



Department of Natural Resources and Environmental Control

Amendment to 7 DE Admin Code 1147 – *CO₂ Budget Trading Program*

Technical Support Document

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Table of Contents

I. INTRODUCTION.....	3
II. BACKGROUND AND PURPOSE.....	4
A. Context of Regulations within Regional Process	6
B. Reducing Global CO ₂ Emissions	8
C. Meeting Delaware’s Greenhouse Gas Reduction Goals.....	9
III. OVERVIEW OF THE PROPOSED AMENDMENTS TO 7 DE Admin Code 1147....	11
A. Size and Structure of the Regional Cap and Delaware State Budget.....	11
B. Adjustments for Banked Allowances	12
C. Cost Containment Reserve.....	13
D. Emissions Containment Reserve.....	15
E. Offset Allowances.....	16
IV. ADMINISTRATIVE AND MINOR TECHNICAL AMENDMENTS.....	17
V. ECONOMIC IMPACTS	18
VI. HEALTH BENEFITS.....	20
VII. SMALL BUSINESS IMPACT STATEMENT.....	21
VIII. STAKEHOLDER PARTICIPATION.....	25
IX. PUBLIC PARTICIPATION	25

I. INTRODUCTION

The Regional Greenhouse Gas Initiative (RGGI) is a cooperative effort of nine Northeast and Mid-Atlantic states to regulate and reduce carbon dioxide (CO₂) emissions from the power sector. In accordance with each state's independent legal authority, Connecticut, Delaware, Maine, Massachusetts, Maryland, New Hampshire, New York, Rhode Island, and Vermont (Participating States) each commit to propose statutory and/or regulatory approval revisions to their CO₂ Budget Trading Programs substantially consistent with the updated Model Rule released on December 19, 2017 (updated 2017 Model Rule).

Delaware's 7 **DE Admin Code** 1147 establishes a compliance obligation on fossil fuel fired electricity generating units with capacities greater than 25 megawatts to report CO₂ emissions and surrender corresponding CO₂ allowances for such emissions.



Figure 1. The RGGI Participating States. (Source: www.rggi.org)

As called for in the RGGI 2012 Program Review's *Summary of Recommendations to Accompany Model Rule Amendments*, the Participating States conducted a second program review of the CO₂ Budget Trading Program – 2016 Program Review. Proposed amendments to the program have been incorporated in an Updated Model Rule¹ which guide each of the Participating States as it follows its own statutory and/or regulatory procedures to propose updates to their individual state CO₂ Budget Trading Program regulations.

The RGGI program review was a rigorous and comprehensive evaluation, supported by an extensive regional stakeholder process that engaged the regulated community, environmental nonprofits, consumer and industry advocates, and other interested stakeholders. The Participating States have been working with program review stakeholders since 2015, convening 9 stakeholder meetings and webinars. Delaware hosted one of the stakeholder meetings in Wilmington on February 2, 2016². The program review has sought to ensure RGGI's continued success – effectively reducing CO₂ emissions while providing benefits to consumers and the region.

The proposed amendments to 7 **DE Admin Code** 1147 would implement the program changes presented in the RGGI Updated Model Rule and RGGI 2016 Program Review

¹ The updated Model Rule to reflect the 2016 program recommendations. December 2017. Retrieved from https://www.rggi.org/sites/default/files/Uploads/Program-Review/12-19-2017/Model_Rule_Redlined_2017_12_19.pdf

² Stakeholder Meeting Agenda. February 2016. Retrieved from https://www.rggi.org/sites/default/files/Uploads/Program-Review/2-2-2016/Meeting_Agenda_02_02_16.pdf

Principles³. The changes contained in the RGGI Updated Model Rule were agreed to by RGGI participating states after a comprehensive two-year program review.

The purpose of the RGGI Updated Model Rule is to serve as a template for similar modifications to each of the RGGI participating state's existing *CO₂ Budget Trading Programs*. Those modifications strengthen the RGGI program, make it more effective, and realign the regional cap with current emissions levels, which are significantly lower than the current regional cap.

The changes include:

- Reduction in the regional CO₂ cap for the years 2021 through 2030,
- Adjustments to the regional CO₂ cap in the years 2014-2020 to account for the private bank of allowances,
- Adjustments to the size of the Cost Containment Reserve (CCR) to an annual quantity of 10% of the state's budget beginning in 2021, and modifications to the CCR trigger price to \$13.00 beginning in 2021 and rise at 7% per year thereafter,
- Establishment of an Emissions Containment Reserve to respond to supply and demand in the market if emission reduction costs are lower than projected beginning in 2021,
- Updates to the RGGI offsets program, remove two protocols – SF₆ and End-use Energy Efficiency, and
- Numerous administrative updates, including updates for all documents incorporated by reference.

II. BACKGROUND AND PURPOSE

The burning of fossil fuels to generate electricity is a major contributor to the warming of the earth's climate. In 2016 the USEPA stated the electricity generation sector accounts for 28% of greenhouse gas emissions, followed by transportation at 28%.⁴ Electricity generation accounts for approximately 23% of total CO₂ emissions in Delaware.⁵

³Principles to Accompany the Model Rule. December 2017. Retrieved from https://www.rggi.org/sites/default/files/Uploads/Program-Review/12-19-2017/Principles_Accompanying_Model_Rule.pdf

⁴This is based on a comparison of seven major economic sectors. Transportation accounted for the second highest proportion, 28%. See United States Environmental Protection Agency (EPA), U.S. Greenhouse Gas Inventory Reports, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2016 (April 2018), Retrieved from <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2016> accessed 08-27-18.

⁵ See Delaware's EGU Emission Inventory 2000-2014 at <http://www.dnrec.delaware.gov/Air/Pages/RegionalGreenhouseGasInitiative.aspx> .

Sources of Greenhouse Gas Emissions in 2016

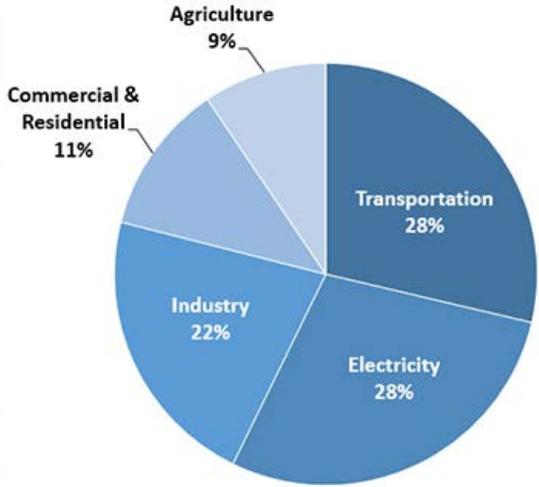


Figure 2. 2016 National GHG emissions by sector.

