Carbon Dioxide Trading Program (Rev. C17)

Re-Proposed Regulation

EXECUTIVE ORDER 57

- June 2016: Governor McAuliffe issued EO 57 directing the Secretary of Natural Resources to convene a Work Group to develop recommendations to reduce Virginia’s carbon emissions *under existing state authority*
- Work Group held 6 meetings (8/31/16-2/28/17)
  - 40 presentations
- Three month public comment period (2/1/17-4/30/17)
  - 8,000 written comments

EO 57 WORKGROUP RECOMMENDATIONS

- May 12, 2017: Group Report to the Governor
- "The Work Group received a number of presentations and written comments from stakeholders advocating for a regulation to limit carbon dioxide emissions from power plants. These comments included recommendations that the Commonwealth join or participate in the Regional Greenhouse Gas Initiative (RGGI) or another regional trading program, that a price be put on carbon, and that Virginia strive to reduce its greenhouse gas emissions by 30 to 40 percent by the year 2030."

EO 57 WORKGROUP RECOMMENDATIONS (Cont.)

- First recommendation: "The Work Group recommends that the Governor consider taking action via a regulatory process to establish a 'trading-ready' carbon emissions reduction program for ***fossil fuel fired electric generating facilities*** that will ***enable participation*** in a broader, established multi-state carbon market."

RGGI

- The Regional Greenhouse Gas Initiative (RGGI) program is a carbon cap-and-trade program covering fossil fuel-fired electric generating units in nine northeast and mid-Atlantic states
  - NY, ME, NH, VT, MA, RI, CT, DE, MD
- Covered sources purchase allowances in quarterly auctions run by RGGI, Inc., with the revenue returned to states

RGGI (Cont.)

- RGGI is a consensus-based program
- All participating RGGI states, as a practical matter, regulate only
  - ***Fossil-fuel emissions***
  - From ***electric generating units*** 25MW or greater

ATTORNEY GENERAL OPINION

- May 12, 2017: Virginia Attorney General issued an official advisory opinion that concluded the board is legally authorized to regulate GHG
- "The Board has the authority to establish a statewide cap on GHG emissions for all new and existing **fossil fuel** electric generating plants as a means of abating and controlling such emissions"

EXECUTIVE DIRECTIVE 11

- Following up on the EO-57 Workgroup's recommendations and the AG's opinion, on May 16, 2017, Governor McAuliffe issued ED-11 directing DEQ to develop a proposed regulation for the board's consideration to abate, control, or limit carbon dioxide emissions from ***electric power facilities*** that:
  - Includes provisions to ensure that Virginia's regulation is ***trading-ready*** to allow for the use of market-based mechanisms and the trading of CO_2 allowances through a ***multi-state trading program***; and
  - Establishes abatement mechanisms providing for a ***corresponding level of stringency*** to limits on CO_2 emissions imposed in other states with such limits

OBJECTIVE

- In accordance with ED-11, DEQ prepared and presented to the board in late 2017 a proposed carbon cap and trade rule for new and existing fossil-fuel electric power generating facilities that was both
  - Under existing board authority and
  - Linkable to the RGGI program

REGULATORY PROCESS

- Full regulatory adoption process is required
- Action is necessary to meet state executive branch requirements
- Public input is important; thoroughness of the standard process gives all interested parties opportunity to scrutinize proposal and provide feedback

REGULATORY PROCESS TO DATE

- June 26, 2017: NOIRA published in Virginia Register
- June 26-July 26, 2017: First public comment period
- August-September: Regulatory advisory panel (RAP)
- November 16, 2017: Board approved proposed regulation for publication
- January 8 - April 9, 2018: Public comment period
- October 29, 2018: Board approved re-proposed regulation for publication
- February 4 - March 6, 2019: Public comment period
- April 19, 2019: Final board approval

STRUCTURE OF PROPOSED REGULATION

- Carbon cap-and-trade commencing in 2020
- Framework is RGGI August 2017 model rule
- Modified to operate as a Virginia rule with additional provisions and modifications
  - Allocation of "conditional allowances" to covered sources with required consignment to RGGI auctions
  - 5% of conditional allowances allocated to DMME to fund CO_2 abatement projects

