



**pennsylvania**  
DEPARTMENT OF ENVIRONMENTAL PROTECTION



# Draft Proposed Rulemaking

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

**Environmental Justice Advisory Board  
May 21, 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

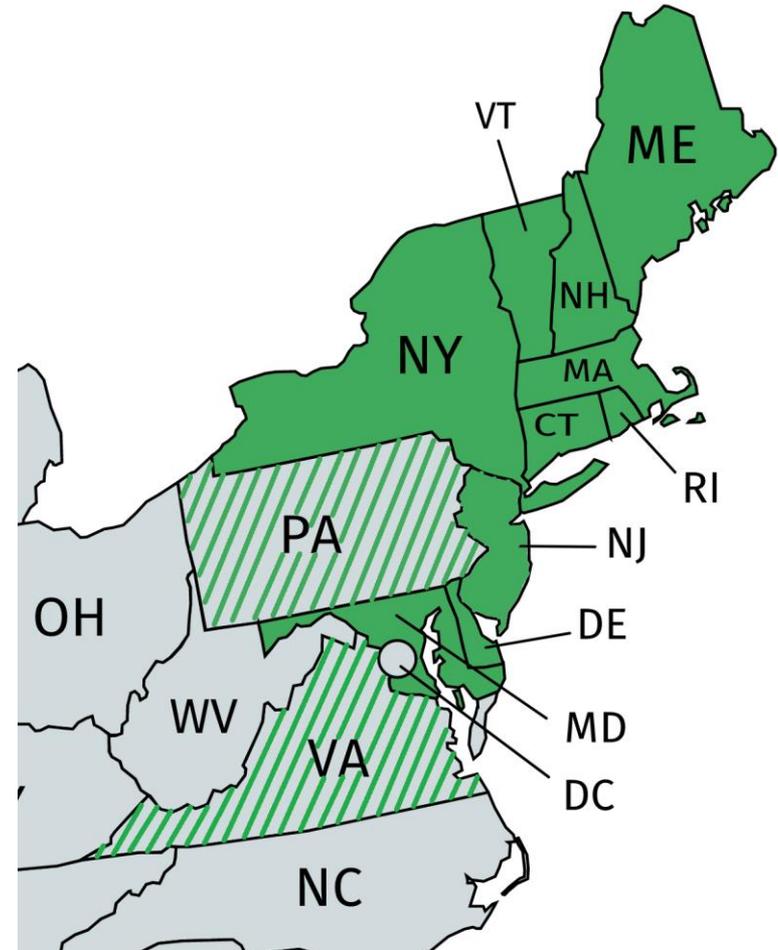
\*20.87 MMTCO<sub>2</sub>e more required to reach the 2025 goal

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

2025 – 26% reduction in GHG Emissions - 214.17 MMTCO<sub>2</sub>e

# Regional Greenhouse Gas Initiative

- 10 Independent State Programs
  - PA and VA not yet participating
- Cap on CO<sub>2</sub> emissions from power sector
- Most allowances sold at auction
- Auction proceeds fund air pollution reduction programs
- Markets are Linked through:
  - Consistent Regulations
  - Reciprocal Acceptance of Allowances
- No central RGGI Authority
  - States oversee program jointly
    - DEP & PUC on Executive Board
  - RGGI Inc. does most administrative and technical functions



# Cap and Trade vs. Cap and Invest (RGGI)

**Require sources to turn in allowances for CO<sub>2</sub> emissions.**

**Only issue a specific number of allowances.**

**Allow sources to trade allowances.**

**Invest proceeds from allowance auctions into air pollution reduction programs.**

**Cap and Trade**

**Cap and Invest**

# Advisory Committee Participation

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

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

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

- ✓ Air Quality Technical Advisory Committee – May 7<sup>th</sup> 2020
- ✓ Citizen’s Advisory Council – May 19<sup>th</sup> 2020
- ✓ Oil & Gas Technical Advisory Board- May 20<sup>th</sup> 2020
- ✓ Environmental Justice Advisory Board- May 21<sup>st</sup> 2020

## **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

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# Draft Proposed Annex Discussion

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# Draft Proposed Annex (Preliminary)

## CHAPTER 145. INTERSTATE POLLUTION TRANSPORT REDUCTION

### Subchapter E. CO<sub>2</sub> BUDGET TRADING PROGRAM

#### GENERAL PROVISIONS

Sec.