Delaware's 2014 GHG Emissions by Sector

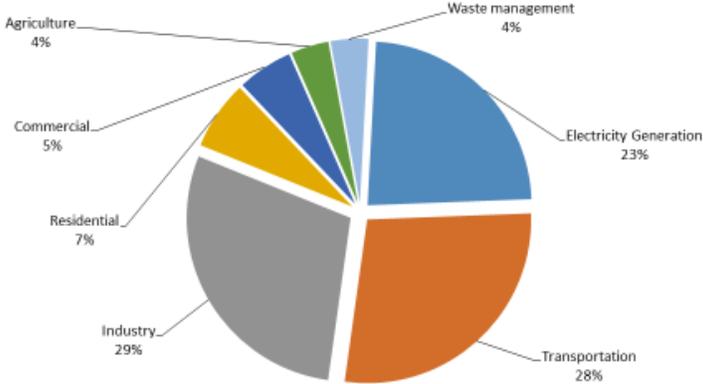


Figure 3. Delaware's 2014 Carbon Dioxide Emissions by Sector.

Given the significant contribution of the electricity generation sector to climate change, in April 2003, New York Governor George Pataki wrote to the governors of 11 Northeastern and Mid-Atlantic States to invite their participation in developing a regional cap and trade program to limit power plant carbon dioxide emissions. By July 2003, Governor Pataki had received positive responses from the governors of eight states—including Connecticut, Delaware, Maine, Massachusetts, New Hampshire, New Jersey, Rhode Island, and Vermont—indicating that their representatives would participate actively in this effort, which became known as the Regional Greenhouse Gas Initiative

(RGGI). After the RGGI discussions were underway, representatives from the Secretariat of the Eastern Canadian Provinces and the Province of New Brunswick, together with representatives from the states of Maryland and Pennsylvania, joined the process as observers.

Ten states became signatories to the RGGI Memorandum of Understanding (MOU) proposed implementing a CO₂ constraint on fossil fuel-fired electricity generation and the development of a cap-and-trade program for the trading of CO₂ emissions allowances, a limited authorization to emit CO₂.⁶ As of September 2008, the following comprise the original ten signatory RGGI states: Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. Today, both Virginia⁷ and New Jersey⁸ (left program at the end of 2012) are working to adopt regulations to begin participation in the RGGI program in 2020.

A. Context of Regulations within Regional Process

The RGGI program was established in 2005 by the participating states through a Memorandum of Understanding (MOU), which outlined the program design elements. The participating states agreed to develop and incorporate these design elements into the RGGI Model Rule. The 2005 program design elements included:

- The level of the regional CO₂ emissions cap,
- The amount of each state's portion of the regional cap,
- The schedule for reductions in the cap through the year 2018,
- A three year compliance period for electricity generation facilities,
- Provisions for offsets (reductions in greenhouse gases from sources outside the electricity generating sector),
- Safety valve price triggers that would:
 - Expand the percentage of offset allowances that could be used to demonstrate compliance,
 - Extend the compliance period from three to four years,
 - Allow the use of international offsets,
- Allocation of at least 25% of allowances for consumer benefit or strategic energy purposes,
- Provisions for the creation of Early Reduction Credits, and
- Provisions for the banking of allowances.

⁶ The MOU was signed by the Governors of the participating states and outlines the program in detail, including the framework for a Model Rule. The states made substantial revisions to the draft model rule in response to public comments. As a result, an amendment to the MOU was agreed to and signed by the heads of the energy regulatory and environmental agencies in each participating state. The MOU and amendments are available at <http://www.rggi.org/agreement.htm>.

⁷ Virginia - <https://www.deq.virginia.gov/Programs/Air/GreenhouseGasPlan.aspx> and <http://www.townhall.virginia.gov/L/ViewStage.cfm?stageid=8130>.

⁸ New Jersey - <https://nj.gov/infobank/eo/056murphy/pdf/EO-7.pdf>.

In 2010, the RGGI participating states began the first comprehensive program review called for in the original RGGI MOU. The effort completed in 2012 had two primary findings:

- There was an excess supply of allowances relative to actual emission levels in the region. There are a number of reasons including: low natural gas prices which have reduced the use of coal, increased use of renewable energy in place of fossil fuels, reduced electric demand due to energy efficiency measures, weather conditions, and economic activity levels⁹.
- The initial cost control measures in the program, which were based upon expansion of the percentage of offset allowances allowable for compliance, were deemed to be ineffective at controlling costs in the event of price spikes.

As a result of these findings, the RGGI participating states worked together to update and amend the program. They issued an updated Model Rule in February 2013, and each state adopted in statute and/or regulation amendments to their respective CO₂ *Budget Trading Program* that were substantially consistent with that Updated Model Rule. In December 2013, Delaware amended 7 DE Admin. Code 1147 – CO₂ Budget Trading Program to reflect the program changes reflected in the updated Model Rule.

In 2015, the RGGI participating states began the second comprehensive review of the program as called for in the 2012 Program Review's *Summary of Recommendations to Accompany Model Rule Amendments*. The Participating States agreed to establish a regional CO₂ cap through 2030, modify the size and trigger prices for the Cost Containment Reserve (CCR), establish an Emissions Containment Reserve (ECR), and eliminate two of the existing offset categories, as outlined below and in the Updated Model Rule:

1. Revised Regional Cap: The Participating States will specify a regional cap through 2030 which continues the downward trajectory of the existing cap. The lower regional CO₂ emissions cap will align the cap more closely with current emissions trends.
 - A regional cap of 75,147,784 tons of CO₂ in 2021, which will decline by 2.275 million tons of CO₂ per year thereafter, resulting in a total 30% reduction in the regional cap from 2020 to 2030.
 - The Participating States will address the bank of allowances held by market participants with a third adjustment for banked allowances. The third adjustment will be made over a 5-year period (2021-2025) based upon the size of the bank at the end of 2020.

⁹ The New York State Energy Research and Development Authority issued a draft white paper “The Relative Effects of Various Factors on RGGI Electricity Sector Emissions 2005-2009” which details the reasons for the significant difference between the emissions levels projected in 2005 when the original program cap was set and actual emission levels experienced in the region. See, https://rggi.org/sites/default/files/Uploads/Design-Archive/2012-Review/2010-11-12/Retrospective_Analysis_Draft_White_Paper.pdf

2. CCR: The Participating States will modify the size and the price triggers for the Cost Containment Reserve (CCR). The CCR is a reserved quantity of allowances, in addition to the cap, that would only be available if defined allowance price triggers are exceeded.
 - Beginning in 2021, allowances provided within the CCR will be equal to 10% of the regional cap.
 - The CCR trigger price will be \$13.00 in 2021, and rise at 7% per year, ensuring that the CCR will only trigger if emission reduction costs are higher than projected.
3. ECR: The Participating States will established a new program design element, an emissions containment reserve (ECR), which is a quantity of allowances that will be withheld from circulation to secure additional emission reductions if prices fall below established trigger prices.
 - The states implementing the ECR may withhold up to 10% of the allowances in their base budgets per year. At this time, Maine and New Hampshire do not intend to implement an ECR. Allowances withheld in this way will not be reoffered for sale.
 - The ECR trigger price will be \$6.00 in 2021, and rise at 7% per year, ensuring that the ECR will only trigger if emission reduction costs are lower than projected.
4. Offsets: The Participating States will eliminate two offset categories, reduction in emissions of sulfur hexafluoride (SF6) in the electricity power sector and end-use energy efficiency in the building sector, and update and retain three categories that some States may continue to implement. Any awarded offset allowances will remain fully fungible across the states.
5. Minimum Reserve Price: The Model Rule retains language to increase the minimum reserve price by 2.5 percent each year.