COVERED SOURCES

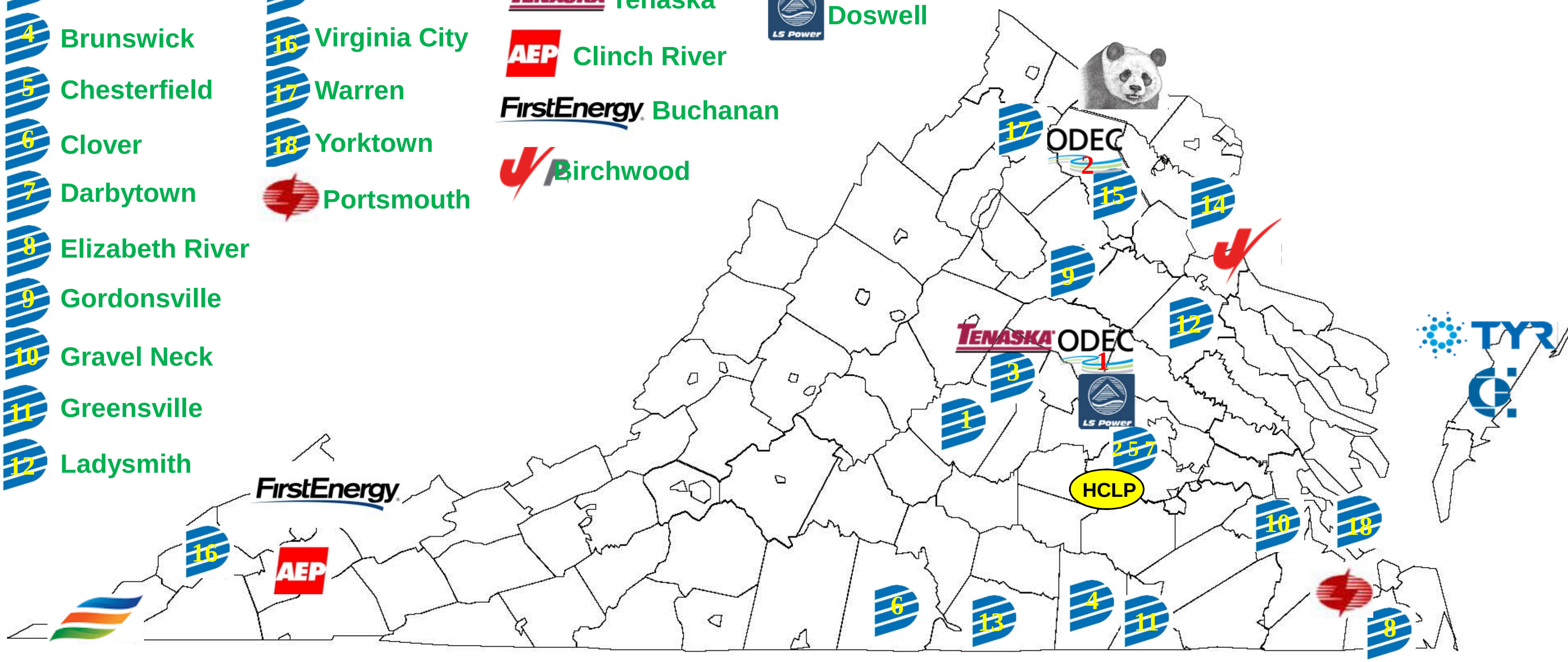
- Consistent with RGGI
- Fossil fuel-fired electric generating units
  - 25 MW and greater
  - Fossil fuel
  - Referred to as "CO_2 Budget Sources"
  - Each CO_2 Budget Source must hold a CO_2 allowance for every ton of CO_2 emitted during a "Control Period"
- Industrial and biomass units exempted

CONSIGNMENT AUCTION APPROACH

- Conditional Allowances are consigned by CO_2 Budget Sources and holders of public contracts with DMME to the RGGI auctions
  - Auctions managed by RGGI, Inc.
  - Anyone can buy allowances at RGGI auctions
- Cost of allowances determined by auction clearing price
- Sources cannot use Conditional Allowances for compliance
- Proceeds returned to CO_2 Budget Sources and entities designated by DMME by auctioneer for consigned Conditional Allowances sold at auction
- Proceeds received by CO_2 Budget Sources owned by regulated electric utilities flow to rate payers pursuant to State Corporation Commission (SCC) requirements