- 145.301. Purpose.
- 145.302. Definitions.
- 145.303. Measurements, abbreviations and acronyms.
- 145.304. Applicability.
- 145.305. Limited exemption for CO<sub>2</sub> budget units with electrical output to the electric grid restricted by permit conditions.
- 145.306. Standard requirements.
- 145.307. Computation of time.

*(Editor's Note: Sections 145.301—145.414 are new and printed in regular type to enhance readability.)*

#### § 145.301. Purpose.

This subchapter establishes the Pennsylvania component of the CO<sub>2</sub> Budget Trading Program, which is designed to reduce anthropogenic emissions of CO<sub>2</sub>, a greenhouse gas, from CO<sub>2</sub> budget sources in a manner that is protective of public health, welfare and the environment and is economically efficient.

# 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

# §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 ?

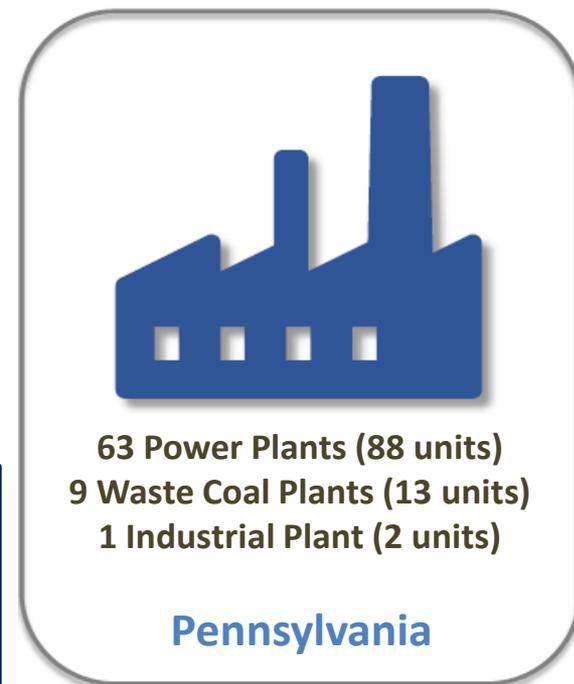
Fossil fuel-fired Electric Generating Units (power plants)

- 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

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



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

=



 = Emissions Allowance

# Calculating Allowance Budget \$145.341

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>		

# State Allowance Set-Asides

State	Set-Aside Programs/Accounts
Connecticut	Voluntary Clean Energy, Customer-side Distributed Resources Combined Heat and Power Useful Thermal Energy
Delaware	n/a
Maine	Voluntary Renewable Energy Integrated Manufacturing Facility Pre-retirement
Maryland	Limited Industrial Exemption, Long-term Contract Clean Generation
Massachusetts	Greenhouse Gas Credit Exchange, Voluntary Renewable Energy
New Hampshire	Voluntary Renewable Energy Market, Emergency
New Jersey	Fixed Price Contract, Co-generation
New York	Voluntary Renewable Energy/Eligible Biomass, Long-term Contract
<b>Pennsylvania</b>	<b>Co-Generation, Waste Coal, Strategic Use,</b>
Rhode Island	Voluntary Renewable Energy Market
Vermont	Voluntary Renewable Energy

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# Compliance Options

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# Options for Compliance

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



Multi-state Auction (RGGI)

Pennsylvania – run Auction

or

# 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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# 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).*

