



**pennsylvania**  
DEPARTMENT OF ENVIRONMENTAL PROTECTION



# Draft Proposed Rulemaking

## Chapter 145. Interstate Pollution Transport Reduction Subchapter E. CO<sub>2</sub> Budget Trading Program

**Air Quality Technical Advisory Committee  
May 7, 2020**

Tom Wolf, Governor

Patrick McDonnell, Secretary

# Climate Impacts in Pennsylvania

Changing climate patterns have caused and will continue to cause impacts in Pennsylvania to public health, infrastructure, emergency services, and major economic contributors like agriculture, tourism, and recreation.



*PennDOT has experienced record breaking impacts from floods and landslides that have **cost over \$125.7 million extra for infrastructure replacement in 2018 alone.***



*Higher temperatures lead to higher concentrations of ground-level ozone, which can lead to increased asthma rates.*



*Farmers are already experiencing direct crop damage from increasingly intense precipitation events. Heat stress may lead to declines in dairy production and summer flowering crop yields.*



*Pennsylvania already has the highest number of cases of Lyme disease in the nation, triple the number from just 10 years ago. This increase is possibly due to the western expansion of Lyme-bearing ticks and warmer winters that are leading to higher tick populations.*

# Impact of Greenhouse Gas Effect

The global warming due to increased greenhouse gases has already impacted communities around the world and is threatening to cause many more changes to the global climate now – and for decades to come.

**We're already seeing temperature and precipitation changes here in Pennsylvania.**



*Temperatures in Pennsylvania have increased 1.8° F in the last century and are expected to increase another 5.4° by 2050.*

*“Mid-century temperatures in the Philadelphia area are projected to be similar to temperatures in Richmond, VA while Pittsburgh will resemble the temperatures in the Baltimore-Washington area.”*

*- DEP Climate Change Impacts Assessment*



*Between 1958 and 2010, the Northeast U.S. saw more than a 70% increase in precipitation falling in very heavy rain events. Pennsylvania's overall precipitation is expected to increase another 8% by 2050.*

# RGGI & Climate Change Goals

## Executive Order 2019-1 *Commonwealth Leadership in Addressing Climate Change and Promoting Energy Conservation and Sustainable Governance*



### Pennsylvania GHG Reduction Goals

- 26% reduction in net GHG emissions by 2025 (from 2005 levels)
- 80% reduction in net GHG emissions by 2050 (from 2005 levels)

## Executive Order 2019-7 *Commonwealth Leadership in Addressing Climate Change through Electric Sector Emissions Reductions*



2005 – Baseline GHG Emissions- 289.43 MMTCO<sub>2</sub>e

2016 – 19% reduction in GHG Emissions - 235.05 MMTCO<sub>2</sub>e

\*20.87 MMTCO<sub>2</sub>e more required to reach the 2025 goal

**2022 – 13.6 million metric tons by 2025 via RGGI participation**

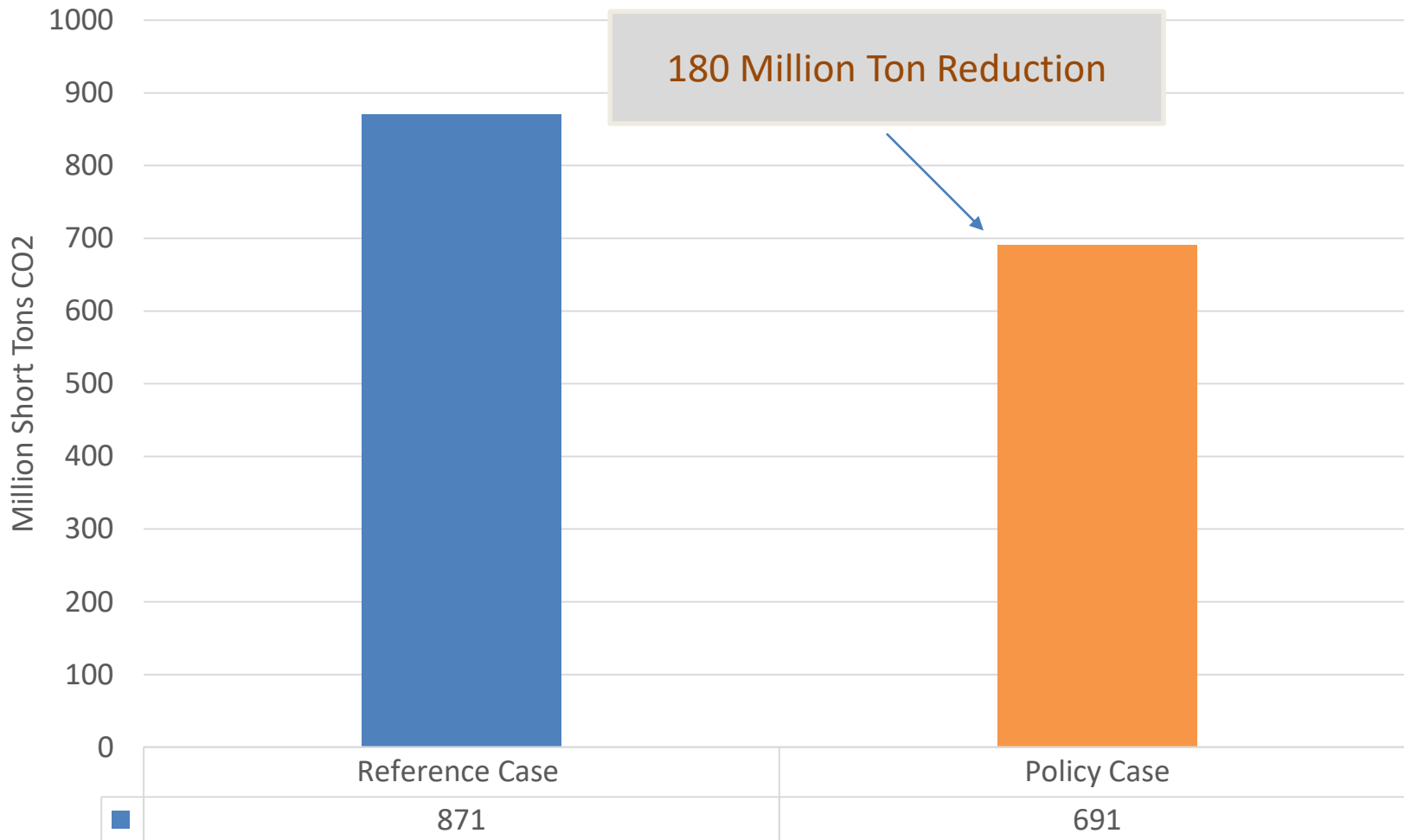
2025 – 25% reduction in GHG Emissions - 214.17 MMTCO<sub>2</sub>e

