**COMMONWEALTH OF PENNSYLVANIA**
**DEPARTMENT OF ENVIRONMENTAL PROTECTION**

Solicitation of Comments on
Proposed Rulemaking: $CO_2$ Budget Trading Program

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**COMMENTS OF**
**INDUSTRIAL ENERGY CONSUMERS OF PENNSYLVANIA**

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On November 7, 2020, the Pennsylvania Bulletin published the Department of Environmental Protection's ("DEP" or "Department") issuance of the Proposed Rulemaking on $CO_2$ Budget Trading Program ("Proposed Rulemaking") and inviting public comments on the draft Proposed Rulemaking received on or before January 14, 2021. 50 Pa. B. 6212, 6231.

The Industrial Energy Consumers of Pennsylvania ("IECPA")[1] offers these Comments in response to the Department's solicitation. IECPA is an association of energy-intensive and trade-exposed[2] industrial consumers of electricity and natural gas taking service from a variety of regulated utilities in Pennsylvania, including major electric utilities such as Metropolitan Edison Company, PECO Energy Company, Pennsylvania Electric Company, PPL Electric Utilities Corporation, and West Penn Power Company. These major electric utilities, and all of their

[1] For the purpose of this matter, IECPA's membership consists of: Air Products & Chemicals, Inc.; AK Steel Corporation; Arconic, Inc.; Benton Foundry, Inc.; Carpenter Technology Corporation; Cleveland-Cliffs Inc.; Domtar Paper Company, LLC; East Penn Manufacturing Company; Keystone Cement Company; Knouse Foods Cooperative, Inc.; Marathon Petroleum Corporation; Praxair, Inc.; Proctor & Gamble Paper Products Company; and United States Gypsum Company.

[2] "Energy-intensive" means that because of the large amounts of energy consumed, small changes in energy rates translate into large changes in cost. "Trade-exposed" refers to the inability to pass cost increases on to customers without risking the loss of those customers to global competition.

customers – including IECPA's members – may be significantly and adversely impacted by any final regulations that result from the Department's Proposed Rulemaking.

IECPA appreciates the opportunity to submit these Comments in this important proceeding. As some of the largest industrial and manufacturing entities in the Commonwealth, employing tens of thousands of Pennsylvanians and contributing millions of dollars to the state and their local communities, IECPA's members hope that the perspective presented by the following Comments provides insight that helps to inform and guide the Department's consideration of this rulemaking.

## I. GENERAL COMMENTS

As an initial matter, IECPA has reviewed the Department's Proposed Rulemaking, and is familiar with the Regional Greenhouse Gas Initiative ("RGGI"), as well as Governor Wolf's decision to join Pennsylvania to this effort. IECPA's members consist of a number of industrial and manufacturing businesses with operations in other states, including those currently participating in RGGI. That experience, coupled with IECPA's long history and experience in the Commonwealth of Pennsylvania as some of the largest consumers of electric generation – which is the primary target of RGGI and the Proposed Rulemaking's effort to significantly reduce $CO_2$ emissions – informs IECPA's concern that RGGI and the Proposed Rulemaking, while intended to result in benefits to the global environment, will likely produce unintended consequences for Pennsylvania's industrial and manufacturing community in the form of significant and deleterious costs that could permanently harm these business. Those unintended consequences would also be felt by all Pennsylvanians by potentially eliminating much-needed jobs and economic opportunities.

Pennsylvania is an energy producing state and would be penalized for that energy production under the Proposed Rulemaking. Looking at the annual amount of RGGI auction revenues collected in each participating state spread over the electric power sector $CO_2$ emissions in those states results in a cost of $3.35 per metric ton. When applied to 82.1 metric tons of electric power sector $CO_2$ emissions in Pennsylvania, the financial impact on Pennsylvania just from the RGGI carbon allowance auction would be approximately $275 million per year in additional costs to electric generators that would be passed along to consumers. This amount does not consider the costs of additional secondary market $CO_2$ allowances that generators may need to purchase, or the increased cost to electric generators to reduce $CO_2$ emissions in order to comply with RGGI.

