New Jersey Post
Emergency Response Seminar
At Rider University
October 5, 2018
Understanding Energy Emergency Preparedness and Storm Response

Presented by
Jim Bruncati
New Jersey Board of Public Utilities,
Division of Reliability and Security
Presentation Overview

- New Jersey’s Energy Profile
- All Hazards Approach
- Shifting Weather Paradigm
- Sandy Impact
- Restoration Process
- BPU Actions and Initiatives
- Lessons Learned
To meet the energy needs (total BTUs consumed) of the State’s 8.9 million residents, NJ relies on a complex regional energy infrastructure which is primarily divided into three interrelated subsectors:

- Electricity
- Natural gas
- Petroleum
MAJOR ENERGY SUPPLY ASSETS

Electric Power:
- Over 150 power producers with over 18,000 Megawatts of capacity.

Natural Gas:
- Over 1,500 miles of interstate and intrastate transmission pipelines.
- Five interstate pipeline companies.

Petroleum:
- Two refineries.
- 15 liquid pipelines delivering petroleum products to distribution centers, bulk terminal facilities and interconnecting with refineries.
- Out-of-state imports via rail, barge and pipeline.
# NEW JERSEY’S ELECTRIC DISTRIBUTION COMPANIES (EDCs)

<table>
<thead>
<tr>
<th>Company</th>
<th>Customers</th>
<th>Area (sq mi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUBLIC SERVICE ELECTRIC &amp; GAS (PSE&amp;G)</td>
<td>2,247,440</td>
<td>1,450</td>
</tr>
<tr>
<td>JERSEY CENTRAL POWER &amp; LIGHT</td>
<td>1,091,614</td>
<td>3,256</td>
</tr>
<tr>
<td>ATLANTIC CITY ELECTRIC</td>
<td>533,452</td>
<td>2,760</td>
</tr>
<tr>
<td>ROCKLAND ELECTRIC COMPANY</td>
<td>70,900</td>
<td>207</td>
</tr>
</tbody>
</table>

**TOTAL ELECTRICITY CUSTOMERS**: 3.94 MILLION
NJ’s Preparedness strategy is based on an all hazards approach to an emergency situation.

Emergency situations can be caused by:

- Natural disasters
- System failures
- Acts of terrorism/intentional acts
- Cyber attacks
- Weather events!
All Hazards Preparedness…

- All hazards response is coordinated at NJ’s Regional Operations Intelligence Center (ROIC).
- The ROIC houses the State Emergency Operations Center (SEOC) and is the State Fusion Center for all hazards intelligence gathering and dissemination.
- During normal operations, the ROIC's intelligence activities provide situational awareness and real time tactical intelligence.
- During an emergency, the SEOC is activated and the ROIC serves as the command center for all State-led emergency response operations – State, County and Local events.
Primary State-level ESF #12 agency with a reliability and security mission that includes emergency response coordination responsibilities.

- Primary ESF #12 Agency
- Support Agencies
- State Fusion Center

New Jersey Board of Public Utilities (BPU)

- NJ Office of Emergency Management (NJOEM)
- NJ Department of Environmental Protection (NJDEP)
- Department of Community Affairs/Division of Fire Safety (DCA/DFS)
- NJ Department of Transportation (DOT)
- Office of Homeland Security & Preparedness (OHSP)
With the exception of the 2003 Northeast Blackout, virtually all significant events causing widespread electric utility outages in the past 10 – 15 years have been weather related events.

In recent years, several major storms caused widespread outages and significant damage to the region’s electric infrastructure.

The most notable events in recent years include:

- Hurricane Irene - 2011
- October Snow Storm - 2011
- Derecho Storm - 2012
- Hurricane Sandy - 2012
New Weather Paradigm...

- During past significant weather events, electric restoration efforts have taken 4 to 7 days to restore all customers.
- Irene took 7-8 days before all of the approx. 1 million peak outages were fully restored.
- The October 2011 Snowstorm took 7 days before all of the approx. 1 million peak outages were fully restored.
- In the case of Super Storm Sandy, despite having the largest utility workforce ever mobilized in NJ, full restoration of the approximately 2.8 million peak customer outages affected by the storm took 14 days.
- Out-of-state crew workers ultimately grew to approx. 17,000 throughout the restoration process including federal assets.
- Weather preparedness has radically changed. There has been a shift in the paradigm for weather event preparedness.
- Disaster planning assumptions have changed.
Approximately 70% of the State’s electric customers lost power during Sandy.
Sandy Restoration Profile…

- By Sunday, November 4th - 6 days into the restoration - over 60% of the peak customer outages were restored.
- On Wednesday, November 7th - 9 days into the restoration - nearly 90% of the 2.8 million peak customer outages were restored.
- On Monday, November 12th, - 14 days into restoration virtually all customers who could safely accept power were restored.
Impact…

Physical Impact to the Electric Infrastructure:

- 71% of all New Jersey distribution circuits were damaged
- Sandy downed 116,671 trees
- Sandy downed 9,441 poles
- 100 transmission lines were out of service
- 4,000 overhead transformers replaced
In addition to losing electric service, natural gas service was also shut down along the NJ barrier islands.