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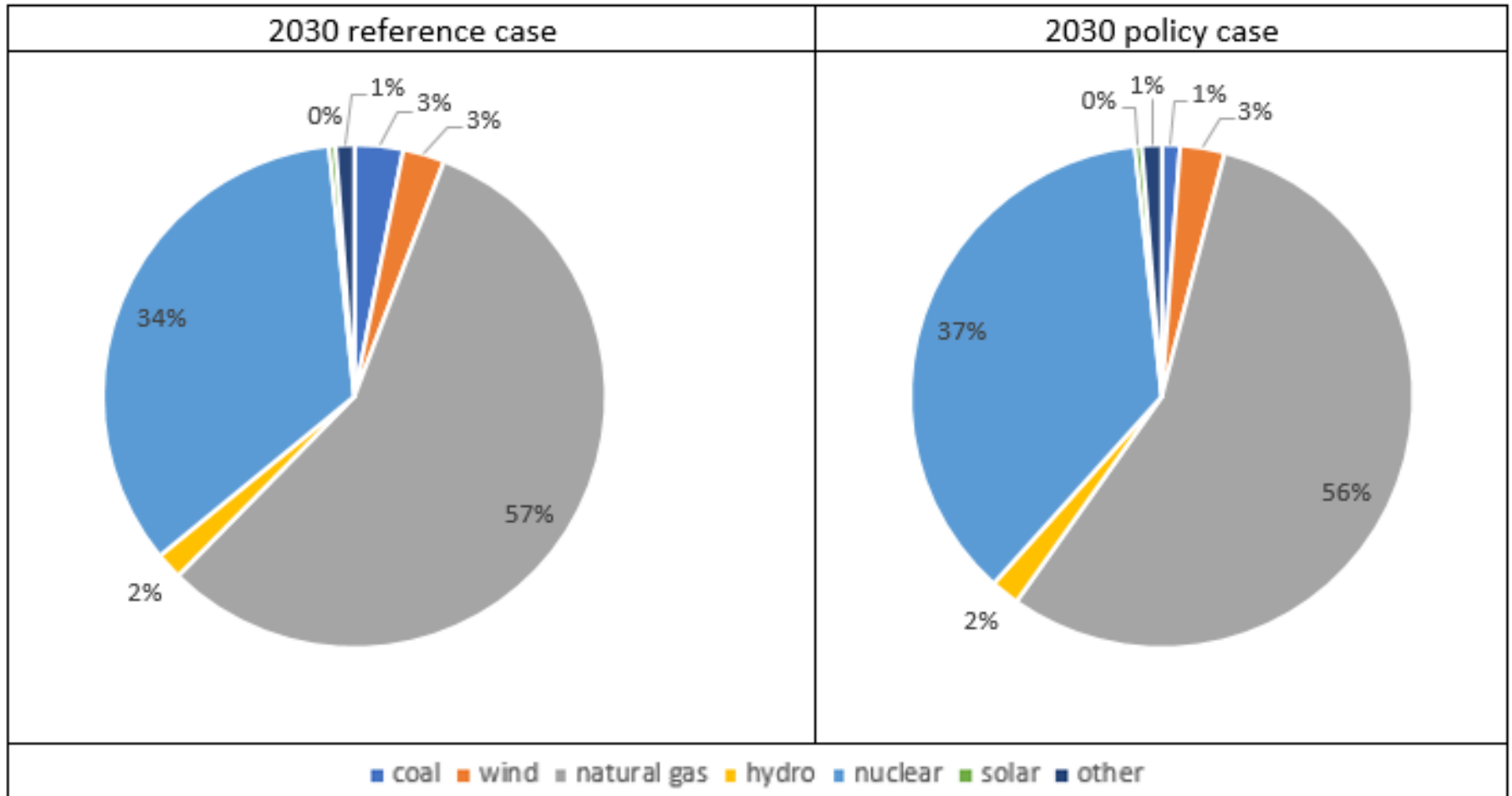
# Power Sector Modeling Overview

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# PA Power Sector CO<sub>2</sub> Emissions Through 2030