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# Auction Proceeds

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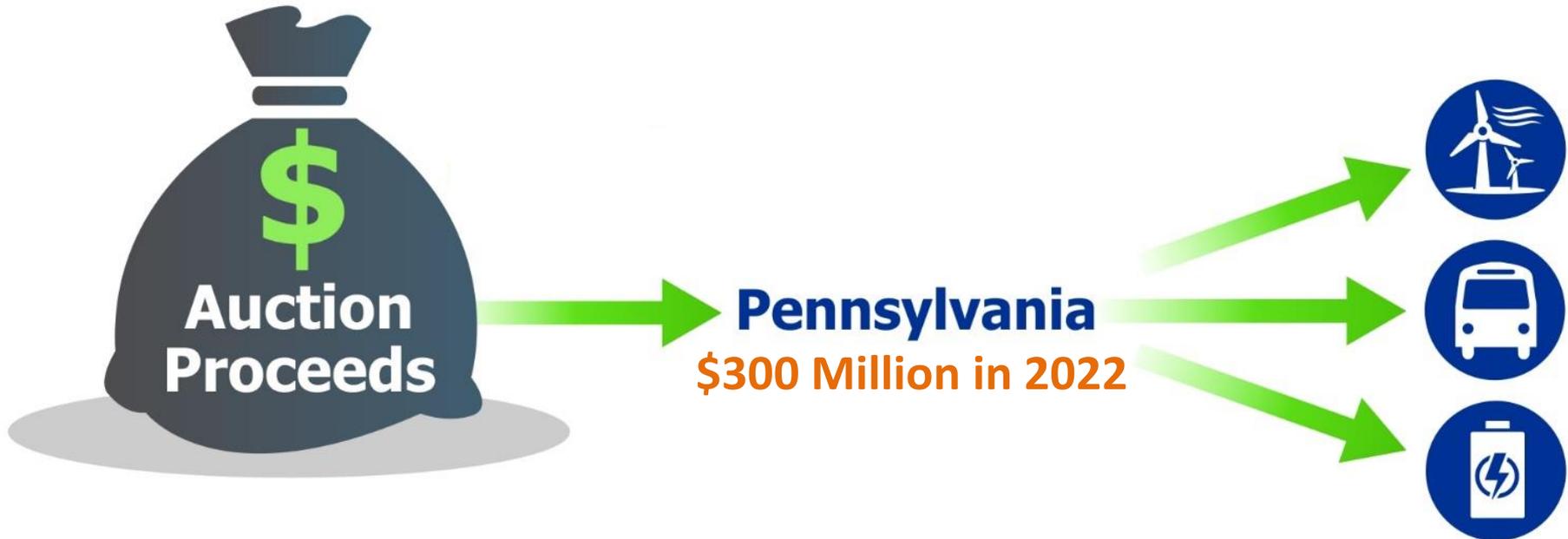
# Distributing PA Allowances



**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 + Investment Scenario			
	Energy Efficiency	Clean and Renewable Energy	Greenhouse Gas Abatement
<b>Revenue Percentage</b>	<b>31%</b>	<b>32%</b>	<b>31%</b>

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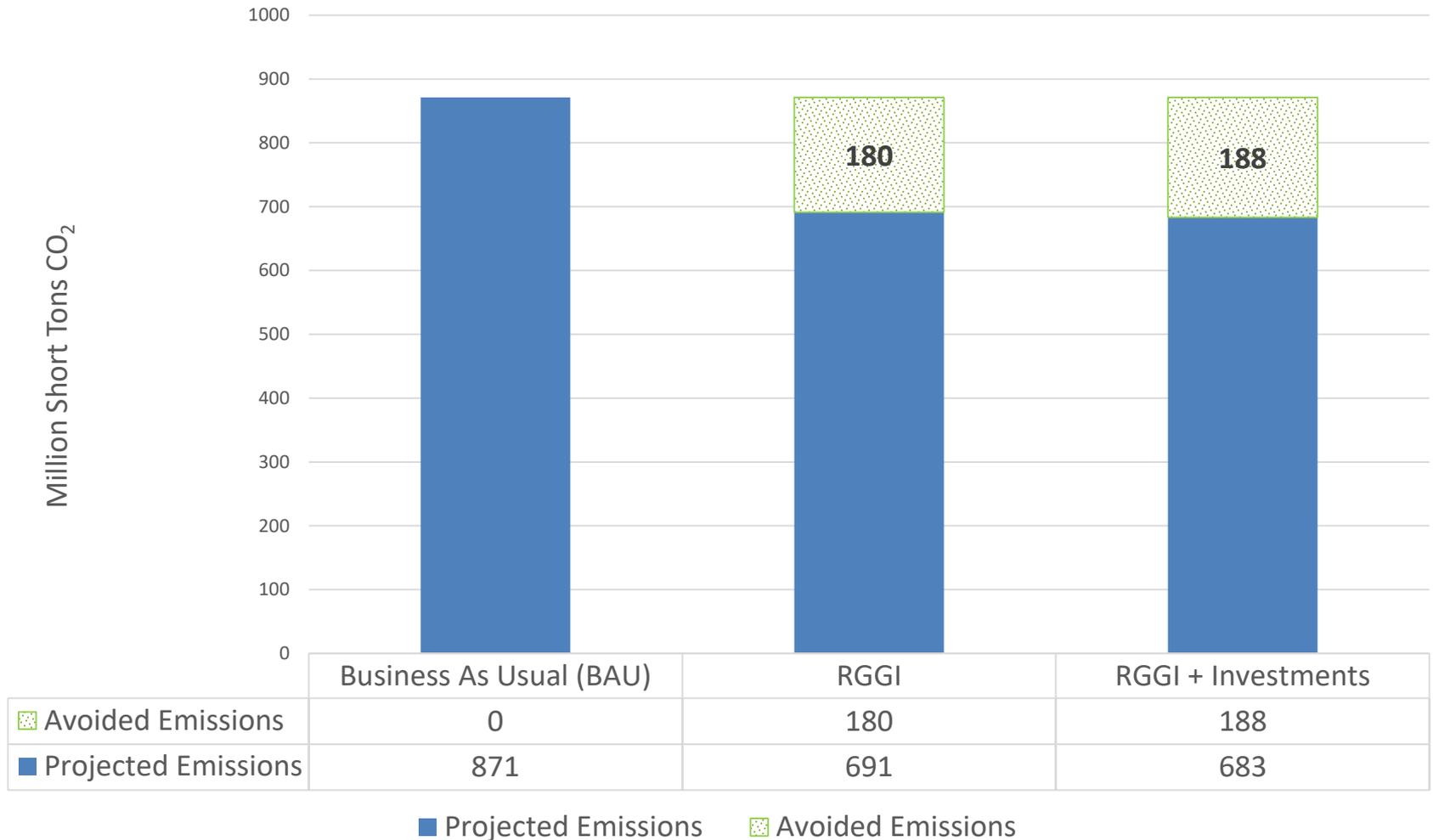
# IPM Modeling Insights