State Air Pollution Control Board April 19, 2019

1 Bear Garden
2 Bellemeade
3 Bremo
4 Brunswick
5 Chesterfield
6 Clover
7 Darbytown
8 Elizabeth River
9 Gordonsville
10 Gravel Neck
11 Greensville
12 Ladysmith
13 Mecklenburg
14 Possum Point
15 Remington
16 Virginia City
17 Warren
18 Yorktown
Portsmouth
ODEC 1 Louisa
ODEC 2 Marsh Run
Tenaska
AEP Clinch River
FirstEnergy Buchanan
Birchwood
Stonewall
Wolf Hills
Doswell
HCLP Hopewell Cogen Ltd Partnership
TYR Commonwealth Chesapeake
Tasley



Fossil fuel-fired electric generating units with ≥ 25 MW capacity

FIRST ROUND OF PUBLIC COMMENT

- February 8 - April 9, 2018
- Public hearings throughout the state
- >7100 commenters (personal communication, Town Hall, petitions, etc.)
- Comment topics

  - General support or opposition
  - Allowance allocations
  - Applicability: biomass, industrials
  - Auction and trading mechanisms
  - **CO_2 base budget**
  - Cost/benefit; need
  - Environmental justice
  - Leakage
  - Legal issues
  - Offsets
  - Program review, post 2030
  - RGGI program mechanisms
  - Set-asides

REVISION TO ORIGINAL CO_2 BASE BUDGETS

- Rule as originally proposed presented two alternate initial CO_2 Base Budgets commencing in 2020
  - 33 million tons based on ICF Reference Case (business as usual) modeling using Virginia assumptions
  - 34 million tons based on ICF Reference Case modeling using RGGI assumptions

EMISISONS CONTAINMENT RESERVE

- CO_2 Base Budget can decrease in a given year by withdrawing allowances necessary to comply with RGGI's new ECR
- Regulatory mechanism used in event auction prices get too low.
- Price triggers determined by RGGI

BANKED ALLOWANCE ADJUSTMENT

- The CO_2 Base Budget can be adjusted downward in accordance with RGGI's Banked Allowance Adjustment
- Under Banked Allowance Adjustment number of allowances for auction declines over several years if the number of banked allowances gets too high
- Criteria determined by RGGI

COST CONTAINMENT RESERVE

- Second allowance budget is called the Cost Containment Reserve (CCR)
- CCR budget equal to 10% of the CO_2 Base Budget allowances in any given year
- CCR budget allowances released into RGGI auction based on a <u>high</u> allowance prices
- Price triggers determined by RGGI

WHY RE-PROPOSE?

- DEQ recommended a significant change from the rule as originally proposed
- Important enough to warrant additional public comment
- Satisfy requirements of Administrative Process Act
- Structure and basic elements of re-proposed rule remain unchanged

RE-PROPOSED CO_2 BASE BUDGETS

- The Department is re-proposing an initial CO_2 base budget of 28 million tons commencing in 2020
- Subsequent annual CO_2 budgets, which decline by 3% a year under the original proposal, are reduced accordingly

ICF MODELING

- The Georgetown Climate Center contracted with ICF to analyze the potential impacts of Virginia's participation in RGGI
- DEQ specified the assumptions, sources and scenario specifications for the analysis
- VA Reference Cases
  - One used assumptions provided by VA DEQ
  - One used same assumptions used by RGGI states
- VA Policy Scenarios
  - Modeled a cap in VA similar to RGGI and linked to RGGI, against both reference cases

WHY DID WE RE-MODEL?