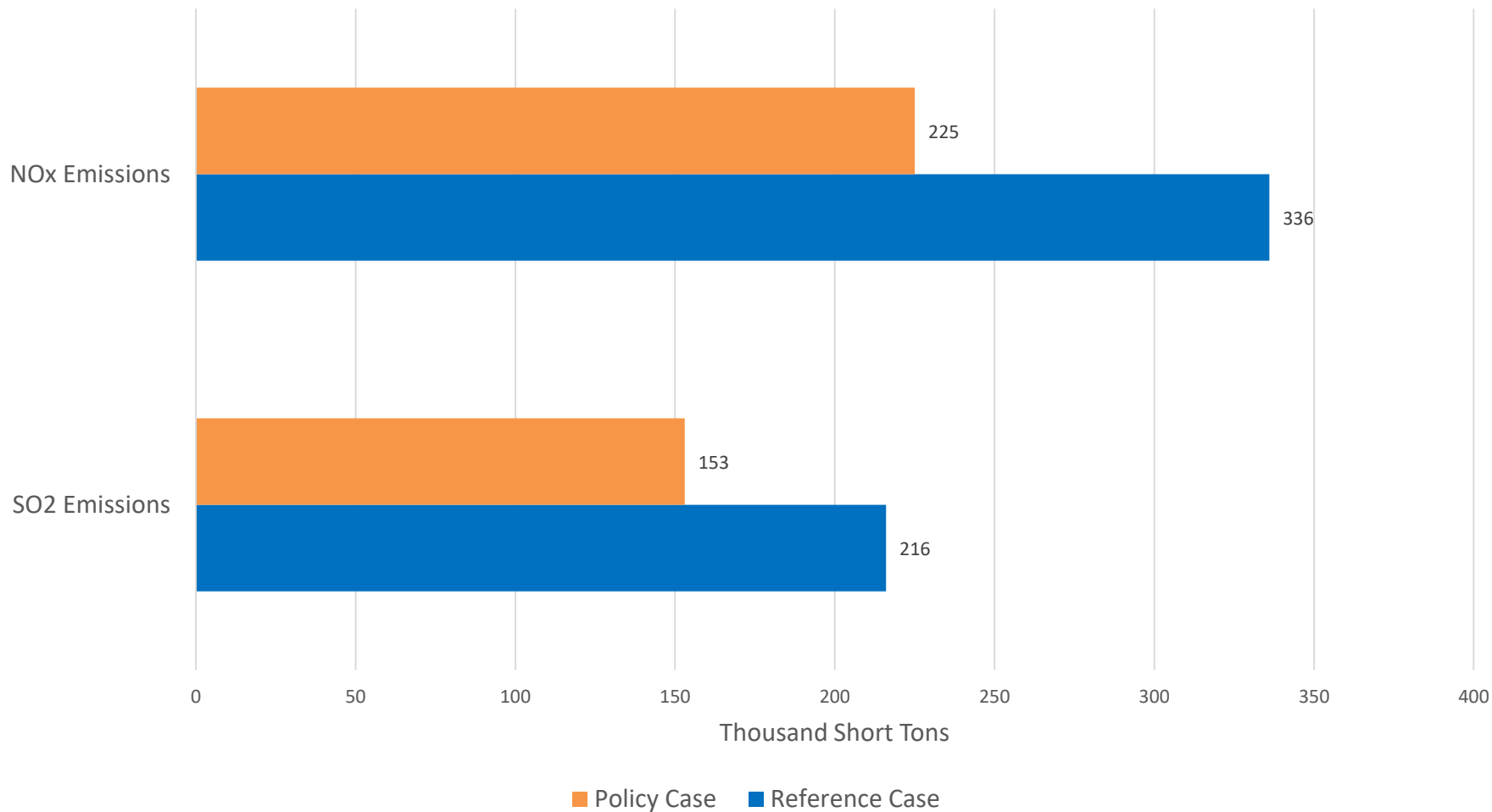


# PA Generation (2030) - Reference vs. Policy



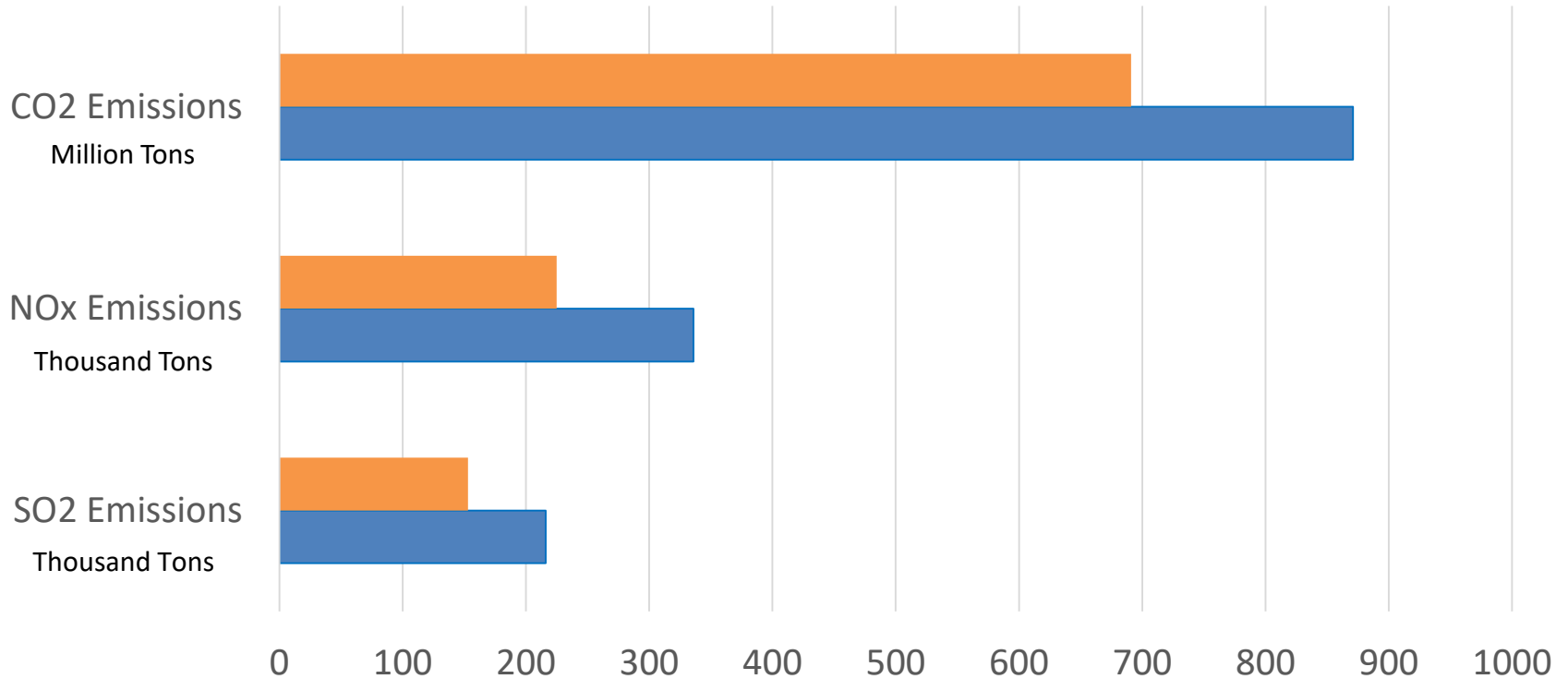
# Environmental Co-Benefits Through 2030

Co-Benefits Comparison





# Environmental Benefits



	SO2 Emissions	NOx Emissions	CO2 Emissions
Policy Case	153	225	691
Reference Case	216	336	871

■ Policy Case
 ■ Reference Case

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# Draft Proposed Annex Discussion

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# Changes Made Since Preliminary Draft

## **§ 145.302: Amended Definition of Legacy Emissions**

- Amends calculation and value of the waste coal set-aside.

## **§ 145.341: Added the PA CO<sub>2</sub> Budget Trading Program Base Budget**

- Establishes Allowance Base Budget at 78 M tons CO<sub>2</sub>.
- Declines annually matching stringency of current RGGI program.

## **§ 145.342: Added additional Allowance Allocations**

- Added two new Set-Aside Accounts
  - Strategic Use Set-Aside Account
  - Cogeneration Set-Aside Account
- Modified allowance allocation methodology for waste coal facilities

**§§ 145.393 – 145.397:** Removed Abandoned well plugging as an offset project option

# Advisory Committee Participation

## **Preliminary Draft Proposed Annex discussed with Advisory Committees**

- ✓ Air Quality Technical Advisory Committee – February 13<sup>th</sup> 2020
- ✓ Citizen’s Advisory Council – February 18<sup>th</sup> 2020
- ✓ Climate Change Advisory Committee – February 25<sup>th</sup> 2020
- ✓ Small Business Compliance Advisory Committee – April 22<sup>nd</sup> 2020

## **Proposed Concepts discussed with Advisory Committees**

- ✓ Air Quality Technical Advisory Committee – December 12<sup>th</sup> 2019
- ✓ Small Business Compliance Advisory Committee – January 22<sup>nd</sup> 2020
- ✓ Citizen’s Advisory Council – November 19<sup>th</sup> 2019

## **Additional Public Webinar on IPM Power Sector Modeling**

- ✓ AQTAC and CAC- on April 23<sup>rd</sup> 2020

# Regulatory Sections

§§ 145.301–145.307	General Provisions
§§ 145.311–145.316	Requirements for Authorized Account Reps
§§ 145.321–145.323	Permit Requirements
§§ 145.331–145.332	Compliance Certification
§§ 145.341–145.343	CO2 Allowance Allocations
§§ 145.351–145.358	CO2 Allowance Tracking System (COATS)
§§ 145.361–145.363	CO2 Allowance Transfers
§§ 145.371–145.377	Monitoring, Reporting & Recordkeeping
§§ 145.381–145.382	Auction of CO2 CCR and ECR Allowances
§§ 145.391–145.397	CO2 Emissions Offset Projects
§§ 145.401–145.409	CO2 Allowance Auctions

# §145.304 Applicability & Covered Sources

## What does the CO<sub>2</sub> Budget Trading Program Establish?

Creates a cap-and-invest program for CO<sub>2</sub> emissions from the power sector.