Thousands of residents were forced to evacuate due to severe flooding.

Electric, gas and water service along the 10 mile barrier islands were shut down.
Impact...

- **Petroleum Sector.**
  Shut down of the State’s petroleum bulk storage terminals along the Arthur Kill, as well as 2 major refineries and several petroleum pipelines.

Approximately 70% of the State’s retail gas stations in the northern part of the State lost power and the ability to pump gasoline.
UNDERSTANDING THE RESTORATION PROCESS

• What Influences Restoration?

➢ **Damage Assessment**
  Damage assessment needs to be precise and accurate. It’s not enough to know that a wire is down. EDCs need boots on the ground.

➢ **Resources**
  Personnel and mutual aid need to be managed (foreign crews).

➢ **System Design/Engineering**
  Some system configurations require large groups of customers be shut down to repair a single component, whereas other system configurations allow a failure in one part of the system to be isolated from the rest of the load.

➢ **Priorities**
  Priorities are always shifting and need to be flexible.
ORDER OF RESTORATION & PRIORITIES

➢ Transmission Lines - High-voltage transmission lines serving thousands of customers are restored first.

➢ Substations - Substations are brought online for power to reach local distribution.

➢ Priority Services - Power is restored to emergency services and critical facilities including hospitals, police and fire, communications systems, etc.

➢ Large Service Areas - Largest number of customers in the least amount of time are restored.

➢ Residential Customers - Once major repairs are completed, service lines to smaller groups of customers are restored.

Dedicated to National Security Since 1920
Order of Restoration & Priorities…

Priorities Need to be Flexible

- Clearing lines, repairing damage and switching customers are core activities of the restoration process.

- After the damage assessment data is analyzed, areas are prioritized and crews dispatched to determine the best deployment strategy. This is not an exact science.

- Some factors that should go into making deployment decisions include:
  - Intel from damage assessment process
  - Number of customers out
  - Critical facilities damaged
  - Severity or extent of damage
  - Access to damaged areas
  - Geography and customer density
  - Logistical support

- Order, speed and priority of restoration may appear inequitable to some.
New storm damage assessment technology application tools

Replace manual process with computer automation/mobile process.

Old Process:
- Labor intensive
- Hard copy forms

New Process:
- GIS view
- Faster mobile field devices
- Visualization display
Following the widespread utility outages in 2011 and 2012, the BPU initiated an investigation of electric utility storm preparedness and response efforts.

The investigation resulted in 2 BPU Orders directing the EDCs to implement improvement measures.

The improvement measures outlined in the BPU Orders fall into the following 5 “buckets” or categories:

1. Preparedness Efforts
2. Restoration and Response
3. Post Event
4. Underlying Infrastructure Issues
5. Communications
Preparedness Efforts

✓ **Adopt the Incident Command System (ICS) emergency response model.**

✓ **Establish an Emergency Management/Preparedness role as a stand-alone function. Offer local OEM support.**

✓ **Establish and maintain EDC webpages describing storm safety and preparedness information.**

✓ **Plan for worst-case scenario. EDC plans should be designed to manage a storm that potentially impacts at least 75% of their customers.**

✓ **Tabletop and exercise.**
BPU Actions & Initiatives…

Restoration and Response

✓ Develop an outage restoration model to anticipate the level of expected damage.

✓ Develop a plan to acquire additional line personnel in the event of a widespread natural disaster that stresses the mutual aid regional system.

✓ Predetermine Staging Areas to support restoration of 75% of total customers.

✓ Provide BPU periodic updates regarding mutual assistance requests made by the EDC, and/or mutual assistance being provided to another EDC.

✓ New interstate fleet movement process.
BPU Actions & Initiatives...

Post Event

✓ Solicit input regarding performance from external stakeholders.
✓ Review all lessons learned.

Underlying Infrastructure Issues

✓ Report on substation flooding including what was flooded, what flood mitigation was in place and what, if any, additional mitigation steps are needed.

✓ Consider high level flooding for future substation design.

✓ Educate municipalities responsible for maintaining drainage management systems about debris impact on substations during a storm.

✓ Develop a program to track tree related outages.
Communications

✓ Daily conference calls with municipalities affected.