**2016 State energy-related carbon dioxide emissions by sector**

Million metric tons of carbon dioxide

| State | Commercial | Electric Power | Residential | Industrial | Transportation | Total |
|---|---|---|---|---|---|---|
| Connecticut | 3.9 | 7.0 | 6.3 | 1.9 | 15.3 | 34.3 |
| Delaware | 0.9 | 3.6 | 0.8 | 3.4 | 4.6 | 13.3 |
| Maine | 1.6 | 1.5 | 2.9 | 1.5 | 8.9 | 16.5 |
| Maryland | 5.2 | 17.2 | 5.5 | 2.2 | 27.6 | 57.6 |
| Massachusetts | 7.0 | 10.7 | 11.4 | 3.4 | 31.7 | 64.2 |
| New Hampshire | 1.4 | 2.4 | 2.5 | 0.8 | 6.7 | 13.8 |
| New York | 21.7 | 27.7 | 30.6 | 8.3 | 75.4 | 163.7 |
| Pennsylvania | 10.7 | 82.1 | 18.4 | 45.6 | 60.7 | 217.4 |
| Rhode Island | 0.9 | 2.6 | 1.8 | 0.6 | 3.9 | 9.8 |
| Vermont | 0.9 | 0.0 | 1.3 | 0.4 | 3.4 | 6.0 |

Source: United State Energy Information Administration ("EIA"), available at: https://www.eia.gov/environment/emissions/state/analysis/.

According to Jeff Berman, manager of emissions and clean energy at S&P Global Platts Analytics[3], the cost of the RGGI program would result in about $6 per megawatt hour ("MWh") added to coal-fired power cost and about $2 per MWh added to gas-fired generation cost. Even the modeling results released by the Department indicate that Pennsylvania electric customers' cost would increase by over $2.6 billion during the first 11 years of the RGGI program (*see* IECPA Exhibit 1).

IECPA member companies operate manufacturing facilities with significant expenditures dedicated to electricity costs. Because these manufacturing businesses are exposed to global trade, they cannot merely pass additional costs on to their customers without risking the loss of those customers to their global competition. This places them at a competitive disadvantage to facilities in others states and countries that do not incur the cost of a program such as that contemplated by this Proposed Rulemaking and could result in manufacturing relocating production and the associated jobs out of Pennsylvania. Additionally, any loss of durable manufacturing jobs has a significant multiplier in the loss of indirect jobs. In fact, durable manufacturing has one of the highest total indirect job impacts at 744 jobs per 100 direct jobs.[4]

To that end, the CATO Institute published a study that compared the current RGGI states to a sample of five non-RGGI states (Illinois, Ohio, Oregon, Pennsylvania at that time, and Texas) that deregulated electric supply in a manner similar to the RGGI states and also had significant Renewable Portfolio Standards ("RPS") requirements. That study found:

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[3]Anderson, Jared, "Joining RGGI to boost Pennsylvania gas-, coal-fired power prices, double emissions traded," S&P Global Platts, Oct. 4, 2019, available at: https://www.spglobal.com/platts/en/market-insights/latest-news/coal/100419-joining-rggi-to-boost-pennsylvania-gas-coal-fired-power-prices-double-emissions-traded.

[4] Josh Bivens, "Updated employment multipliers for the U.S. economy," Economic Policy Institute, January 23, 2019 available at: https://www.epi.org/publication/updated-employment-multipliers-for-the-u-s-economy/

> The comparison states economies grew 2.5 times faster than the RGGI states. Data from the U.S. Bureau of Economic Analysis show that the RGGI states lost 35 percent of energy intensive businesses (primary metals, food processing, paper products, petroleum refining, and chemicals), the comparison states only lost 4 percent. The RGGI states lost 13 percent of overall goods production, while the comparison states grew by over 15 percent.[5]

