


Policy Office

Proposed CO2 Budget Trading Program

Compatible with the Regional Greenhouse Gas Initiative (RGGI)

Tom Wolf, Governor

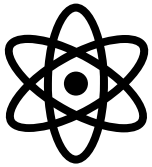
Patrick McDonnell, Secretary

Pennsylvania's Energy Sector

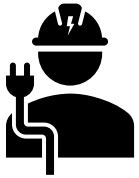
Pennsylvania has always been an energy leader, leading the country in developing energy resources.

- ✓ First U.S. oil well developed for commercial use was in Pennsylvania.
- ✓ Lead the nation in anthracite coal production since the 19th century.
- ✓ Pennsylvania contained the world's first commercial full-scale nuclear electric power plant.

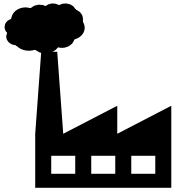
Today, Pennsylvania maintains that energy leadership:



2nd in U.S. in electricity generated from Nuclear power.



One of the top electricity exporters in the country.



2nd in U.S. in natural gas production.

3rd largest coal producing state in the nation.

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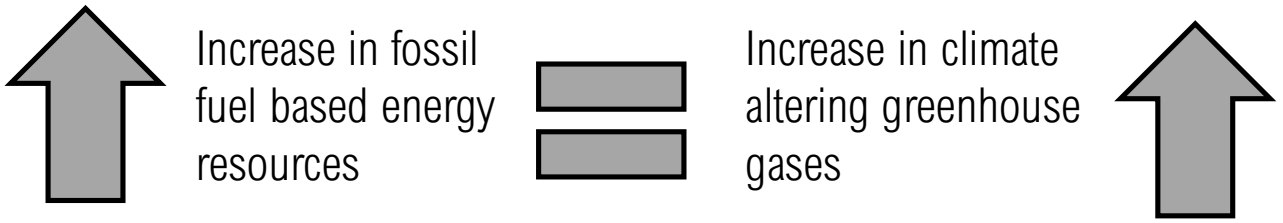
Energy and the Environment



The Greenhouse Gas Effect: Greenhouse gases such as carbon dioxide (CO2), methane, and nitrous oxide, intercept the energy absorbed by Earth's surface and warm the Earth's surface and atmosphere.

- In the last 150 years, atmospheric CO2 levels have nearly doubled, due to the growth of modern civilization, which has depended on a range of industrial activities.

- The significant increase in the amount of greenhouse gases in the atmosphere and ocean is heating the Earth at an accelerated rate and will continue to do so for decades.

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 the 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 events. Pennsylvania's overall precipitation is expected to increase another 8% by 2050.

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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.*

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Pennsylvania's Emission Reduction Goals

It was for these reasons that Governor Wolf set the first ever statewide GHG emission reduction goals of 26% by 2025 and 80% by 2050 from 2005 levels.

- If other states and nations achieved similar targets, global temperatures could be kept below the threshold beyond which dire climate consequences would occur.

Governor Wolf Establishes First Statewide Goal to Reduce Carbon Pollution in Pennsylvania

January 08, 2019

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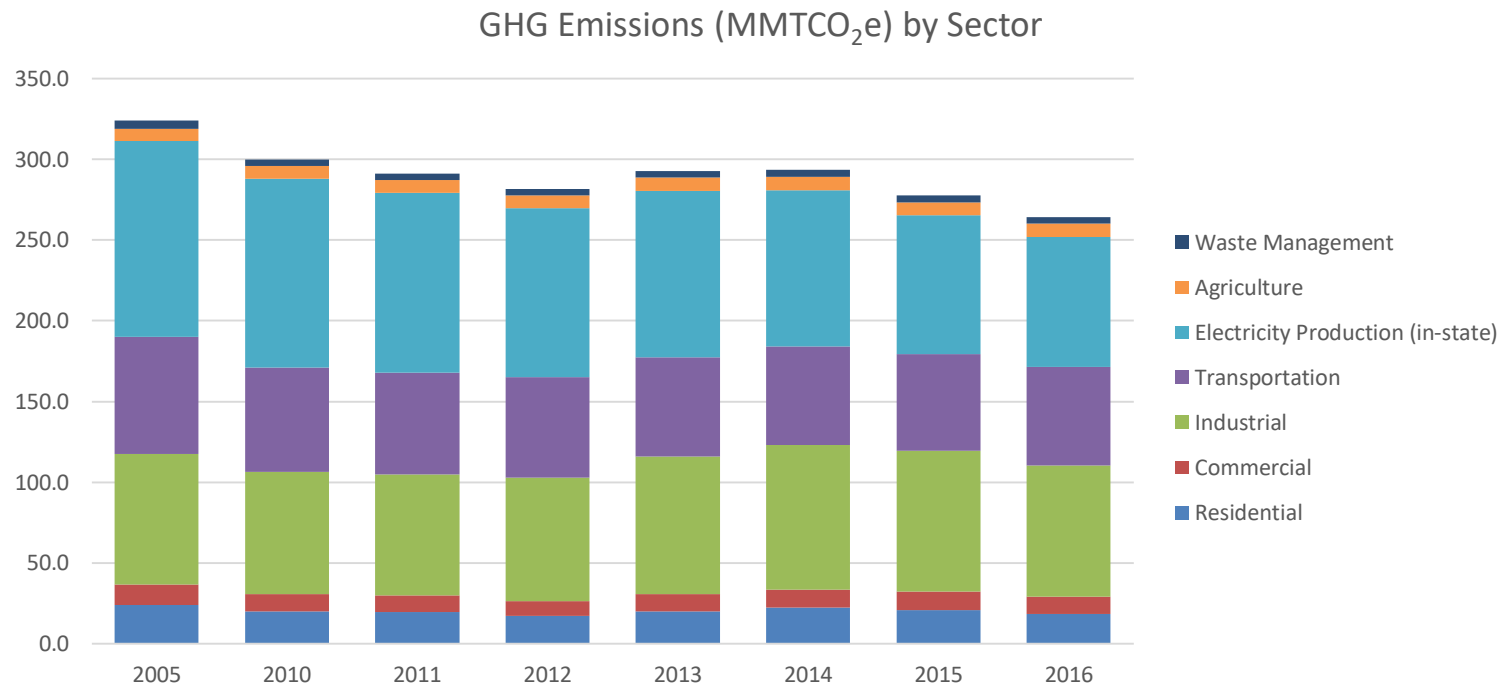
Recent Greenhouse Gas Emissions



Pennsylvania decreased its overall greenhouse gas emissions from 2005-2016 due to a combination of energy efficiency and shifts in the electricity portfolio mix.

