



**Summary Report of Outage Information  
Submitted by Electrical Distribution  
Companies Affected  
by Hurricane Irene (Aug. 27-28, 2011)**

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*DISCLAIMER: Any comments or conclusions contained in this report do not necessarily reflect the views or opinions of the Commission or individual Commissioners.*

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## INTRODUCTION

Hurricane Irene (Irene) had a large impact on Pennsylvania and its Electric Distribution Companies (EDCs) as well as most of the states in the Mid-Atlantic and New England. The hurricane brought high winds and heavy rain to the eastern third of Pennsylvania. However, high winds affected counties as far west as Perry and Cumberland. The effects of Irene began to be felt in southeastern Pennsylvania in the late afternoon of August 27, 2011 and the high winds and rain continued northward through August 28, 2011 and ended that evening. The wind and rain caused over 750,000 electric customer outages at the peak, 5 p.m. on August 28, 2011. Approximately 1.3 million electric customers experienced an outage in Pennsylvania as a result of Irene. Several million electric customers throughout the eastern seaboard were affected. Power outages caused other ancillary effects such as minor telephone outages and water outages in areas where water treatment plants lost power for multiple days. Most customers (91.6% of the peak) were restored by the morning of August 31, 2011. Restoration continued until the final customers were restored on September 7, 2011. The affected electric utilities were Metropolitan Edison, PECO, Pennsylvania Electric, Pike Light & Power, Pennsylvania Power and Light, and UGI Electric.

The number and duration of these outages warranted a review of the EDCs' preparation and response by the Bureau of Technical Utility Services (TUS). This report reviews and summarizes the information contained in the utilities' report of outage forms required under 52 Pa. Code § 67.1 plus additional information requested by TUS' Emergency Preparedness Coordinator. The review is based on the utilities' reports, telephonic and email conversations with the utilities throughout the restoration period, and the information from the Commission's October 12, 2011, Special Reliability Forum. Recommendations for further action by the Commission are included at the conclusion of this report. A summary of the key information supplied on the report of outage forms, and the utilities' responses to the additional information requests can be found on pages 24 through 41. Finally, weather information about the forecasted path of Irene, the forecasted effects of Irene on Pennsylvania, and the actual effects of Irene on Pennsylvania is presented in pages 42 through 49.

## EXECUTIVE SUMMARY

The Commission truly appreciates the dedication and service of all utility workers as they performed admirably under very difficult circumstances during the response to Irene. However, as with any storm response, there are lessons to be learned and it is important to review the things that went well and those things that could be improved. Irene, while unusual in that landfall of hurricanes in northeastern states is rare, was not unexpected. The Commission, the Pennsylvania Emergency Management Agency (PEMA), and the EDCs were certainly aware of the potential impacts early on. This review details the preparations and certain response actions of the utilities. This review notes those key findings of lessons to be learned and recommends a course of action to address those findings. Findings of industry best practices that would serve other utilities well are also noted.

### Key Findings

- It was soon apparent that there were major problems with the ability of the EDCs' customer call centers to handle the high volume of calls on August 27 and 28, 2011.
- Those EDCs with Interactive Voice Response (IVR) systems had initial restoration estimates that went out to customers before the IVR system could be suspended or updated with the correct restoration information. This caused problems with customers receiving inaccurate and potentially misleading restoration information.
- While over 93% of customers out of service at the peak of the outages were restored within 72 hours, the remaining customers were not fully restored for 4 or more days.
- As compared to similar storms from the EDCs' recent histories (see page 27, below), full restoration for Irene appeared to take longer. Even if a day or two is removed from the restoration time, given that the tropical storm force winds lasted through much of the full day on August 28, 2011, the full restoration for Irene appeared to be extended.
- All EDCs realized the potential of utilizing alternative communication methods such as text messaging, email, Twitter and Facebook to disseminate information and restoration estimates.

### Recommendations

- **Recommendation 1:** EDCs need to improve their ability to handle high volume call periods during major outage events as well as implementing a procedure to prevent inaccurate or misleading restoration messaging during expected long-term outage events.

