



Connecticut Department of Energy and Environmental Protection



Section 22a-174-22 – The Next Generation: Revised Emissions Limitations Framework

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Current thinking

- The proposed RCSA Section 22a-174-22 rule revision would include two phases to provide compliance flexibility:
 - Phase 1 would be from 2017 (year EPA requires revised RACT to be implemented) to 2021 or 2022;
 - Phase 2 would start in 2021 or 2022.
- Phase 1 serves as a “bridge” for boilers serving electric generating units (EGUs) and turbines, with the same/similar emission limits as those in Phase 2, but with longer averaging times (ozone season vs. 24-hr).
- Phase 2 includes 24-hr averages for boilers serving EGUs; turbines; industrial, commercial, institutional (ICI) boilers; and reciprocating engines .
- Phase 2 24-hr averages are similar or identical to NY or NJ limits.



NJ and NY NOx limits for Boilers Serving EGUs and ICI boilers

NJ	Coal	Natural gas	Other gas (not refinery)	No. 2 oil	Other liquid fuels	Dual fuel
Boilers serving EGUs	1.50 lb/MWh	1.00 lb/MWh	_____	1.00 lb/MWh	2.00 lb/MWh	_____
ICI boilers* 25 MMBtu/hr up to 100 MMBtu/hr	_____	0.05 lb/MMBtu	0.20 lb/MMBtu	0.08 lb/MMBtu	0.20 lb/MMBtu	0.12 lb/MMBtu
ICI boilers* 100 MMBtu/hr or greater	_____	0.10 lb/MMBtu	0.20 lb/MMBtu	0.10 lb/MMBtu	0.20 lb/MMBtu	0.20 lb/MMBtu

*Whether or not at a major NOx facility

NY	Coal	Gas only	Gas/Oil
Mid size boilers 25-100 MMBtu/hr	_____	0.05 lb/MMBtu	0.08 lb/MMBtu (distillate oil/gas) 0.20 lb/MMBtu (residual oil/gas)
Large boilers 100-250 MMBtu/hr	0.20 lb/MMBtu (pulverized) 0.08 lb/MMBtu (fluidized bed)	0.06 lb/MMBtu	0.15 lb/MMBtu
Very large boilers 250 MMBtu/hr and >	0.12 lb/MMBtu 0.20 lb/MMBtu (cyclone) 0.08 lb/MMBtu (fluidized bed)	0.08 lb/MMBtu	0.15 lb/MMBtu 0.20 lb/MMBtu (cyclone)



Emissions Limits and Compliance Options

- Emissions limits assigned to the following categories:
 - Boilers Serving EGUs (aka CAIR sources)
 - Simple Cycle Turbines
 - Combined Cycle Turbines
 - ICI Boilers
 - Reciprocating Engines
- Compliance options provided per category.
 - Alternative RACT will only be available if certain eligibility criteria are met. Criteria are under development.



Emissions Limits- Boilers Serving EGUs

Current limits (24-hr average) + non-ozone season limit	Natural gas-fired (lb/MMBtu)	Residual oil-fired (lb/MMBtu)	Distillate oil-fired (lb/MMBtu)	Coal-fired (lb/MMBtu)
Cyclone furnace	0.43	0.43	0.43	0.43
Other boiler	0.20	0.25	0.20	0.38
Non-ozone season limit (7 month average) (CAIR sources only)	0.15	0.15	0.15	0.15
Phase 1 limits (May 1, 2017-April 30, 2021 or 2022) = Current limits (24-hr average) + Non-ozone season limit + Ozone season limit				
Ozone season limit (5 month average) (CAIR sources only) (new requirement)	0.10	0.20	0.10	0.15
Cyclone furnace (24-hr average)	0.43	0.43	0.43	0.43
Other boiler (24-hr average)	0.20	0.25	0.20	0.38
Non-ozone season limit (7 month average) (CAIR sources only)	0.15	0.15	0.15	0.15
Phase 2 limits (May 1, 2021 or 2022 and after) = Phase 2 limits (24-hr average) + Non-ozone season limit				
Phase 2 limits (24-hr average) (CAIR sources only) (new requirement)	0.10	0.20	0.10	0.15
Non-ozone season limit (7 month average) (CAIR sources only)	0.15	0.15	0.15	0.15