Additionally, industrial and manufacturing businesses in Pennsylvania have already contributed hundreds of millions of dollars to the Commonwealth's existing efforts to reduce greenhouse gas ("GHG") emissions by large electric generation facilities through the various electric utilities' compliance with the stringent energy efficiency and conservation ("EE&C") requirements of Act 129 (codified at 66 Pa. C.S. § 2806.1). In many cases, these large utility customers have borne these massive annual costs despite the fact that the Act 129 requirements approved by the Pennsylvania Public Utility Commission ("PUC" or "Commission") and implemented by utilities provide little to no direct benefits to those businesses, like IECPA's members, who continually and proactively make sound business decisions to invest in energy efficiency measures in their own operations.

To further that point, data from EIA and the U.S. Bureau of Economic Analysis ("BEA") recently showed a steady 52 percent decrease in industrial and manufacturing energy intensity going back to 1987.[6] The behaviors exhibited by large industrial customers over this time are not a function of any federal or state energy efficiency program; rather, the behaviors that produced this data are simply what is required of these businesses to survive in an increasingly competitive global market.

[5] Stevenson, David T., "A Review of the Regional Green Gas Initiative," CATO Institute, Aug. 10, 2017, available at: https://www.cato.org/sites/cato.org/files/pubs/pdf/working-paper-45_1.pdf.

[6] Source: EIA and BEA.

As it currently stands, Act 129 contains no provision for such businesses to opt-out of paying charges related to utility investments in EE&C measures, irrespective of the amount of energy efficiency (and corresponding reduced GHG emissions) that these businesses have historically contributed, and continue to contribute, to Pennsylvania's electricity sector and environment. The incurrence of these massive costs by Pennsylvania's industrial and manufacturing community have already hindered economic development by forcing the businesses that comprise this community to make operational decisions to reduce production in Pennsylvania, which may also include the shifting of production to more economical environments.

The requirements of RGGI and the Department's Proposed Rulemaking therefore stand to impose upon Pennsylvania electric utilities substantial and significant further compliance costs in achieving GHG emission reductions. Generally speaking, by operation of law and PUC regulations, those future compliance costs will be passed through to all electric consumers, including the aforementioned industrial and manufacturing companies that provide critical support to the Commonwealth's economy, and who – as stated above – are unable to simply pass those costs along to other entities as the utilities are able to do. For this reason, IECPA is profoundly concerned that RGGI and the Proposed Rulemaking may foist upon Pennsylvania's industrial and manufacturing community additional costs, adding to the financial burden of operating within the Commonwealth, while providing no direct economic benefits in return to ease the impact. This burden may not be survivable for some of these businesses.

Accordingly, while IECPA supports efforts to continue to generate and use electricity efficiently and in a manner that is environmentally sound, including reductions in $CO_2$ emissions, IECPA also urges the Department to be mindful of the pressures faced by the critical industrial and manufacturing segment of the Pennsylvania economy. To that end, and as specified below,

IECPA offers some additional comments and suggestions as to how the Commonwealth may reasonably implement the Proposed Rulemaking within these considerations. The fact that IECPA does not address each and every issue presented by the Proposed Rulemaking should not be construed as support for the Department's assessment of those issues, and IECPA reserves the right to provide further Comments, in accordance with the Department's process, as it deems necessary.

## II. SPECIFIC COMMENTS AND RECOMMENDATIONS

### A. Structure and Administration of RGGI Programs

Upon review of the Proposed Rulemaking, it is unclear to IECPA how the Department proposes to structure any potential programs under RGGI and under what agency these programs may be administered. Specifically, the Proposed Rulemaking appears to indicate that the Department will be the primary agency responsible for overseeing final regulations and states that the Department worked with the PUC (as well as PJM Interconnection, LLC ("PJM")) "to promote the integration of this program in a manner that preserves orderly and competitive economic dispatch within PJM and minimizes emissions leakage."[7] The Proposed Rulemaking, however, does not specify what role, if any, the Commission should have going forward. IECPA strongly recommends that administration of any implemented programs be done independently of the PUC and certainly separate from current and future Act 129 requirements.

