Reducing CO_2 Emissions

February 25, 2020

NEW JERSEY PROTECTING AGAINST CLIMATE THREATS:

Dramatically cut emissions of greenhouse gases.

#NJPACT

The focus of today's meeting:

To provide you with an opportunity to inform the Department on potential pathways to reduce carbon emissions in the State as we work with other agencies to achieve the goals of (1) 80% reduction in greenhouse gas emissions from 2006 levels by 2050 and (2) 100% clean energy by 2050.

BACKGROUND

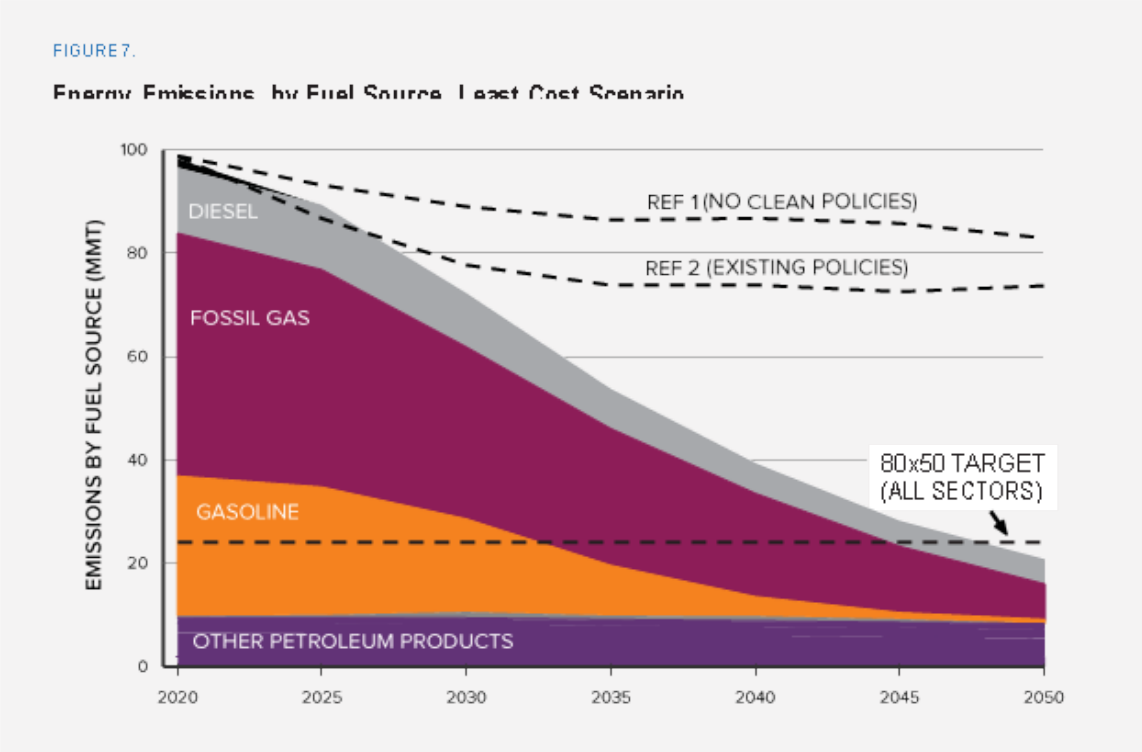
Energy Master Plan

EO 100

NJ PACT

2019 Energy Master Plan

Figure 1, p. 23



On January 27, 2020, the New Jersey Board Of Public Utilities released the 2019 Energy Master Plan (EMP), which outlined proposed strategies to reach the 80% reduction in greenhouse gas emissions from 2006 levels by 2050.

-2019 New Jersey Energy Master Plan, https://www.bpu.state.nj.us/bpu/pdf/publicnotice/NJBPU_EMP.pdf

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On the same day, Governor Murphy signed Executive Order No. 100 (EO No.100), directing the Department to adopt regulatory reforms "to reduce [greenhouse gas] emissions and adapt to climate change."

-01/27/2020 Office of the Governor Press Release, https://nj.gov/governor/news/news/562020/approved/20200127a.shtml

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In response to EO No. 100, the Commissioner of the Department issued Administrative Order No. 2020-01, directing the Department to "[p]ropose regulations establishing criteria that shall govern and reduce emissions of carbon dioxide within 12 months of the date hereof, and if appropriate, adopt same within 24 months."