✓ All communications channels at an EDC’s disposal shall be mobilized as soon as potential Major Events are forecasted.

✓ Worst-case projections shall be issued from the outset of any Major Event.

✓ Develop Interactive Voice Response messages to provide customers with immediate information. Allow mobile communications.

✓ Allow mobile communications platform for customers.

✓ EDC municipal web page must include (or link to) information describing why customers need to call to report an outage.
ETRs: The Bread and Butter of Restoration

Focus on maturing the ETR process

- Establish a Global ETR within 24 hours of the end of the event.
- Within 48 hours of a weather event, EDCs shall make certain information available to municipal officials including the number of customers out of service in the municipality, number of tree cutting locations, number of confirmed street closures, etc.
- Optimize outage websites to show detail about the number of customers out by municipality, crew en-route, cause of outage, estimated ETR, etc.
- EDCs must develop individual customer ETRs that can be obtained from the EDC municipal web pages.
- EDC municipal web page must include (or link to) an Estimated Time of Restoration.

Remember: ETRs = Estimates
Vegetation Management – Over 116,000 trees were downed during Sandy

- BPU is in the process of re-adopting vegetation management rules.

- Under the current rules, EDCs are required to perform vegetation management on vegetation close enough to pose a threat to energized conductors at least once every four years.

**New Pilot Program:**
A new pilot program is also under way to reduce tree-related outages by removing or pruning trees designated as “danger trees” including trees outside of the ROW.

The EDCs, BPU and 19 municipalities are participating in the program.

Under the program, the EDCs will remove and replace approx. 20 trees per municipality.
71% of all distribution circuits were damaged during Sandy

EDC Storm Recovery

After Sandy, the EDCs received BPU approval to recover costs to repair facilities damaged by the storm.

EDC Storm Hardening

EDCs also received approval for storm hardening work which includes substation mitigation projects and installing advanced technologies.
LESSONS LEARNED

What should communities do in advance of, and during, a major storm?

- Full awareness of your municipality’s energy profile – electric, natural gas and emergency fuel needs.
- Constantly monitor weather forecasts.
- Become familiar with EDC websites. Make full use of the new information being posted per BPU requirements.
- Encourage residents to prepare for extended outages.
- Communicate with your EDC, gas utility, emergency management agencies and State officials.
- Ensure that backup generators are operating properly, fully fueled, and that you have a contingency plan for emergency fuel deliveries.
- Special medical needs customers should be coordinated with local OEM.
- Special needs may not equate to priority restoration.
Lessons Learned…

- In long duration outages, clearing key roadways becomes a critical community function issue.
- Coordinate road clearing issues with the county. There is now a formalized process for EDCs to coordinate road clearing through the County OEM.
- Continue to monitor EDC municipal webpages for information.
- Webpage guidance – handouts.
Questions ?
PSE&G Outage Map
(PSE&G Website)

Outages by County-Municipality

- Essex: 325,562
- Gloucester: 33,200
- Hudson: 296,445
- Hunterdon: 876
- Mercer: 141,014
- Middlesex: 244,210
- Monmouth: 1,011
- Morris: 713
- Passaic: 160,172
- Somerset: 168,159
- Union: 154,354

OUTAGE INFORMATION

Customers Affected: Fewer Than 5
Start Time: Jun 13, 7:21 PM
Estimated Restoration: Jun 13, 12:30 AM

Last Updated: Jun 12, 11:59 AM
Information is updated every 15 minutes.
Municipal Customer/Facilities Data:

Name of Municipality: EAST ORANGE CITY
Last Updated: Jun 12, 11:00 AM
Number of Customers Served: 27,652
Number of Stations Serving Municipality: 12
Number of Circuits Serving Municipality: 61
Number of Poles in Municipality: 5,572
Miles of Conductor in Municipality: 121.72

Municipal Outage and Damage Data:

Number of Customers Out: Fewer Than 5
Percent of Customers Out: <1%
Estimated Time of Restoration (ETR) Min: Jun 13, 12:30 AM
Estimated Time of Restoration (ETR) Max: Jun 13, 12:30 AM

Description of Facilities Serving Municipality:

The circuits serving the municipality consist of 4 and 15-kV conductors that originate in substations. The circuits leave the substation in underground construction to wood pole lines where the conductors are in overhead construction. Certain developments are served as Buried Underground Distribution (BUD) where the conductors are in underground construction.
Active Outages: 6
Affected Customers: 17

Outages County-Municipality

Click on the new Outages County-Municipality link above to view municipal level information.

OUTAGE INFORMATION
Customers Affected: Less than 5
Outage Reported: Jun 5, 1:05 PM
Cause: Under Evaluation
Status: En Route
Estimated Restoration: Jun 5, 4:00 PM