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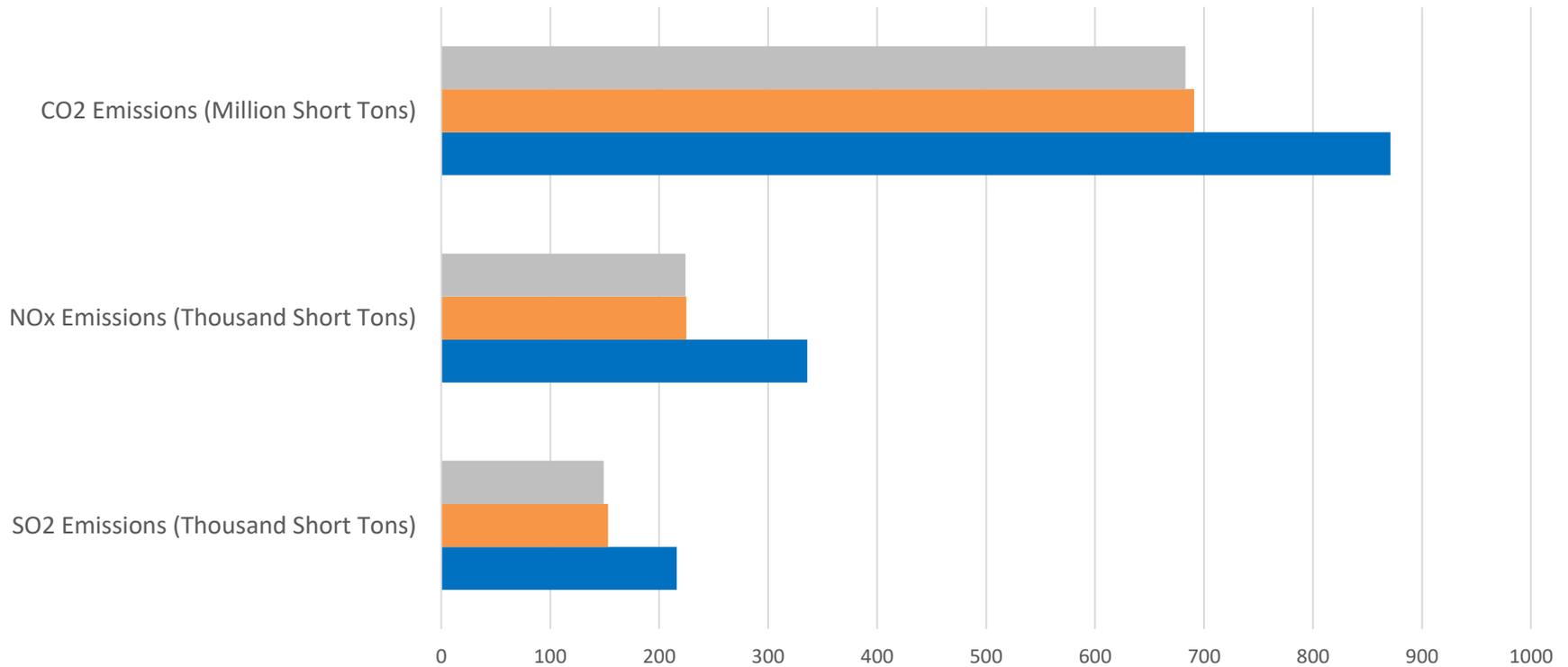
# Modeling Insights- PA RGGI Participation