## What are the Affected Sources §145.304 ?

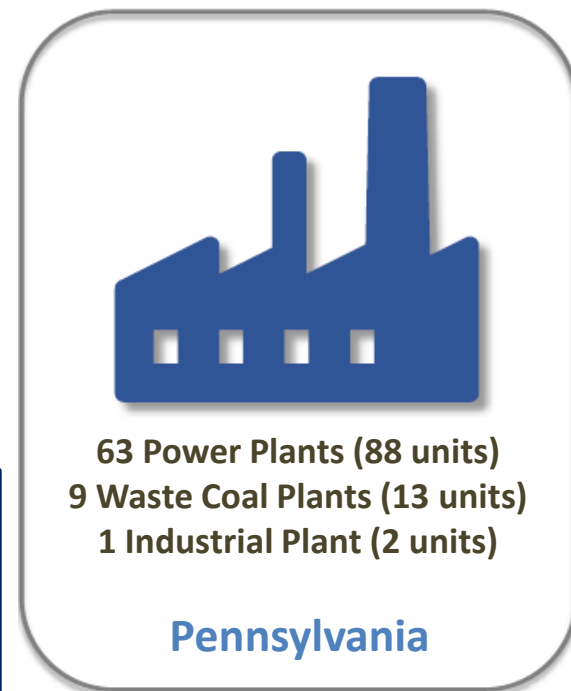
Fossil fuel-fired Electric Generating Units (power plants)

- 25 MW or more nameplate capacity AND
- Sends >10% of gross generation to the grid.

## Limited Exemptions for CHP §145.305

- An otherwise qualifying EGU (25 MW+) that supplies  $\leq 10\%$  of its gross generation to any entity.
- An otherwise qualifying co-generation EGU (25 MW+) that supplies  $\leq 15\%$  of its annual total useful energy to any entity- not including energy sent to an interconnected manufacturing facility.

Addition to the Model Rule



# Establishing Allowance Budget §145.341

Insert regulatory reference One allowance is created for each ton of emissions allowed under Pennsylvania's CO<sub>2</sub> emissions budget.



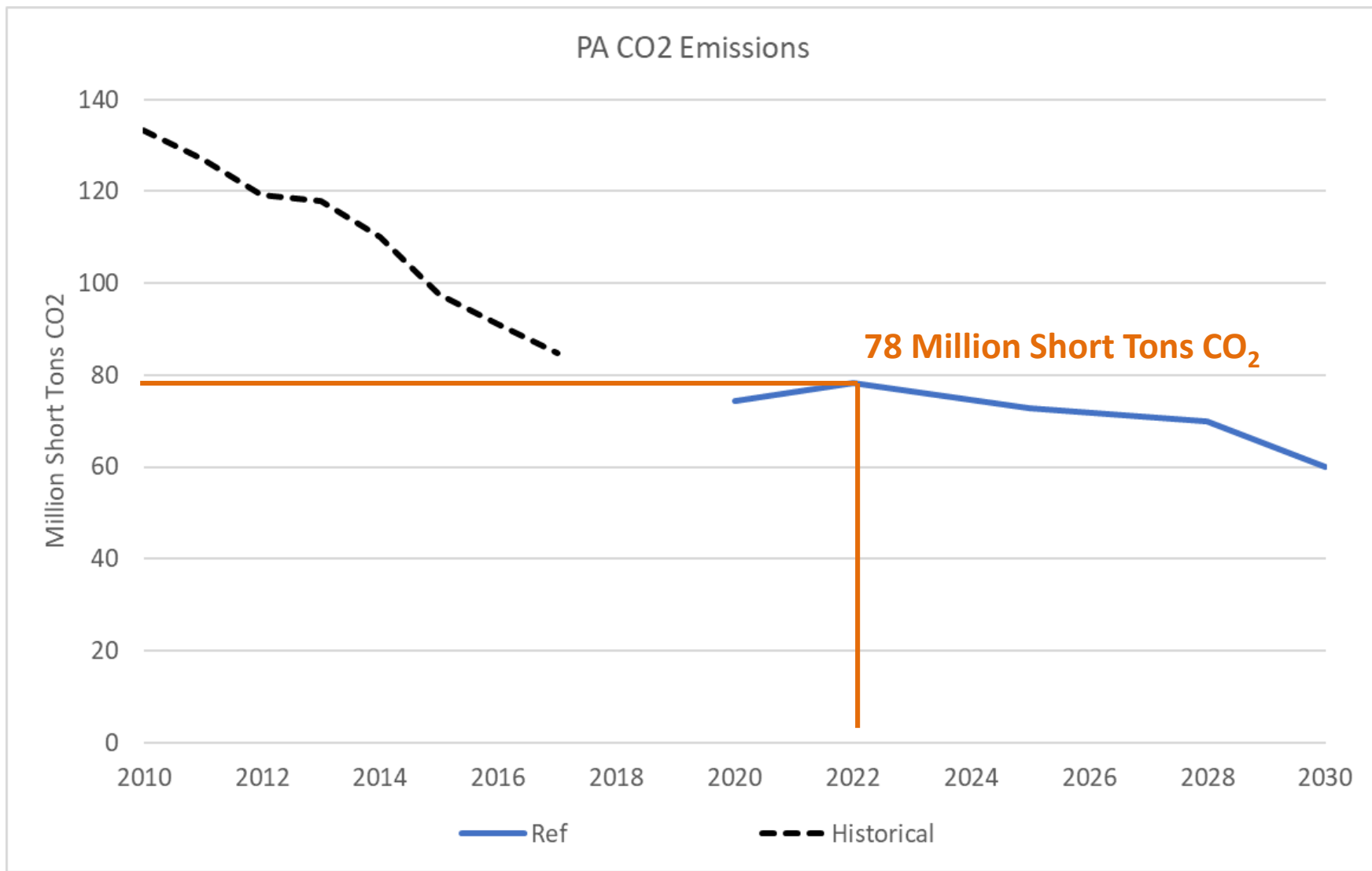
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 = One ton of CO<sub>2</sub> Emissions

