



**Department of the Environment**

# Amendments to COMAR 26.11.36 - Distributed Generation



Reporting and Recordkeeping  
Requirements

AQCAC meeting – June 8, 2015



# Topics Covered

- Background
- COMAR 26.11.36
- Curtailment Service Providers
- Operation of Engines
- PJM's Demand Response Program
- EPA Engine Rules
- MDE Considerations



# Background

- Stationary engines are installed in large commercial buildings, hospitals and numerous other facilities
- Provide back up power in the event of loss of electricity
- Most engines use diesel fuel and no pollution controls
  - Release significantly more pollution per unit of power than those from power plant





# NOx Emissions Comparison

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- Newer stationary engines are much cleaner, but vast majority of engines are less efficient and produce a lot of NOx

## Stationary Engines

## NOx Emissions

Manufactured pre-1980:

15 g/bhp-hr = 44 lb/MWh

Manufactured year 2000:

7.4 g/bhp-hr = 21.89 lb/MWh

Tier 2 Emergency 1MW:

6.4 g/bhp-hr = 18.93 lb/MWh

Tier 4 Engine 1 MW:

0.88 g/bhp-hr = 2.60 lb/MWh

MDE load shaving rate:

1.4 g/bhp-hr = 4.1 lb/MWh

## Sample HEDD Units

## NOx Emissions

Perryman CT3 (53MW) Diesel

135 hrs in 2011 = 12.35 lb/MWh

Riverside CT6 (112MW) NG

21 hrs in 2011 = 3.97 lb/MWh

Chalk Point GT3 (103MW) NG

205 hrs in 2011 = 1.28 lb/MWh

# What does this mean?

In general . . . For non-emergency engines

- Pre-1996 –  
No NOx emission limit
- After 1996 –  
NOx emission limit 9.2 g/kw-hr
- Around 2011 –  
NOx emission limit 3.5 g/kW-hr
- In 2014 –  
NOx emission limit 0.40 g/kW-hr

Convert to: lbs/MMBtu

- ??????
- 5.9 lbs/MMBtu
- 2.3 lbs/MMBtu
- 0.26 lbs/MMBtu



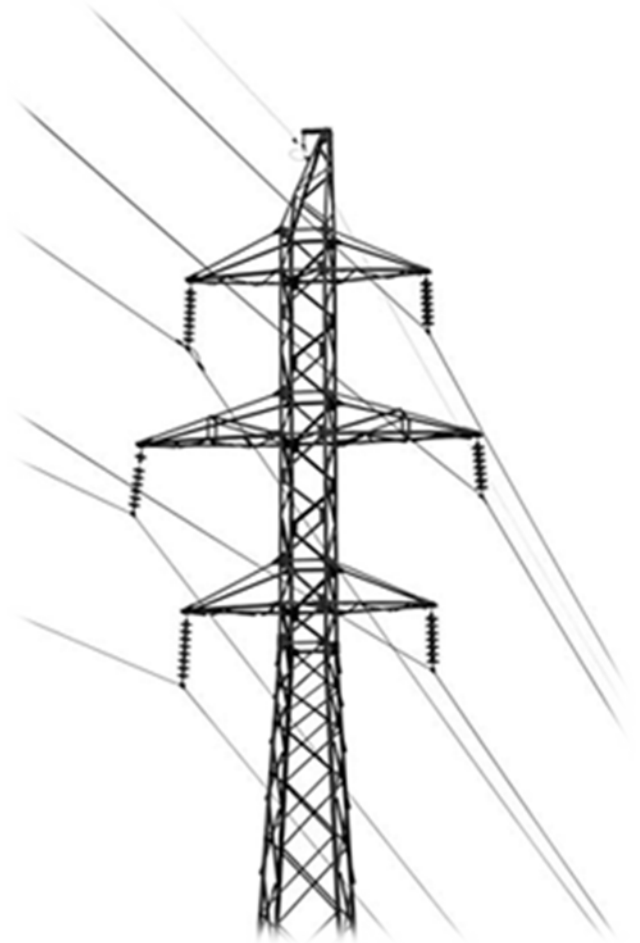
# COMAR 26.11.36

- Established NOx emission requirements for emergency generators and load shaving units
- Requires NOx standard be met, NOx allowances purchased, or limited use
- CSP reporting amendment required in 2011



# Curtailment Service Providers

- CSPs provide economic incentives for owners of engines to run during times of increased energy demand
- Results in excess NO<sub>x</sub> emissions on high ozone days
- Since 2011, CSPs required to submit annual report to MDE summarizing engine usage and other curtailment activities