Administrative Order No. 2020-01, https://www.nj.gov/dep/njpact/index.html

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Given the projected impacts of climate change in New Jersey, the Department believes it is critical to look to the future and consider all potential opportunities to reduce emissions. As we develop new rules, the Department will consider many factors, including risk levels of various types of activities in various locations, as well as cost effectiveness of sustainable solutions.

This proposed rulemaking should consider the CO_2 emissions reductions that can be achieved by Electric Generating Units (EGUs) and stationary Non-EGU sources already permitted by the Department.

EGUs

Generally speaking, EGUs are a combustion/steam source that delivers power to the grid

Though the EMP acknowledged that by rejoining the Regional Greenhouse Gas Initiative (RGGI), New Jersey will achieve emissions reductions, the EMP signaled that additional regulation of CO_2 might be necessary to meet the emissions reduction goal.

-2019 New Jersey Energy Master Plan, p. 113

Non-EGUs

Generally speaking, stationary combustion/steam sources used in the Commercial, Industrial, Institutional, and Residential sectors.

Number of Non-EGU Units with Air Permits in NJ

	Boilers	Engines	Turbines
>100 MMBtu/hr	53	-	1
>50 and <100	65	-	3
>20 and <50	335	29	2
<20	7,374	261	9
SUM	**7,827**	**290**	**15**

Questions concerning content?

Proposed regulations should consider the emissions reductions that can be achieved in the short-term, as well as long term strategies to foster alternatives to fossil fuels.

Potential short-term strategies for reducing CO_2

1. Fuel switching to lower carbon intensity
2. Increasing efficiencies
3. Other strategies
   a. Measures to reduce energy demand
   b. Implementing Transportation Control Measures

Potential Long-term Strategies for reducing CO_2

1. Electrification
2. Renewables
3. Carbon Capture and Sequestration

Short-term strategies for EGUs

Fuel switching to lower carbon intensity

Increasing efficiencies

Other strategies

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EGUs are responsible for 18% of CO_2 emissions in New Jersey.

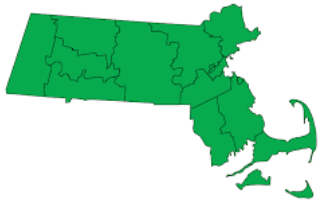
Other States Have Adopted Regulations (in addition to RGGI) to Reduce CO_2 Emissions from EGUs:

- New York recently adopted regulations establishing CO_2 emissions limits of 1,800 lbs/MW-hr gross electrical output or 180 lbs/mmBTU of input for non-modified existing major electric generating facilities

See http://www.dec.ny.gov/regulations/113536.html

- Massachusetts has an allowance trading program, in addition to RGGI, which has an annually declining limit on aggregate CO_2 emissions