- Significant Emissions Reductions Realized Over the Decade.
- Environmental Benefits Accrue in the near-term.
- Pennsylvania Remains a Leading Electricity Exporter.
- PA Generation Remains At Near Historical Levels.
- PA Wholesale Energy Prices Increase Slightly Short-Term.
- Generation Mix Shifts as RGGI price impacts dispatch.
- RGGI Participation is critical to meeting GHG reduction goals.

# PA Avoided Emissions Through 2030

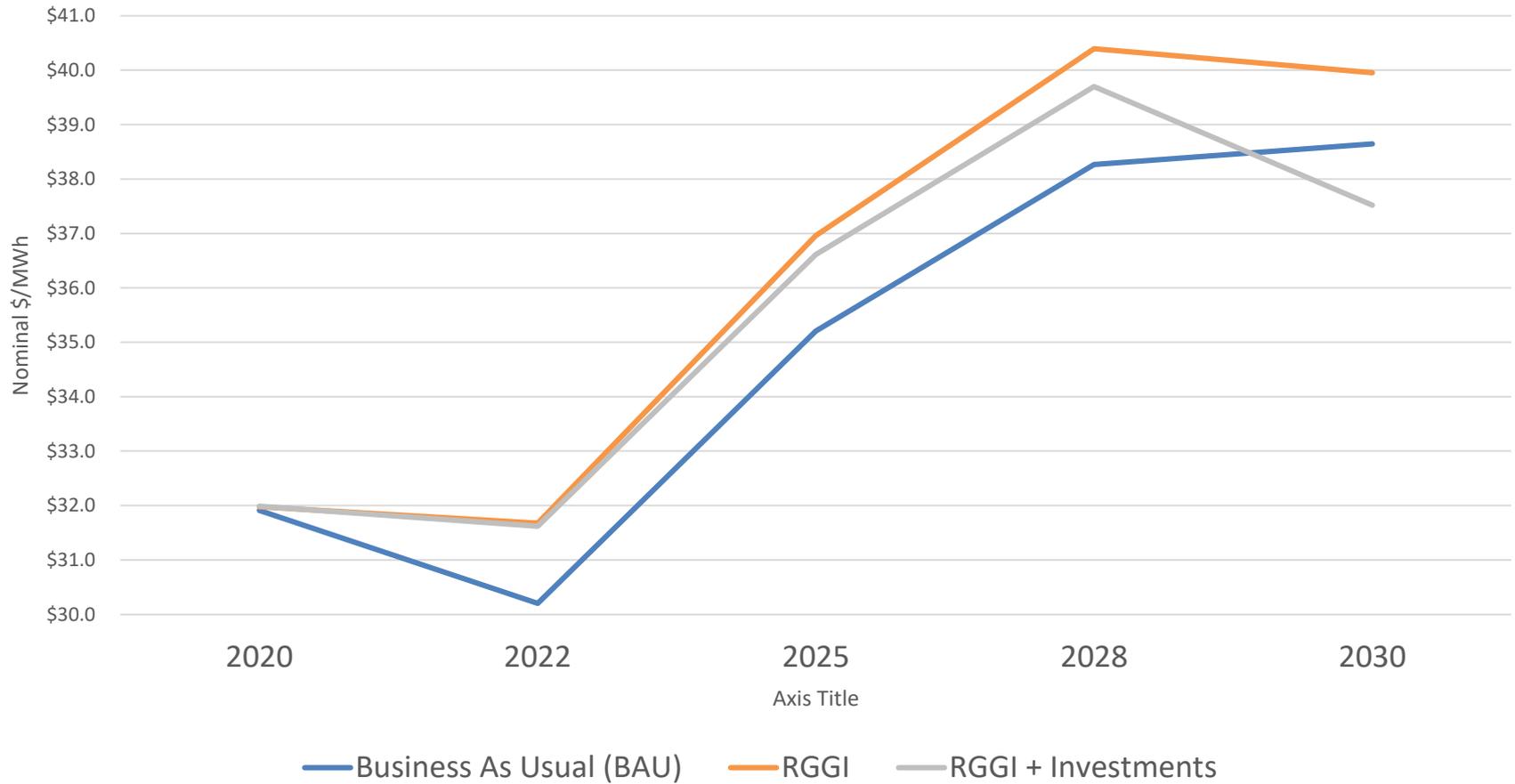


# PA Environmental Benefits Through 2030

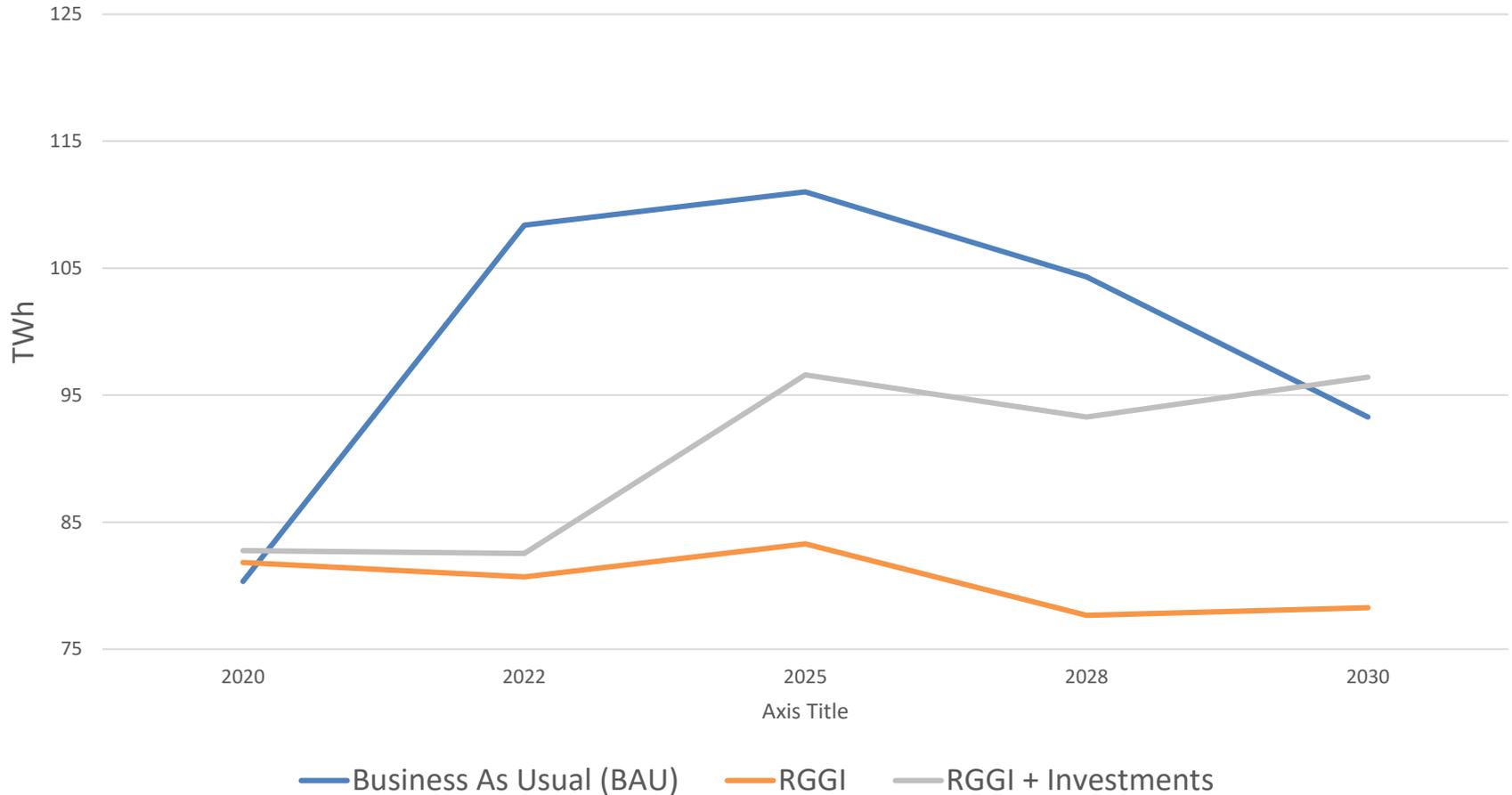


	SO2 Emissions (Thousand Short Tons)	NOx Emissions (Thousand Short Tons)	CO2 Emissions (Million Short Tons)
■ RGGI + Investments	149	224	683
■ RGGI	153	225	691
■ Business As Usual (BAU)	216	336	871