 = Emissions Allowance

# Calculating Starting CO<sub>2</sub> Allowance Budget





# Calculating Allowance Budget Trajectory

Year	Budget	Decline (Tonnage)	Annual Decline (Percentage)
2020			
2021			
2022	78,000,000		
2023	75,510,630	2,489,370	-3.19%
2024	73,021,260	2,489,370	-3.30%
2025	70,531,890	2,489,370	-3.41%
2026	68,042,520	2,489,370	-3.53%
2027	65,553,150	2,489,370	-3.66%
2028	63,063,780	2,489,370	-3.80%
2029	60,574,410	2,489,370	-3.95%
2030	58,085,040	2,489,370	-4.11%
<b>2022-2030 Total Reduction:</b>		<b>19,914,960</b>	<b>-25.532%</b>
<b>25.532% reduction from 2022:</b>	<b>58,085,040</b>		
<b>Total tonnage reduction:</b>	<b>19,914,960</b>		
<b>Annual tonnage reduction:</b>	<b>2,489,370</b>		

# Waste Coal Set-Aside Account

*A general account established by the Department for the allocation of CO<sub>2</sub> allowances in an amount sufficient to provide CO<sub>2</sub> allowances equal to the legacy emissions from all waste coal-fired units under § 145.342(i).*

## **Defining Legacy Emissions**

1. The total of CO<sub>2</sub> emissions in tons equal to the highest calendar year of emissions from each unit during the 5-year period beginning January 1, 2015 through December 31, 2019 as determined by the Department. §145.302
2. The Department has determined that legacy emissions are equal to 9,300,000 tons of CO<sub>2</sub> emissions. §145.342
3. Any remaining allowances are transferred to the Strategic Use set-aside each year.

# Strategic Use Set-Aside Account

*A general account established by the Department for the distribution of CO<sub>2</sub> allowances to encourage energy efficiency measures, promotion of renewable or noncarbon-emitting energy, and carbon emissions abatement.*

## **Set-Aside Criteria and Functionality**

1. Department will allocate undistributed CO<sub>2</sub> allowances to the strategic use set-aside account for each allocation year from the waste coal set-aside account.
2. Distributions may be made from the set-aside account for the use in elimination of air pollution including projects that:
  - a) Encourage and foster promotion of energy efficiency measures.
  - b) Promote renewable and non-carbon emitting energy technologies.
  - c) Stimulate investment in development of innovative carbon emissions abatement technologies with significant carbon reduction potential.

# Cogeneration Set-Aside Account

*A general account established by the Department for the allocation of allowances for retirement in an amount equal to the adjustment of the compliance obligation of a cogeneration unit.*

## **Set-Aside Eligibility Criteria for Qualifying Facilities**

1. Units must be located in PA and be subject to the CO<sub>2</sub> Budget Trading Program.
2. Must meet definition of Cogeneration Unit per §145.302.
  - a) An electric-generating unit that uses a steam-generating unit or stationary combustion turbine to simultaneously produce both electric or mechanical and useful thermal energy from the same primary energy facility.
3. Completion of a compliance obligation adjustment application including:
  - a) Documentation that CO<sub>2</sub> budget unit is a cogeneration unit.
  - b) Identify the compliance account for the CO<sub>2</sub> budget unit.
  - c) Identify the allocation year for which the adjustment is being requested.
  - d) Calculations and supporting data to determine compliance adjustment.
4. Department makes a compliance obligation adjustment determination.

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# Compliance Options

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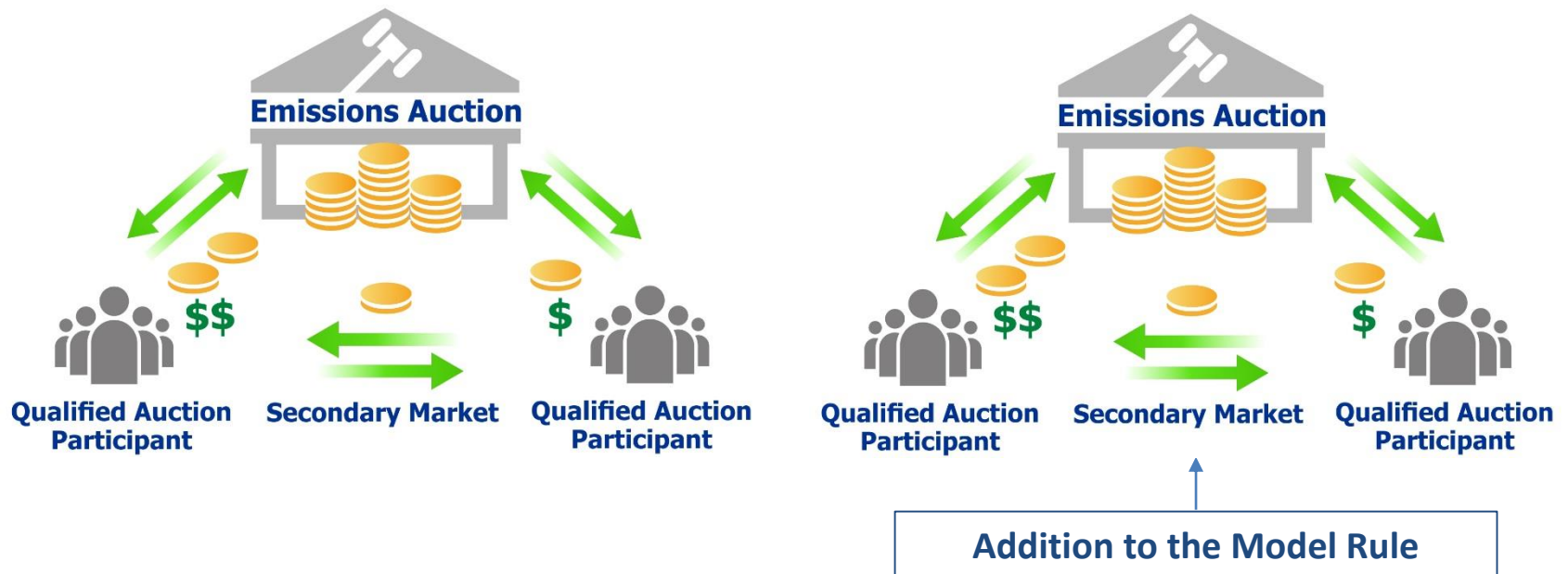
# Auction Platform Flexibility

*The Department will participate in multistate CO<sub>2</sub> allowance auctions in coordination with other participating states but reserves the right to conduct Pennsylvania-run auctions to sell CO<sub>2</sub> allowances allocated to the air pollution reduction account if the regulatory conditions for the multistate auctions are no longer met.*

Multi-state Auction (RGGI)