As noted above, IECPA is concerned that the Proposed Rulemaking could exacerbate already deleterious impacts that Pennsylvania's largest electricity consumers have experienced through ongoing implementation and enforcement of Act 129 energy conservation requirements, which are regulated by the PUC. In order to avoid an unnecessary duplication of harm through Act 129, IECPA strongly suggests that any program that results from this Proposed Rulemaking

[7] Proposed Rulemaking, Pa. Bulletin, Vol. 50, No. 45 (Nov. 7, 2020), p. 6221.

be explicitly implemented outside of Act 129 and the existing PUC EE&C regulations. Furthermore, IECPA submits that any programs resulting from this Proposed Rulemaking should remain exclusively under the jurisdiction and enforcement of the Department, and not the PUC.

Although the Proposed Rulemaking unarguably intends to address emissions from electric generation facilities, which could mean institution of additional EE&C requirements that PUC-jurisdictional electric distribution utilities may have to satisfy, this potential overlap with issues presently under the purview of the PUC should not dictate that regulation and enforcement of the Proposed Rulemaking's ultimate programs should fall to the Commission. On the contrary, IECPA submits that the specific aim of the Proposed Rulemaking, to "reduce anthropogenic emissions of $CO_2$ . . . from $CO_2$ budget sources in a manner that is protective of public health, welfare and the environment,"[8] is a regulatory goal that, if enforceable by the Commonwealth of Pennsylvania at all, is enforceable strictly by the Department. Indeed, the jurisdiction of the Department to oversee the implementation and enforcement of any final regulations far exceeds the purview of the Commission, which is charged with regulating only PUC-jurisdictional entities. Pennsylvania is a "deregulated" competitive regulatory jurisdiction, meaning that the Commission generally does not engage in the regulation of generation facilities themselves, except to the extent that the output of these facilities may be purchased by jurisdictional electric distribution utilities for the purpose of serving their captive, "non-shopping" customers, or to the limited extent that competitive suppliers are licensed to offer generation output to customers on the competitive retail market. In all other respects, such as the environmental controls placed upon generation facilities, the PUC does not exercise jurisdiction.

[8] Proposed Rulemaking, § 145.301.

## B. Additional Industrial and Manufacturing Protection

IECPA respectfully submits that, to the extent the Department has authority to move forward with this Proposed Rulemaking, additional protections are needed in order to preserve the Commonwealth's industrial and manufacturing community, and the Pennsylvania public as a whole, from unwarranted and unnecessary harm. Although Section 145.342(b) of the Proposed Rulemaking provides for certain "set-aside allocations," which IECPA supports as important protections to the Pennsylvania public, particularly as these protections relate to containing the cost of RGGI compliance, more specific revenue allocations should be contemplated and incorporated into this section for the purpose of also promoting industrial and manufacturing projects designed to meet behind-the-meter load reduction, which would further support the overall stated goals of the Department and the Proposed Regulations in reducing $CO_2$.

Conversely, however, in promulgating new regulations under the Proposed Rulemaking, the Department should likewise insure that the final regulations do not create a disincentive for cogeneration, and specifically Combined Heat and Power ("CHP"), facilities within the Commonwealth. This will require modification of the Proposed Rulemaking, which as drafted, would create such an unintended result. That modification should insure that qualifying CHP facilities – both existing and those that have yet to be placed in operation – will be exempt from any of the compliance requirements associated with RGGI or any final Department regulations.

### 1. Exemption and Support for CHP Projects

The Proposed Rulemaking states that the Department "is seeking comment on ways appropriately address the benefits of cogeneration in this Commonwealth, including the allocation of $CO_2$ allowances similar to the waste coal set-aside provision."[9] As currently proposed, IECPA

[9] Proposed Rulemaking, Pa. Bulletin, Vol. 50, No. 45 (Nov. 7, 2020), p. 6212.

is concerned that the proposed regulations will have a significant negative impact on existing CHP units presently employed in Pennsylvania and will inhibit the installation of new CHP units.

