

# Regional Greenhouse Gas Initiative

RGGI 101

How it Works and How it Benefits Pennsylvanians

August 6, 2020

Tom Wolf, Governor

Patrick McDonnell, Secretary

# Presentation Overview

- Climate Change – Impacts in Pennsylvania
- Overview of the Regional Greenhouse Gas Initiative
- How RGGI Works – and Reduces Air Pollution
- Overview of Pennsylvania's RGGI Modeling Efforts
- How RGGI Benefits Pennsylvanians and Communities
- Opportunities for RGGI Revenue Reinvestment
- Next Steps and Continued Stakeholder Engagement

# 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

Changes in global climate due to increased greenhouse gases have already impacted communities around the world and are threatening to cause many more negative impacts 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.*

# Pennsylvania Views on Climate

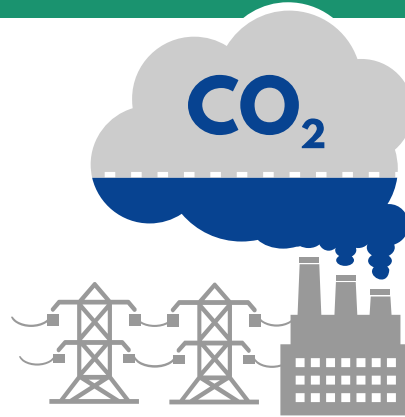
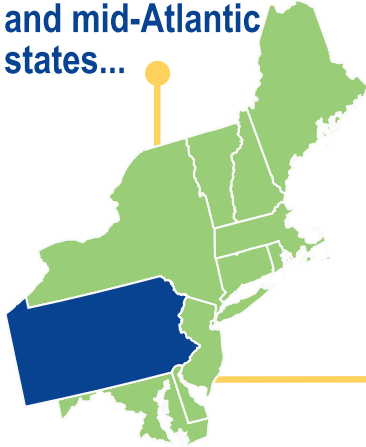
*In October 2019, Governor Wolf directed DEP to begin a rulemaking process that will enable Pennsylvania to participate in the Regional Greenhouse Gas Initiative- reduce emissions and combat climate change – and has the support of 72% of Pennsylvanians.*

**According to the 2019 Yale Climate National Survey:**

- ✓ 67% of Pennsylvanians believe that global warming is happening;
- ✓ 67% believe global warming will harm future generations;
- ✓ **72% of Pennsylvanians support regulating CO2 as a pollutant;**
- ✓ 68% support setting strict CO2 limits on existing coal-fired power plants;
- ✓ 70% of Pennsylvanians believe that environmental protection is more important than economic growth.

# PA Participation in the Regional Greenhouse Gas Initiative (RGGI)

RGGI is a partnership between Northeastern and mid-Atlantic states...



...Designed to cap and reduce carbon emissions from fossil fuel fired power plants.

The electricity sector is the 2nd leading source of Greenhouse Gas Emissions in PA.



**By 2025**

Participating in RGGI will help PA reach our greenhouse gas emissions goals...



**By 2050**



Since 2005, RGGI states have significantly reduced their power sector CO<sub>2</sub> pollution.

...And help PA combat climate change.



# RGGI Benefits Pennsylvania

***Decreases Emissions:*** CO<sub>2</sub> emissions will decrease by more than 10x when compared to future emissions without program participation. Significant co-benefits accrue from SO<sub>2</sub> and NO<sub>x</sub> emission decreases as well.

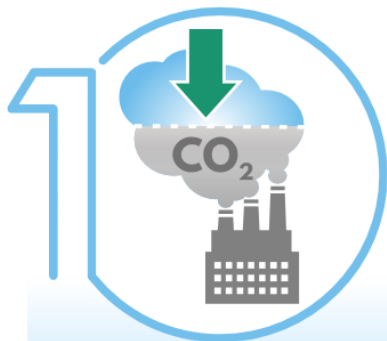
***Positive Economic Benefits:*** Although overall economic benefits of RGGI participation are minimal, estimates show that Pennsylvanians will experience growth in statewide economic output and jobs.

***Reduces Healthcare Costs:*** Reductions in air pollutants are estimated to save Pennsylvanians billions of dollars in avoided healthcare costs.

***Improves Quality of Life:*** Less deaths, hospitalizations and ER visits due to cardiac and respiratory issues exacerbated by poor air quality- especially for children.

[July 7th – DEP Press Release “Capping Carbon Pollution Would Save Hundreds of Lives and Billions of Dollars”](#)

# How RGGI Works



States set limits on the amount of CO<sub>2</sub> pollution from powerplants.



States offer allowances for sale through auctions.



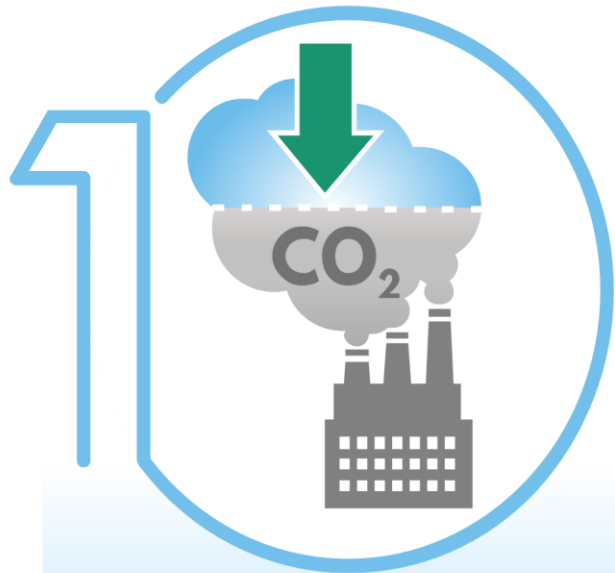
Powerplants buy allowances to meet the amount of pollution they create.



States receive revenue from auctions to reinvest in economy.



# How RGGI Works – CO<sub>2</sub> Limits



States set limits on the amount of CO<sub>2</sub> pollution from powerplants.

- Pennsylvania is proposing a 2022 allowance budget of 78 million short tons of CO<sub>2</sub>.
- Each state sets a yearly allowance budget.
- The total of all state allowance budgets equals the regional cap.
- Each year each state's allowances budgets along with the regional cap decline.
- Analyzing emissions impacts in environmental justice (EJ) areas – and developing EJ principles.