- **Recommendation 2:** EDCs need to strengthen their relationships with local and county emergency management and elected officials.
- **Recommendation 3:** The Commission and the industry should partner to study whether Pennsylvania is experiencing increased extreme/severe weather events. Particularly, more information is required on the recent long-term outages experienced by the EDCs: (1) Were the outages caused by the damage of the severe storms in more remote and hard-to-reach locations of circuits? or (2) Are these the same troublesome circuits that have experienced multiple long-term outages?
- **Recommendation 4:** When performing major storm reviews, TUS should examine EDC crew movements not only for the external crews received, but also any internal crews moved outside of the affected EDCs service territories and whether it has a detrimental effect on restoration.

## REVIEW

While the specific details of all of the information contained in the utilities' submitted outage reports and responses to the additional information requested can be seen in pages 24 through 35, the following review highlights those items that are germane to the discussion of the utilities' preparation and response to Irene.

### State Preparation

The Pennsylvania Emergency Management Agency (PEMA) recognized that Irene was a serious threat to the Commonwealth and a state weather conference call was convened on August 24, 2011 at 11 a.m. On that call, the National Weather Service (NWS) reported that Irene was going to affect the eastern third of Pennsylvania with high winds and heavy rains, which started sometime on August 27, 2011 and lasted through August 28, 2011. A subsequent state weather call on August 25, 2011 was held and the NWS indicated that the effects on eastern Pennsylvania would be more severe than detailed in the call on August 24, 2011. PEMA indicated that the State Emergency Operations Center (SEOC) would be activated to a Level II, which would bring in Emergency Preparedness Liaison Officers (EPLOs) from various state agencies, including the PUC. The timing of the activation was not determined but was expected to start some time on Saturday, August 27, 2011.

PEMA held another weather call on August 26, 2011 and it was decided that the SEOC would activate to a Level II on August 27, 2011 with certain state agencies such as Pennsylvania Department of Transportation (PennDOT), Pennsylvania State Police (PSP), Department of Military and Veteran's Affairs (DMVA), and the Turnpike Commission (Turnpike) reporting in at 8 a.m. The other state agencies such as PUC, Department of Environmental Protection (DEP), Department of Public Welfare (DPW), Department of General Services (DGS), Department of Health (DOH), Red Cross and others would report in at 7 p.m. on August 27, 2011 as the storm was not expected to really hit until that evening.

The state weather conference calls are not only utilized to understand potential weather impacts, but also for state agencies to share preparedness steps and any potential shortfalls. Those shortfalls could be materials or manpower needs. The overall state response strategy is also discussed with PEMA facilitating the discussion and determining the posture of the SEOC. This also includes PEMA reaching out to County and Federal partners such as the Federal

Emergency Management Agency (FEMA). Based on input from the NWS and state agencies from the weather calls, PEMA will recommend the Governors' Office issue an emergency declaration or proclamation to enable the state to utilize its resources to aid Pennsylvania citizens and critical infrastructure. PEMA, through the SEOC and the state agencies present coordinated the state response efforts and resource requests. For Irene, the Governor issued an emergency declaration on August 26, 2011 and PennDOT issued an hours-of-service waiver for commercial drivers engaged in emergency response or support roles. In short, the state was well aware and prepared for the potential impacts of Irene.

### **PUC Preparation**

The PUC's Emergency Preparedness Coordinator (EPC) in TUS is the Lead EPLO for the Commission and is responsible for staffing the SEOC with PUC EPLOs when the SEOC is activated to a Level II or greater. The EPC also ensures communications regarding any regulated utility service interruptions or emergencies that flow between the utilities, SEOC, and key PUC staff such as Commissioners and their staffs, Bureau Directors, Managers and Supervisors. The PUC has 10 staff members, including the EPC and Deputy EPC, who are qualified as EPLOs.

For Irene preparations, the EPC emailed all electric distribution companies (EDCs) on August 24, 2011 to provide them with the information from the state weather call and to ask if any preparations were under way. When major storms hit, it is the EDCs that are affected the most by service outages. Telephone and water utilities typically have service issues if the electric outages are prolonged. The EDCs generally replied that they were aware and monitoring the storm. EDCs that were in the areas affected, such as Metropolitan Edison (Met-Ed), PECO Energy Company (PECO), Pennsylvania Electric (Penelec), Pike Light & Power (Pike), Pennsylvania Power and Light (PPL), and UGI Electric (UGI), noted that they were preparing for the storm and were reviewing emergency response plans, staffing considerations and material stocks. On August 25, 2011, the EPC emailed all EDCs as well as the major telephone and water utilities. The email contained the weather briefing notes from the 11 a.m. state weather call as well as a notification that the SEOC would be activated to a Level II and PUC EPLOs would be manning the PUC desk at the SEOC and that the EPC would notify all utilities when the activation occurred. The EPC also asked the utilities to reply if they were utilizing any alternative contacts other than the normal emergency contacts. Verizon did reply with an alternate contact to utilize during the activation. On August 25, 2011, the EPC forwarded to all utilities an invitation for a pre-landfall conference call held by the Department of Homeland



Security and FEMA for the benefit of critical infrastructure partners. The conference call was held on August 26, 2011 at 12 p.m.