- Public comments
- A lot changed in a year
  - More rapid introduction of renewable energy and energy efficiency than previously anticipated
    - Grid Transformation & Security Act (GTSA)
    - Increased RGGI state RE & EE additions
- Foster better integration into the RGGI program

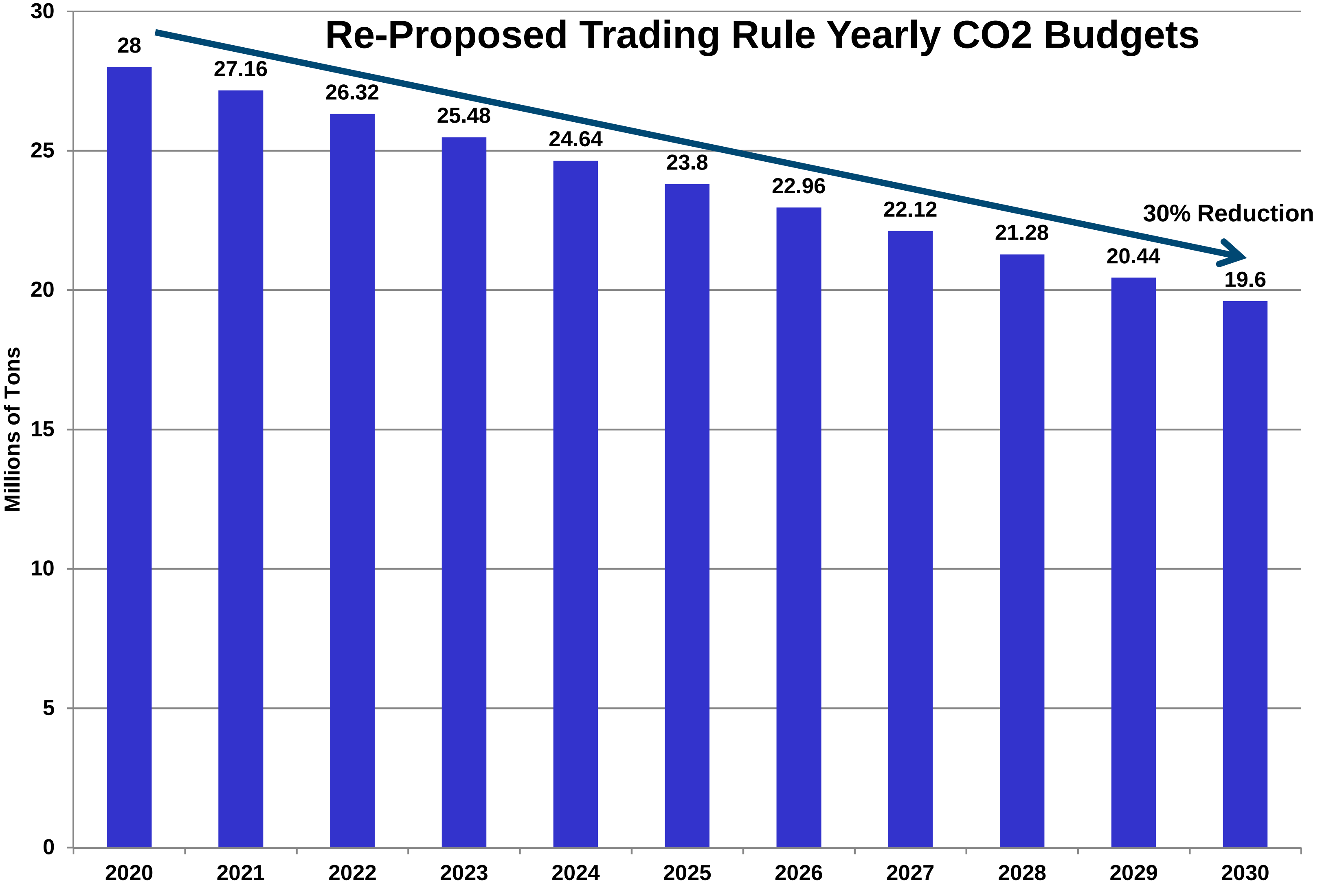
REASON FOR RE-PROPOSED CO_2 BASE BUDGETS

- Newer ICF modeling indicated Virginia's CO_2 Budget Sources will emit 28 million tons of CO_2 in 2020 under a business-as-usual scenario
- One reference case run with combined VA/RGGI assumptions updated from 2017
  - Greater amounts of renewable energy and energy efficiency coming on line in Virginia and RGGI states by 2020 than previously assumed