# How RGGI Works – Allowance Auctions



- **Pennsylvania offers CO<sub>2</sub> allowances for sale in the quarterly auctions.**
- **Allowances are purchased by both in-state and out-of-state facilities or groups.**
- **Market-based auction determines prices based on competitive bidding process.**
- **Revenue proceeds return to the Commonwealth.**

# How RGGI Works – Compliance



Powerplants buy allowances to meet the amount of pollution they create.

- **Powerplants must acquire one allowance for each ton of carbon pollution emitted.**
  - *1 allowance = 1 short ton of CO<sub>2</sub> emissions*
- **Energy sources with no CO<sub>2</sub> emissions do not need to purchase allowances.**
- **Compliance oversight would be managed by PA Department of Environmental Protection.**
- **Allowances can be traded throughout the RGGI region for use by all RGGI facilities and have no expiration date.**

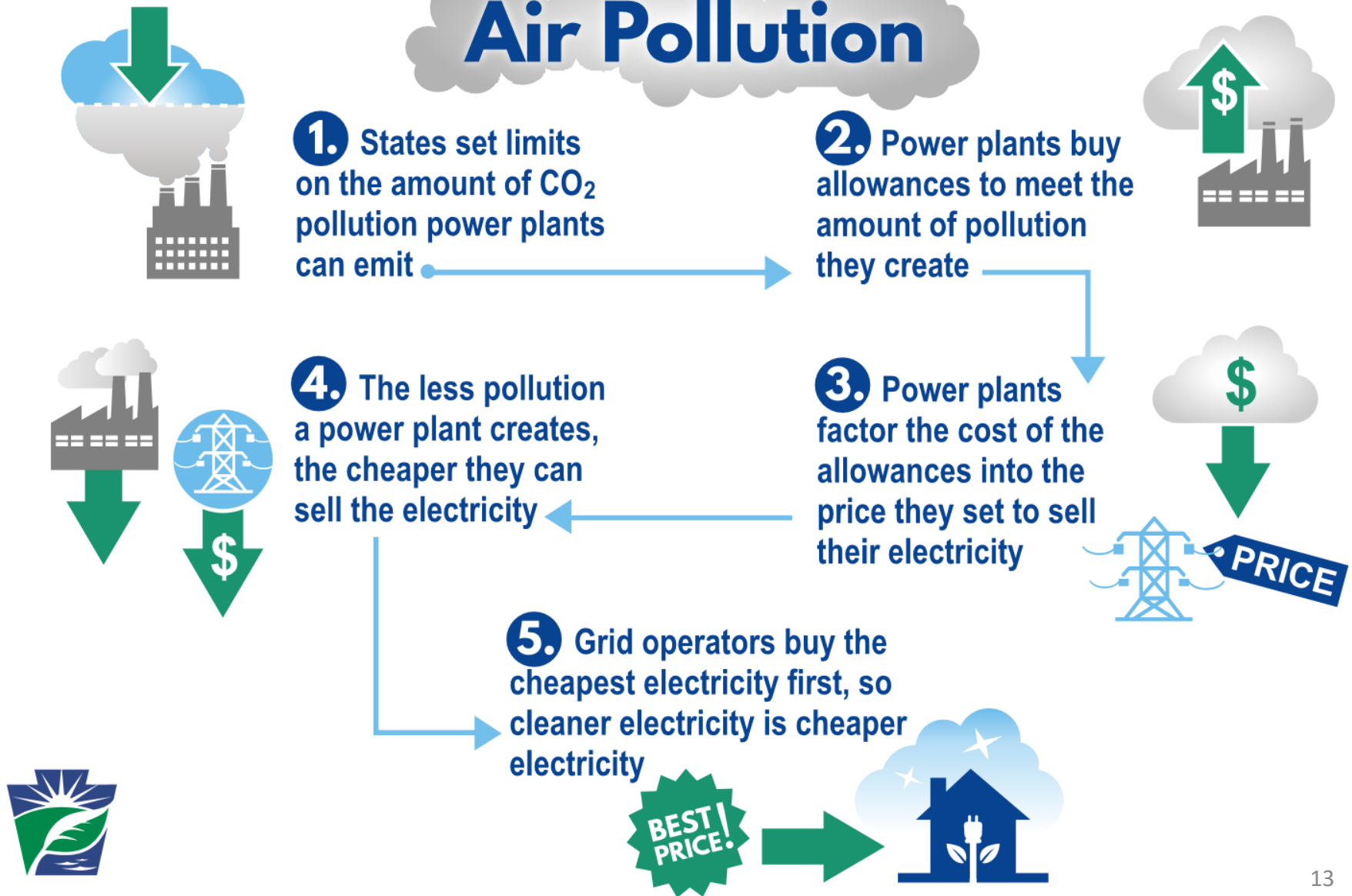
# How RGGI Works - Investments



- Pennsylvania anticipates \$300 M in 2022 from the sale of allowances in quarterly auctions.
- Revenue will be reinvested into Pennsylvania - to spur job creation and economic growth.
- Auction revenue to be used only for the “elimination of air pollution”.
- Inclusion of equity and Environmental Justice Principles.
- Consideration of Fairness for Workers and Communities.