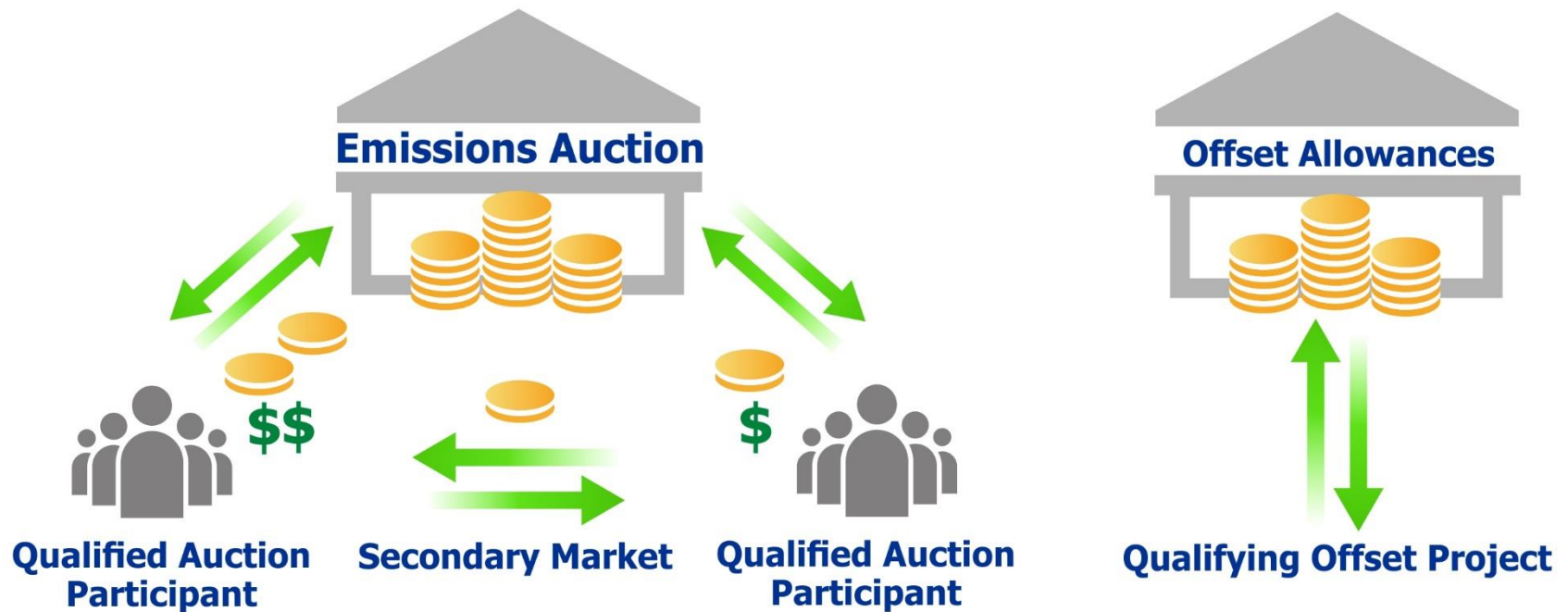
or

Pennsylvania – run Auction



# Options for Compliance

Affected Sources must attain the number of allowances  
– equal to the amount of CO<sub>2</sub> they emit –



# Quarterly Regional Auctions

## 2020 RGGI Regional Auction Dates

<b>Auction #47</b>	<b>March 11, 2020</b>	<b>\$5.65</b>
<b>Auction #48</b>	<b>June 3, 2020</b>	
<b>Auction #49</b>	<b>September 2, 2020</b>	
<b>Auction #50</b>	<b>December 2, 2020</b>	

**RGGI Inc.**



## MARKET MONITOR REPORT FOR AUCTION 47

Prepared for:

on behalf of the RGGI Participating States

*Bids were submitted across a wide range of prices in the auction and the clearing price of \$5.65 was relatively consistent with average bid prices submitted.*

The following table reports several statistics regarding the bid prices for bids submitted in Auction 47. The median and mean bid prices are weighted by the quantity of each bid.

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<b>Bid Prices:</b>	
<b>Minimum</b>	\$2.32
<b>Maximum</b>	\$6.75
<b>Average (Median)</b>	\$5.55
<b>Average (Mean)</b>	\$5.18
<b>Clearing Price:</b>	\$5.65

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# RGGI CO<sub>2</sub> Offset Allowances

*A RGGI CO<sub>2</sub> offset allowance represents a project-based greenhouse gas emission reduction outside of the capped electric power generation sector.*

## **Offset Project Categories**

1. Landfill Methane\*
2. Reforestation, Improved Forest Management and Avoided Conversion.
3. Agricultural Methane

## **Offset Project Requirements**

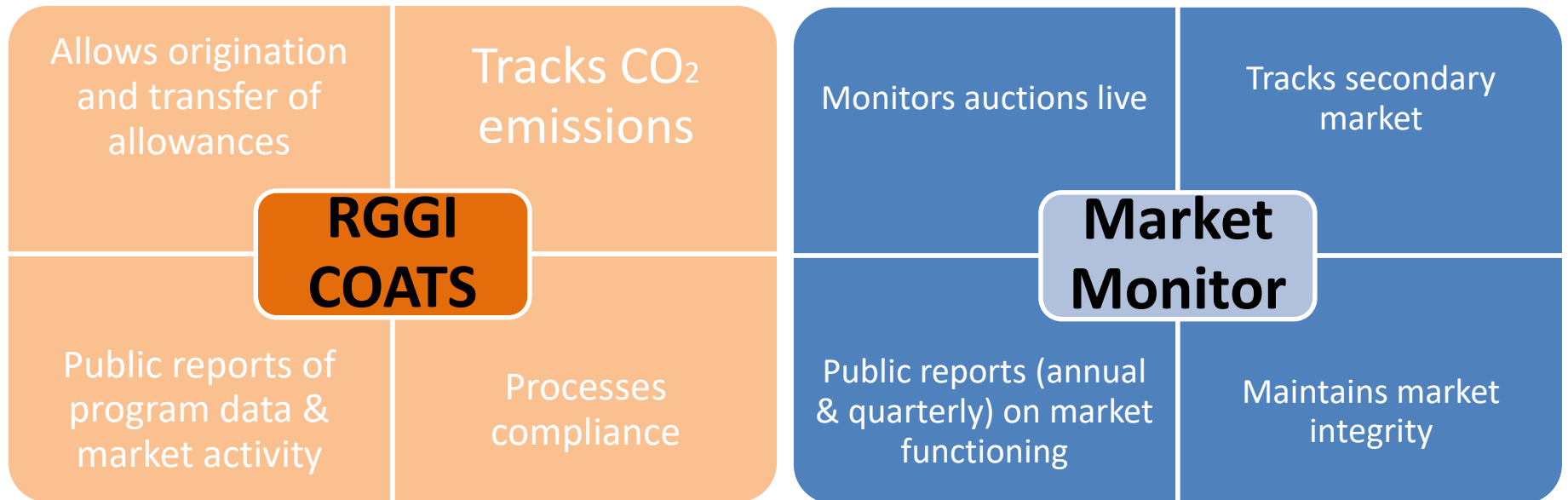
- Project-based.
- Greenhouse gas emission reduction outside of power generation sector.
- Comparable offsets across region.
- In addition to, not in place of a regulatory requirement.
- Located at least partly in Pennsylvania.