- Pennsylvania's electricity generation has shifted from higher carbon-emitting electricity generation sources, such as coal, to lower and zero emissions generation sources, such as natural gas, wind, hydro, and solar energy.

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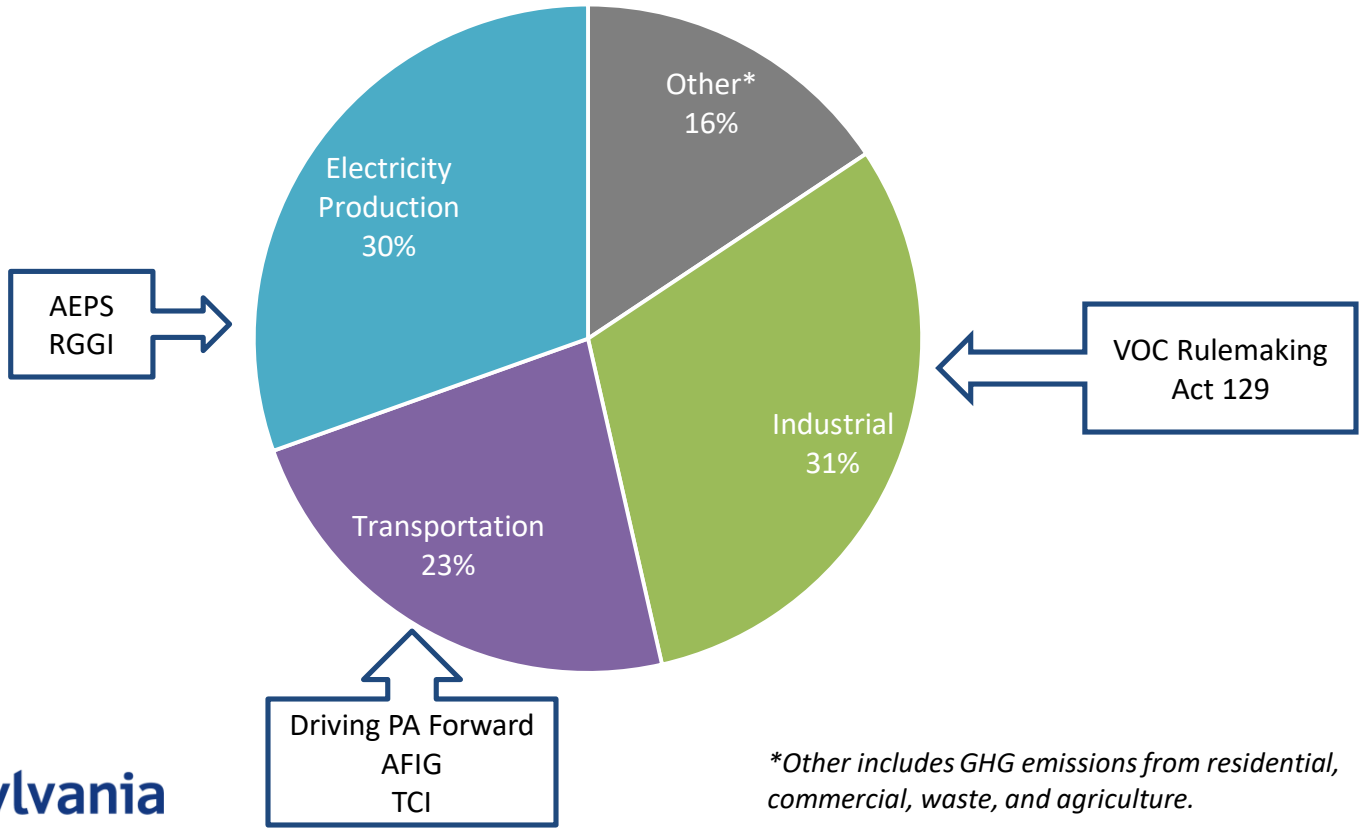
Greenhouse Gas Emissions By Sector

Electricity Production, Transportation, and Industrial make up approximately 84% of all PA GHG emissions. RGGI specifically targets CO2 emissions in electricity production sector, while other initiatives are targeting emissions in the other key sectors.



**Other includes GHG emissions from residential, commercial, waste, and agriculture.*

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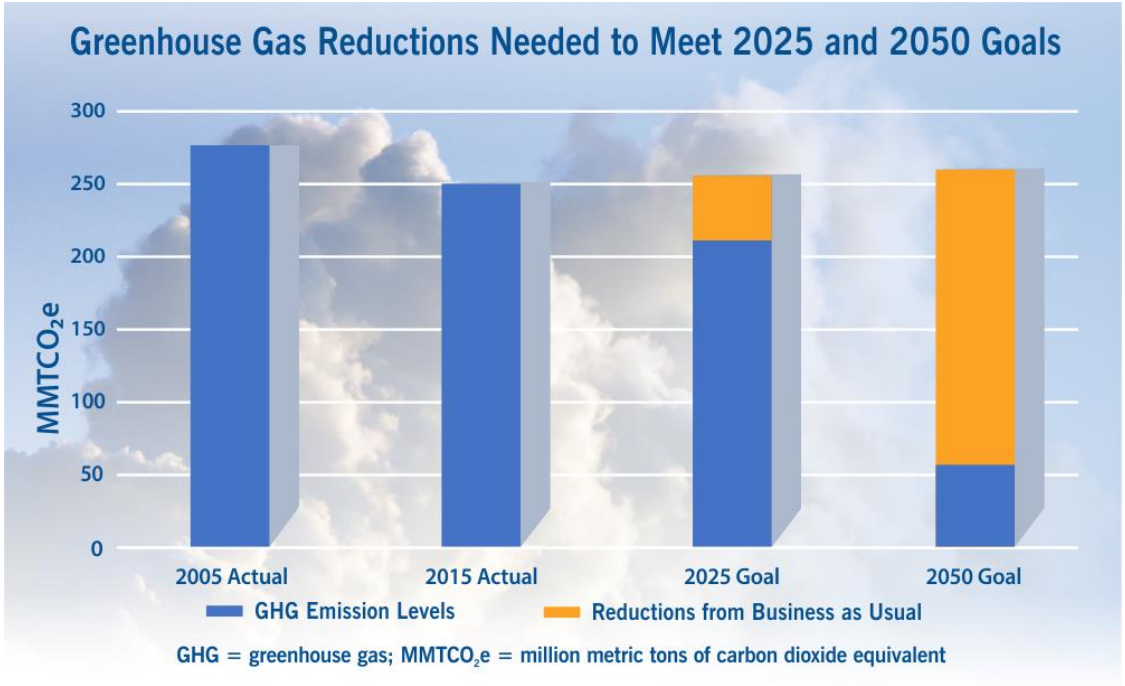
Future Greenhouse Gas Emissions