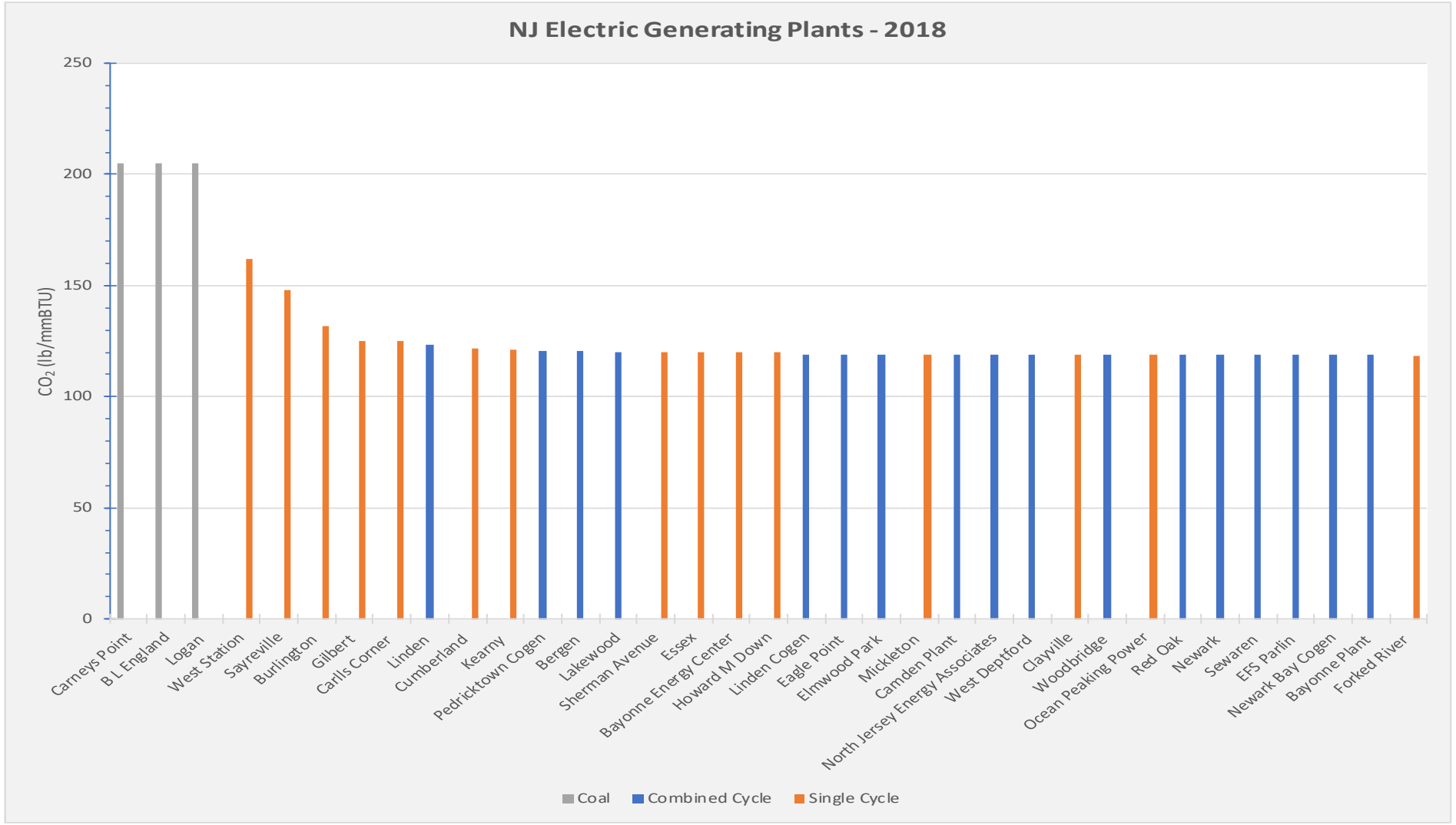
See https://www.mass.gov/guides/electricity-generator-emissions-limits-310-cmr-774