# How RGGI Reduces

## Air Pollution



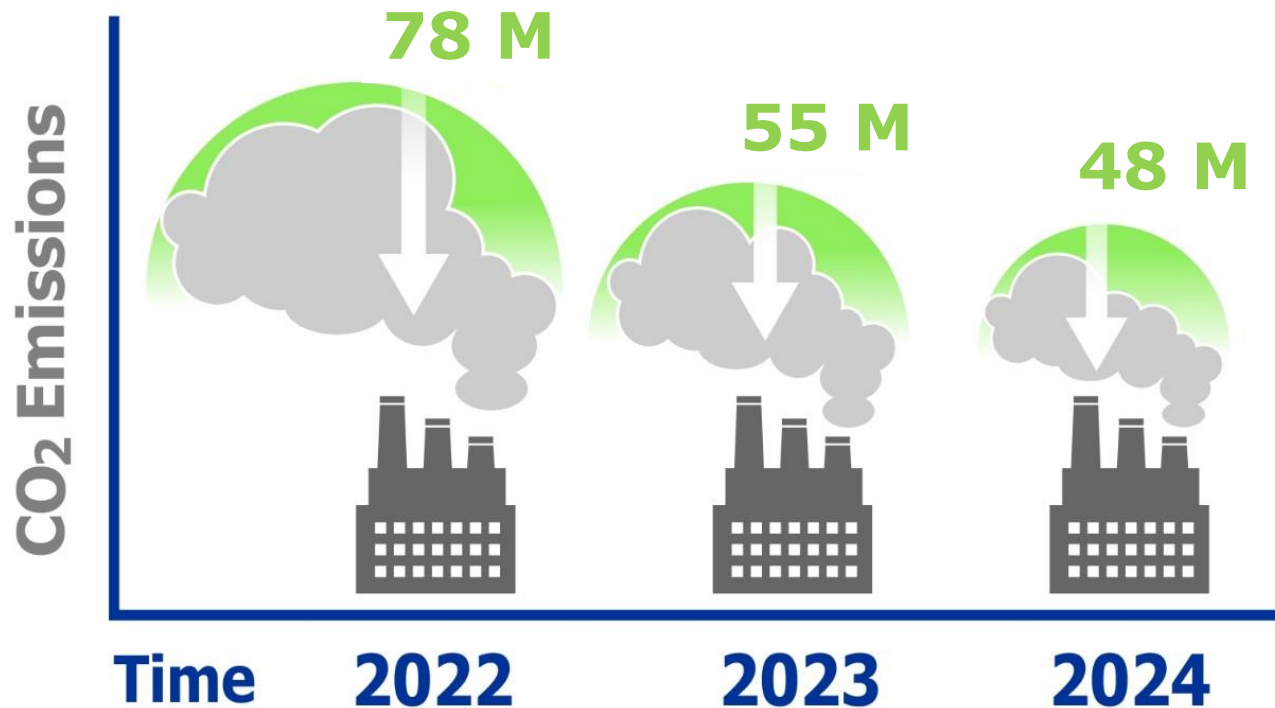
# Modeling Approach

- **Power Sector Modeling\*** – Integrated Planning Model (IPM®)
  - Business-as-Usual (BAU) or Reference Case – No RGGI
  - RGGI Participation or Policy Case – RGGI Participation
  - RGGI + Investments – RGGI Participation + Revenue Reinvestment
- **Economic Modeling** – Regional Economics Model, Inc. (REMI®)
  - Balanced Approach – Investments in EE, RE and GHG abatement
  - Ratepayer Assistance – Strong focus on electric bill discounts
  - General Fund – Funds diverted- no strategic investment
- **Health Benefit Calculations** – U.S. Environmental Protection Agency
  - Benefit per Ton (BPT) Methodology
  - Incidence per Ton (IPT) Methodology

\*See Appendix and [www.dep.pa.gov/RGGI](http://www.dep.pa.gov/RGGI) for detailed results.

# Environmental Benefits of RGGI

*Based on IPM modeling, participation in RGGI would result in the elimination of 188 million tons of CO<sub>2</sub> in Pennsylvania by 2030.*



*Note: Based on IPM modeling results for the 'RGGI + Investments' scenario.*

# Co-Benefits of CO<sub>2</sub> Reductions

When powerplants pollute less....



**CO<sub>2</sub> Decreases by 188 Million Tons**

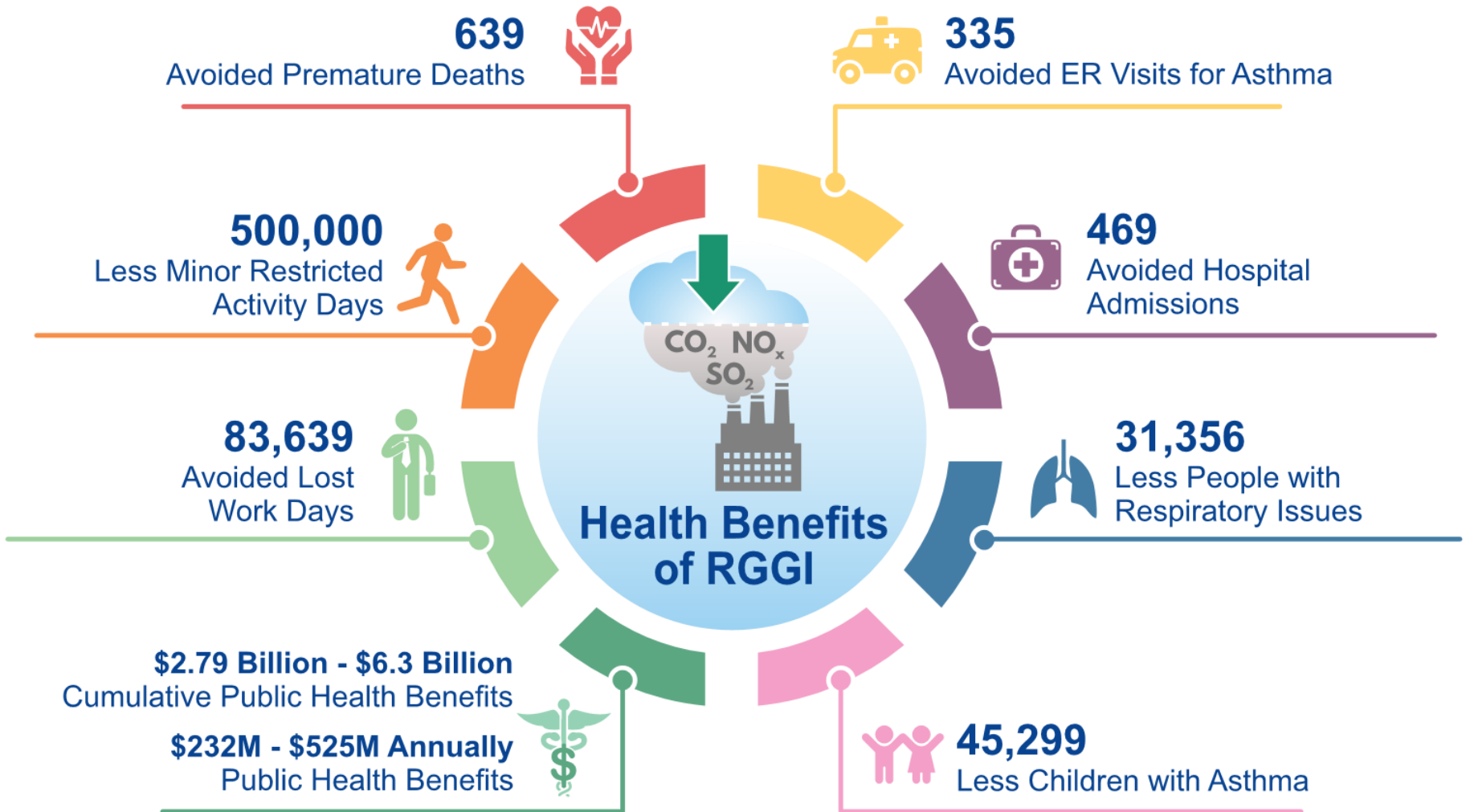
**SO<sub>2</sub> Decreases by 67,000 Tons**