# Compliance Requirements §145.304

1. Title V Permit Modifications
2. Establish CO<sub>2</sub> Allowance Tracking System (COATS) Account
3. Emissions Monitoring (EPA's CAMD)
4. Recordkeeping & Reporting
5. Application for Allowances from Qualifying Set-Asides (optional)
6. Transfer of Required Allowances to Budget Unit Compliance Account
  - a) 50% during interim control periods
  - b) 100% at the close of the control period

**Allowance Transfer Deadline:** *Midnight of March 1<sup>st</sup> the deadline by which CO<sub>2</sub> allowances must be submitted for recordation in a CO<sub>2</sub> budget source's compliance account in order for the source to meet the CO<sub>2</sub> requirements of § 145.306(c).*

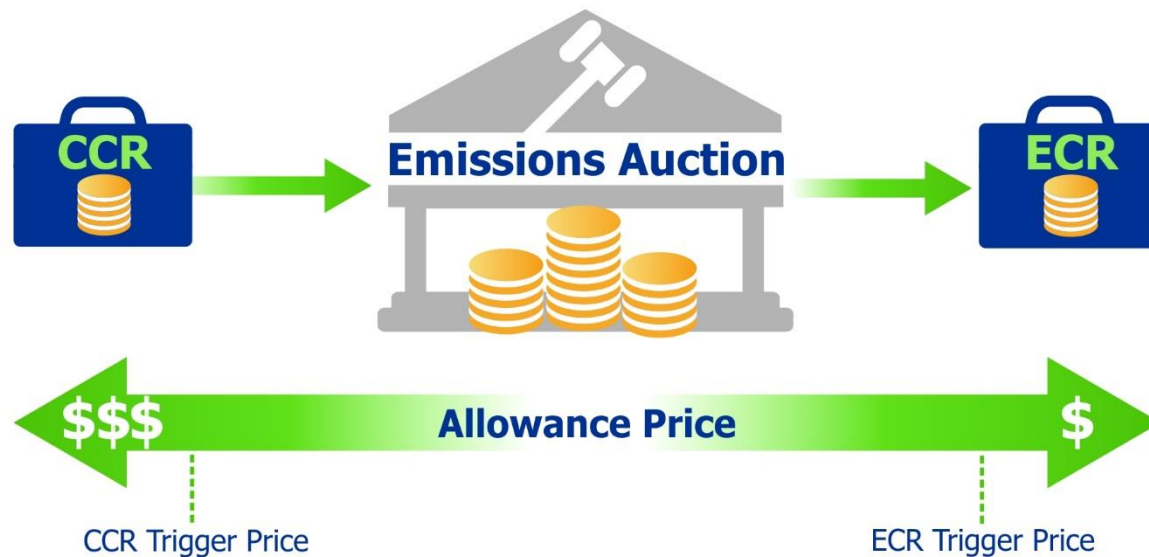
# CO<sub>2</sub> Allowance Tracking System (COATS)



# Additional Market Mechanisms

If the allowance price becomes much higher or lower than expected then there are market mechanisms in place to adjust the supply of allowances.

- If allowances prices are higher than expected, a set aside amount of allowances are entered into the market, called a “Cost Containment Reserve” (CCR).
- If allowance prices are much lower than expected, allowances are removed from the market, called an “Emissions Containment Reserve” (ECR).



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# Reinvestment of Auction Proceeds

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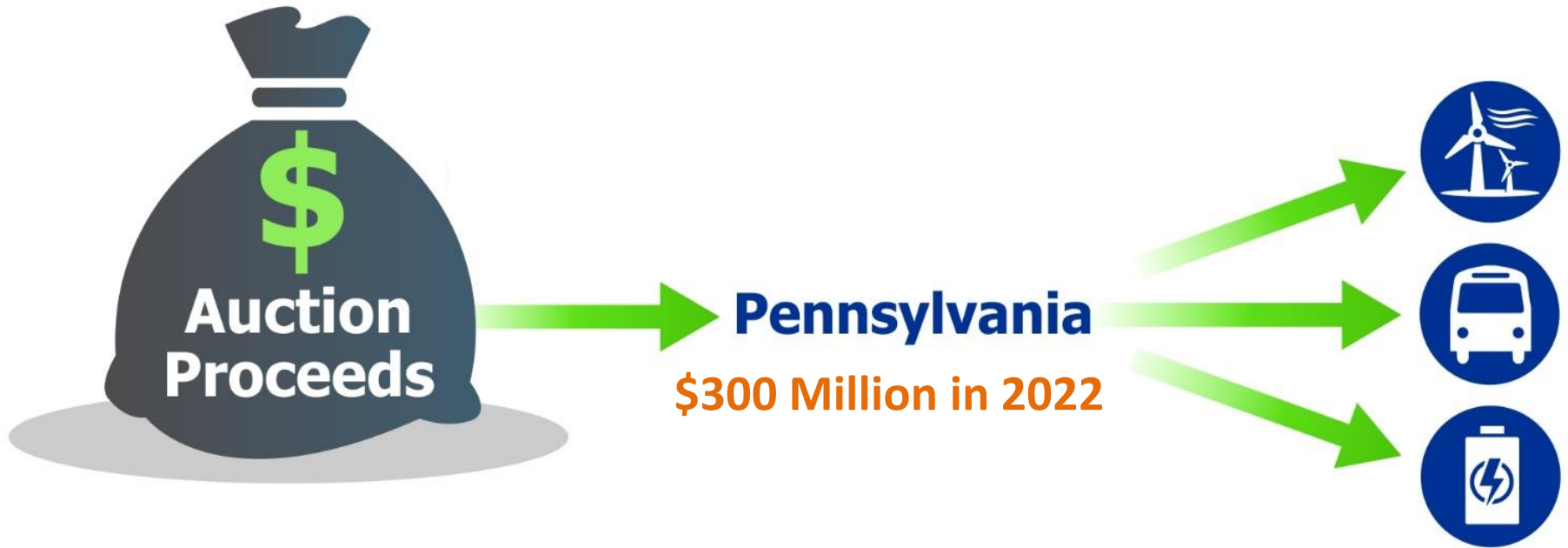
# Distributing PA Allowances