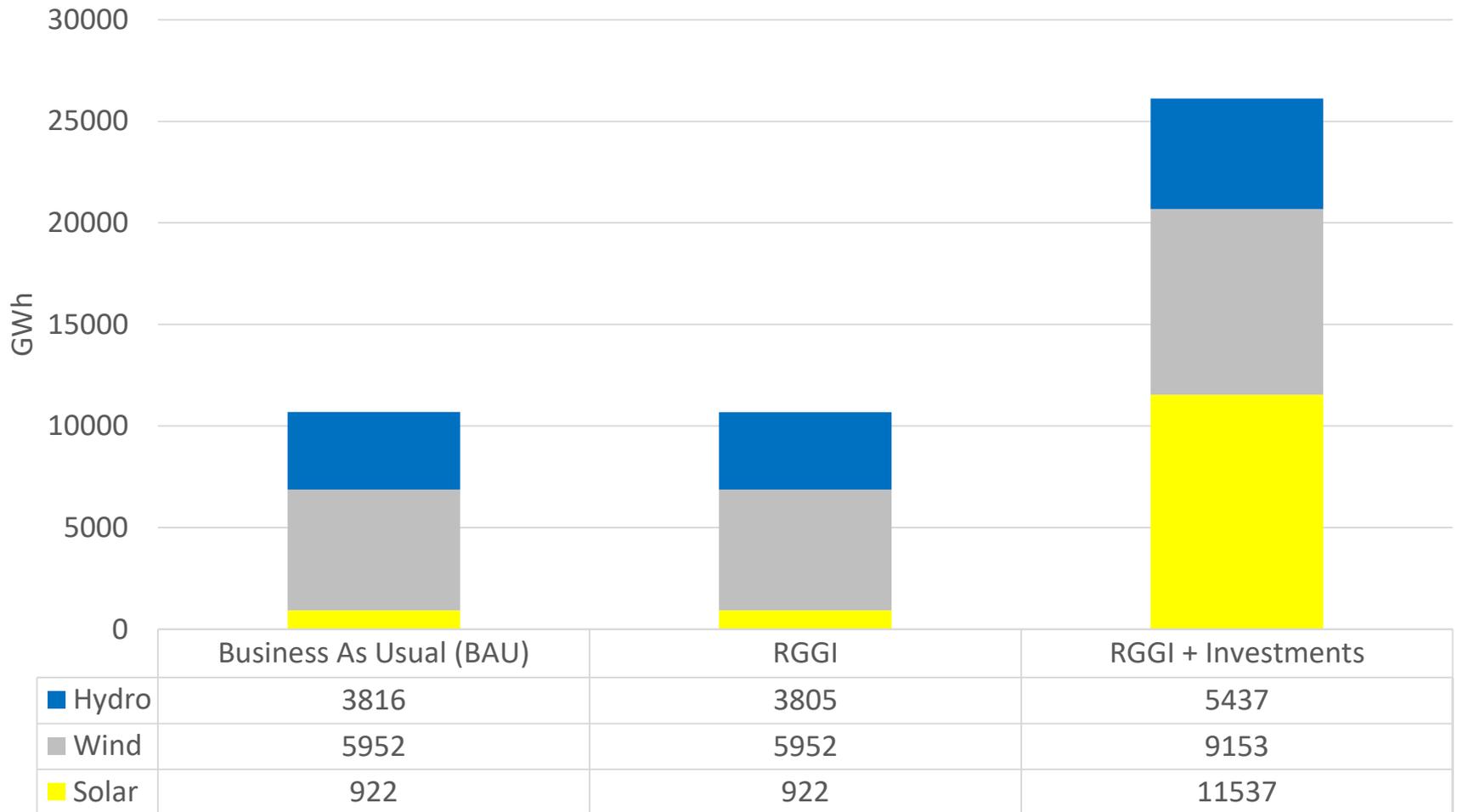
# Pennsylvania Firm Power Prices



# PA Electricity Exports



# PA 2030 Renewable Generation



# PA Historical Energy Generation

## 2019 PA Total Generation - 231,245 GWh



**Natural Gas**  
42%



**Nuclear**  
36%



**Renewable**  
5%