While Pennsylvania's reductions have been encouraging, it's still not enough.

- DEP projects emissions to *increase* by 2025 and even more so by 2050 if no additional policies are implemented.
- These projected increases are primarily in the electricity sector.
  - Expected closing of some nuclear power plants and a slowdown of fuel switching from coal to natural gas.
- The electricity sector has some of the greatest potential to reduce emissions in the near future.

Limiting Power Sector Emissions Through Cap and Trade

- One of the most effective ways to ensure emissions do not increase is by capping the amount of emissions a particular source or sector can emit.
- Other countries and multiple states already do this in different ways.
- The Regional Greenhouse Gas Initiative (RGGI) is a successful example of a regional cap utilized in the Northeast and Mid-Atlantic U.S.

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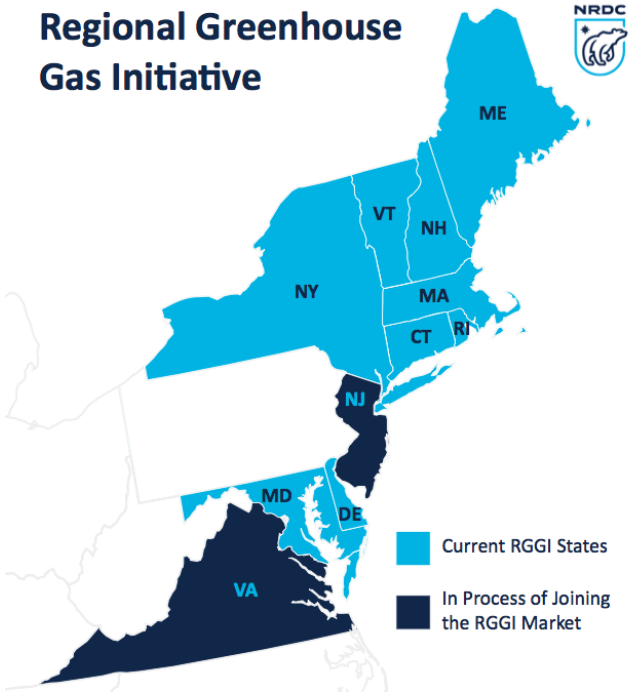
Regional Greenhouse Gas Initiative

- ✓ The RGGI emissions cap took effect January 1, 2009, based on an agreement signed by RGGI state governors in 2005.
- ✓ First mandatory cap-and-trade program for greenhouse gas (GHG) emissions.
- ✓ Includes nine states
  - Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont. New Jersey are Virginia are expected to join the program over the next two years.
- ✓ The system applies only to carbon dioxide emissions from electric generating units with capacity to generate 25 megawatts or more.
  - Currently includes approximately 165 facilities in the region.
- ✓ Offers a "Model Rule" that states can use to draft their regulation.



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Pennsylvania's Intent to Participate in RGGI

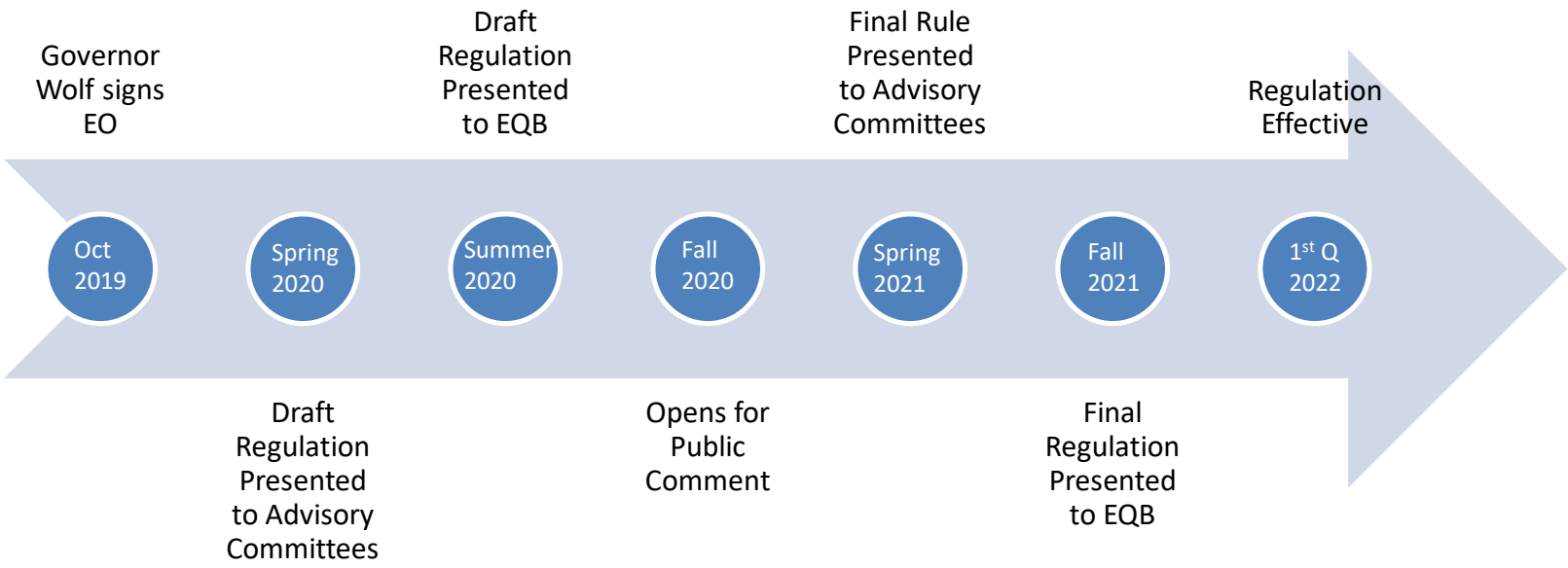
In October, Governor Wolf directed DEP to begin a rulemaking process that will allow Pennsylvania to join the Regional Greenhouse Gas Initiative.

