COMAR 26.11.36
Distributed Generation
Conceptual
Amendments

June 2013

Background

PJM electricity markets

- Research shows increased likelihood that emergency generators will be operating.
- Emergency Backup Generators can be very old and lack current technologies for emission controls.

2009 Maryland Distributed Generation regulation was a good start, recognized emerging markets and allowed flexibility.

- We now have conclusive numbers that show more than 9 tons of NOx can be emitted in one event/day in Maryland.

Concerns

- The electricity markets deploy all eligible supply-side and demand-side resources without consideration of respective environmental performance.
- Demand Response (DR) programs provide financial incentives for the use of uncontrolled backup generators on the hottest summer days, when conditions would be most conducive to the formation of ground-level ozone.
- Most stationary generators are fired with diesel fuel and are uncontrolled.
- The combustion of diesel fuel releases significantly more NOx emissions per unit of power compared to the generation of electricity from well-controlled power plants.

Proposed MD DG Regulations

- Revise definition of "Emergency Generator" to exclude all DR programs
  - A "Load shaving unit" is a generator that operates for other than emergency
  - New – all PJM Economic AND Emergency DR is load shaving
  - "Peak Shaving" is running a generator to offset a utility bill demand charge, under PJM program or not. Peak shaving is load shaving
- PJM Emergency DR generators will have emission restrictions for NOx

Proposed MD DG Amendments

COMAR 26.11.02

- Permit required for engines 500 hp or above. And ADD all load shaving engines, 100 hp and above.

COMAR 26.11.36

- All DR programs are load shaving and need non-emergency permit. {Emergency DR = load shaving}
- NOx rate 1.4 g/bhp-hr for existing load shaving (prior to 2015)
- NOx rate 0.5 g/bhp-hr for new load shaving (after 2015)
- Delete 10 hour allowance for storm avoidance or other non-emergency hours.
- Delete purchase of NOx allowances to offset emissions in 2015.

How to comply

- To meet strict NOx emission rates, NOx controls will likely need to be installed. Manufacturer Guarantee.
- Install new Tier 4 generator. EPA Certified.
- Permits will need to be obtained or revised.
  - MDE will require all generators in any DR Program or performing Peak Shaving to obtain a Permit to Contruct (PTC)
  - Load shaving units are permitted with 8760 hours
  - Multiple engines and other equipment on site can trigger Permit to Operate (PTO).

Alternative, don't run generator for DR event,
instead reduce KW usage only,
and still get paid.

Reasons for Proposed Amendments

Why more strict now?

- Tighter federal ozone standard and Maryland 2008 Ozone Status
- Need for local NOx controls
- PJM DR expansion in the market may preclude cleaner generation
- Maryland CSP reports confirm generators are running
- To adopt the OTC Model Rule standards