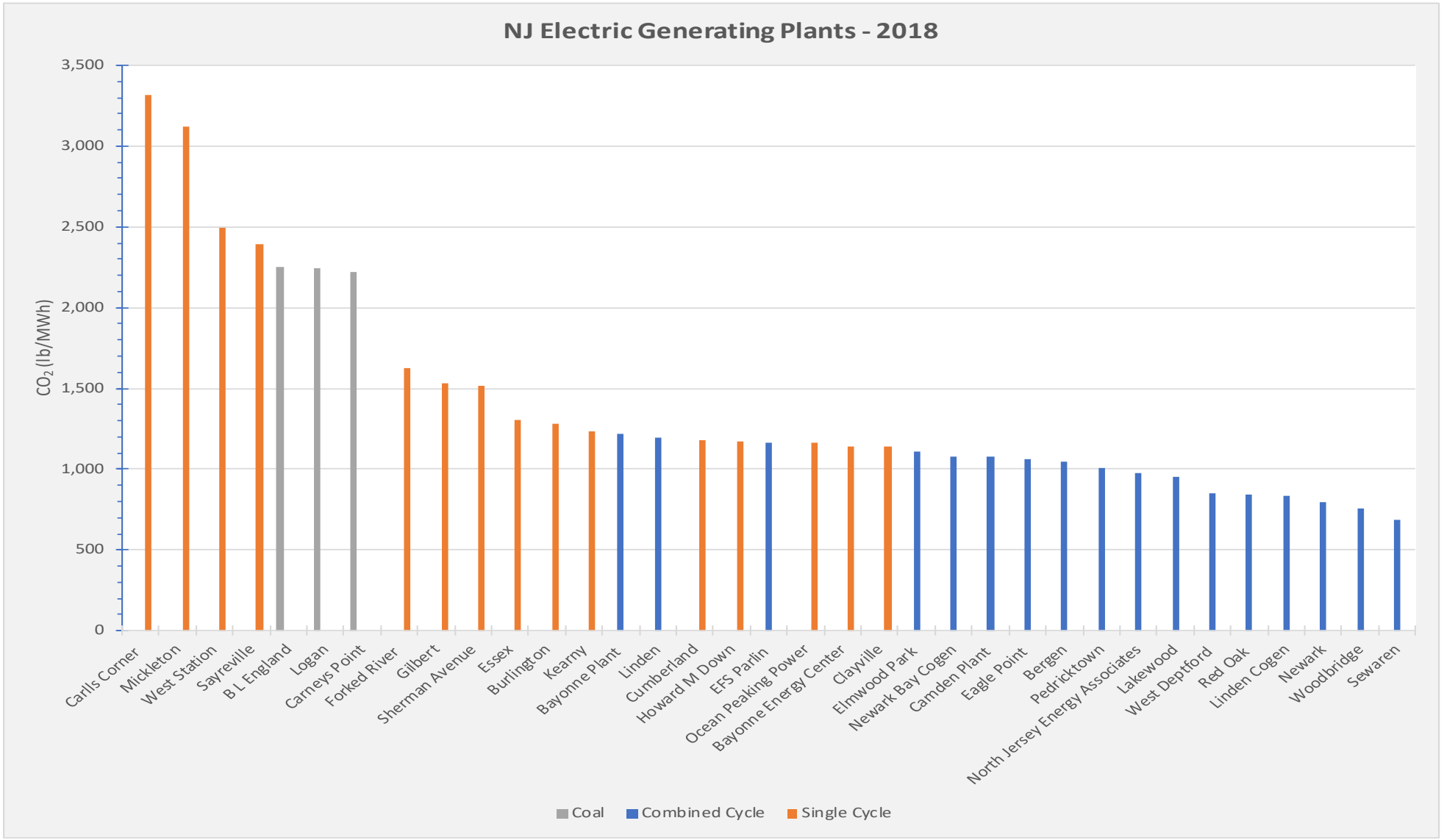
Fuel Type CO_2 emissions (lb/MMBtu)

• Coal	210
• Residual Heating Oil (#4 and #6)	174
• Diesel Fuel/#2 Fuel Oil	161
• Kerosene	159
• Gasoline	157
• Propane	139
• Natural Gas	117

NJ POWER PLANTS RANKED BY LB OF CO_2/MMBTU



NJ POWER PLANTS RANKED BY LB CO_2/MWHR



Existing Permit Conditions as a result of PSD regulations (12-Month Rolling) in NJ

- **Facilities Constructed:**
- PSEG Sewaren—888 lb/MW-hr (Approved 4/26/2016)
- NEC-897 lb/MW-hr (Approved 11/1/2012)
- Woodbridge Energy Center—925 lb/MW-hr (Approved 9/13/2012)

- **Other Approvals:**
- Linden Cogen—888 lb/MW-hr (Approved 7/30/2019)
- Middlesex Energy Center—866 lb/MW-hr (Approved 7/19/2016) – (no duct burner)
- West Deptford Energy Center Phase II—955 lb/MW-hr (Siemens), 947 lb/MW-HR (GE) (Approved 7/18/2014)
- PSEG Sewaren (2014 Approval)—925 lb/MW-hr (Approved 4/22/2014)

For which facilities is fuel switching feasible?

Considerations:

-timeframe/technology

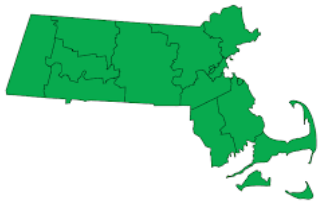
-cost

-health impacts

-location: Environmental Justice/Community Concerns

location: Infrastructure/Utility Availability

Would a performance standard (similar to NY) or an allowance program (similar to MA) make sense for New Jersey to reduce CO_2 emissions from EGUs?