On the morning of August 26, 2011, the EPC emailed all utilities to ask if there was any need for assistance in obtaining permits or requesting of waivers for utility or utility contractor vehicles. That email also included a copy of the PEMA SOP 25, which details the process for requesting emergency permits or waivers. The EPC also explained how to submit the permit/waiver form. On the afternoon of August 26, 2011, after the state weather call, the EPC emailed all utilities with the start time of the SEOC activation and the contact numbers and email for the PUC desk at the SEOC. The EPC confirmed the PUC EPLO shifts and staff for the activation with the schedule running until the evening of Tuesday, August 30, 2011, if necessary. Finally, on the morning of the August 27, 2011, the EPC had the PUC Gas Safety Manager contact the natural gas utilities in the eastern third of Pennsylvania in order to ensure they were prepared for any flooding contingencies.

The PUC worked in the SEOC from 7 p.m. on August 27, 2011 until approximately 11 p.m. on August 28, 2011. PEMA demobilized most of the EPLOs from other state agencies because the life-safety issues were addressed and there were no known ancillary issues for life-safety due to the power outages. The weather was forecast to be dry and temperatures moderate for the next several days after the storm, so there were no issues of customers without heat or air conditioning due to power loss. During the activation, the PUC EPLOs worked to monitor and report on utility service interruptions and to address any critical customer outages that were brought to their attention, such as hospitals and water treatment plants. The PUC EPLOs worked with the major water utilities to identify any plants or pump stations without power and to forward those on to the applicable EDCs. Fortunately, there were enough storage and backup power systems that no large-scale water service interruptions occurred. Consumers that have their own well systems would experience water loss if they did not have an adequate backup power system, but the PUC does not monitor those issues as they are handled at the local and county level. After the SEOC was demobilized, the EPC continued to monitor and report service outages and respond to unmet need request from the SEOC. The monitoring and reporting continued until the final update came from UGI on September 7<sup>th</sup>.

## Utility Preparation

The details for each EDC's preparation are found in the summary of requested additional information, below, beginning on page 24. However, below are some highlights of the steps taken by each EDC before Irene impacted Pennsylvania. It should be noted that mutual-aid assistance was very limited due to the regional nature of the storm and the high demand for available crews from utilities all along the eastern seaboard.

- **Met-Ed** – Met-Ed began internal planning several days before the storm and pre-staged approximately 94 linemen from FirstEnergy affiliate companies on August 27 and 28, 2011. Met-Ed issued a press release on August 25, 2011 noting the impending storm and advising customers on how to deal with expected power outages. There was no specific outreach to local/county emergency management officials for this storm.
- **PECO** – PECO held a strategy conference call on August 24, 2011 and opened their system Emergency Operations Center on August 25, 2011. PECO had 190 mutual aid linemen from their ComEd affiliate and Duquesne Light on system before the storm hit on August 28, 2011, in addition to arranging for contractor availability for that day. PECO also offers liaisons to the 9-1-1 centers in their service territory.
- **Penelec** – Penelec began internal planning several days before the storm and pre-staged approximately 22 linemen from FirstEnergy affiliate companies, in addition to pre-staging internal resources in the eastern portion of their service territory. Penelec contacted local emergency management agencies and 9-1-1 coordinators to verify correct contact numbers.
- **Pike** – Pike began internal (system-wide with parent company Orange & Rockland) conference calls on August 24, 2011 and conducted internal conference calls twice daily and mutual aid conference calls once daily. Pike notified life support customers on August 25, 2011 to encourage them to make plans for possible electrical outages. Pike also notified county and municipal emergency management agencies to provide them with procedures and contact numbers.
- **PPL** – PPL began monitoring the NWS Hurricane Center information the week before the storm and began elevated storm operations on August 23, 2011. Daily system conference calls were conducted from August 24, 2011 onward. PPL arranged for a total of 418 linemen from mutual aid crews from their affiliate in Kentucky and from out-of-state contractors to arrive on system on the August 28, 2011.
- **UGI** – UGI held a storm planning meeting on August 26, 2011 with all operations supervisors and engineers. UGI based storm preparations on what they experienced with

Hurricane Floyd in 1999. UGI had 51 contractor linemen report for work on the morning of the August 28, 2011.