**NO<sub>x</sub> Decreases by 112,000 Tons**

**Air and Water are Cleaner. People are Healthier.**



# Health Benefits of RGGI



# Revenue Reinvestment Scenarios

## **Pennsylvania modeled three potential reinvestment scenarios\***

1. Balanced Approach
2. Ratepayer Assistance
3. General Fund

## **Identified Five Broad Categories for Investments**

1. Energy Efficiency – Insulation and Weatherization, system improvements, and Appliance Recycling etc.
2. Clean and Renewable Energy – Biogas, solar, wind, hydropower etc.
3. Greenhouse Gas Abatement – R&D, Workforce Development, Well Plugging, Electric Vehicles (EVs) and EV Infrastructure
4. General Fund – Service public debt or other non-energy investments
5. Bill Assistance – Credits on electric bills for struggling households

# Revenue Reinvestment Scenarios

Pennsylvania modeled three reinvestment scenarios – FOR MODELING PURPOSES ONLY

Percentage of Revenue Invested by Category						
		Efficiency	Renewables	GHG Abatement	Bill Assistance	General Fund
REMI Modeling Scenarios	Balanced Approach	31%	32%	31%	----	----
	Ratepayer Assistance	30%	8%	7%	49%	----
	General Fund	10%	5%	10%	----	69%

*\*Each scenario equals 94% as each assumes 6% for programmatic costs.*

*\*\*Revenues are estimated to be on average \$261 Million annually from 2022 to 2030.*

# Balanced Approach Yields Benefits

## Investing RGGI Revenue in a 'Balanced Approach'

*Utilize auction revenue to spur innovation, technology deployment and incentivize private sector investments.*



- **Generates Jobs:** Net increase 30,000+ job years in this Commonwealth by 2030.
- **Grows the Economy:** Gross State Product (GSP) increases by \$1.9 billion by 2030.
- **Slight Decrease in Disposable Personal Income\*:** on the order of a decline of .017% by 2030 – and then an increase by 2033.

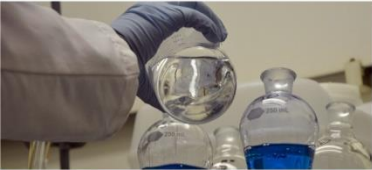
*\*Not reflective of the health or other societal benefits related to emissions reductions.*

# Next Steps



## The Regulatory Process: Step by Step

1. After a need to create or change a regulation is identified, DEP develops **draft regulatory language**, which is shared with stakeholder groups, including DEP advisory committees.
2. The (EQB) considers the draft regulation and votes to adopt it as a **proposed regulation**.
3. Once adopted, the proposed regulation undergoes review by the Office of General Counsel, the Governor's Budget Office, and the Office of Attorney General.
4. The proposed regulation is published in the *Pennsylvania Bulletin* and opened for public comment (<http://www.pacodeandbulletin.gov/>), then sent to the House and Senate Environmental Resources and Energy committees and IRRC for review. The EQB may hold public hearings on the proposed regulation as part of the public comment period.
5. All **public comments** submitted during the public comment period to the EQB become part of the official public record.



**pennsylvania**

DEPARTMENT OF ENVIRONMENTAL PROTECTION



## For Additional Information

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Visit the RGGI website @ [www.dep.pa.gov/RGGI](http://www.dep.pa.gov/RGGI)

Materiales también disponibles en español.

Email staff with specific questions @

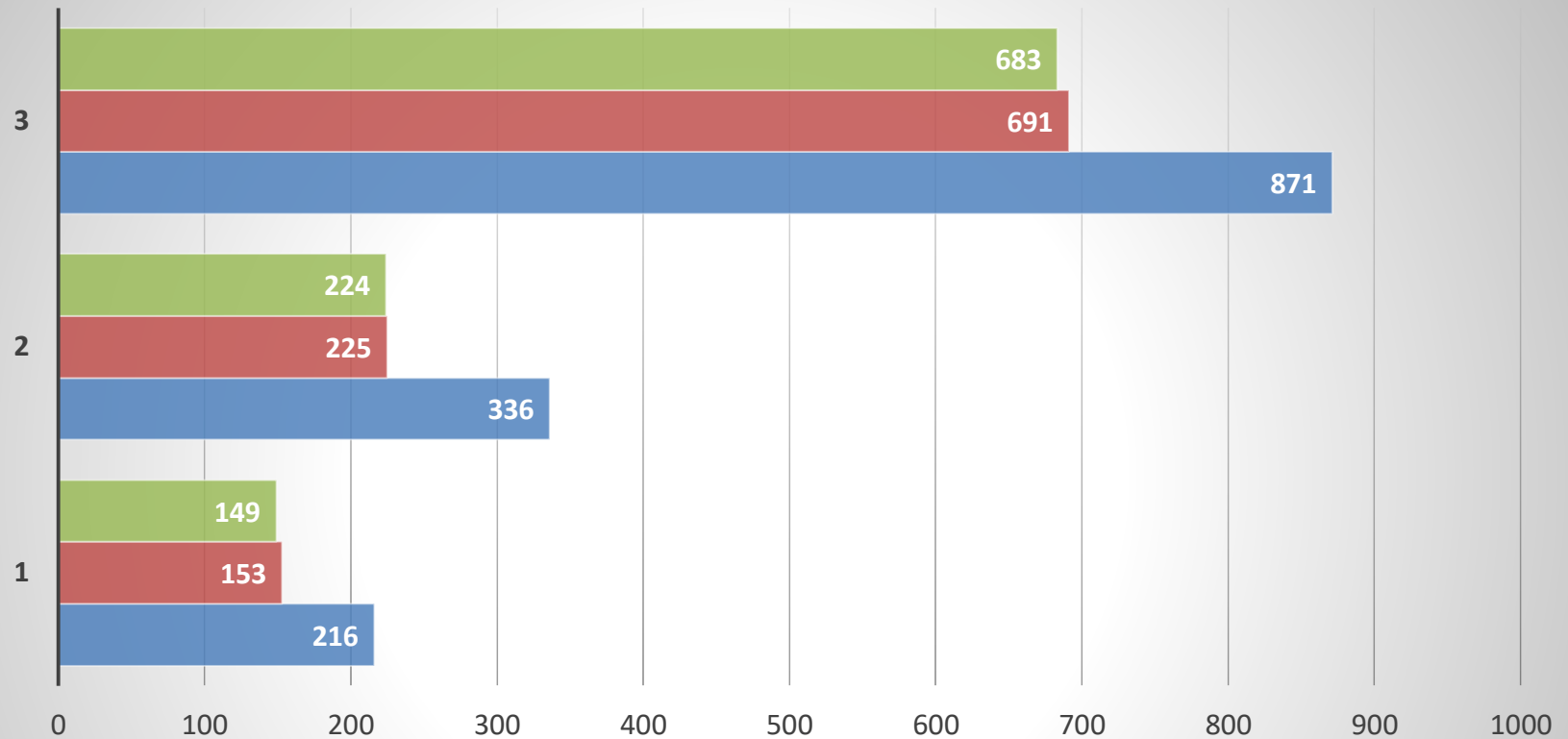
[ra-epclimate@pa.gov](mailto:ra-epclimate@pa.gov)