MODELING ASSUMPTIONS

- Updated demand projections
  - Demand projections are down in most RGGI states
- Updated natural gas prices
  - Lower than previously modeled
- 2018 GTSA commitments
  - Up to 5,000 megawatts of renewable energy
  - Significant energy efficiency investments by regulated utilities (close to $1 billion)
- Significant clean energy deployments in the RGGI states

State Air Pollution Control Board ***April 19, 2019***



COSTS

- All of the firm power price projections are lower than the previous modeling exercise in 2017

  2020: 14% less*

  2030: 29% less*

  ** 2017 Va. assumptions policy run v. 2018 policy run*

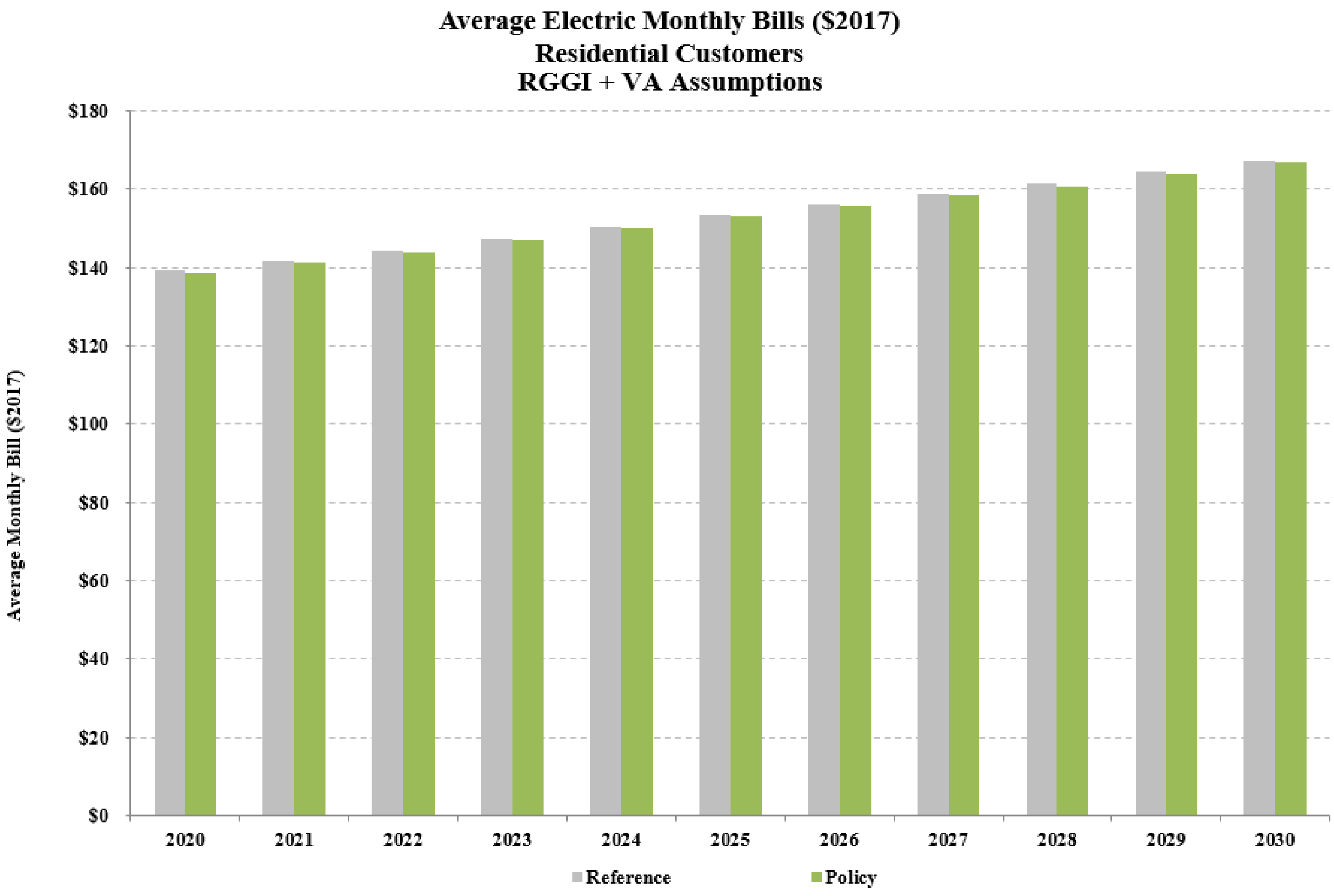
- The cost of the program will be less for consumers and regulated sources than previously estimated