By way of background, CHP offers significant environmental, economic, and reliability benefits for Pennsylvania, as well as the lowest $CO_2$ emissions per MWh of electricity from any type of fossil fuel derived generation, and CHP units supply a portion of their generated electricity to the electric grid. The portion of electricity produced by the CHP units displaces electricity that would otherwise have been generated by another lower efficiency fossil fuel fired energy source, like a boiler that only generates electric power with a steam turbine with significant associated mechanical and thermal loss.

While IECPA understands and supports the intent of the Proposed Rulemaking to both reduce carbon dioxide ($CO_2$) emissions and promote cleaner power technology, IECPA does not believe that the inclusion of industrial CHP for regulation pursuant to the Proposed Rulemaking – even with the proposed "cogeneration set-aside account" under proposed Section 145.342(k) – actually aligns with that intent. The Department has previously included and promoted CHP as one of the cleaner, more efficient energy generating technologies in its Pennsylvania Climate Action Plan 2018.[10] This is reinforced even by the Department's acknowledgment in the Proposed Rulemaking that cogeneration units "concurrently produce electricity and useful thermal energy, making them energy efficient and environmentally beneficial."[11] Additionally, the U.S. Environmental Protection Agency ("EPA") also promotes CHP technology as a means of reducing GHG.

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[10] DEP, Pennsylvania Climate Action Plan 2018, Apr. 29, 2019, available at: http://www.depgreenport.state.pa.us/elibrary/GetDocument?docId=1454161&DocName=2018%20PA%20CLIMATE%20ACTION%20PLAN.PDF%20%20%20%3cspan%20style%3D%22color:blue%3b%22%3e%28NEW%29%3c/span%3e.

[11] Proposed Rulemaking, Pa. Bulletin, Vol. 50, No. 45 (Nov. 7, 2020), p. 6212.

Based on data submitted by electric generating facilities nationwide to the EPA and compiled in the Emissions & Generation Resource Integrated Database ("eGRID"),[12] IECPA is concerned that the Proposed Rulemaking will have a significant negative impact on CHP units that provide electricity to the PJM electric grid. Actual operational data shows that CHP can achieve superior fuel and emissions efficiency, and demonstrates a much greater utilization of useful thermal energy, when CHP units can be operated as intended for its industrial application. CHP is even more efficient than the newest and most efficient combined cycle natural gas-fired electric generation units ("EGUs") supplying power to the PJM electric grid ("Grid").

For some CHP applications to achieve their highest efficient operation, it is vital for them to be able to export electricity to the Grid. The useful thermal energy that is derived after the generation of electric power is directly related to the amount of power that is generated in the first phase of CHP. That is, the size and design of a particular CHP application is a function of how the facility intends to use power and other forms of useful thermal energy (*i.e.*, steam, hot water, hot air, etc.) at its facility. A CHP unit is not solely sized and designed to optimize electricity sent to the Grid, but also considers the overall intended generation of both power and heat with the facility's energy requirements being the most important consideration.

As previously noted, CHP is the most efficient combustion generated electricity. Specifically, CHP units have an efficiency range of 60 to 75 percent in the generation of useful energy as both electricity and thermal energy otherwise used in industrial or commercial processes (*i.e.*, steam, hot water, hot air). By comparison, the best (*i.e.*, newest, most efficient) natural gas-

[12] EPA eGRID2018, released Jan. 28, 2020, revised Mar. 9, 2020, available at: https://www.epa.gov/egrid/download-data.

fired combined cycle power plant is approximately 50 to 55 percent efficient, and simple cycle power plants are less than 50 percent efficient.