Considerations:

- -timeframe/technology
- -cost
- -health impacts
- -location: Environmental Justice/Community Concerns
- -location: Infrastructure/Utility Availability

Questions concerning content?

DISCUSSION
EGU Short-Term

1. What option would the facility you represent most likely choose?
2. What are the advantages and disadvantages of each option?
3. What options are the best for the environment?
4. How does each option affect public health?
5. What is the effect on environmentally burdened areas?
6. What is the social impact for each option? Jobs?
7. What is the impact of each option outside NJ?

Short-term Strategies for Non-EGUs

1. Fuel switching to lower carbon intensity
2. Increasing efficiencies
3. Other strategies

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Fuel Type CO_2 emissions (lb/mmBTU)

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AMOUNT OF FUEL USED (mmBTU) IN NJ FOR 2017 BY SECTOR*

Fuel Type	Industrial	Commercial	Residential	Total by Fuel
Distillate Oil	1,866,272	2,061,493	19,072,990	**23,000,755**
Natural Gas	162,608,545	115,386,989	232,688,400	**510,683,934**
Kerosene	12,150	10,494	28,350	**50,994**
LPG	2,081,469	557,530	4,296,163	**6,935,163**
Total by Sector	**166,568,437**	**118,016,506**	**256,085,903**	

*Excludes EGUs and Mobile

CO_2 EMISSIONS (METRIC TONS) IN NJ FOR 2017 BY SECTOR*

Fuel Type	Industrial	Commercial	Residential	Total by Fuel
Distillate Oil	137,984	152,418	1,410,174	**1,700,576**
Natural Gas	8,629,696	6,123,630	12,348,860	**27,102,186**
Kerosene	915	790	2,135	**3,840**
LPG	128,403	34,393	265,024	**427,821**
Total by Sector	**8,896,998**	**6,311,231**	**14,026,192**	

*Excludes EGUs and Mobile

For which facilities is fuel switching feasible?

Considerations:

-timeframe/technology

-cost

-health impacts

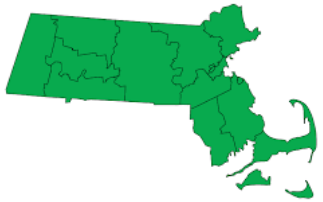
-location: Environmental Justice/Community Concerns

-location: Infrastructure/Utility Availability

Would a performance standard or allowance program make sense for New Jersey to reduce CO_2 emissions from non-EGUs?

Considerations

-timeframe/technology
-cost
-health impacts
-location: Environmental Justice/Community Concerns
-location: Infrastructure/Utility Availability



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Non-EGU Short-Term

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Long-term Strategies for Non-EGUs

1. Electrification
2. Renewables

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Electric steam boiler

- Boiler where the steam is generated using electricity, rather than the combustion of a fuel source
- Used in laundries, food processing, hospitals
- Relatively simple to operate

Electric steam boiler
Advantages

- Electricity may come from a carbon-free source
  - May result in much less pollution
- Fewer parts, lower maintenance
- Safer than a traditional fire-heated boiler
- 100% efficient - may be cheaper than typical liquid-fuel-fired boiler
  - No flame to be constantly lit
  - Depends on local cost of fuel, and electricity

Electric steam boiler
Disadvantages

- Electricity may come from a carbon-intensive source
  - Pollution impact will depend upon source supplying energy
  - Transmission losses
- Could be more expensive, depending on local cost of electricity

Questions concerning content?

DISCUSSION
Non-EGU Long Term

1. What option would the facility you represent most likely choose?
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Long-term Strategies for EGUs

1. Renewables

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DISCUSSION - EGU Long Term

How do EGUs transition to a renewable portfolio?

GENERAL DISCUSSION

Other Challenges to Implementation?

Law/Rule Changes Needed?

Anything Else?

COMMENTS

By March 10, 2020, please send comments and/or technical support information to:

NJDEP-BAQP@dep.nj.gov

Please use the following heading in the Subject Line of the email:

"Reducing Carbon Emissions in New Jersey"

THANK YOU!!!!