**Allowance distributed into  
auction marketplace**

**Set Asides**

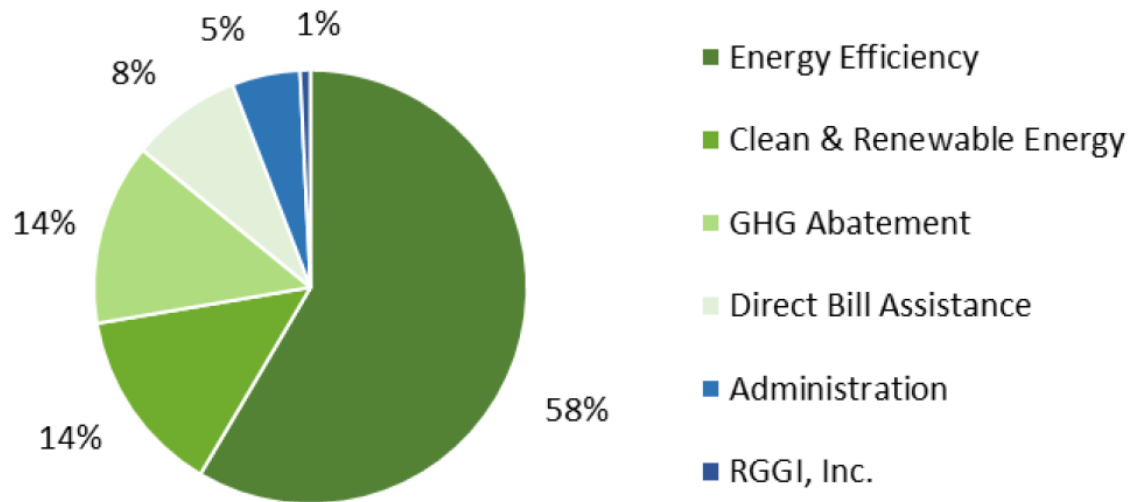
# Pennsylvania Auction Proceeds



Estimated PA Annual RGGI Program Revenue (millions)									
	2022	2023	2024	2025	2026	2027	2028	2029	2030
<b>Annual Revenue</b>	<b>\$320</b>	<b>\$318</b>	<b>\$315</b>	<b>\$311</b>	<b>\$274</b>	<b>\$240</b>	<b>\$207</b>	<b>\$193</b>	<b>\$179</b>

# RGGI State Historic Investments

Chart 4: Cumulative RGGI Investments by Category



The nine participating RGGI states invested \$2.17 billion from the start of the program through 2016. \$245.1 million remained to be invested in 2017 and future programs. \$93.1 million was transferred to state general funds by acts of state legislatures.

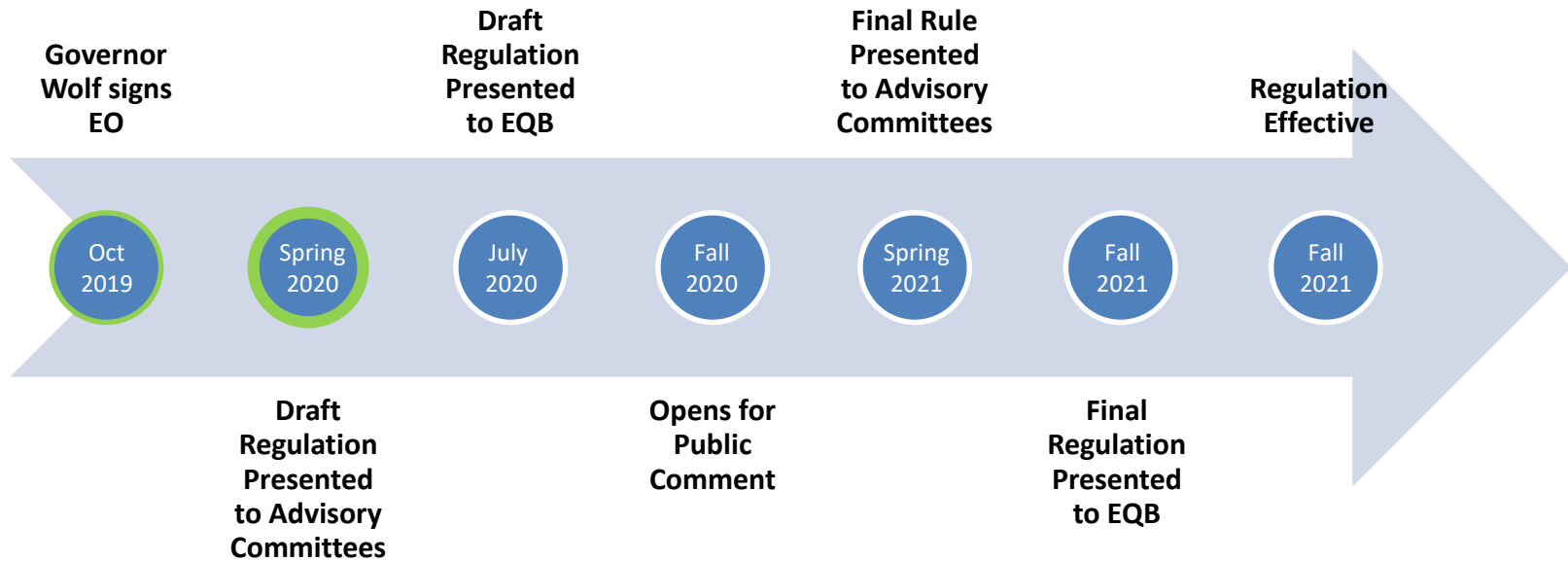


# RGGI Results Thus Far

- ✓ **Decreased Emissions:** CO<sub>2</sub> emissions from RGGI power plants have fallen by 47%.
- ✓ **Lower Electricity Prices:** Over the first decade of RGGI's existence, electricity prices in RGGI states have fallen by 5.7%.
- ✓ **Health Benefits:** RGGI-driven reductions in pollutant emissions have resulted in over \$5.7 billion in health and productivity benefits in the RGGI states.
- ✓ **Net Job Growth:** Researchers estimate that from 2009-2017 the RGGI program yielded a net benefit of \$4.7 billion to the RGGI states and more than 40,000 job-years.
- ✓ **Benefits the economy:** GDP in RGGI states has grown by 47% since the start of the program, demonstrating that RGGI is not an impediment to significant economic growth.

**Source:** [https://acadiacenter.org/wp-content/uploads/2019/09/Acadia-Center\\_RGGI\\_10-Years-in-Review\\_2019-09-17.pdf](https://acadiacenter.org/wp-content/uploads/2019/09/Acadia-Center_RGGI_10-Years-in-Review_2019-09-17.pdf)

# Regulatory Timeline



# Questions & Answers



## AQTAC Action

The Department is requesting AQTAC's concurrence with the Department's recommendation to move the proposed rulemaking *Pennsylvania's CO<sub>2</sub> Budget Trading Program* forward to the EQB for consideration.



**pennsylvania**

DEPARTMENT OF ENVIRONMENTAL PROTECTION



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