Any disruption of CHP units running at their optimum will result in less efficient, non-CHP power being supplied to the Grid and lower efficient steam being generated to replace the CHP steam at the industrial site. This will result in increased $CO_2$ emissions both at the CHP facility site and increased $CO_2$ for the electricity supplied to the Grid. For example, a CHP facility may sell power to the Grid at prices lower than generation costs because there will still be the benefit of increased efficiency at the facility for the useful heat side of CHP unit. The lower cost industrial power and heat still offsets the monetary loss for the power sold to the Grid.

Conversely, the requirement to purchase $CO_2$ allowances will certainly increase the amount of time that a CHP unit's cost to produce electric power exceeds the revenue available from selling that excess power on the Grid. Additionally, the uncertainty of the market price of $CO_2$ allowances will cause even more reductions in CHP electricity sent to the Grid by these resources. Reducing the use of CHP, and replacing the electric and thermal heat produced with less efficient units, will actually *increase* $CO_2$ emissions to the Grid and *increase* $CO_2$ emissions at the CHP industrial source even when considering the newest, most efficient combined cycle plants supplying power to the Grid. Comparing CHP's 65 percent efficiency to power that is 50 percent efficient is a gross 15 percent difference, but that difference on a percentage basis is actually a 30 percent improvement in efficiency. Including CHP in the proposed regulations and requiring CHP resources to purchase market-rate $CO_2$ allowances will disincentivize power that emits $CO_2$ at a 30 percent lower rate.

This result is clearly contrary to the expressed intent of the Proposed Rulemaking. Therefore, IECPA recommends that the Proposed Rulemaking should provide an exemption from

RGGI regulation for facilities qualifying as CHP resources. That said, IECPA believes that it is possible to define "CHP" in such a manner that ensures electric generating sources that are not truly intended to operate as CHP would not qualify for the exemption. To that end, IECPA would propose defining "qualifying" CHP facilities as those with an overall useful thermal efficiency greater than 60 percent and with total electric generation sold to the Grid, in comparison to its total useful thermal energy, of less than 50 percent. Facilities meeting this "qualifying" criteria of well performing CHP would be given a full exemption from the PA RGGI rule.

Although IECPA appreciates the intent of the Proposed Rulemaking to establish a "cogeneration set-aside account," providing for $CO_2$ allocations via a "set aside" has many logistical problems, either through implementing a complicated and burdensome process of demonstrating compliance on an annual basis with certified continuous parametric monitoring systems (subject to reporting and penalties for failure of these systems) or by requiring CHPs to count all of the $CO_2$ emissions towards allocations instead of just $CO_2$ emissions resulting from electric power sent to the Grid.

Furthermore, having to set aside CHP allowances creates an inability to accurately calculate how many allowances would be set aside for new, *future* CHP installations, when it is impossible to know how many future CHP units might be installed in Pennsylvania. This is especially true when considering both retrofits for existing industry and the development of new industries that can take advantage of the increased availability of natural gas and the high efficiency of CHP for energy intensive products.

IECPA believes that a full exemption for CHP in the final RGGI regulations is consistent with Pennsylvania's Climate Action Plan 2018, and the EPA's and the Department's promotion of

CHP and encouragement of the lowest emitting power being produced in Pennsylvania and an important public policy goal.

2. Inclusion of Programs to Promote Demand Reductions

Section 145.342(j)(3) of the Proposed Rulemaking contemplates allocations of revenues pursuant to the "strategic use set-aside" to other "eligible projects" that help achieve "elimination of air pollution," including projects that "encourage and foster promotion of energy efficiency measures," "promotion of renewable or noncarbon-emitting energy technologies," and "stimulation or reward of investment in the development of innovative carbon emissions abatement technologies with significant carbon reduction potential." IECPA appreciates the intent of this section to address other measures that also contribute to the broader goals of RGGI and the Proposed Rulemaking through reduction or elimination of emissions from primary electric generation resources. That said, the Proposed Rulemaking's provisions in this regard may not go far enough.

