

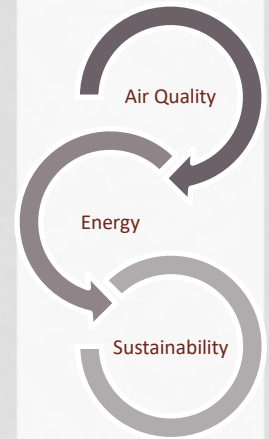


STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION



BOILER ELECTRIFICATION

NJ PACT: STATIONARY SOURCE



Presented by: Christopher Schwalje, Division of Air Quality

INTRODUCTION

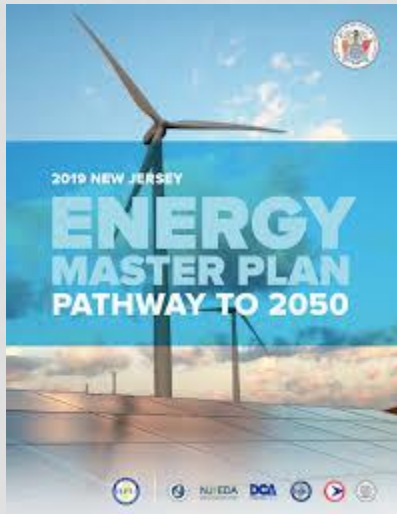
- Christopher Schwalje
 - Environmental Engineer 2
 - Bureau of Stationary Sources/Title V
 - 16 years in DEP



OVERVIEW

- New Jersey Energy Master Plan Strategy 4
 - Reduce Energy Consumption and Emissions from the Building Sector
- Boilers and emissions generated
- Fossil fuel vs electric boilers
- Boiler fleets (military and university)
- Implementation and future
 - What can DEP do to help meet EMP goal?
 - What is technically feasible?
 - How to ensure industry flexibility

NEW JERSEY ENERGY MASTER PLAN



- “Space heating, water heating, appliances, and industrial use account for 28% of New Jersey’s [GHG] emissions, including 15.2 MMT of CO₂e in the residential sector, 9.4 MMT of CO₂e in the commercial sector, and 7.2 MMT of CO₂e in the industrial sector. Buildings are also responsible for a combined 62% of the state’s total end-use energy consumption, including similar energy consumption in commercial buildings (26%) and residential buildings (25%), followed by the industrial sector (12%).” (EMP, pg. 157)
- “Modeling results from the Integrated Energy Plan suggest it would be most cost effective to begin constructing all-electric buildings by 2025 and to begin transitioning existing building stock during natural stock rollover events beginning in 2030.” – (EMP, pg. 167)

BOILERS

- Equipment used for generating steam or hot water
- Fossil fuel combustion (oil/propane/natural gas)
- Size variability
 - Residential/commercial sources typically less than 1 MMBTU/hr (Exempt sources per Subchapter 8, Insignificant sources per Subchapter 22)
 - Industrial sources often greater than 1 MMBTU/hr (permitted as significant sources per Subchapter 8 and 22)

FOSSIL FUEL BOILER EMISSIONS

- Greenhouse Gas Profile

Fuel	lb. of CO ₂ per MMBTU
Heating Oil	161.3
Propane	139
Natural Gas	117

- Criteria pollutants including nitrogen oxides, sulfur oxides, and particulate emissions, including black carbon. (EMP, pg. 159)

FOSSIL FUEL VS ELECTRIC

- Decarbonization through use of electric boilers
- Used in laundries, food processing, and hospitals
- Technical Concerns
 - No maintenance/simpler design
 - 100% efficiency
 - No direct source emissions, but generated from power source
 - Size limitations
 - Cost
- Permitting
 - Electric boilers are exempt from permitting
 - Facility could claim shutdown credits from actual emissions
 - Title V permits could become Synthetic Minor



BOILER FLEETS

- Fleet: multiple sources at a single facility
- Info on fleets at military and university facilities
(Data source: NJ Data Miner search from April 2020)
 - As many as 79 sources at a university and 80 sources at a military base.
 - Boilers range from 0.04 MMBTU/hr to approximately 10 MMBTU/hr (not including CHP and large auxiliary boilers)
 - Approximately 2,550 MMBTU/hr at facilities with multiple boilers
 - Dorms/residencies, administrative, and classroom buildings



WHAT CAN DEP DO TO REDUCE GHGs IN BUILDING SECTOR?

- Encourage natural stock rollover & set market expectations
- Permitting Options
 - Prohibit installation of new fossil fuel boilers
 - What date can this take place? All at once or sliding scale?
 - Based on size/availability?
 - Are waivers allowed based on alternative emission reductions, economic feasibility, technical and safety issues?
 - Deny renewal of existing fossil fuel boilers
 - What date can this take place?
 - Based on age/size?
 - Alternative compliance for facilities with boiler fleet?
 - General Permit availability?

OPTIONS FOR FLEETS

- Fleet standard?
- Allow owners of fleets to keep some fossil fuel boilers beyond deadline if emissions are averaged with electric units?
 - What if averaged with electric and energy efficiency improvements?
 - What if averaged with on-site Green Energy (solar/wind)?
 - What if averaged with emission reductions from transportation control measures (i.e. bus retrofit)?

REQUEST FOR COMMENTS

- By September 17, 2020, please send comments and/or technical support information to:
NJairrulesstationary@dep.nj.gov
- Please use the following heading in the Subject Line of the email:
“NJ PACT: Boilers”