- The Executive Order directs DEP to develop and present a regulation to the Environmental Quality Board by July 31, 2020.
- Assuming the Environmental Quality Board votes to adopt the proposed rulemaking, the regulation will be enacted consistent with the requirements of the Regulatory Review Act, which can take upwards of two years.

Creating a program as directed by Governor Wolf would put a direct price on the carbon pollution emitted by larger power plants.

- It is important to remember that there is already a price on carbon paid for by Pennsylvanians through dealing with the impacts of pollution and climate change.
- Yale studies show that nearly 70% of Pennsylvanians think global warming will harm future generations and 78% of Pennsylvanians support regulating CO2 as a pollutant.

Potential Timeline



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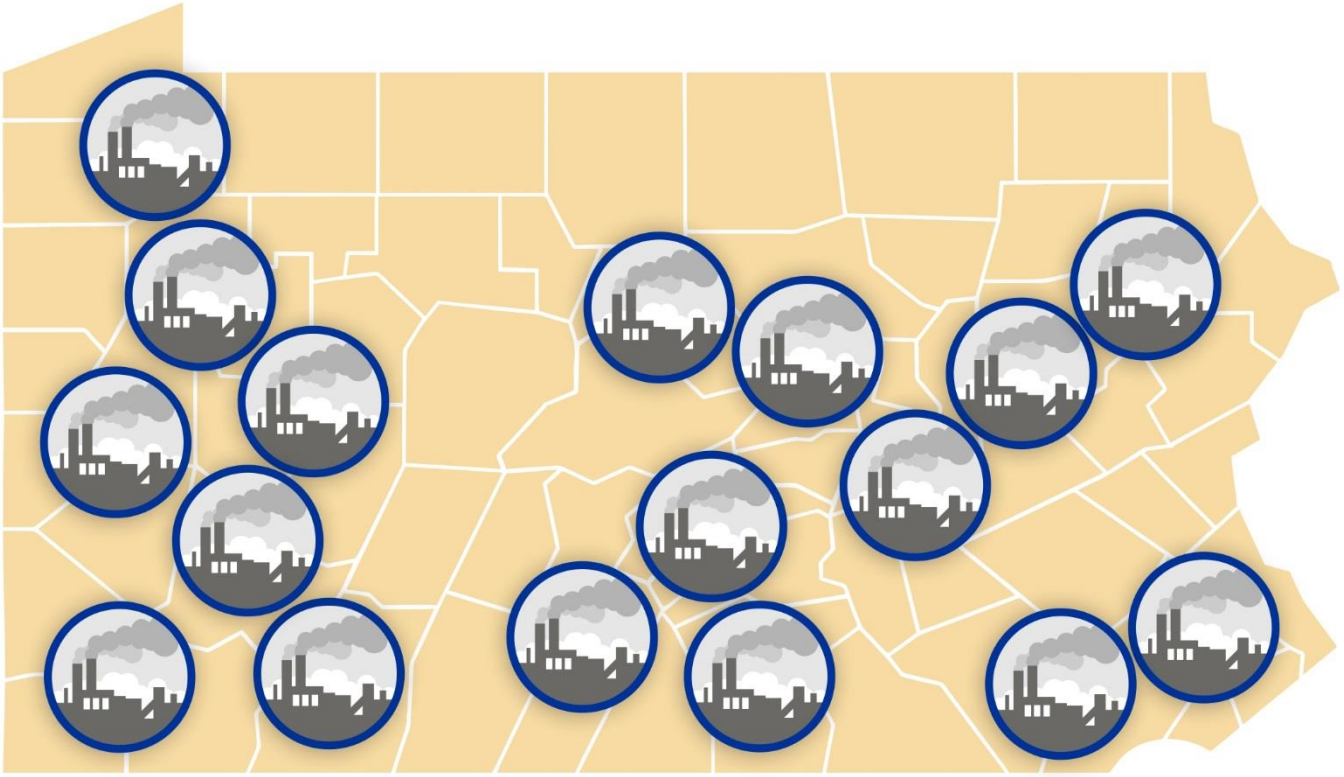
How Would a Carbon Cap and Trade Program Work?