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# Additional Data

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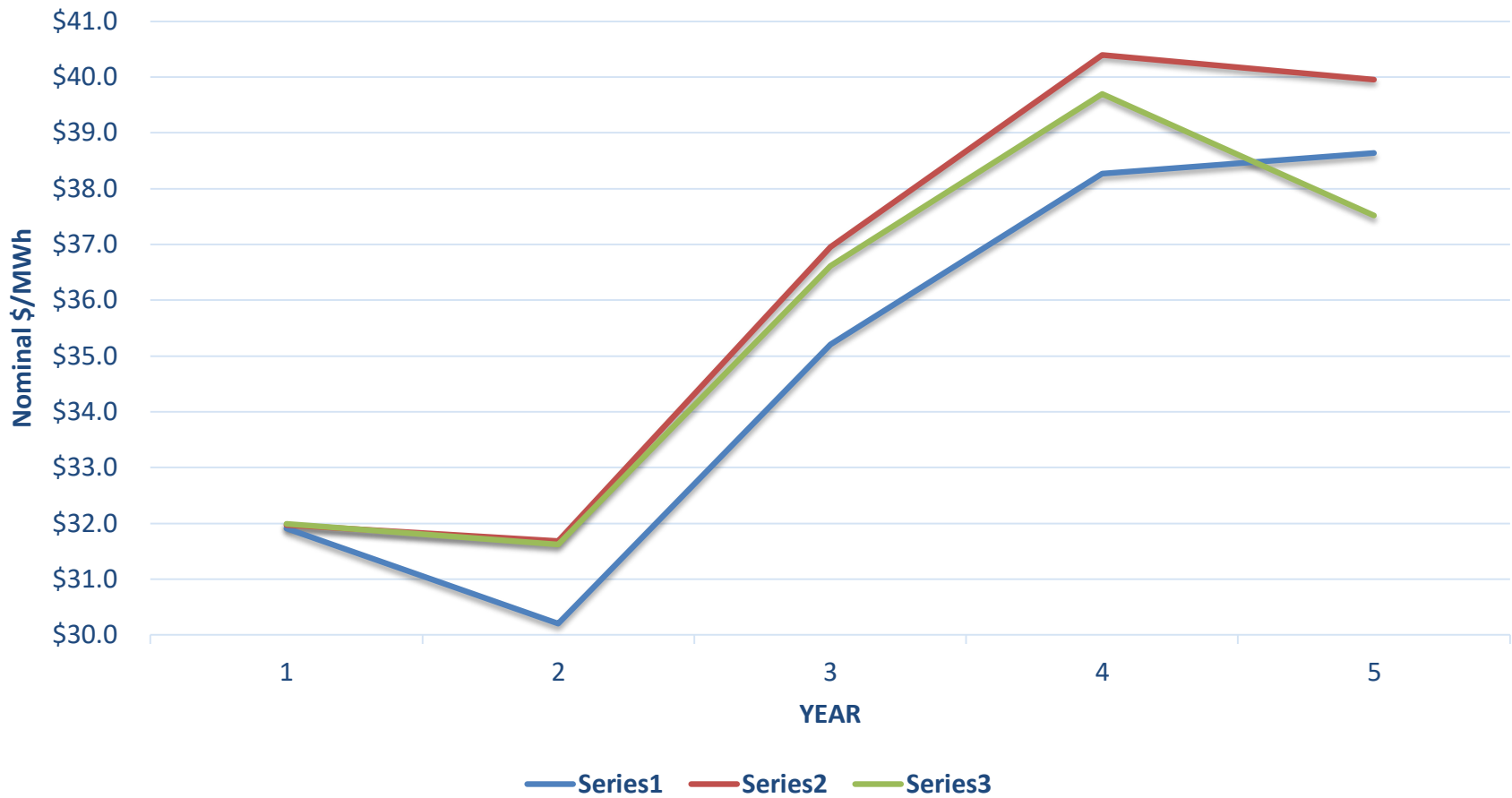
# Environmental Benefits Through 2030