PJM DR Growth

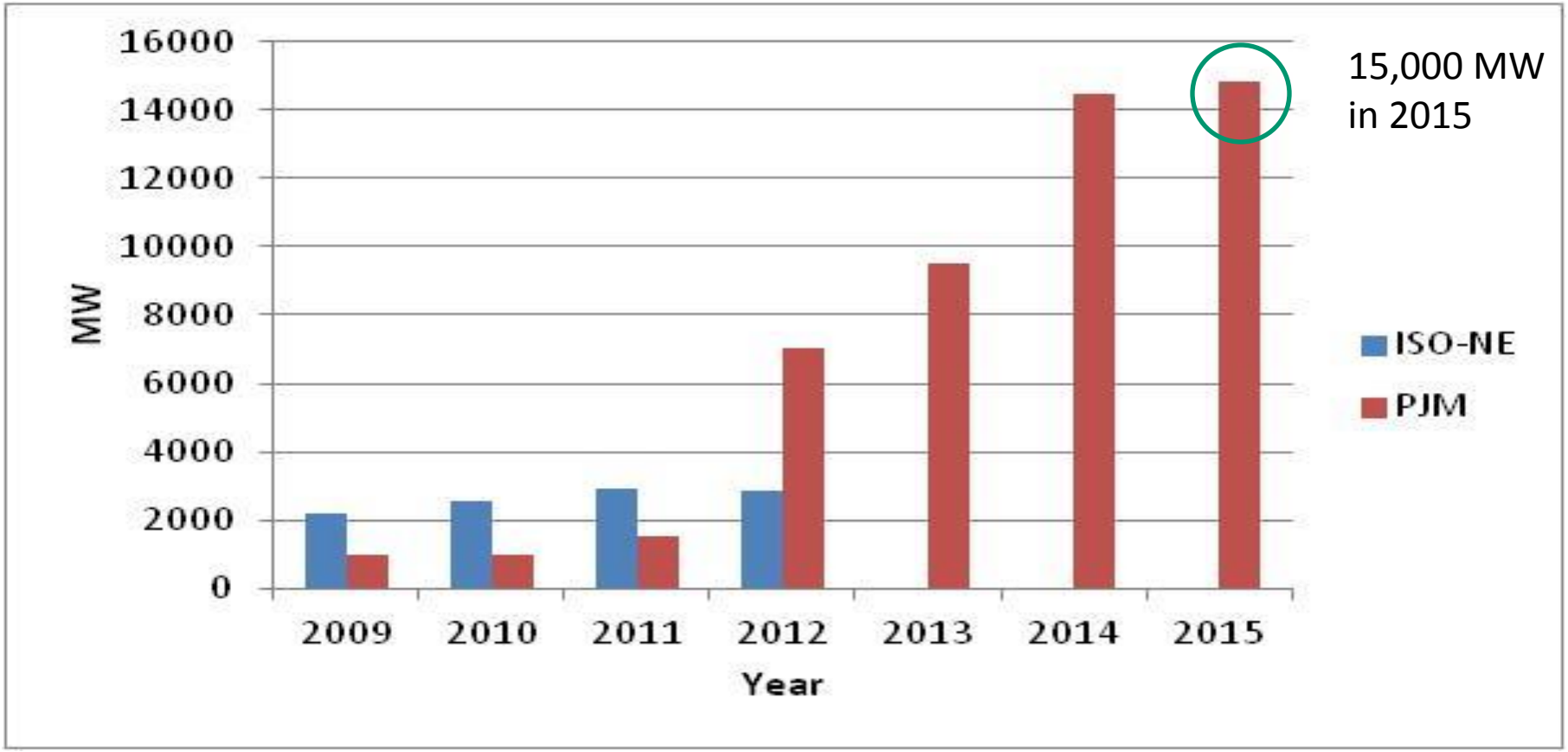
Market Growth

- In the 2010-2011 market DR was 6% (or 9,052 MW of the total 154,074 MW).
- In the 2015-2016 market DR has been bid over 9% (or 14,833 MW of the total 164,561 MW).

Emission Estimate

15GW in DR the overall PJM region in 2015, **if 50%** is supplied by back-up generators, then **490 tons of NOx** can be emitted in one 6-hour event. (Maryland would be 36 tons)

Demand resources growing in New England and PJM



Data from ISO New England and PJM website

PJM Future

- PJM Market Analyst predicts number of Emergency DR events will increase from 1-4 per year to 5-9 per year based on market growth.
- PJM is evolving programs to ensure reliability.
- Complexity in the market and possible future programs with unlimited hours of availability have provoked the Department to review regulations.

Three Product Types available beginning in the 2014/2015 DY

Requirement	Limited DR	Extended Summer DR	Annual DR
Availability	Any weekday, other than NERC holidays, during June – Sept. period of DY	Any day during June-October period and following May of DY	Any day during DY (unless on an approved maintenance outage during Oct. - April)
Maximum Number of Interruptions	10 interruptions	Unlimited	Unlimited
Hours of Day Required to Respond *(Hours in EPT)*	12:00 PM – 8:00 PM	10:00 AM – 10:00 PM	Jun – Oct. and following May: 10 AM – 10 PM Nov. – April: 6 AM- 9 PM
Maximum Duration of Interruption	6 Hours	10 Hours	10 Hours
Notification	Must be able to reduce load when requested by PJM All Call system within 2 hours of notification, without additional approvals required		
Registration in eLRS	Must register sites in Emergency Load Response Program in Load Response System (eLRS)		
Event Compliance	Must provide customer-specific compliance and verification information within 45 days after the end of month in which PJM-initiated LM event occurred.		
Test Compliance	In absence of the PJM-initiated LM event, CSP must test load management resources and provide customer-specific compliance and verification information.		

