; lower cost
- Stranded assets: increase cost
- New units must meet BACT, causes market distortions
- New units should be under cap to prevent market distortions
- Costs will always be higher for existing units
- Distortions due to leakage: however one can develop approached to deal with leakage
- If new units included then costs go down
- Need to include additional costs: transmission costs; increased pressure on gas pipline increases costs, hook-up of renewable increases costs, current PJM study doesn't include transmission costs
- A function market will decrease costs; it must have transparency, liquidity and flexibility then market will determine less cost options
- To reduce the cost, reduce demand
- Rate payers will pay for new construction and transmission anyway

- Existing low-carbon units need to be recognized in market place; cheaper to maintain an exiting renewable than to build a new one
- Benefit of zero carbon facilities must be taken into account
- Don't confuse transmission costs with CPP costs
- What
-
- How do the other "cap" states (RGGI) deal with caps
- Cost of carbon is very low now relative to cost of electricity
- Possibility of a hybrid plan:
    - Use cap approach until something significant occurs that would trigger allowing new sources
    - Issue of backsliding
- New source complement eliminates market distortions; without it you have leakage.
- EPA approach distorts markets
- Performance based output addressed leakage without market distortions
- RGGI states: average customer bill is cheaper than in VA even though the cost of electricity per Kw is higher. (Due to the high use of fuel oil?)
- Consequence of high carbon price: Residents of Cal. Use less energy than anywhere else in the country –Very difficult to compare region fluctuations between parts of the country.

Prioritizing Pros/Cons of Mass- Based (M-B) No New Sources

Pros:

- Allowance allocation easier-coal facilities can't generate ERCs
- Compliance easier-already familiar with compliance requirements due to previous programs
- Environmental certainty due to cap
- All technologies can participate
- Economic development of renewable and energy efficiencies due to allocation cap.
- Leakage is addressed.

Cons:.

- Increased energy costs without future new sources
- Limits growth especially if the new source complement is included
- Finite amount of allowances tend to pit companies against each other
- Increased cost if an auction is used to allocate allowances
- Potential for litigation costs under ERC creation –ERC created "after the fact" no certainty

Discussion:

- Existing plants subject to additional costs that new sources (those online after 2022) don't have

- Risk of stranded assets
- Need a level playing field
    - Need to treat new and existing sources the same
    - If not treated the same market distortions will occur
- Cost of entry for a new combine-cycle is very high
- SCC has traditionally made it difficult for energy efficiency to compete: SCC just responding to companies' proposals
- Let market determine lowest cost then the utility can take that to the SCC
- Need an allocation system that provides a way for each utility to capture the benefits of prior activity-historic approach of allocating leads to higher costs
- The big question is how will the state address leakage
    - One way is through output based allocation
- Carbon cost is reflected in cost of allowance-issue only with auction approach.
- To avoid additional costs allocate to combine cycle first then existing coal and new sources compete on level playing field.
- Cost of carbon is relative to the stringency of the cap
- Less efficient units set price-they will have costs under both approaches

Prioritizing Pros/Cons of Rate- Based (R-B)

Pros:

- No cap: new sources can be built
- Good for utilities with a diverse portfolio
- Combined-cycle units generate ERCs
- Provides flexibility for economic development

Cons:.

- Some ERCs won't get to market
- Potential for limited market
- Mechanism not as well understood
- Doesn't recognize benefits of zero-carbon assets
- Additional resources needed for reliability and fuel diversity
- Are ERCs fungible
- "Buyer beware" Increased costs due to litigation

Discussion:

- Pro/Cons of ERC development can lead to unintended consequences
- How will efficiency be rewarded:
    - State develops registry with verification
    - Third part looks to the registry for ERCs

    - Seller is held accountable if fraud is detected
- Is there a different value for different quality of ERCs?
    - Renewable ERCs have a direct measurement; very straightforward
    - Energy Efficiency ERCs need a verification procedure; the registry would take responsibility
    - There are ways to certify and verify ERCs
- ERCs comparable to carbon offsets
- Cost associated to defending ERCs
- Costs for ERCs: verification costs; financing with ERCs becomes problematic as finance folks question true value
- Need to build generation into IRP for when renewable are not operating

Design Elements of a M-B Program

****Must address leakage

*Needs to be trading ready-need to trade with other states

****Allocation base on historical data;

***Early retired units keep allowances through useful life to ensure coverage for rate payers

There are never enough free allowances

Allowances can be addressed through allowance allocation

New combined cycle units need more allowances as they can't rely upon historic operation; (these are presumably the units that we want to operate more; i.e. cleaner, more efficient)

If new units are included new source set aside could be short and create market distortions

*Include combined heat, include all types i.e.** biomass, *round wood (considered carbon neutral)

Don't distort wood market

Approach will have impact on all manufacturing

**Need to include trading, ***banking and borrowing

Borrowing not be necessary if means to convert between rate and mass

No shell life for allowances

Avoid protracted allocation method

**Auction best choice for allocating allowances in long term; insures transparency

Provide allowances to entities based on load-then pass through to rate payers

Could use a consignment auction: 1st initial auction determines price; conduct auction then return revenue

Under auction scenario the rich get richer; small guys can't compete

Historic approach can adversely impact some operators

***Need to provide some set aside

*Need to recognize the importance of renewable in allowance allocation method

*Concern that state just selects "winners" and "losers" if just allocates allowances

Don't include borrowing

Energy efficiency needs to be competitive with renewable energy generation

Don't use 3-year historical data; some operate under PPA so allocation would be based on contracts-too limiting

Market can be manipulated by holding allowances; need to place a limit on how much one can hold

Can others buy-Goldman Sachs?

Provide market innovation

Align incentives to meet program goals: Don't allocate base on historic data

*Performance-base allocation system that updates annually

*Tech neutral

2010-2012 not representative of historical operations

* indicates number of times comment mentioned