Compliance Options – Boilers Serving EGUs

- Institute emissions caps during the ozone/non-ozone seasons, based on potential emissions at proposed seasonal rates or actual operations during the last 6 years.
- Install or optimize control apparatus on the unit in question or another unit at the facility.
- Commit to combust natural gas in unit that is permitted to combust either natural gas or fuel oil.
- Cap the hours of operation of the unit in question or another unit at the facility.
- Reduce the emission rate by 40% from a 2010 baseline rate.
- Average emissions with overcomplying emission units at the facility.
- Limit unit operations to OP4, Action 6 events.
- Commit to modify, replace or retire unit in question or another unit at the facility.
- Use existing, banked DERCs to comply (Phase 1 only).
- An alternative action, as approved by DEEP and EPA. (Eligibility criteria to be developed.)



Emissions Limits- Simple Cycle Turbines

Current limits (24-hr average) + non-ozone season limit	Natural gas-fired	Distillate oil-fired
Turbine engines with maximum rated capacity \geq 100 MMBtu/hr	55 ppmvd	75 ppmvd
Turbine engine with maximum rated capacity < 100 MMBtu/hr	0.90 lb/MMBtu	0.90 lb/MMBtu
Non-ozone season limit (7 month average) (CAIR sources only)	0.15 lb/MMBtu	0.15 lb/MMBtu
Phase 1 limits (May 1, 2017-April 30, 2021 or 2022) = Current limits (24-hr average) + Non-ozone season limit + Ozone season limit		
Turbine engines with maximum rated capacity \geq 100 MMBtu/hr	55 ppmvd	75 ppmvd
Turbine engine with maximum rated capacity < 100 MMBtu/hr	0.90 lb/MMBtu	0.90 lb/MMBtu
Ozone season limit (5 month average) (CAIR sources only) (new requirement)	50 ppmvd	50 ppmvd
Non-ozone season limit (7 month average) (CAIR sources only)	0.15 lb/MMBtu	0.15 lb/MMBtu
Phase 2 limits (May 1, 2021 or 2022 and after) = Phase 2 limits (24-hr average) + Non-ozone season limit		
Phase 2 limits (24-hr average) (all turbines) (new requirement)	40 ppmvd	50 ppmvd
Non-ozone season limit (7 month average) (CAIR sources only)	0.15 lb/MMBtu	0.15 lb/MMBtu



Compliance Options – Simple Cycle Turbines

For the 24-hour limits, turbines that are not controlled must use one of the following compliance options:

- Reduce the emission rate by 40% from a 2010 baseline rate.
- Average emissions with overcomplying emission units at the facility.
- Limit unit operations to OP4, Action 6 events.
- Accept an enforceable cap on emissions or hours of operation.
- Commit to reconstruct, replace or retire unit in question or another unit at the facility.
- Use existing, banked DERs to comply (Phase 1 only).
- An alternative action, as approved by DEEP and EPA. (Eligibility criteria to be developed.)

To comply with the non-ozone season limit, controlled turbines (i.e., water injection) will have the following compliance option to meeting the 0.15 lb/MMBtu limit: use the controls and accept an enforceable cap on hours or on mass emissions.