RGGI's phased approach to reducing emissions, with initially modest emissions reductions, is intended to provide market signals and regulatory certainty so that electricity generators plan for, and invest in, lower-carbon alternatives throughout the region. It is also designed to avoid creating dramatic wholesale electricity price impacts and related retail electricity rate impacts.

B. Reducing Global CO₂ Emissions

According to the Intergovernmental Panel on Climate Change (IPCC), the industrialized countries must reduce their greenhouse emissions to well below 1990 levels if global atmospheric concentrations of CO₂ are to be stabilized at acceptable levels. IPCC analyses have been updated to reflect CO₂ equivalent (CO₂-eq) reductions relative to 2010 levels, which were 31% above 1990 levels. In concrete terms, global greenhouse gas emissions must be stabilized at 450 parts per million (ppm) CO₂-eq. Based on IPCC

analyses, this would require that greenhouse gas emissions are reduced 41-72% below 2010 levels by 2050 and levels near or even below zero emissions by 2100 (78-118% below 2010 levels). Failure to do so could push annual global mean surface temperature past pre-industrial levels by more than 2.0 - 2.4 degrees Celsius (3.6 - 4.3 degrees Fahrenheit), which is considered the risk threshold for triggering the most catastrophic climate scenarios¹⁰.

Some debate continues among IPCC contributors about whether the world has already exceeded this threshold. Even at early stabilization levels of 450 ppm CO₂-eq, average temperatures are projected to increase between 0.6°C and 4.0°C (1.1°F - 7.2°F) in this century. The larger the temperature change, the greater the risks to the environment and human health¹¹.

C. Meeting Delaware's Greenhouse Gas Reduction Goals

The DE CO₂ Budget Trading Program is a key component of Delaware's strategy to mitigate the environmental and health impacts of climate change in Delaware. Climate change poses a threat to Delaware's human health, tourism industry, agriculture industry, transportation infrastructure, wastewater infrastructure, homes and our communities in addition to our air quality, surface and subsurface drinking water supplies, marine and freshwater fisheries, salt and freshwater wetlands, forest species and wildlife habitats¹².

Delaware is already experiencing climate change, which is causing increased temperatures, sea levels and heavy precipitation events.¹³ Since 1900 the average annual temperature rose by 2°F, and average temperatures are expected to increase another 2.5 to 4.5 degrees by mid-century (2050) and by as much as 8 degrees by 2100 (late century). By 2100 average precipitation is expected to increase by about 10 percent. Heavy rainstorms and the potential for flooding are expected to become more frequent and more intense. Increasing temperatures may increase the risk of serious illness such as heat stroke, especially for our state's vulnerable citizens. Increased temperatures may also increase the number of days when ground-level ozone concentrations exceed health based standards, which impacts children and the elderly

¹⁰ Intergovernmental Panel on Climate Change, Fifth Assessment Report, Working Group III Report, "Climate Change 2014: Mitigation of Climate Change," Chapter 6, "Assessing Transformation Pathways," http://ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_chapter6.pdf, accessed August 28, 2018.

¹¹ Intergovernmental Panel on Climate Change, Fifth Assessment Report, Working Group III Report, "Climate Change 2014: Mitigation of Climate Change," Summary for Policymakers, http://ipcc.ch/pdf/assessment-report/ar5/wg3/ipcc_wg3_ar5_summary-for-policymakers.pdf, accessed August 28, 2018.

¹² Intergovernmental Panel on Climate Change, Fifth Assessment Report, "Climate Change 2014: Synthesis Report," Summary for Policymakers, http://ipcc.ch/pdf/assessment-report/ar5/syr/AR5_SYR_FINAL_SPM.pdf, accessed August 28, 2018.

¹³ Delaware Climate Change Impact Assessment. February 2014. Retrieved from http://www.dnrec.delaware.gov/energy/Documents/Climate%20Change%202013-2014/DCCIA%20interior_full_dated.pdf.

and even healthy individuals. Changes in precipitation and temperature may also impact how disease spreads, including mosquito and tick borne diseases.

“Climate change is also impacting Delaware by contributing to accelerated sea level rise.¹⁴ Because of its location, low average elevation, and dependence on the coast, Delaware is particularly vulnerable to the effects of rising sea levels including loss of low-lying land and structures, saltwater intrusion into ground and surface waters, and increased coastal flooding from storm events. Statewide, between 8% and 11% of the state’s land area could be inundated by sea level rise by the year 2100.¹⁵ Sea level rise is likely to affect the condition of roads and bridges and other infrastructure throughout the state, including access routes and evacuation routes to many beach communities and other low-lying areas. Although the direct impacts from sea level rise will be felt primarily in areas near tidal waters, every Delawarean is likely to be affected whether through increased costs of maintaining public infrastructure, decreased tax base, loss of recreational opportunities or loss of community character.”

Because climate change is impacting Delaware’s residents, natural resources, infrastructure and industries, Delaware believes that strong actions to mitigate greenhouse gases are necessary to ensure a high quality of life and economic vitality for generations to come. Following the 2017 decision by the Trump administration to withdraw the U.S. from the Paris climate agreement¹⁶, the U.S. Climate Alliance¹⁷ was formed by a bi-partisan coalition of 17 states committed to reducing greenhouse gas emissions consistent with the goals of the Paris Agreement. Delaware is a founding member of the U.S. Climate Alliance, and in joining the coalition, agreed to reduce its economy-wide GHG emissions by 26-28% by 2025 from a 2005 baseline.

In order to achieve this commitment, Delaware will need to identify approximately 2.5 million metric tonnes of additional emission reductions from all economic sectors. Projection data suggests that the emissions in 2025 are expected to be approximately 16.8 million metric tonnes. Based on the 2014 GHG inventory data, the Alliance target for Delaware is approximately 14.3 million metric tonnes – a reduction gap of 2.5 million if emissions rise as projected.