MODELED COSTS

VA Reference Case	2020	2022	2025	2028	2030
VA CO2 Emissions (Million Tons)	28	27	27	29	29
VA Firm Power Prices (2017$/MWh)	$32.70	$33.00	$34.50	$34.30	$34.40
VA Policy Case	2020	2022	2025	2028	2030
VA Firm Power Prices (2017$/MWh)	$33.00 (1.0%)	$33.20 (<1.0%)	$35.00 (1.4%)	$34.50 (<1.0%)	$34.50 (<1.0%)

Virginia IPM Scenario Customer Bill Analysis

October 26, 2018



Residential Average Bills
Reference Case and Policy Scenario (2020-2031)

Virginia Average Bill Impacts
IPM Scenario Summary Comparison

VA Monthly Bill Impact for Years 2020-2030
RGGI + VA Assumptions

		Policy Scenario	
Customer Class	Reference Case Bill ($2017)	Monthly Difference ($2017)	Percent Difference
Residential	$ 153.20	$ (0.54)	-0.4%
Commercial	$ 882.47	$ (5.24)	-0.6%
Industrial	$ 29,671.14	$ (198.75)	-0.7%

Virginia Health Benefits Analysis COBRA Model

November 9, 2018

Health Benefits of Incidental Reductions in NO_X, SO_2 and $PM_{2.5}$ ($2017)
U.S EPA Co-Benefits Risk Assessment (COBRA) Model

State	Year	NOx Reduction (tons)	SO2 Reduction (tons)	PM2.5 Reduction (tons)	$ Total Health Benefits (low estimate)	$ Total Health Benefits (high estimate)
Virginia	2025	280	83	10	$2,109,498	$4,762,897
	2028	1294	113	61	$7,628,750	$17,224,773
	2030	1292	113	74	$8,329,022	$18,805,882
TOTAL for 2025 + 2028 + 2030					**$18,067,270**	**$40,793,554**

OTHER CHANGES TO THE ORIGINAL PROPOSAL

- Changes made to track with latest RGGI model rule
- Clarify program applies only to CO_2 emissions from fossil fuel combustion
- Industrial exemption clarified
- New Article 10 program review to include consideration of community impacts and environmental justice

BIOMASS

- Fossil fuel regulation
- Not carbon neutral
- Will keep close watch
- Reconsider at next program review
- But don’t regulate now
  - Increase cap
  - Remodel – resources uncertain
  - Renegotiate w/RGGI – RGGI will oppose cap increase
  - Re-propose

INDUSTRIAL EXEMPTION

- Exemption language clarified to include specific limits to excess power to the grid
- 2 options provided for existing industrial sources to qualify for exemption
  - ≤ 10% net electrical generation sent to grid, or
  - ≤ 15% useful thermal energy provided to an entity other than the manufacturing facility to which the budget source is interconnected
- Permit conditions are required

INDUSTRIAL EXEMPTION (Cont.)

- Would apply to 6 **existing** facilities in Virginia (paper mills and CHP facilities)
  - New greenfield industrial electric generating units facilities would be covered by program if they otherwise meet the applicability criteria
  - Existing facilities would retain the exemption to modify and expand within New Source Review air permit requirements so long as they continued to meet exemption criteria
- Emissions impact of the exemption is minimal
  - 1.2 million tons in 2016
- Some RGGI states have some form of exemption
  - NY, MD, ME, DE
- Other RGGI states don’t include the exemption because they don’t have any affected industrial sources

PERIODIC PROGRAM REVIEW AND ENVIRONMENTAL JUSTICE

- DEQ to re-assess CO_2 base budget in next RGGI program review
- Va. Code 2.2-4017 (APA) requires agencies review regulations every four years
- New Article 10 recognizes DEQ's commitment to environmental justice while providing the flexibility to listen to communities and fashion solutions on a case-by-case basis