Slide courtesy of PJM

Concerns

- Emergency generators bid into the PJM forward capacity market can displace other controlled technologies such as natural gas combustion turbines.
- Actual numbers of backup generators have been undocumented by RTO's. (thus extensive emissions can be predicted)
- The Department supports DR load shedding or passive curtailment (ex.HVAC, lighting control).

COMAR 26.11.36.04

Curtailment Service Provider Reporting

2011 & 2012

Answered the Question - Who is running a generator?

- Industrial facilities
- Hospitals
- Shopping centers
- Aggregated residential (through smart meter reductions)
- All types of business’

30% of all facilities reported use of a generator.

CSP 2011 Data

- 12 CSP companies submitted a report
- 1100 Facilities in a DR program
- 470 generators, approximately ½ have identified a MD registration number. (The other ½ were marked as unknown or smaller than 500 hp)
- Many facilities had more than one generator
- Mean age of generators was 2002

Approx. 3% of 2011 contracts reported were for Economic DR therefore 97% are Emergency DR = Limited PJM program

MD Generators in DR

- Estimate 3,000 generators in the State
- 470 generators reported
- 30% of facilities reporting using a generator, therefore 70% of facilities used curtailment practices only
- However looking at reported MWh totals vs. participation in 7/22/11 Emergency DR event

  45% used BUG and 55 % curtailment only
- PJM BGE zone reported approx. 900 MW reduction by Emergency DR at peak hour

Detailed Estimate 2011

- Maryland data for 7/22/11
- 322 generators reported
- 9 tons NOx emitted in 7-hour event based on generator age and assumed emission factors (range from 7.4 – 2 g/bhp-hr)
- Applied NOx control to 1.4 g/bhp-hr for generator over 450hp
- Reduced NOx emissions by 5 tons for the 7-hour event

Regional 2011 Data

NESCAUM Report Aug. 2012

- On July 22, 2011, PJM 7-hour event backup diesel generator participation emission estimates
  - 109 tons of NOx in the region
  - 3 tons of PM in the region
- For the region, July 21 and July 22 also coincided with the highest ozone readings that month.
- For the New York City metropolitan area the highest ozone level recorded in 2011 occurred on July 22, 2011.

Federal Standards

EPA final rulemaking Jan. 30, 2013 stationary ICE NSPS and NESHAP

- A stationary reciprocating internal combustion engine means any RICE, except combustion turbines, that converts heat energy into mechanical work and is not mobile.
- Federal NSPS – New and Modified

  40 CFR 60 subpart JJJJ Stationary Spark Ignition ICE

  40 CFR 60 subpart IIII Compression Ignition ICE
- Federal NESHAP – Existing and new

  40 CFR 63 subpart ZZZZ – all engines at major and area source

18

Federal Standards

- Emergency engines have less strict emission requirements than non-emergency, both rules now allow 100 hours of participation in emergency demand respond while keeping emergency engine status.
- NSPS – Engines built after 2006 – Tiers with emission phase in.
- NESHAP – Existing and new engines – CO catalyst may be required for 500HP and above.
- May have Maryland more stringent load shaving status, with also an EPA non-emergency status.

OTC Model Rule 2011

– Emergency generators are part of Demand Response Program and would be considered non-emergency and would require emission limit for NOx, HC, CO and PM.

- Emergency generators can only run in “true emergency”, maintenance and testing. No other non-emergency run time.
- Emergency definition contains reference to 5% voltage or transmission deviation as an emergency.

OTC Model Rule 2011

All Fuel	NOx	HC	CO	PM
	g/hp-hr			
Existing Engines	1.36	0.65	3.4	0.24
New Engines – meet Tier 4 EPA rates	0.50	0.14	2.62	0.015
New engines – using waste, landfill or digester gases to meet EPA rates	0.75	0.24	3.4	-

Other States

- DE & NJ – Generators in any DR program need to permit as non-emergency with required emission limits
- MA, NH & VA - Generators registered as emergency can be in “Emergency DR” only – equivalent of NERC EEA Level 2

Conceptual Amendments

- Want public attention to how they are offsetting power generation, and know that MDE is looking at smaller sources for local controls
- If a facility wants to run a generator in a DR program then they will need an efficient clean generator
- A facility can invest money gained from DR program into emission control
- Stick to using the emergency back-up generators for “True emergency”

Questions