Specifically, IECPA submits that the Proposed Rulemaking should also acknowledge the opportunities presented by behind-the-meter load response technologies – and particularly those installed or implemented by industrial and manufacturing entities – as measures that should also be eligible for allocation of revenues under this section. Although this proposed section certainly carves out projects that "foster promotion of energy efficiency measures" related to energy consumption, behind-the-meter load response projects also address the demand component of electric generation production (and by correlation, emissions of $CO_2$ and other GHGs). Indeed, by reducing the amount of demand that an individual industrial or manufacturing electricity customer requires at its site, such behind-the-meter load reduction technologies and practices help to reduce the amount of overall capacity that is required from the generation sector. This not only

complements the goal of fostering promotion of energy efficiency measures, it helps to achieve that goal at the generator level.

Therefore, in the same way that Section 145.342(j)(3) provides for allocation of revenues from the set-aside account to certain eligible projects, IECPA respectfully recommends that this section be expanded to also include projects that "promote demand reduction" as an additional segment of "eligible projects."

## III. CONCLUSION

IECPA again appreciates the opportunity to contribute to this important rulemaking process. To that end, IECPA looks forward to the process going forward, and is more than willing to work collaboratively with the Department and all other parties to further refine and improve the Proposed Rulemaking to the degree that it continues and moves forward. And to the degree that this process continues, IECPA again reserves the right to provide additional comments and information, as necessary.

Respectfully submitted,

By _____

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# IECPA Exhibit 1

| Energy Prices (Nominal $/MWh) | 2020 | 2022 | 2025 | 2028 | 2030 | 11 Year Total |
|---|---|---|---|---|---|---|
| PA DEP Reference Case | $ 27.7 | $ 24.4 | $ 26.5 | $ 30.4 | $ 31.7 | |
| PA DEP Policy Case | $ 27.8 | $ 25.8 | $ 27.8 | $ 31.8 | $ 32.8 | |
| Policy Case vs Reference | $ 0.07 | $ 1.5 | $ 1.3 | $ 1.4 | $ 1.1 | |
| Electric Customer Impact | **$ 9,524,988** | **$ 214,199,415** | **$ 189,405,677** | **$ 197,277,683** | **$ 157,661,976** | **$ 1,782,082,594** |
| Percentage Increase | **0.2%** | **6.1%** | **4.9%** | **4.5%** | **3.4%** | |

| Capacity Prices (Nominal $/kW-yr) | 2020 | 2022 | 2025 | 2028 | 2030 | |
|---|---|---|---|---|---|---|
| PA DEP Reference Case | $ 36.5 | $ 51.1 | $ 76.3 | $ 68.5 | $ 61.0 | |
| PA DEP Policy Case | $ 36.5 | $ 51.1 | $ 80.2 | $ 75.2 | $ 62.9 | |
| Policy Case vs Reference | $ - | $ - | $ 3.9 | $ 6.7 | $ 1.9 | |
| Electric Customer Impact | **$ -** | **$ -** | **$ 118,525,339** | **$ 203,539,411** | **$ 58,778,736** | **$ 821,433,576** |
| Percentage Increase | **0%** | **0%** | **5%** | **10%** | **3%** | |

| Total Customer Impact (Energy + Capacity) | $ 9,524,988 | $ 214,199,415 | $ 307,931,016 | $ 400,817,094 | $ 216,440,712 | $ 2,603,516,170 |
|---|---|---|---|---|---|---|

Notes:
Energy Prices and Capacity Prices from DEP IPM Modeling Results
Reference Case Results
RGGI Case Results

Total Customer Impact based on:
Electrical usage (MWh) information from U.S. Energy Information Administration
Load data (kW) from Pennsylvania Public Utility Commission "Electric Power Outlook for Pennsylvania 2018-2023", August 2019
http://www.puc.state.pa.us/General/publications_reports/pdf/EPO_2019.pdf

The Totals are for the 11 year period. However since data is not provided for each year, the prior years data is used for any missing year up to the next year of data that is provided in order to develop the 11 year total.