CHANGES TO REPROPOSAL MADE BY BOARD AT OCTOBER 2018 MEETING

- Add additional environmental justice language
- Add post-2030 cap provision
- Remove reference to "fossil fuel" beyond the definition of "fossil fuel”
  - Believed redundant and intended only to clarify the fossil-fuel only nature of the rule

SECOND ROUND OF PUBLIC COMMENT

- Re-proposal comment period February 4 - March 6, 2019
- About 5000 commenters (personal communication, Town Hall, petitions, etc.)
- Complete summary and response to comments in board book; comments available on Town Hall and DEQ web page

SECOND ROUND OF PUBLIC COMMENT, SPECIFIC ISSUES

- Public notice requested comment on specific issues
  - Treatment of CO_2 emissions from budget units that do not combust fossil fuels exclusively
  - Whether the term “fossil fuel-fired” should be specified in regulatory text other than in the definition of “fossil fuel-fired”
  - Costs and benefits, impacts on farm and forest land preservation, and impacts on small business of re-proposed rule
  - Many relevant comments received both pro and con on all of these issues

DEQ & SCC IMPACTS ANALYSES

MODELING EXERCISES

- DEQ analysis performed by an independent third party expert (ICF) using the widely accepted IPM model
- Inputs & outputs of the analysis are publically available
- SCC analysis used modeling performed by Dominion Energy using an electric utility model (PLEXOS)

DEQ & SCC IMPACT ANALYSES

PROGRAM COSTS

- Both the DEQ IPM and bill analyses predict minor cost impacts of the trading program
  - IPM predicts slightly higher firm power prices (~1%)
  - Bill analysis predicts slightly lower bills mainly due to allowance revenue that flowing back to utilities
- The SCC analysis predicts much higher cost impacts of the program
  - $3-5 billion based on linking to or joining RGGI
  - $7-12 dollars for monthly bills

DEQ & SCC IMPACT ANALYSES

THE SCC PROGRAM COSTS – ALLOWANCE PRICE & REVENUE

- SCC analysis assumes allowance pool is limited to Virginia state cap
  - Does not account for the nature of a regional trading program and allowance pool
- Allowance prices in SCC analysis significantly higher (50 to 99%) than DEQ's IPM analysis based on RGGI experiemce
  - Leads to higher compliance costs in the SCC analysis
- Unclear how proceeds generated by allowances handled in SCC analysis

DEQ & SCC IMPACT ANALYSES

PROGRAM COSTS – COAL UNIT RETIREMENTS & COSTS

- SCC analysis assumes certain coal plants remain economically viable and operate far into future in absence of carbon rule
  - Attributes closure of these coal units and all associated stranded costs fully to this rule
  - Also attributes all costs of constructing expensive fossil-fuel generation to replace closed coal plants to this rule
  - Appears to not account for ongoing transition in the power sector away from coal
- SCC mostly discounts GTSA requirements for renewable generation and energy efficiency
- The DEQ IPM analysis predicts same coal units will retire for economic reasons even without a trading program
  - Stranded costs and replacement costs NOT attributed to rule
- Approximately $1.5 billion difference

DEQ & SCC IMPACT ANALYSES

PROGRAM COSTS – OTHER ISSUES

- SCC analysis may underestimate amount of allowances and proceeds Dominion will receive under the program
- Unclear what demand forecast SCC analysis used and whether it differs from rejected Dominion IRP forecast
- SCC analysis averages costs over 25 years thru 2040
  - Unclear when costs accrue and in what amounts
- Unclear how SCC analysis produced resulting bill impacts
- Where SCC assumptions can be ascertained, they appear overly conservative leading to greater predicted cost of this rule

RECOMMDED CHANGES TO PROPOSAL BASED ON SECOND ROUND OF PUBLIC COMMENTS

- Restored text removed by Board related to fossil fuel applicability:
  - Numerous comments demonstrated board-removed text is needed to clarify this is fossil fuel rule
  - Rule would apply to EGUs that combusted less than 95% biomass without re-inserted text