¹⁴ *ibid.*

¹⁵ Preparing for Tomorrow’s High Tide – Sea Level Rise Vulnerability Assessment for the State of Delaware. July 2012. Retrieved from <http://www.dnrec.delaware.gov/coastal/Pages/SLR/DelawareSLRVulnerabilityAssessment.aspx>

¹⁶ The Paris Agreement central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. Retrieved from <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>

¹⁷ The United States Climate Alliance is a bipartisan coalition of governors committed to reducing greenhouse gas emissions consistent with the goals of the Paris Agreement. Retrieved from <https://www.usclimatealliance.org/>

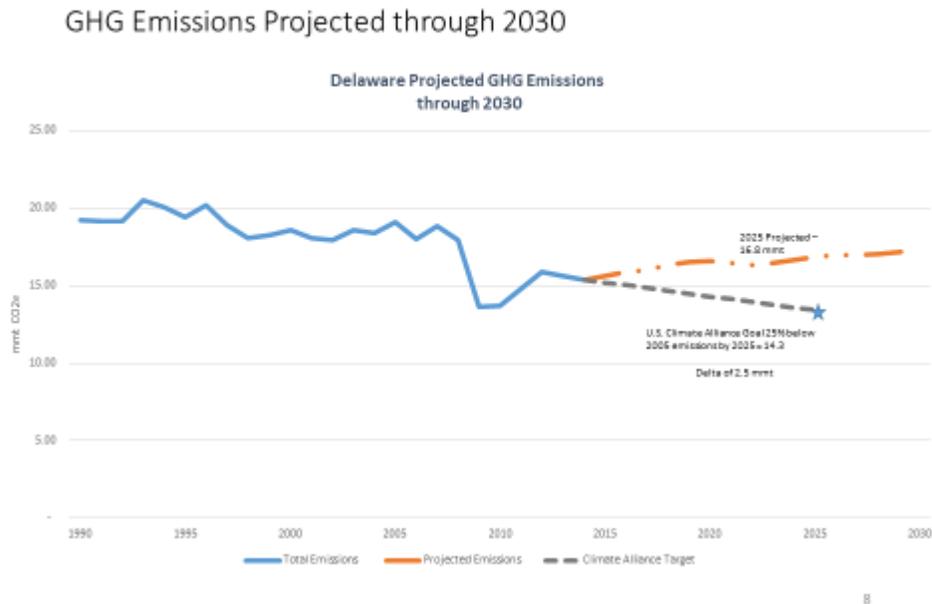


Figure 4. Delaware projected GHG emissions – 2030.

III. OVERVIEW OF THE PROPOSED AMENDMENTS TO 7 DE Admin Code 1147 DELAWARE’S CO₂ BUDGET TRADING PROGRAM.

A. Size and Structure of the Regional Cap and Delaware State Budget

During the program review, RGGI participating states conducted electric system modeling and macroeconomic analysis for a number of proposed cap levels and key program design elements. The regional emissions cap was set at 91 million tons of CO₂ in 2014¹⁸, reduced by 2.5 percent per year in the years 2015 through 2020. The regional cap beginning in 2021 of 75 million will decline each year by 2.275 million tons resulting in an overall emission reduction of 30% by 2030. Macroeconomic analysis indicated that the overall regional economic impacts resulting from the 2021 cap will be slightly positive. Also, customer bill impact analysis indicated that the resulting average customer bill impacts will be slightly positive.

Delaware’s portion of the regional emissions cap is approximately 4.47 percent. Therefore, DNREC is proposing the following Delaware CO₂ Trading Program base budgets by year:

¹⁸ In 2012, CO₂ emissions from power plants in the region were approximately 92 million tons. RGGI COATS.

Table 1. Delaware’s Base CO₂ Allowance Budget

Year	Tons of CO₂
2019	3,613,361
2020	3,523,027
2021	3,383,313
2022	3,280,789
2023	3,178,264
2024	3,075,739
2025	2,973,215
2026	2,870,690
2027	2,768,165
2028	2,665,641
2029	2,563,116
2030 ¹⁹	2,460,591

B. Adjustments for Banked Allowances

As part of the determination of the RGGI regional cap for the years 2014 through 2020, consideration was given to the private bank of allowances that would be in circulation when the new cap began in 2014. These allowances represent excess allowances (more than the total quantity of allowances necessary for all sources regulated under the program to demonstrate compliance) purchased during the 2009 through 2013 period. DNREC is proposing the regional cap and the resulting Delaware *CO₂ Budget Trading Program* base budgets be adjusted downward in three distinct budget adjustments to account for the existing privately held allowances. To accomplish this goal, Delaware (and the other RGGI participating states) are proposing to add the following interim adjustments to the RGGI program.

- The First Control Period Interim Adjustment for Banked Allowances (first adjustment) adjusts the Delaware *CO₂ Budget Trading Program* base budget to account for Delaware’s share of 100 percent of the first control period private bank of allowances (vintages 2009, 2010, and 2011). These allowances were held by market participants as of the end of the first control period. This change for the region is expected to be approximately 50 million tons. The first adjustment was determined by January 15, 2014. The adjustment are made over the seven year period 2014 through 2020.
- The Second Control Period Interim Adjustment for Banked Allowances (second adjustment) adjusts the Delaware *CO₂ Budget Trading Program* base budget to account for Delaware’s share of 100 percent of the 2012

¹⁹ And each succeeding calendar year.

and 2013 vintage allowances. These allowances were held by market participants as of the end of 2013. This change for the region is expected to be approximately 70 million tons. The second adjustment was determined by March 15, 2014. The adjustments are to be made over the six year period 2015 through 2020.

As part of the determination of the RGGI regional cap for the years 2021 through 2030, consideration was again given to the private bank of allowances that will be in circulation when the new cap begins in 2021. These allowances represent excess allowances (more than the total quantity of allowances necessary for all sources regulated under the program to demonstrate compliance) purchased during the 2009 through 2020 period. DNREC is proposing the regional cap and the resulting Delaware *CO₂ Budget Trading Program* base budgets be adjusted downward in a third budget adjustment to account for the existing privately held allowances. To accomplish this goal, Delaware (and the other RGGI participating states) are proposing to add the following interim adjustments to the RGGI program.

- The Third Control Period Interim Adjustment for Banked Allowances (third adjustment) adjusts the Delaware *CO₂ Budget Trading Program* base budget to account for Delaware's share of 100 percent of the private bank allowances at the end of the fourth control period in 2020. This change for the region is expected to be approximately 70 million tons. The third adjustment will be determined by March 15, 2021. The adjustment will take place over the five year period 2021 through 2025.

These adjustments will be made over a five year period to provide market participants with ample notice of the intent to adjust for these allowances, while realigning the long term supply of allowances with the projected emission quantities for that period (projected by the electric system modeling).

C. Cost Containment Reserve

DNREC is proposing amendments to the cost containment reserve (CCR) that provides flexibility and cost containment for the program. DNREC will allocate allowances to the Delaware Auction Account. The CCR will consist of a fixed quantity of allowances, in addition to the cap, that would be held in reserve, only to be made available for sale if allowance prices exceed predefined price levels.

There will be an annual limit on the quantity of allowances that can be withdrawn from the CCR. In 2014, the annual limit will be 5 million allowances. The annual limit in 2015 through 2020 will be 10 million allowances. Beginning in 2021 and beyond, the annual limit of CCR allowances that can be added will be 10% of the regional base budget. The CCR allowances will be made available immediately in any auction in which demand for allowances at prices above the CCR trigger price

exceeds the supply of allowances offered for sale in that auction prior to the addition of any CCR allowances.