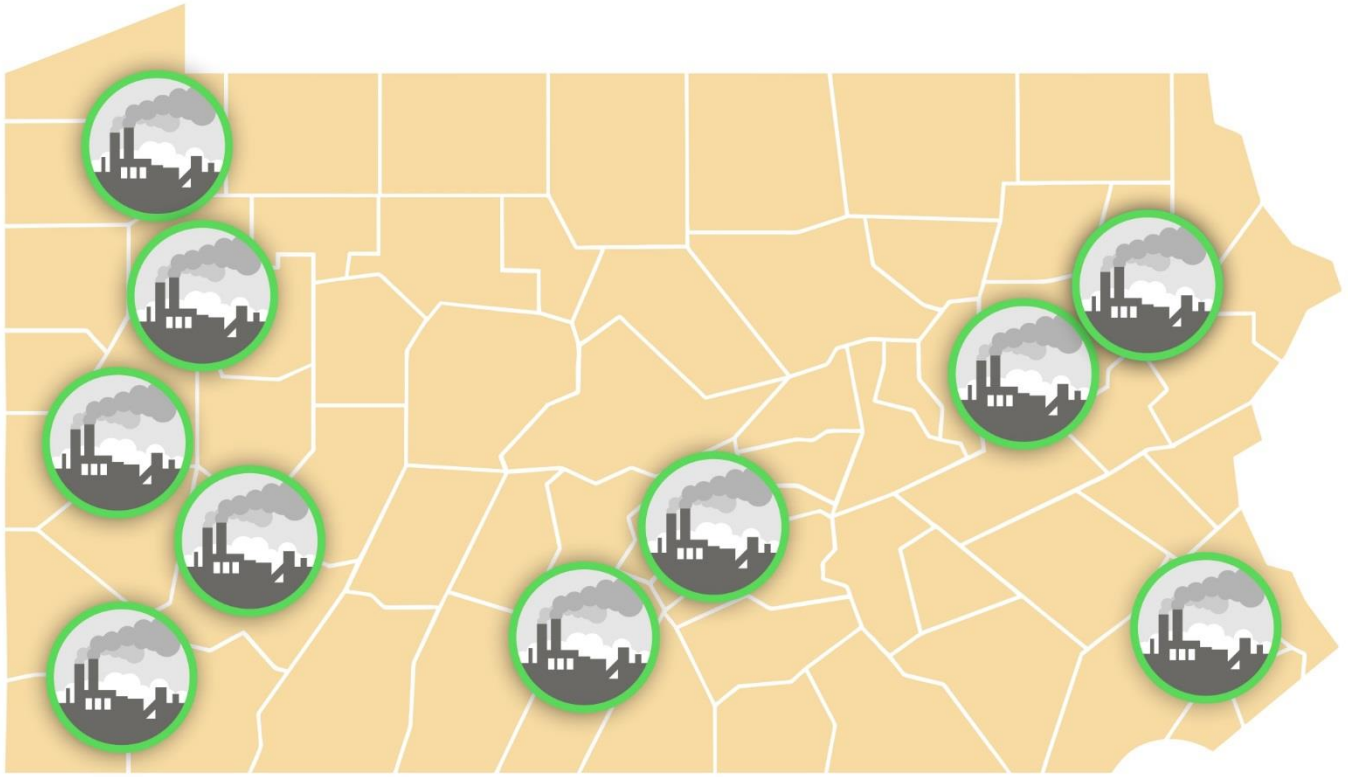
Identifying Eligible Sources

1. **Identify all of the Pennsylvania electric power plants that emit carbon dioxide.**



Identifying Eligible Sources

2. Within that group, identify the plants that currently have the capacity to generate more than 25 Megawatts and feed most (>10%) of that electricity onto the grid (instead of using it onsite). These are called the "eligible sources."



Determining the Cap

3. Add up all of the emissions from each of the eligible sources from a certain year. The summation of all of those emissions, measured in tons, equals the Cap.

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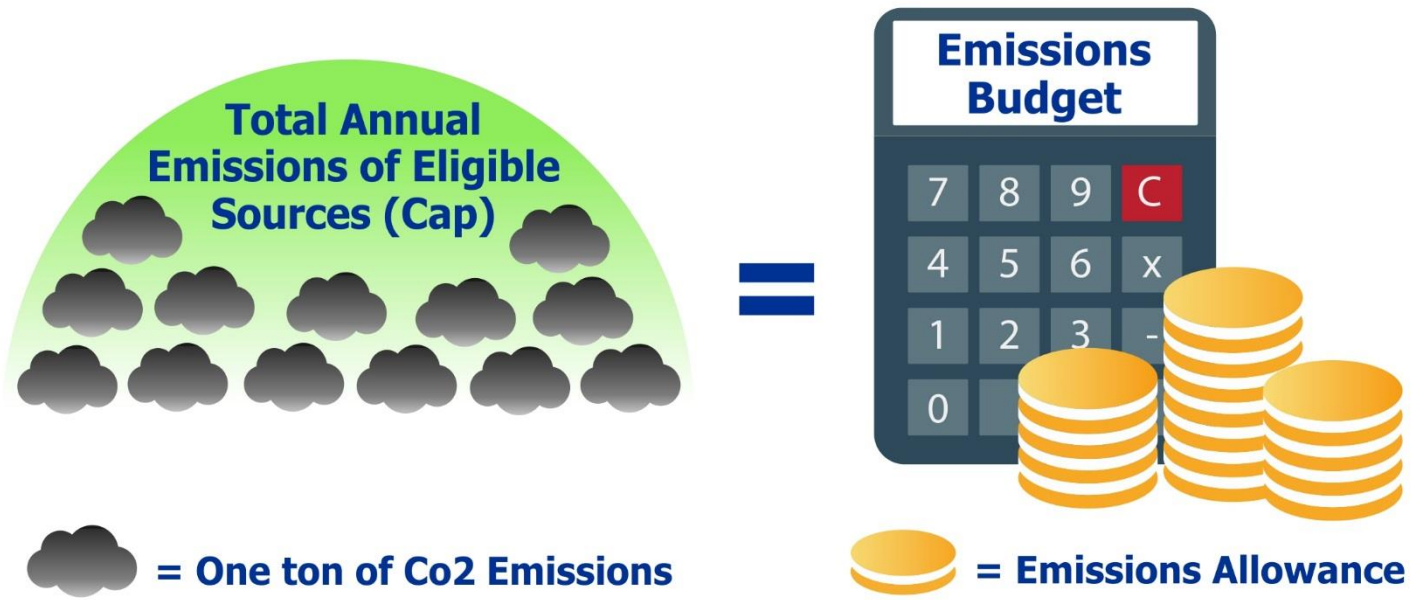
Establishing Allowances

4. Once the Cap is established, an equal amount of "allowances" are created equal to the Cap. One ton of CO2 emissions equals one allowance.