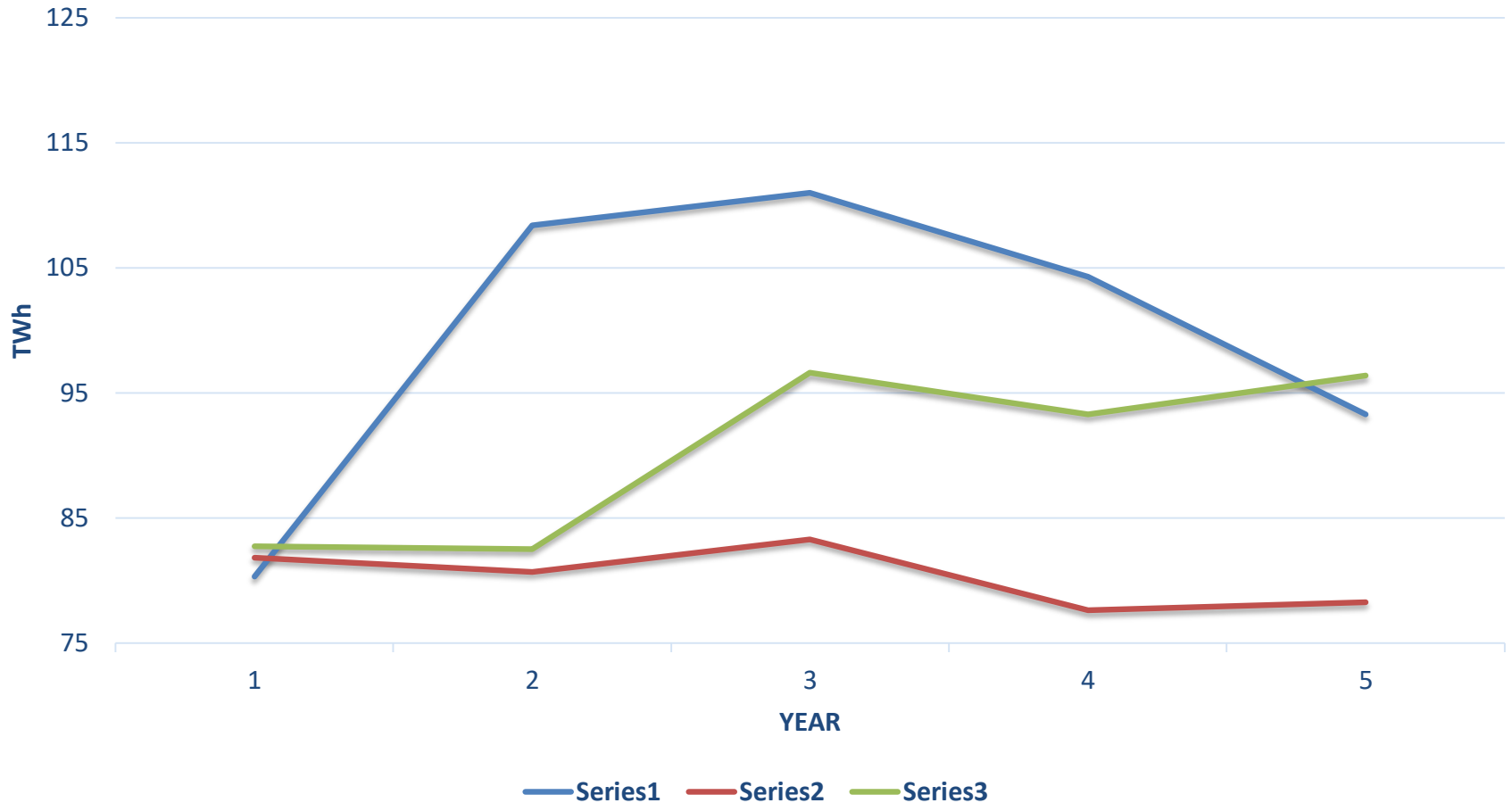
	1	2	3
Series3	149	224	683
Series2	153	225	691
Series1	216	336	871