If the CCR is triggered, the CCR allowances will only be sold at or above the CCR trigger price. The CCR trigger prices are proposed to be \$10.00 in 2017, and increase as follows. The CCR trigger price will be multiplied by a factor of 1.025 through the year 2020 and rounded to the nearest cent. The CCR trigger price will then be adjusted to \$13.00 in 2021 and will be multiplied by a factor of 1.07 each year thereafter through 2030, shown in the following table:

Table 2. CCR Trigger Prices

Year	CCR Size	CCR Trigger Prices
2017	457,658	\$10.00
2018	457,658	\$10.25
2019	361,336	\$10.51
2020	352,303	\$10.77
2021	338,331	\$13.00
2022	328,079	\$13.91
2023	317,826	\$14.88
2024	307,574	\$15.92
2025	297,322	\$17.03
2026	287,069	\$18.22
2027	276,816	\$19.50
2028	266,564	\$20.87
2029	256,312	\$22.33
2030	246,059	\$23.89

Allowances from the CCR will be fully fungible and can be used for compliance in any of the RGGI states. The CCR will be populated with allowances from each of the participating states in a proportion equal to each respective state's portion of the overall regional emissions budget (the regional cap). The proposed size of the CCR and the proposed CCR trigger prices were determined based upon a series of iterative modeling runs. The CCR size and CCR trigger prices are intended to balance cost control (mitigation of short term price spikes) and the overall environmental integrity of the regional emissions cap.

The CCR is being amended to simplify and improve the cost containment mechanism for the program. The CCR will provide the ability for an immediate injection of additional allowances in the next quarterly auction in the event price triggers are exceeded. This addresses the concern expressed by stakeholders that the current cost containment mechanism (expansion of the percent of offset allowances allowable to demonstrate compliance) would be slow to react and ineffective.

DNREC is proposing to amend the CCR size and trigger prices.

D. Emissions Containment Reserve

Consistent with the updated Model Rule, DNREC is proposing the implementation of an emissions containment reserve (ECR) as a means of additional containment of CO₂ emissions in the event of lower than anticipated emissions reduction costs. DNREC will transfer any allowances withheld into the Delaware ECR Account. ECR allowances will be withheld from auction only if the sale price of allowances falls below the predefined price levels. Maine and New Hampshire will not be participating in the ECR.

There will be an annual limit to the number of allowances that can be withheld from auction. The ECR will be implemented beginning in 2021 and each year thereafter. The annual limit of ECR allowances that can be withheld is equal to 10% of the base budget, not including the potential contributions of Maine and New Hampshire. The ECR allowances will be withheld in any auction in which demand for allowances at prices below the ECR trigger price prior to the withholding from the auction of any ECR allowances.

If the ECR is triggered, the ECR allowances will be withheld from auction. The ECR trigger price will be \$6.00 in 2021 and will be increased each year by multiplying the previous year’s ECR trigger price by 1.07. The ECR trigger prices are shown below:

Table 3. ECR Trigger Prices

Year	ECR Size	ECR Trigger Price
2021	338,331	\$6.00
2022	328,079	\$6.42
2023	317,826	\$6.87
2024	307,574	\$7.35
2025	297,322	\$7.86
2026	287,069	\$8.41
2027	276,816	\$9.00
2028	266,564	\$9.63
2029	256,312	\$10.30
2030	246,059	\$11.02

Allowances that are withheld in the ECR shall not be withdrawn. The annual limit of ECR allowances is to be populated from each participating state in proportion to each respective state’s portion of the regional base budget. The proposed size of the ECR and the proposed ECR trigger prices were determined based upon a series of iterative modeling runs. The ECR size and ECR trigger prices are intended to balance cost control (mitigation of short term falls in emissions reduction costs) and the overall environmental integrity of the regional emissions cap.

The ECR is being proposed to improve the emissions containment mechanism for the program and avoid allowance price volatility. The ECR will provide the capability to withhold excess allowances, should the costs of emissions reduction be lower than initially anticipated. In an analysis by Resources for the Future²⁰, it is shown that implementing the ECR will provide stability in performance of the market. This ensures allowance sale prices can continue to achieve RGGI goals, such as investments in energy efficiency, renewable energy, and more. As such, the ECR *“leads to sharing the benefits of lower-than-expected compliance costs among economic and environmental interests.”*

DNREC is proposing to adopt the ECR.

E. Offset Allowances

An offset represents a project-based greenhouse gas (GHG) emissions reduction or carbon sequestration achieved outside of the capped electricity sector. RGGI participating states currently allow regulated power plants to use a carefully chosen group of qualifying offsets to meet up to 3.3 percent of their CO₂ compliance obligation. A CO₂ offset allowance is a CO₂ allowance awarded by a RGGI participating state to an offset project sponsor. A CO₂ offset allowance represents the sequestration of one ton of CO₂ or an equivalent reduction in emissions of CO₂ or another GHG.

The RGGI participating states have cooperatively developed prescriptive regulatory requirements for each of the five eligible offset project categories. These requirements ensure that RGGI offset projects represent CO₂-equivalent emission reductions or carbon sequestration that is real, additional, verifiable, enforceable, and permanent.

Additionality addresses whether offset projects result in “additional” GHG reductions that would not have occurred in the absence of the RGGI program. Additionality is a key criterion for ensuring that offset projects result in real GHG reductions in the context of a market-based emissions reduction program. To ensure that offsets projects are additional, the RGGI participating states:

- Prohibit the award of CO₂ offset allowances to projects that a) are required by law, regulation, or administrative or judicial order or b) receive incentives from state programs funded by electricity and natural gas ratepayers, including programs funded with RGGI CO₂ allowance auction proceeds.

²⁰ The Next Big Thing in Carbon Markets? RGGI to Implement an Emissions Containment Reserve. Dallas Burtraw. RFF’s online magazine. Fall 2017. <http://www.rff.org/research/publications/next-big-thing-carbon-markets-rggi-implement-emissions-containment-reserve-reserve>

- Require that all offset projects meet category-specific performance standards designed to ensure that offset project activities significantly exceed standard market practice.

At this time, the RGGI participating states limit the award of offset allowances to five project categories, each of which is designed to reduce or sequester emissions of three GHGs: carbon dioxide (CO₂), methane (CH₄), and sulfur hexafluoride (SF₆). Currently, RGGI's five eligible offset project categories include projects that:

- Capture or destroy CH₄ from landfills
- Reduce emissions of SF₆ from electricity transmission and distribution equipment
- Sequestration of carbon due to U.S. forest projects (reforestation, improved forest management, avoided conversion) or afforestation (for CT and NY only)
- Reduce emissions of CO₂ through non-electric end-use energy efficiency in buildings
- Avoid CH₄ emissions through agricultural manure management operations

Currently, all offset projects must be located within one of the RGGI participating states. One project has been approved and awarded offset allowances – in 2017, Maryland's Department of Environment allocated 16,003 offset allowances to a landfill methane capture and destruction project at the New Beulah landfill near Hurlock, Maryland. This is our first-ever award of offset allowances.