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Distributing Allowances

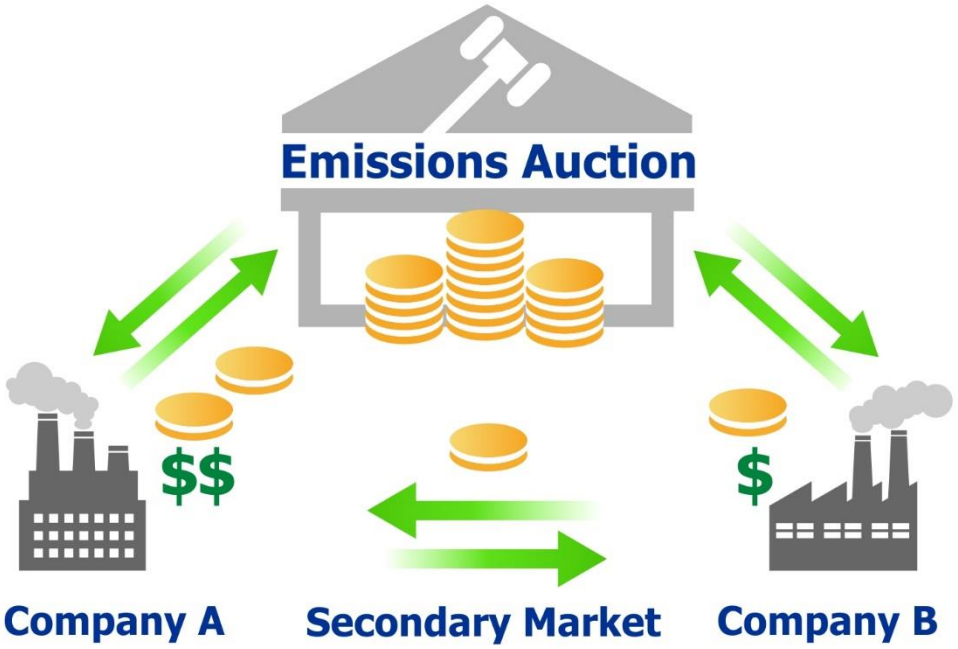
5. The allowances can be distributed in multiple ways.

- **Some can be distributed into a market where eligible facilities purchase them via auction.**
- **Some can be set aside for various purposes.**

Attaining Allowances

6. Once the Emissions Allowances are entered into the marketplace, Eligible Sources attain a number of allowances – through quarterly auctions – equal to the amount of CO2 they emit.

- Eligible Sources are given a set amount of time (called a compliance period) to attain enough allowances.
- The cost of each allowance is determined by the auction clearing price.
- Allowances can also be traded on a secondary market.

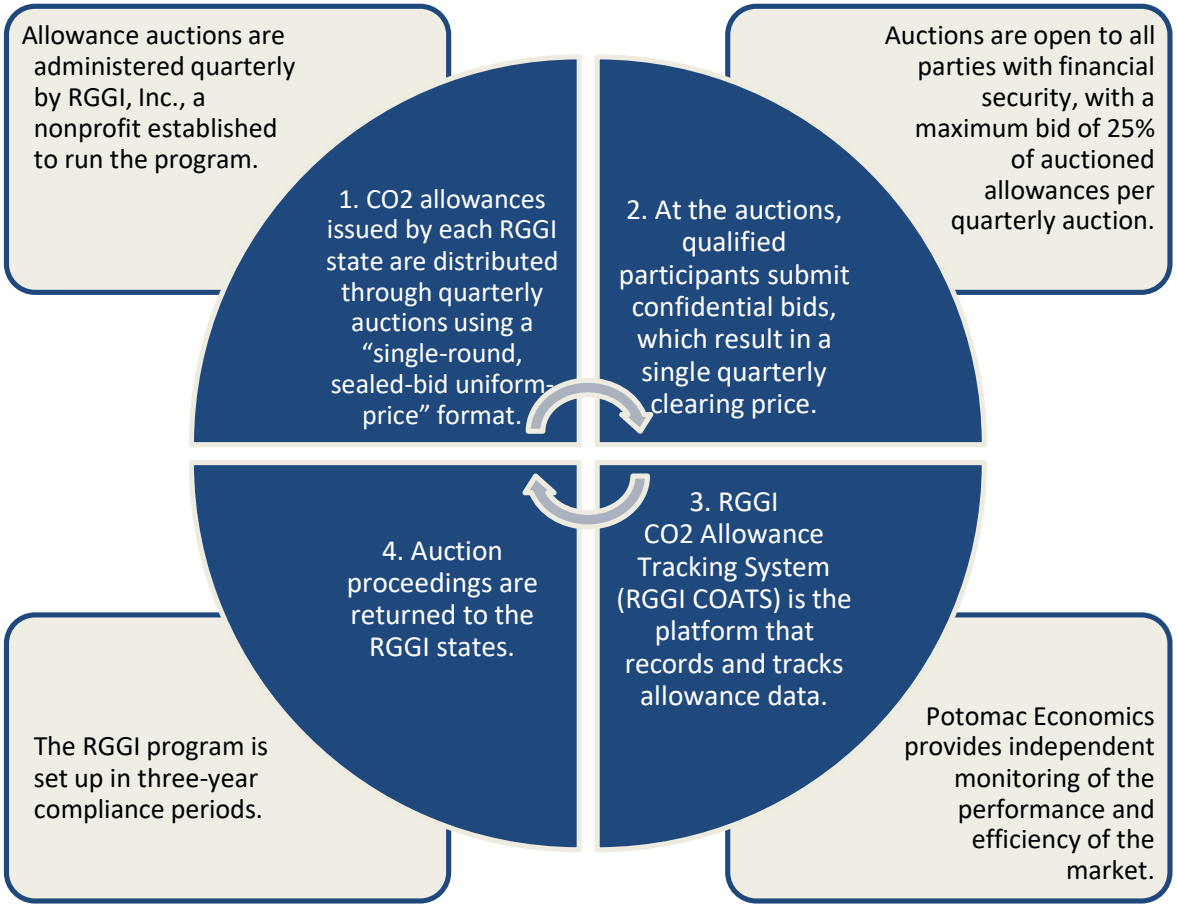


Additional Market Mechanisms

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).

How does the Auction work?