Emissions Limits- Combined Cycle Turbines

Current limits (24-hr average) + non-ozone season limit	Natural gas-fired	Distillate oil-fired
Turbine engines with maximum rated capacity \geq 100 MMBtu/hr	55 ppmvd	75 ppmvd
Turbine engine with maximum rated capacity < 100 MMBtu/hr	0.90 lb/MMBtu	0.90 lb/MMBtu
Non-ozone season limit (7 month average) (CAIR sources only)	0.15 lb/MMBtu	0.15 lb/MMBtu
Phase 1 limits (May 1, 2017-April 30, 2021 or 2022) = Current limits (24-hr average) + Non-ozone season limit + Ozone season limit		
Turbine engines with maximum rated capacity \geq 100 MMBtu/hr	55 ppmvd	75 ppmvd
Turbine engine with maximum rated capacity < 100 MMBtu/hr	0.90 lb/MMBtu	0.90 lb/MMBtu
Ozone season limit (5 month average) (CAIR sources only) (new requirement)	50 ppmvd	50 ppmvd
Non-ozone season limit (7 month average) (CAIR sources only)	0.15 lb/MMBtu	0.15 lb/MMBtu
Phase 2 limits (May 1, 2021 or 2022 and after) = Phase 2 limits (24-hr average) + Non-ozone season limit		
Phase 2 limits (24-hr average) (all turbines) (new requirement)	25 ppmvd	42 ppmvd
Non-ozone season limit (7 month average) (CAIR sources only)	0.15 lb/MMBtu	0.15 lb/MMBtu



Compliance Options – Combined Cycle Turbines

- Reduce the emission rate by 40% from a 2010 baseline rate.
- An alternative action, as approved by DEEP and EPA. (Eligibility criteria to be developed.)
- Average emissions with over complying emission units at the facility.
- Commit to modify/reconstruct, replace or retire unit in question or another unit at the facility.
- Commit to combust natural gas in unit that is permitted to combust either natural gas or fuel oil.
- Use existing, banked DERs to comply (Phase 1 only – limited supply).
- Accept an enforceable cap on emissions or hours of operation, based on potential emissions at proposed seasonal rates or actual operations during the last 6 years.
- Limit unit operations to OP4, Action 6 events.



Emissions Limits – ICI Boilers

Current limits (24-hr average)	Natural gas-fired (lb/MMBtu)	Residual oil-fired (lb/MMBtu)	Distillate oil-fired (lb/MMBtu)
All boilers > 5 MMBtu/hr	0.20	0.25	0.20
Phase 1 limits (24-hr average)			
Boilers < 25 MMBtu/hr (new requirement)	Annual tune up	Annual tune up	Annual tune up
All boilers \geq 25 MMBtu/hr	0.20	0.25	0.20
Phase 2 limits (24-hr average) (May 1, 2021 or 2022 and after)			
Boilers < 25 MMBtu/hr (new requirement)	Annual tune up	Annual tune up	Annual tune up
Boilers 25 MMBtu/hr up to 100 MMBtu/hr (new requirement)	0.05	0.20	0.10
Boilers 100 MMBtu/hr or greater (new requirement)	0.10	0.20	0.15



Compliance Options – ICI Boilers

- Commit to combust natural gas in unit that is permitted to combust either natural gas or fuel oil.
- Reduce the emission rate by 40% from a 2010 baseline rate.
- Average emissions with overcomplying emission units at the facility.
- Commit to reconstruct, replace or retire unit in question or another unit at the facility.
- An alternative action, as approved by DEEP and EPA. (Eligibility criteria to be developed.)
- Use existing, banked DERCs to comply (Phase 1 only – limited supply).



Emissions Limits – Reciprocating Engines

Current and Phase 1 limits (24-hr average)	Natural gas-fired (g/hp-hr)	Distillate-oil-fired (g/hp-hr)	Landfill gas or digester gas, alone or fired with natural gas (g/hp-hr)
All reciprocating engines	2.5	8	No limit
Phase 2 limits (24-hr average) (May 1, 2021 or 2022 and after)			
Rich burn reciprocating engines (new requirement)	1.5	1.5	2.0
Lean burn reciprocating engines (new requirement)	1.5	2.3	2.0



Compliance Options – Reciprocating Engines

- Reduce the emission rate by 40% from a 2010 baseline rate.
- Average emissions with overcomplying emission units at the facility.
- Commit to reconstruct, replace or retire unit in question or another unit at the facility.
- Use existing, banked DERCs to comply (Phase 1 only).
- An alternative action, as approved by DEEP and EPA. (Eligibility criteria to be developed.)