Since the program began in 2009, the RGGI participating states have never received a complete application for either SF₆ or end-use efficiency offsets project category nor have any 3rd party verifiers been certified for the end-use energy efficiency category.

As part of the changes proposed through the 2016 program review process, the SF₆ and end-use energy efficiency project categories are proposed to be eliminated. Offset allowances will continue to be fungible between RGGI participating states. Additional offset categories may be added in future program reviews.

Therefore, DNREC is proposing to eliminate the SF₆ and end-use energy efficiency project category.

IV. ADMINISTRATIVE AND MINOR TECHNICAL AMENDMENTS

- DNREC is amending the format for referencing other sections from “of this regulation” to precede the section or subsection with – at “section” or “subsection”.

- DNREC is proposing to update all documents that are incorporated by reference in the existing 7 **DE Admin Code** 1147.
- DNREC is eliminating definitions associated with the two offset categories that are proposed for elimination – SF6 and End Use Energy Efficiency.
- DNREC is adding clarifications to section 2.6.6 – 2.6.8 regarding the delegation of authority to review information in the CO2 Allowance Tracking System (COATS).
- DNREC is striking references to 7 DE Admin Code 1136 – NOx Budget Trading Program as this regulation was repealed November 1, 2013.
- DNREC is proposing minor clarifications to the formulas found in the Offset project categories – 10.5.
- DNREC is proposing to add “or its agent” in section 11.13 of 7 DE Admin. Code 1147. Auction results and the clearing price will be published by the Department or its agent – RGGI Inc.

V. ECONOMIC IMPACTS

The economic impacts of the proposed amendments are anticipated to be positive.

The nine participating states contracted through RGGI Inc., to hire the ICF consulting firm to use its Integrated Planning Model (IPM) to project electricity sector and economic impacts of numerous proposed potential policy change scenarios. Impacts of these potential policy change scenarios were compared against the current RGGI program. Sensitivity analyses were conducted to examine impacts resulting from changes in key input variables such as relative fuel prices, and electricity load projections.

The IPM model outputs were then used as inputs to economic analyses including REMI macroeconomic modeling and customer bill impact analyses. The REMI modeling showed regional economic impacts (cumulative change in Gross State Product, cumulative change in employment, and cumulative change in real personal income) resulting from the changes to the regional cap beginning in 2021 to be slightly positive.

IPM modeling results are available at the RGGI Website at:

https://www.rggi.org/sites/default/files/Uploads/Program-Review/9-25-2017/Draft_IPM_Model_Rule_Results_Overview_09_25_17.pdf

REMI modeling results are available at the RGGI Website at:

https://www.rggi.org/sites/default/files/Uploads/Program-Review/12-19-2017/REMI_2017_12_19.pdf

Table 4. Policy Case (Model Rule Policy Scenario) - Annual Results (Undiscounted)										
Economic Indicator	Region	2018	2020	2022	2025	2028	2030	2035	2040	2045
Total Employment (Jobs)	DE	183	260	332	383	398	421	415	296	122
% Change from BAU		0.031%	0.044%	0.057%	0.065%	0.068%	0.072%	0.069%	0.048%	0.019%
	RGGI	-610	-861	1,161	3,469	4,515	4,842	8,872	6,158	2,675
		-0.002%	-0.003%	0.004%	0.013%	0.017%	0.018%	0.032%	0.022%	0.009%
Gross State Product (Millions of Fixed 2015\$)	DE	\$7.0	\$14.0	\$23.0	\$29.0	\$33.0	\$35.0	\$43.0	\$32.0	\$12.0
% Change from BAU		0.011%	0.021%	0.034%	0.040%	0.043%	0.044%	0.050%	0.035%	0.012%
	RGGI	-\$64	-\$43	\$158	\$384	\$511	\$503	\$1,132	\$840	\$392
		-0.002%	-0.001%	0.005%	0.011%	0.014%	0.014%	0.028%	0.019%	0.008%
Disposable Personal Income (Millions of Fixed 2015\$)	DE	\$8.0	\$12.0	\$18.0	\$23.0	\$26.0	\$28.0	\$29.0	\$25.0	\$15.0
% Change from BAU		0.018%	0.026%	0.036%	0.043%	0.046%	0.048%	0.046%	0.038%	0.021%
	RGGI	-\$26.0	-\$62.0	\$41.0	\$190.0	\$298.0	\$327.0	\$748.0	\$618.0	\$375.0
		-0.001%	-0.003%	0.002%	0.007%	0.011%	0.011%	0.024%	0.018%	0.010%

The purpose of RGGI allowances is to regulate and reduce the amount of CO₂ emitted by the power sector. Since the program's inception, the price of natural gases has fluctuated but remained low in recent years. This caused a shift in the power sector such that natural gas fueled units have the best chance to return revenue for generation costs. The PJM State of the Market report by Monitoring Analytics, LLC²¹ provides levelized costs of energy for new entrants of various electricity generation sources. Levelized costs of energy for combustion turbines (CT) and combined cycles (CC) were roughly 31% and 19%, respectively, of that for coal. Specifically in the Delmarva power zone, the percent of 20-year levelized costs recovered varies drastically for each unit, with the best recovery from a new CC (data shown in the table below). Cost recovery for a new coal plant entrant is 14% in the Delmarva power zone, which indicates that it is not highly economically feasible. Thus, the impact of natural gas prices on the power sector are shown to significantly impact the economic feasibility of electricity generated by coal.

²¹ State of the Market Report for PJM. Volume 2: Detailed Analysis. Table 7-8 Levelized Costs of Energy: 2017. March 2018. http://www.monitoringanalytics.com/reports/PJM_State_of_the_Market/2017/2017-som-pjm-volume2.pdf

Table 5. Levelized Costs of Energy by Generation Source Type for 2017

	Combustion turbine	Combined cycle	Coal plant
Levelized energy cost (\$/MWh)	\$61	\$37	\$194
Percent recovery of 20-year levelized costs (Delmarva)	72%	90%	14%

The modeling for the proposed RGGI program from 2021-2030 matches independent economic analysis that has found a positive economic effect from RGGI. In 2017, the Analysis Group conducted an independent economic analysis of the RGGI program's most recent three-year compliance period (2015-2017).

“Over the last three years (2015-2017), the RGGI program led to \$1.4 billion (net present value (“NPV”)) of net positive economic activity in the nine-state region. Each RGGI state’s electricity consumers and local economy also experienced net benefits from the RGGI program. When spread across the region’s population, these economic impacts amount to nearly \$34 in net positive value added per capita.²²”

Additional reports and analysis by the Analysis Group for the first and second year compliance period are available on their website.

VI. HEALTH BENEFITS

RGGI has public health benefits to Delaware and the region.

An independent study²³ by Abt provides an analysis of the public health impacts of the Regional Greenhouse Gas Initiative (RGGI) over its first six years of implementation (2009 to 2014). The key findings of the report are summarized in Table 6.