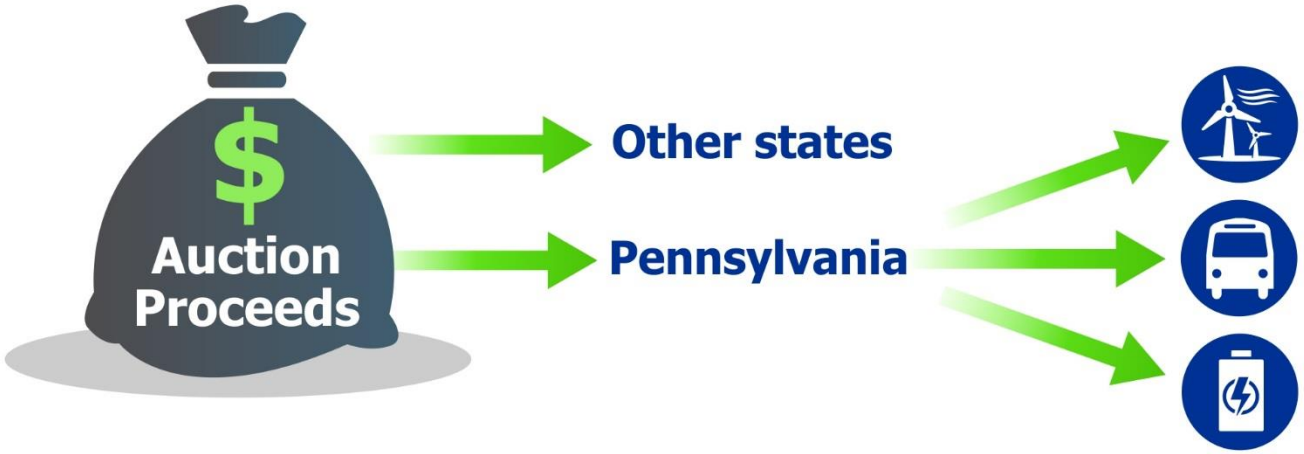


Entities are also able to trade allowances on secondary markets, via over-the-counter trades as well as exchanges such as Intercontinental Exchange.

Auction Proceeds

7. The auction proceeds are routed through RGGI Inc., a non-profit that manages the auction, and then given to each participating state to invest however they'd like according to regulations governing their program.

- A minimum of 25% of each state's funds must be used to benefit the environment if they are to participate in RGGI Inc.'s auctions.



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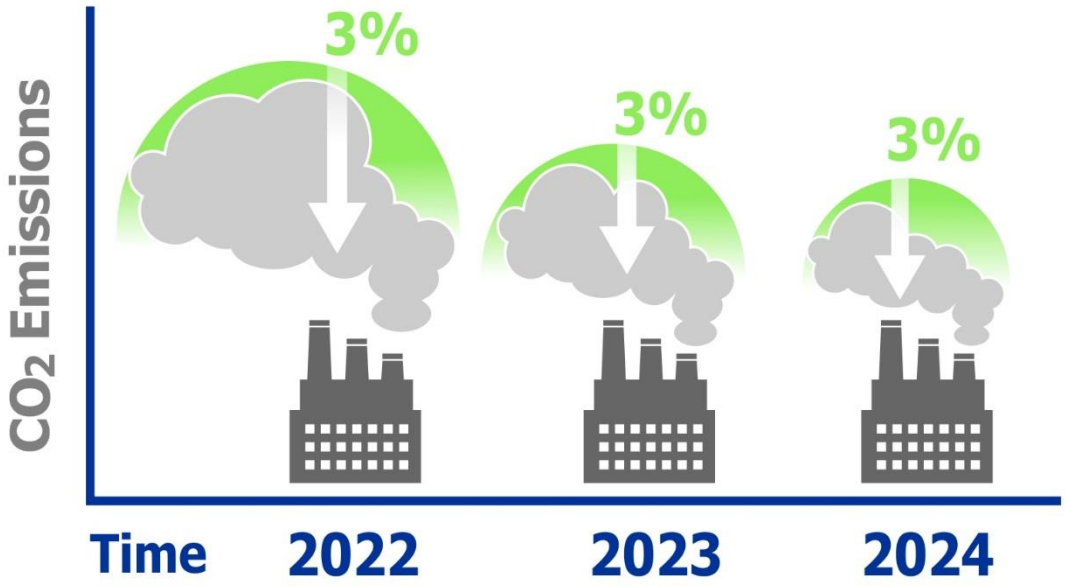
How Are Emissions Reduced?

8. The total Cap is reduced over time, incentivizing technologies and fuels with less carbon content and lowering total emissions year over year.



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Considerations for Pennsylvania's Regulation

- Eligible Sources
- Set Asides
- Offsets
- Investments

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Eligible Sources in Pennsylvania

Category	Facilities	Emission Units	2022 CO2 Emissions (Low) (Million Tons)	2022 CO2 Emissions (High) (Million Tons)
EGUs (Excluding Waste Coal and Industrial)	56	139	84	94
Waste Coal Facilities	8	11	6	8
Industrial Facilities	4	8	2	2
Total	68	158	93	104

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Allocations and Set Asides

There are a number of different regulation design options available through set asides to ensure each regulation works for each state's unique circumstance.

- *Set aside accounts are allowances pulled from the total prior to auction. Set aside accounts can be used for a number of different purposes.*

Connecticut	Voluntary Clean Energy Purchase Set-aside Account Customer-side Distributed Resources (CDR) Set-aside Account Combined Heat and Power Useful Thermal Energy Set-aside Account
Delaware	N/A
Maine	Voluntary Renewable Energy Set-aside Account Integrated Manufacturing Facility Pre-retirement Account
Maryland	Limited Industrial Exemption Set-aside Account Long Term Contract Set-aside Account Voluntary Renewable Set-aside Account Clean Generation Set-aside Account
Massachusetts	Greenhouse Gas Credit Exchange Set-aside Account Voluntary Renewable Energy Account
New Hampshire	Voluntary Renewable Energy Market Set-aside Account Emergency Set-Aside Account
New York	Voluntary Renewable Energy Market and Eligible Biomass Set-aside Account Long Term Contract Set-aside Account
Rhode Island	Voluntary Renewable Energy Market Set-aside Account
Vermont	Voluntary Renewable Energy Set-aside Account

For more information, please see http://www.rggi.org/design/regulations.

Allocations and Set Asides

The vast majority of allowances across RGGI are sold at auction.