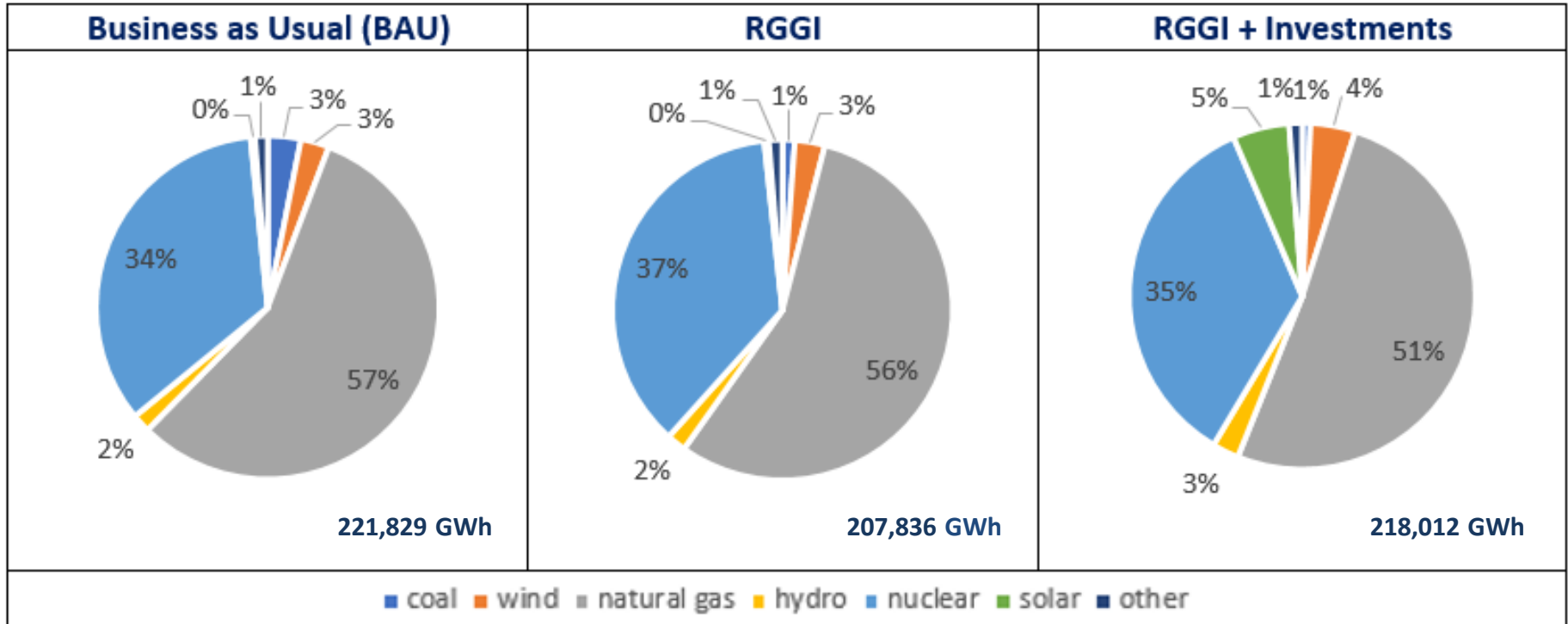
# Pennsylvania Firm Power Prices



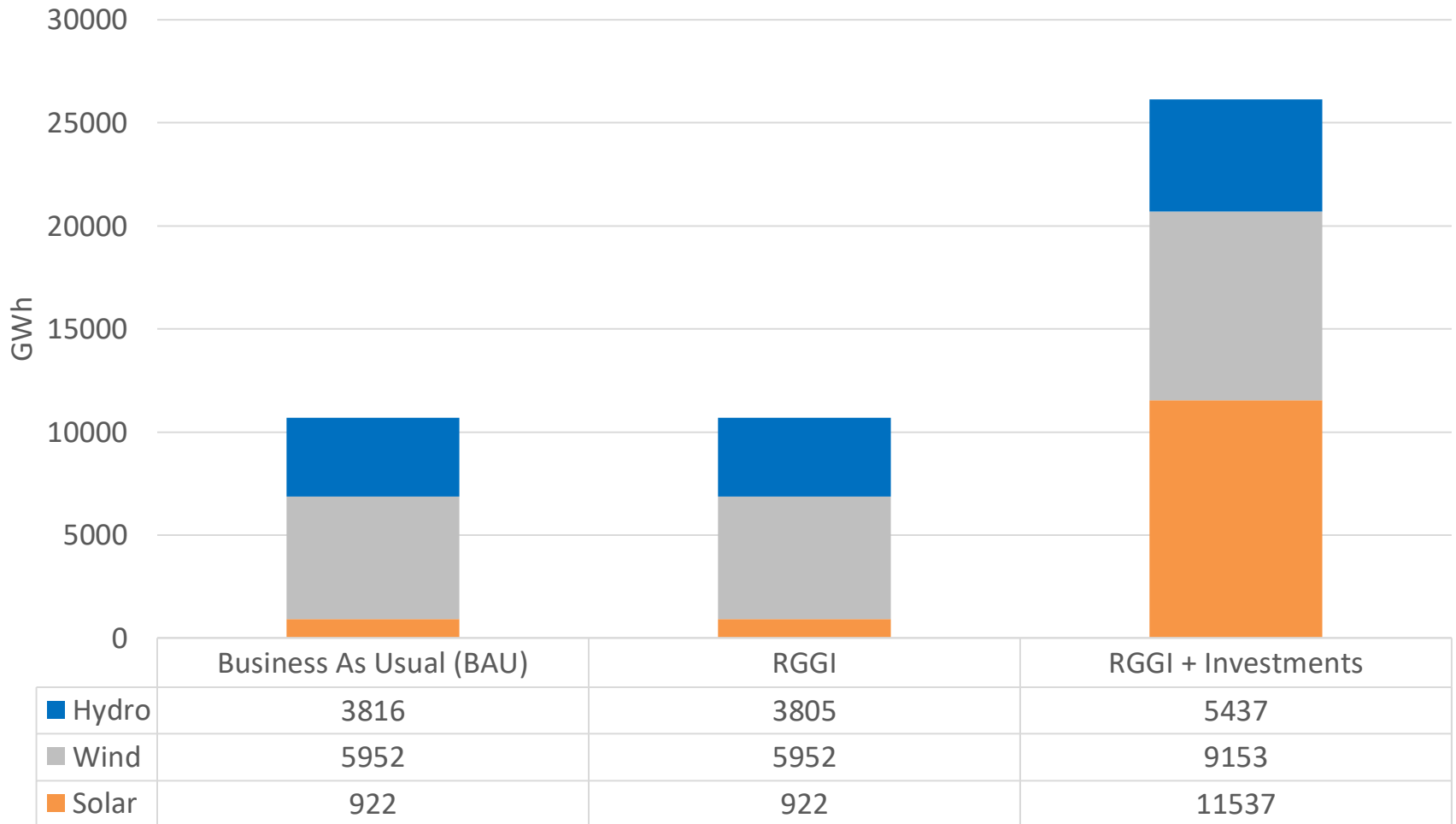
# PA Electricity Exports



# 2030 PA Energy Generation



# PA 2030 Renewable Generation

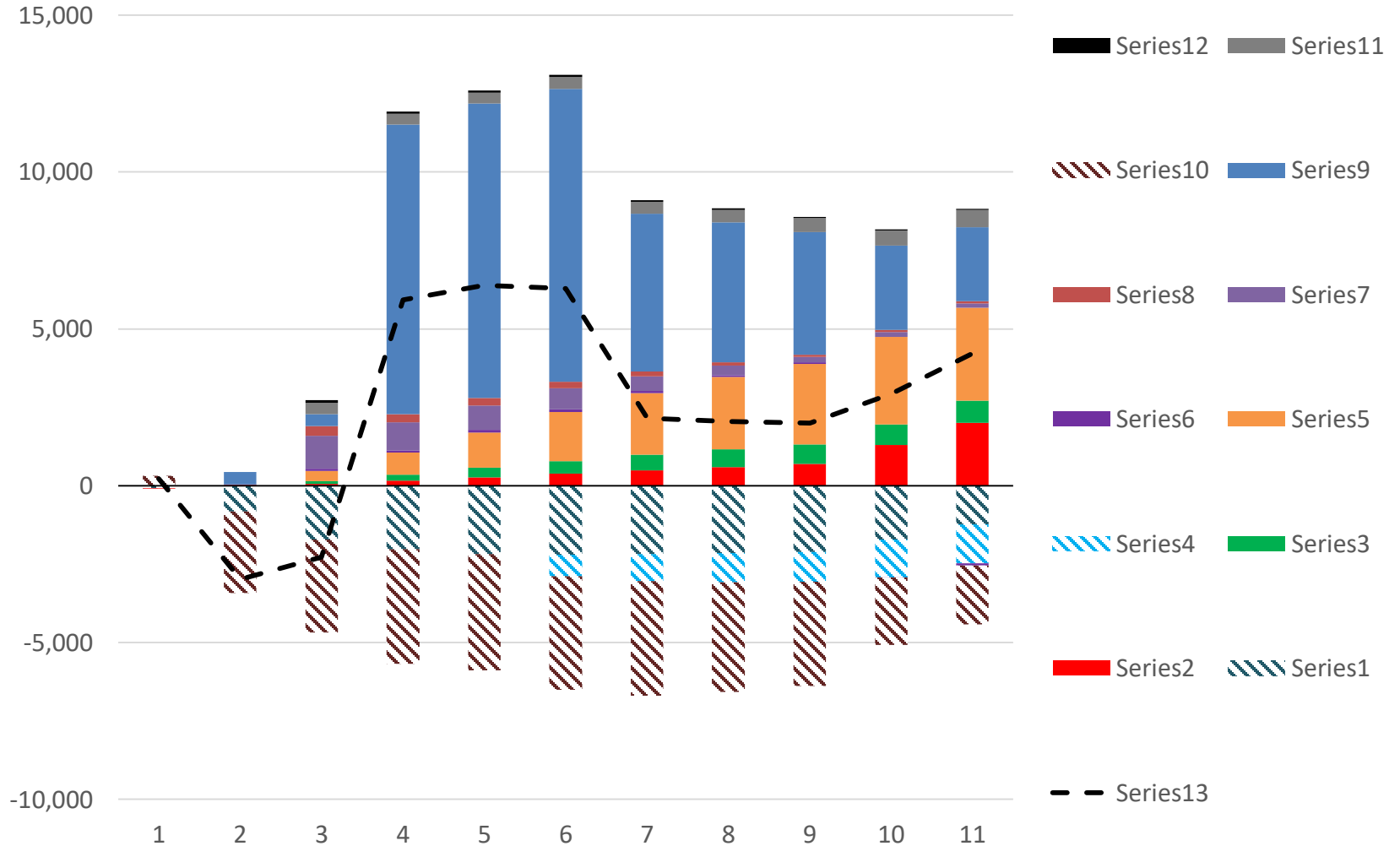


# Revenue Reinvestment Scenarios

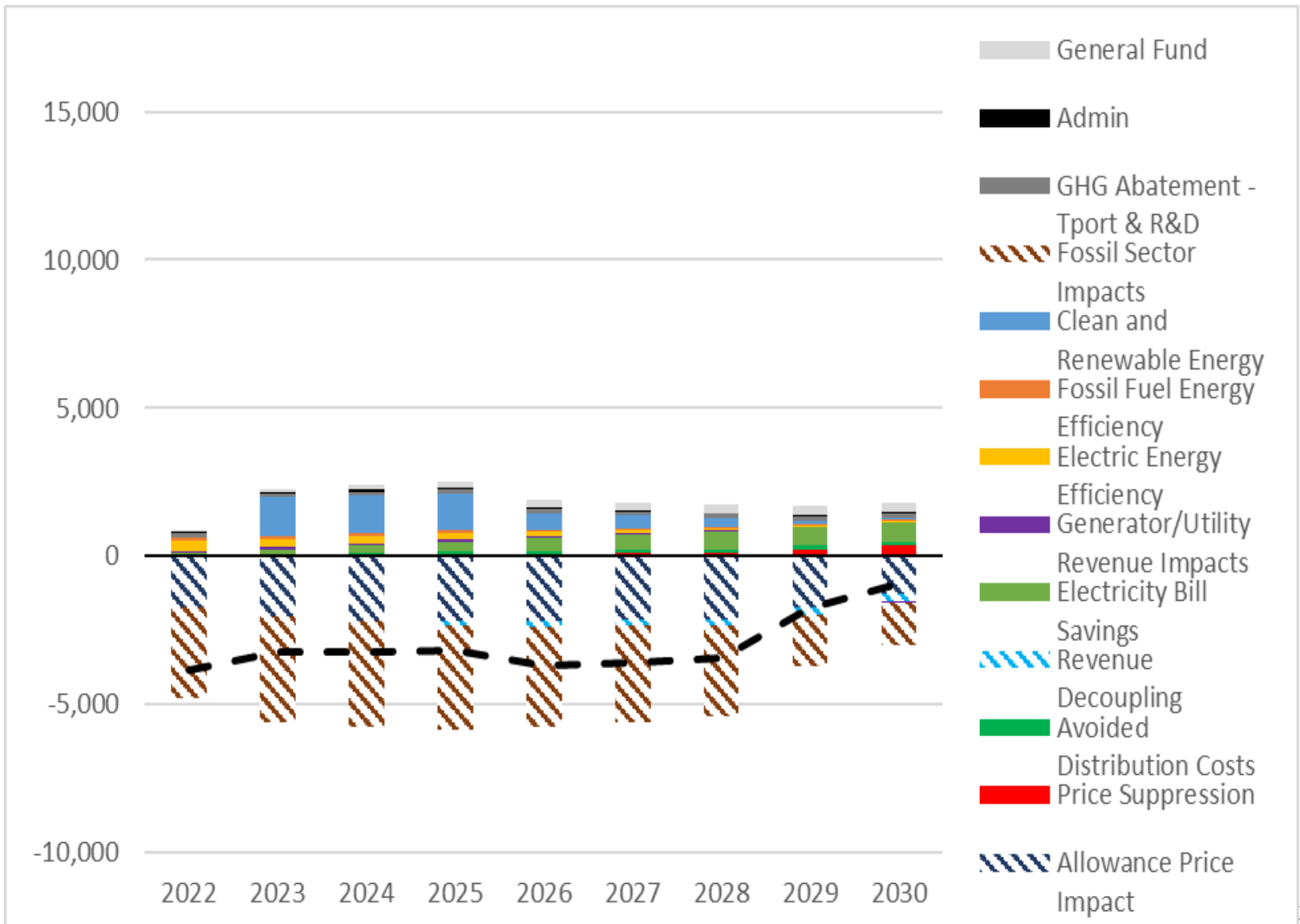
Amount of Revenue Invested by Category (Million 2017\$)						
REMI Modeling Scenarios		Efficiency	Renewables	GHG Abatement	Bill Assistance	General Fund
	Balanced Approach	<b>\$80.87</b>	<b>\$83.48</b>	<b>\$80.87</b>	----	----
	Ratepayer Assistance	<b>\$78.26</b>	<b>\$20.87</b>	<b>\$18.26</b>	<b>\$127.83</b>	----
	General Fund	<b>\$26.09</b>	<b>\$13.04</b>	<b>\$26.09</b>	----	<b>\$180.00</b>

*\*Each scenario assumes \$15.65 for program operations- average \$261 Million annually between 2022 and 2030.*

# Balanced Approach – Job Trends



# Ratepayer Assistance – Job Trends



# General Fund Approach – Job Trends