Table 6. Summary of Cumulative RGGI Health Benefits, 2009 to 2014	
	Avoided Mortality
Avoided Health Effects	<ul style="list-style-type: none">• 300–830 premature adult deaths
	Avoided Morbidity

²² The Economic Impacts of the Regional Greenhouse Gas Initiative on Nine Northeast and Mid-Atlantic States – Review of RGG’s Third Three-Year Compliance Period (2015-2017). Analysis Group. April 2018. Retrieved from http://www.analysisgroup.com/uploadedfiles/content/insights/publishing/analysis_group_rggi_report_april_2018.pdf

²³ Analysis of the Public Health Impacts of the Regional Greenhouse Gas Initiative, 2009-2014. Abt Associates. January 2017. Retrieved from <https://www.abtassociates.com/insights/publications/report/analysis-of-the-public-health-impacts-of-the-regional-greenhouse-gas-0>.

	<ul style="list-style-type: none"> • 35–390 non-fatal heart attacks • 420–510 cases of acute bronchitis • 8,200–9,900 asthma exacerbations • 13,000–16,000 respiratory symptoms 		
	Other		
Value of Avoided Health Effects	Low	Central	High
	\$3.0 billion	\$5.7 billion	\$8.3 billion

VII. SMALL BUSINESS IMPACT STATEMENT

This regulation applies only to electricity generators in the state who produce more than 25MW of power annually; no small businesses fall within this category and so there is no direct impact to any of Delaware’s small businesses.

In addition, these proposed regulations are expected to result in reduced electricity prices for all electricity customers, a positive impact for small businesses. Bill impact analysis²⁴ estimated that the average commercial customer monthly electric bill of \$589 would decrease by \$10.67 (1.8%) and industrial customer’s bill would decrease by by 2.9%.

<u>Year</u>	<u>Average Monthly Bill (\$2015)</u>		<u>Difference between Reference Case and Model Rule Policy Scenario (\$2015)</u>	
	<u>Reference Case</u>	<u>Model Rule Case</u>	<u>Average Monthly Difference (\$2015)</u>	<u>Percent Difference</u>
2017	\$ 82.48	\$ 81.16	\$ (1.31)	-1.6%
2018	\$ 91.05	\$ 89.25	\$ (1.80)	-2.0%
2019	\$ 100.17	\$ 97.77	\$ (2.40)	-2.4%
2020	\$ 109.93	\$ 106.87	\$ (3.05)	-2.8%
2021	\$ 116.91	\$ 113.29	\$ (3.62)	-3.1%
2022	\$ 124.66	\$ 120.33	\$ (4.32)	-3.5%

²⁴ DE’s bills analysis results for the Model Rule Policy Scenario. August 2017.

2023	\$	133.24	\$	128.17	\$	(5.07)	-3.8%
2024	\$	143.80	\$	137.86	\$	(5.94)	-4.1%
2025	\$	155.45	\$	148.25	\$	(7.20)	-4.6%
2026	\$	168.19	\$	159.51	\$	(8.68)	-5.2%
2027	\$	182.17	\$	172.04	\$	(10.12)	-5.6%
2028	\$	197.48	\$	185.53	\$	(11.95)	-6.0%
2029	\$	214.27	\$	200.32	\$	(13.95)	-6.5%
2030	\$	231.92	\$	215.27	\$	(16.64)	-7.2%
2031	\$	251.36	\$	231.65	\$	(19.70)	-7.8%
Average	\$	153.54	\$	145.82	\$	(7.72)	-5.0%

**Table 8: Average Bill Impacts
DE Commercial Customers**

<u>Year</u>	<u>Average Monthly Bill (\$2015)</u>		<u>Difference between Reference Case and Model Rule Policy Scenario (\$2015)</u>	
	<u>Reference Case</u>	<u>Model Rule Case</u>	<u>Average Monthly Difference (\$2015)</u>	<u>Percent Difference</u>
2017	\$ 345.18	\$ 338.45	\$ (6.74)	-2.0%
2018	\$ 382.36	\$ 374.41	\$ (7.95)	-2.1%
2019	\$ 421.22	\$ 411.98	\$ (9.25)	-2.2%
2020	\$ 461.97	\$ 451.37	\$ (10.59)	-2.3%
2021	\$ 480.83	\$ 470.31	\$ (10.52)	-2.2%
2022	\$ 501.97	\$ 491.44	\$ (10.53)	-2.1%
2023	\$ 525.65	\$ 515.09	\$ (10.56)	-2.0%
2024	\$ 559.88	\$ 549.09	\$ (10.79)	-1.9%
2025	\$ 597.25	\$ 585.97	\$ (11.27)	-1.9%
2026	\$ 638.01	\$ 626.10	\$ (11.91)	-1.9%
2027	\$ 682.58	\$ 671.31	\$ (11.26)	-1.6%
2028	\$ 731.28	\$ 720.43	\$ (10.84)	-1.5%
2029	\$ 784.54	\$ 774.00	\$ (10.54)	-1.3%
2030	\$ 837.23	\$ 824.70	\$ (12.53)	-1.5%
2031	\$ 895.48	\$ 880.75	\$ (14.73)	-1.6%
Average	\$ 589.69	\$ 579.03	\$ (10.67)	-1.8%

**Table 9: Average Bill Impacts
DE Industrial Customers**

<u>Year</u>	<u>Average Monthly Bill (\$2015)</u>		<u>Difference between Reference Case and Model Rule Policy Scenario (\$2015)</u>	
	<u>Reference Case</u>	<u>Model Rule Case</u>	<u>Average Monthly Difference (\$2015)</u>	<u>Percent Difference</u>
2017	\$ 8,634.32	\$ 8,398.74	\$ (235.57)	-2.7%
2018	\$ 9,575.29	\$ 9,294.87	\$ (280.42)	-2.9%
2019	\$ 10,538.33	\$ 10,209.56	\$ (328.77)	-3.1%
2020	\$ 11,526.86	\$ 11,147.51	\$ (379.35)	-3.3%
2021	\$ 11,714.96	\$ 11,335.73	\$ (379.23)	-3.2%
2022	\$ 11,934.38	\$ 11,552.60	\$ (381.78)	-3.2%
2023	\$ 12,189.21	\$ 11,805.04	\$ (384.17)	-3.2%
2024	\$ 12,750.52	\$ 12,356.56	\$ (393.96)	-3.1%
2025	\$ 13,356.26	\$ 12,943.63	\$ (412.63)	-3.1%
2026	\$ 14,008.85	\$ 13,572.59	\$ (436.26)	-3.1%
2027	\$ 14,714.87	\$ 14,300.06	\$ (414.81)	-2.8%
2028	\$ 15,477.76	\$ 15,076.94	\$ (400.82)	-2.6%
2029	\$ 16,303.55	\$ 15,914.10	\$ (389.46)	-2.4%
2030	\$ 17,005.74	\$ 16,552.76	\$ (452.98)	-2.7%
2031	\$ 17,784.89	\$ 17,263.20	\$ (521.70)	-2.9%
Average	\$ 13,167.72	\$ 12,781.59	\$ (386.13)	-2.9%

Historic electricity price data supports this modeling. Additional analysis of EIA data²⁵ for the State of Delaware – Annual Electric Power Industry Report (2016) shows flat growth or declines in the average retail price of electricity since the RGGI program began in 2009. Residential rates have decreased by 4% since 2009. Commercial rates have decreased by 16% and industrial rates by 15%. This data provides an indication that the RGGI program has not increased Delaware ratepayer’s costs since the program began in 2009.