# Are Engines Still Being Operated?

- The existence and operation of engines in MD is not entirely known
  - MDE needs to better determine who is operating engines
- New EPA rules may significantly limit the operation of engines for economic programs and non-emergency usage
- MDE will be monitoring development and outcome of EPA engine rules







# CSP Events, 2011

2011			
Daily peak 8-hour ozone concentration (ppb)	Demand response	hours, total	
		DATE	hours, total
05/26/11	76	05/01/11	0.35
05/30/11	76	05/26/11	0.33
05/31/11	85	05/31/11	562.6
06/01/11	92		
06/02/11	77		
06/07/11	89		
06/08/11	114		
06/09/11	106		
06/10/11	98		
06/18/11	76		
06/28/11	76	06/26/11	0.17
07/01/11	81		
07/02/11	107		
07/03/11	84		
07/05/11	98		
07/06/11	90		
07/07/11	94		
07/12/11	79		
07/18/11	88		
07/19/11	76		
07/20/11	86		
07/21/11	83		
07/22/11	97	07/22/11	4981
07/23/11	91		
07/26/11	78		
07/28/11	79	07/28/11	0.2
07/29/11	88		
07/31/11	78		
08/01/11	94		
		08/04/11	6
		08/17/11	170
		09/14/11	15
		09/16/11	55
		09/24/11	0.15
		09/27/11	0.5

EEA Level 2  
demand response hours > 17 hours

DATE	OZONE READING	HOURS of Generator Operation	NOx EMISSIONS (tons)
5/31/2011	85	235	1.338
7/22/2011	97	322	6.960

5/31/2011	hours	number of participants	NOx (tons)	Combination			Curtailment		Generator		
				hours	number of participants	NOx (tons)	hours	number of participants	hours	number of participants	NOx (tons)
economic	3	3	0.005						3	3	0.005
emergency	560	515	1.651	37	34	0.318	279	249	244	232	1.333
unknown											
TOTAL	563	518	1.656	37	34	0.318	279	249	247	235	1.338

7/22/2011	hours	number of participants	NOx (tons)	Combination			Curtailment		Generator		
				hours	number of participants	NOx (tons)	hours	number of participants	hours	number of participants	NOx (tons)
economic	10	2	0.000						10	2	
emergency	3916	694	5.194	202	34	0.240	2182	379	1532	281	4.953
unknown	1055	207	2.007				857	168	198	39	2.007
TOTAL	4981	903	7.200	202	34	0.240	3039	547	1740	322	6.960

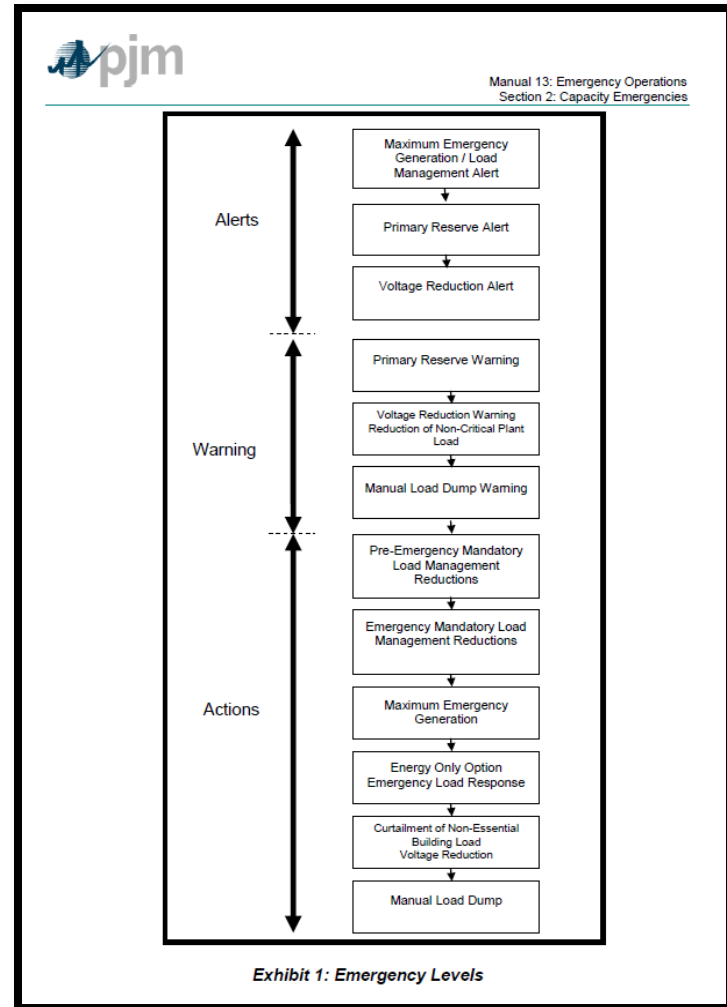
8/17/2011	hours	number of participants	NOx (tons)	Combination			Curtailment		Generator		
				hours	number of participants	NOx (tons)	hours	number of participants	hours	number of participants	NOx (tons)
economic											
emergency	1	1	0.000				1	1	0		
unknown	169	169	0.113				147	147	22	22	0.113
TOTAL	170	170	0.113				148	148	22	22	0.113