- *As seen below, states can choose to use set asides at different rates or not use them at all.*

State	Total Allowances	Sold at Auction	Transferred from set aside	Remaining set aside	Set asides retired
CT	3,772,461	2,749,880	8,732	113,174	0
DE	2,611,556	1,958,667	N/A	N/A	N/A
ME	2,099,237	1,434,189	0	186,985	0
MD	12,961,983	7,397,754	0	2,943,704	0
MA	9,223,560	6,404,682	0	0	683,985
NH	3,041,970	2,218,713	0	83,687	0
NY	22,693,866	15,370,401	1,500,000	700,000	0
RI	1,652,960	1,087,884	0	20,054	0
VT	414,945	311,209	0	4,149	0

Offsets

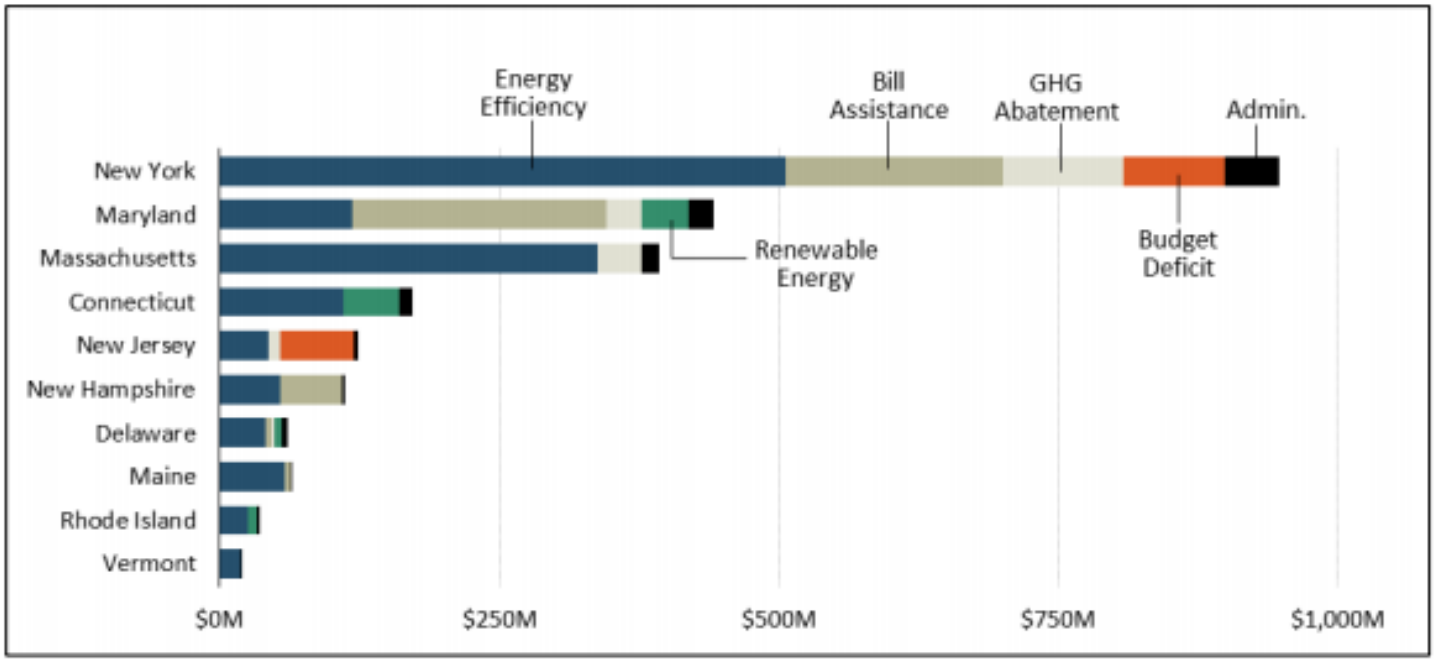
The RGGI model rule includes options for states to offer offsets as a compliance options.

- *An offset is a measurable reduction, avoidance, or sequestration of Greenhouse gas emissions from a source not covered by an emission reduction program.*
- *RGGI's covered entities may submit offsets from specific project types in lieu of the emission allowances needed to satisfy compliance obligations (up to a certain amount).*

Examples of potential offset projects include reforestation, biogas, anaerobic digesters, and more. States can include different offsets in their regulation.

RGGI Investments

Figure 4. Allocation of Auction Revenue by RGGI State
2008-2016



Source: Congressional Research Service

Average investments across RGGI states from 2008-2016:

- Energy efficiency (50%)
- Bill assistance (19%)
- GHG Abatement (7%)
- Renewable Energy (4%)
- State Budget Allocation (6%)

Not all funds have been distributed at this time, but are expected to fall within these breakdowns.

Pennsylvania Investments

Depending on exact structure of regulation, Pennsylvania could expect approximately $277-$315 million (based on 2022 projected emissions and a $5/ton allowance price) in allowance proceeds.

Pennsylvania does not currently have all of the same options for investments as some other RGGI states.

- Under the Air Pollution Control Act, any funds received must be used in the elimination of air pollution.

The RGGI model rule stipulates that at least 25% of emissions allowances be allocated for a “consumer benefit or strategic energy purpose” defined as:

- ✓ Promotion of energy efficiency measures
- ✓ Direct mitigation of electricity ratepayer impacts
- ✓ Promotion of renewable or noncarbon-emitting energy technologies
- ✓ Development of innovative carbon emissions abatement technologies with significant carbon reduction potential

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Additional Pennsylvania Considerations

Electricity Rate Costs – DEP has been working with the Public Utility Commission to address utility burden for low-income residents, which recently resulted in a new policy statement from the Commission lowering the maximum "energy burden" thresholds for low-income individuals to 6% of income.

Nuclear Facilities – Participation in RGGI is beneficial to nuclear facilities, and other non-carbon emitting energy resources, because they would not need to purchase credits because they have zero carbon emissions when generating electricity.

Impacts to PJM Grid & PA Generators – Pennsylvania joining RGGI is not expected to cause significant shifts in generation, however DEP will be working collaboratively with the Public Utility Commission and the grid operator PJM to identify solutions to help prevent Pennsylvania's electricity generators from being disadvantaged based on the commonwealth's participation in RGGI compared to generators in the non-participating states.

Next Steps

- Looking forward, DEP will be seeking opportunities for engagement by the General Assembly, key stakeholders, and residents and businesses of Pennsylvania.

- A draft Annex of the regulation is expected to be presented at a Air Quality Technical Advisory Committee meeting in the first quarter of 2020.

Questions & Comments

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Thank you!

Jessica Shirley
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