RECOMMENDED CHANGES TO PROPOSAL BASED ON SECOND ROUND OF PUBLIC COMMENTS

- <u>9VAC5-140-6020. Definitions</u>
  - "CO_2 budget source" means a source that includes one or more CO_2 budget units.
  - "CO_2 budget unit" means a unit that is subject to the CO_2 Budget Trading Program requirements under 9VAC5-140-6040.
  - "Fossil fuel" means natural gas, petroleum, coal, or any form of solid, liquid, or gaseous fuel derived from such material.
  - “Fossil fuel-fired" means the combustion of fossil fuel, alone or in combination with any other fuel, where the fossil fuel combusted comprises, or is projected to comprise, more than [~~10%~~ 5%] of the annual heat input on a Btu basis during any year.
  - "Unit" means a fossil fuel-fired stationary boiler, combustion turbine, or combined cycle system.

RECOMMENDED CHANGES TO PROPOSAL BASED ON SECOND ROUND OF PUBLIC COMMENTS

- 9VAC5-140-6040. Applicability
  - A. Any fossil fuel-fired unit that serves an electricity generator with a nameplate capacity equal to or greater than 25 MWe shall be a CO_2 budget unit, and any source that includes one or more such units shall be a CO_2 budget source, subject to the requirements of this part.
- 9VAC5-140-6050.C. CO_2 requirements shall be as follows.
  - 1. The owners and operators of each CO_2 budget source and each CO_2 budget unit at the source shall hold CO_2 allowances available for compliance deductions under 9VAC5-140-6260, as of the CO_2 allowance transfer deadline, in the source's compliance account in an amount not less than the total CO_2 emissions [**that have been generated as a result of combusting fossil fuel**] for the . . . control period, . . .

RECOMMENDED CHANGES TO PROPOSAL BASED ON SECOND ROUND OF PUBLIC COMMENTS

- Changes made at RGGI’s behest
  - Clarifications and corrections (proper use of "conditional allowance," "initial comment period," etc.)
  - Removed board-recommended post-2030 declining CO_2 budgets

POST 2030

- RGGI strongly opposes proposed post 2030 declining cap
  - Violates RGGI principle of comity
    - Decisions on caps made through consensus
    - Single state can't drive agenda before scheduled program reviews
  - Caps and budgets based on rigorous modeling
  - Post 2030 declining cap is potential deal breaker for RGGI states

RECOMMENDED CHANGES TO PROPOSAL BASED ON SECOND ROUND OF PUBLIC COMMENTS

Replace 9VAC5-140-6190 C (page 29) with the following:

For 2031 and each succeeding calendar year, [~~the Virginia CO_2 Budget Trading Program base budget is 23.10 million tons~~ ~~the department will review the Virginia CO_2 Budget Trading Program base budget and recommend to the board appropriate adjustments in the base budget for such succeeding years. The department will consider the best available science and all relevant information and policies available from any CO_2 multi-state trading program in which Virginia is participating when considering further reductions. Absent any adjustment, the Virginia CO_2 Budget Trading Program base budget for each year of the decade 2031-2040 shall be reduced by 840,000 tons from the preceding year~~ the Virginia CO_2 Budget Trading Program base budget is 19.60 million tons unless modified as a result of a program review and future regulatory action].

ADDITIONAL CHANGE TO RE-PROPOSED FINAL RULE

9VAC5-140-6045. Legislative approval.

In the event the allocation of conditional allowances by the department as required by 9VAC5-140-6190 B has not occurred by January 1, 2020, the program will be considered to be operating and effective as of the calendar year following the date on which the department allocates the conditional allowances as it corresponds to the schedule of 9VAC5-140-6190 A. Permitting and compliance dates, including the due date for a permit as required by 9VAC5-140-6150, shall be adjusted to be in force 6 months after the date the department allocates the conditional allowances. Any excess emissions tonnage identified by the new program implementation date may be addressed through program review and regulatory action as necessary to ensure compliance with the final compliance date. The department will notify the board and each affected CO_2 budget source accordingly.

DEPARTMENT RECOMMENDATION:

That the board adopt this proposal with an effective date as provided in the Administrative Process Act.