9/16/2011	hours	number of participants	NOx (tons)	Combination			Curtailment		Generator		
				hours	number of participants	NOx (tons)	hours	number of participants	hours	number of participants	NOx (tons)
economic											
emergency	55	55	0.091				43	43	12	12	0.091
unknown											
TOTAL	55	55	0.091				43	43	12	12	0.091



# PJM Demand Response Program

- On June 1, 2014, PJM released Manual 13: Emergency Operations, Revision 56
- Revised program to include Pre-Emergency and Emergency Mandatory Load Management Reductions.
- Revised lead time to 30 minutes, and minimum duration to 1 hour.
- Included reference to “any environmentally restricted units”, which establishes that emission rates are to be considered.





# EPA Engine Rules

## **40 CFR 60, Subpart IIII: Stationary Compression Ignition Internal Combustion Engines**

## **40 CFR 63, Subpart ZZZZ: Stationary Reciprocating Internal Combustion Engines**

- Both revised: January 30, 2013
- Establishes emission standards, monitoring/operating, and records/reporting requirements for Non-Emergency and Emergency ICE.
- Non-Emergency ICE Reporting: based on age and size (minimum engine power >25 HP), keep records and/or submit reports.
- Emergency ICE Reporting: if engine power >100 HP, submit annual report, beginning with 2015, no later than March 31, 2016. Reports to contain:
  - Company , location, contact name/information;
  - Engine size rating and model year;
  - Installation data;
  - Hours operated, including date, start time, end time, and for what purpose; and
  - Identify the entity that dispatched the engine and the situation that necessitated the dispatch of the engine.



# Federal Emission Rates

Environmental Protection Agency

§ 89.112

Table 1.—Emission Standards (g/kW-hr)

Rated Power (kW)	Tier	Model Year <sup>1</sup>	NOx	HC	NMHC + NOx	CO	PM
kW<8	Tier 1	2000	—	—	10.5	8.0	1.0
	Tier 2	2005	—	—	7.5	8.0	0.80
8≤kW<19	Tier 1	2000	—	—	9.5	6.6	0.80
	Tier 2	2005	—	—	7.5	6.6	0.80
19≤kW<37	Tier 1	1999	—	—	9.5	5.5	0.80
	Tier 2	2004	—	—	7.5	5.5	0.60
37≤kW<75	Tier 1	1998	9.2	—	—	—	—
	Tier 2	2004	—	—	7.5	5.0	0.40
	Tier 3	2008	—	—	4.7	5.0	
75≤kW<130	Tier 1	1997	9.2	—	—	—	—
	Tier 2	2003	—	—	6.6	5.0	0.30
	Tier 3	2007	—	—	4.0	5.0	
130≤kW<225	Tier 1	1996	9.2	1.3	—	11.4	0.54
	Tier 2	2003	—	—	6.6	3.5	0.20
	Tier 3	2006	—	—	4.0	3.5	
225≤kW<450	Tier 1	1996	9.2	1.3	—	11.4	0.54
	Tier 2	2001	—	—	6.4	3.5	0.20
	Tier 3	2006	—	—	4.0	3.5	
450≤kW≤560	Tier 1	1996	9.2	1.3	—	11.4	0.54
	Tier 2	2002	—	—	6.4	3.5	0.20
	Tier 3	2006	—	—	4.0	3.5	
kW>560	Tier 1	2000	9.2	1.3	—	11.4	0.54
	Tier 2	2006	—	—	6.4	3.5	0.20

<sup>1</sup> The model years listed indicate the model years for which the specified tier of standards take effect.

**NOx Emission rates are a function of:**

- Use: emergency, non-emergency, fire pump
- Age of unit
- Size
- Cylinder displacement
- Tier level
- RPM
- etc.

**As a result:**

- Very complicated

# Potential Paths Forward

- Coordinate with EPA to obtain records on engines as reported according to federal rules
- MDE considering public awareness campaign to educate businesses of existing federal and state regulations
- MDE may update reporting and record keeping requirements for engines in COMAR 26.11.36
- Amend existing regulations to either reference or match federal rules