**Coal**  
17%

## 2010 PA Total Generation - 233,100 GWh



**Natural Gas**  
14%



**Nuclear**  
34%

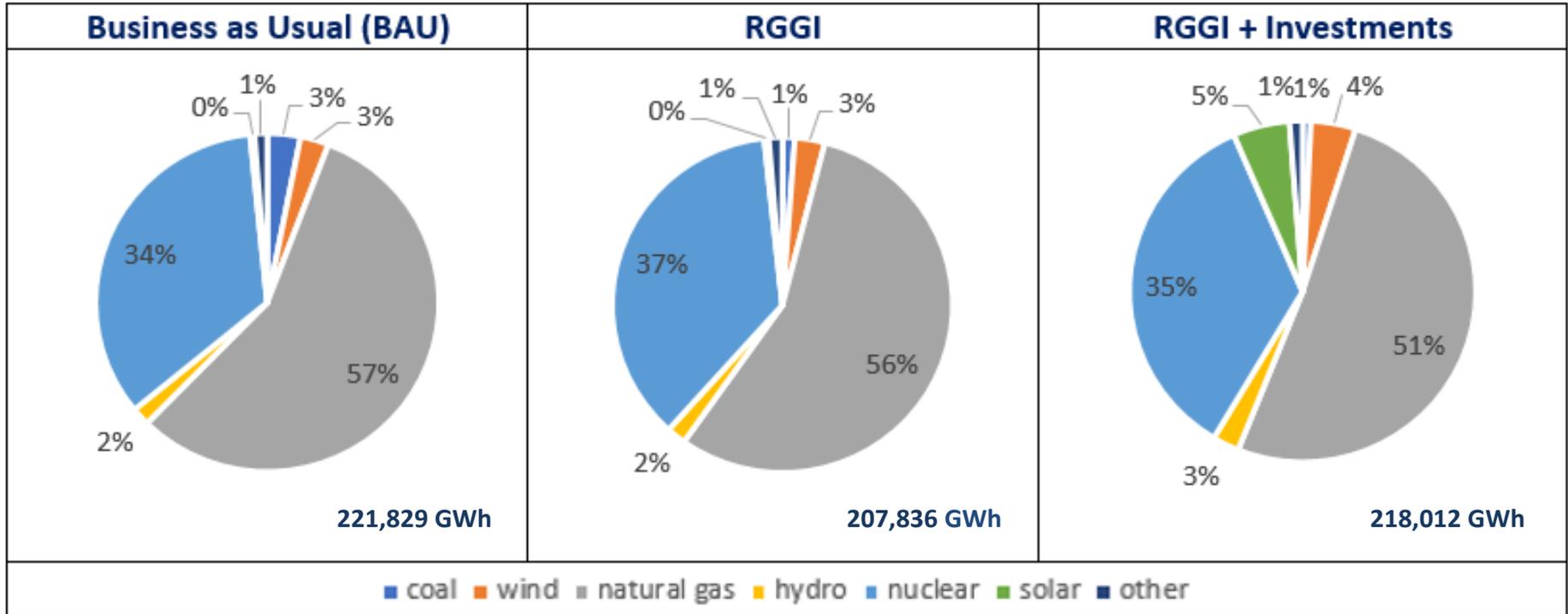


**Renewable**  
5%



**Coal**  
47%

# 2030 PA Energy Generation



# Questions & Answers





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