²⁵ Electric Power Sales, revenue, and energy efficiency Form EIA – 861. (2016) Retrieved from <https://www.eia.gov/electricity/data/eia861/> and Full data tables 1-14 <https://www.eia.gov/electricity/state/Delaware/>.

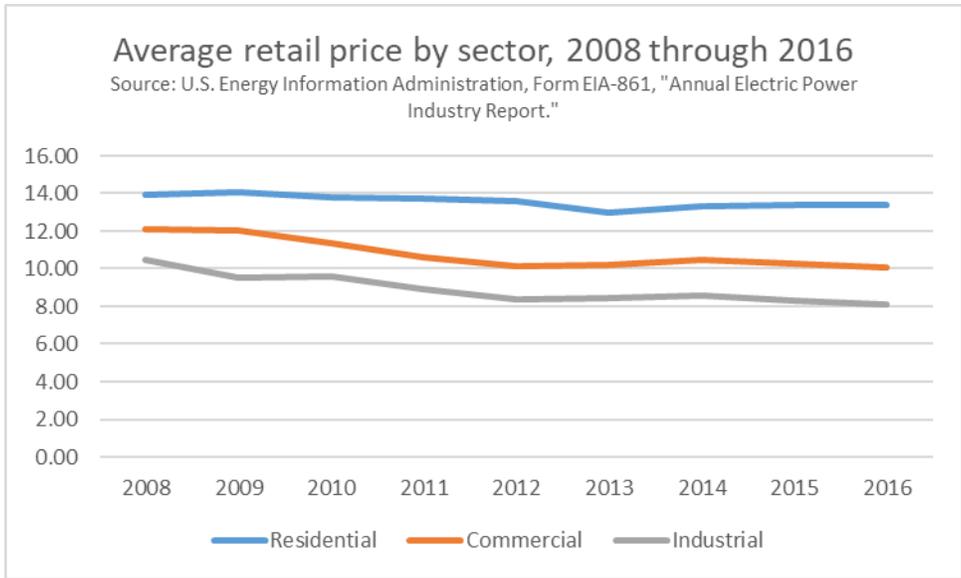


Figure 5. State of Delaware Average Retail Price

From the Delmarva Integrated Resource Plan²⁶ (IRP) executive summary, the standard offer of service for residential customers has declined since 2009 by approximately 33%. Retail prices remain stable or have declined since the inception of the RGGI program.

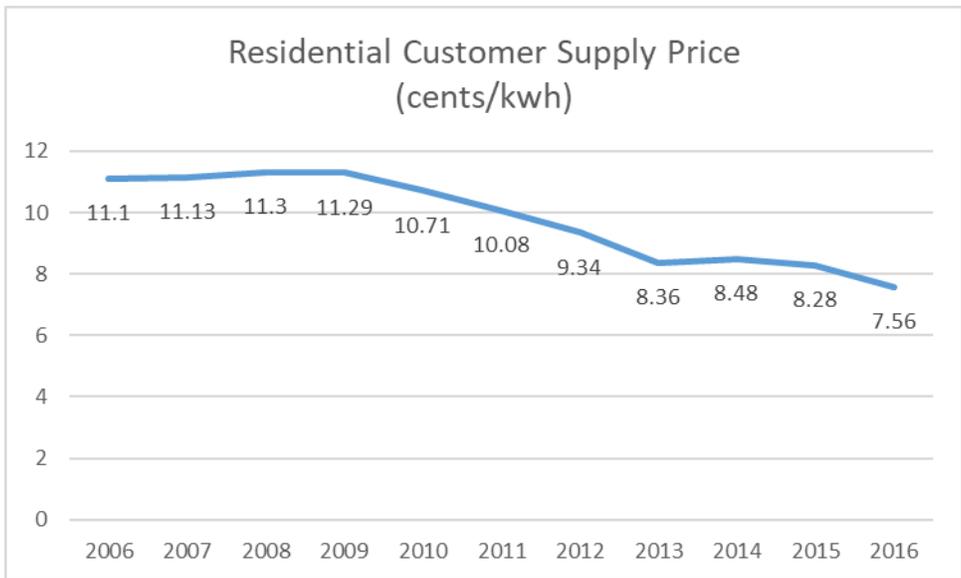


Figure 6. DELMARVA IRP Residential Customer Supply Price (Nov. 2016)

²⁶ DELMARVA Integrated Resource Plan. November 2016. Retrieved from <https://dep.sc.delaware.gov/wp-content/uploads/sites/54/2017/03/DPL-Public-IRP-113016.pdf>.

VIII. STAKEHOLDER PARTICIPATION

Two workgroup meetings were scheduled with stakeholders (March 21, 2018 and April 17, 2018) to discuss the amendments to the RGGI Model Rule as well as receive stakeholder feedback. The first meeting on March 21, 2018 was cancelled due to snow. The April 17th meeting included a presentation on the updated RGGI Model Rule design elements as well as the economic modeling that was performed by RGGI Inc. to support program modifications.

The discussion was opened to stakeholders and members from the public regarding Delaware specific amendments. David Stevenson representing the Caesar Rodney Institute provided his analysis of the impact the program amendment may have on the NRG Indian River facility²⁷.

IX. PUBLIC PARTICIPATION

DNREC held a public workshop on May 22, 2018 to educate the public on the amendments made to the RGGI's Model Rule as they apply to Delaware's CO₂-Budget Trading Program. The Sierra Club as represented by Stephanie Herron read a letter with their thoughts and comments²⁸.

DNREC has given public notice and provided an opportunity to review the proposed regulations on July 26, 2018, which is at least 20 days prior to holding the public hearing. The public hearing notice, proposed regulations and background document will be made available on DNREC's website at:

<http://www.dnrec.delaware.gov/Air/Pages/RegionalGreenhouseGasInitiative.aspx>

Questions about this document may be addressed to:

Valerie Gray at (302) 739-9402 or via email at valerie.gray@state.de.us

²⁷ Comments submitted on April 17, 2018 on behalf of David Stevenson, Caesar Rodney Institute. Retrieved from http://www.dnrec.delaware.gov/Air/Documents/CommentsReceived-4-17-18_David%20Stevenson_.pdf

²⁸ Sierra Club letter dated May 21, 2018. Retrieved from <http://www.dnrec.delaware.gov/Air/Documents/2018%2005%2021%20Joint%20Stakeholder%20Cmts%20re%20DE%20RGGI%20Reg%20Update.pdf>