### **Hurricane Irene Impacts**

As can be seen in pages 47 through 49, the expected and actual impacts of Irene were substantial in terms of wind and rain. No major flooding was experienced, although significant flash flooding and ponding of water did occur in southeastern Pennsylvania. Tropical storm winds (greater than 39 mph sustained winds and gusts of 73 mph or higher) were felt for a period of up to 15 hours in southcentral, southeastern and eastern Pennsylvania from late afternoon on August 27, 2011 to early evening on August 28, 2011 as the hurricane moved up the coast. The impact of the winds was not expected to be as high in the southcentral region, as is seen on page 49, so the impact on electrical outages to areas like Cumberland and Dauphin Counties was more than expected. Overall, however, the impacts felt of Irene were just about as expected and predicted by the NWS and the NWS National Hurricane Center.

### **Utility Restoration Response**

Below are summaries of each EDC's response and observations of PUC staff based on the EDC's outage reports, additional outage information submitted by EDCs, phone calls and emails with the EDCs, meetings with individual EDCs, and the information provided by EDCs at Special Reliability Session conducted on October 12, 2011.

- **Met-Ed**
  - After 72 hours, Met-Ed restored approximately 83.4% of customers from the peak amount of outages on August 28, 2011 at 5 p.m.
  - Met-Ed did not have full restoration until September 5, 2011, which was approximately 9 days after the initial storm-related outage. This was 2 days longer than PPL and PECO. 46.7% of Met-Ed customers experienced sustained outages as a result of Irene.
  - As compared to similar storms (see page 27) from historical events, Met-Ed ranked Hurricane Isabel as first in terms of number and duration of outages. However, restoration for Irene was almost 3 days longer than for Hurricane Isabel in 2003. Met-Ed had 1,905 outage cases for Isabel as compared to 2,766 for Irene.
  - Met-Ed listed large amounts of physical damage in terms of numbers of replaced poles, transformers, and wire.

- Met-Ed had planned on sending 41 linemen and 2 mechanics to Florida Power & Light as part of a mutual aid effort. The crews left Met-Ed on August 22, 2011, despite indications from the NWS National Hurricane Center that Irene could affect the northeast states, including Pennsylvania. Those crews were diverted to Baltimore Gas & Electric on August 23, 2011 and remained out-of-state until the morning of August 28, 2011. It is not clear if this impacted the ability of Met-Ed to restore service to customers, but it is concerning that Met-Ed would even consider sending their crews out of the area, given the forecasts (see pages 42 through 49).
- The PUC and several state legislators received general complaints from customers on the lack of specific restoration information provided by Met-Ed's IVR system. There were also general complaints of inconsistent and misleading restoration information provided – missing restoration estimates and informing customers that power was restored when it was not.
- The PUC received several requests for assistance in communicating with Met-Ed by state legislators' offices and county emergency management agencies. Specifically, on August 30, 2011, Pike County submitted a request through PEMA to have the Commission alert Met-Ed to contact the County Emergency Manager. On August 31, 2011, a request came to the Commission from Monroe County inquiring as to the estimated restoration for the eastern part of the county. In addition, during the recovery there were requests from the offices of State Representatives Gary Day and John Payne to the Commission to have Met-Ed contact their offices. During this storm, Met-Ed did not appear to have an effective communications strategy for county emergency management and legislative officials.
- During this storm, Met-Ed did not offer a liaison to county 9-1-1 centers or emergency management agencies.
- **PECO**
  - After 72 hours, PECO restored over 97% of customers from the peak amount of outages on August 28, 2011 at 5 p.m.
  - PECO had full restoration on September 3, 2011, which was approximately 7 days after the initial storm-related outage. 30.4% of PECO customers experienced sustained outages as a result of Irene.

- As compared to similar storms (see page 27) from historical events, PECO ranked Irene third in terms of number and duration of outages. However, restoration was almost 3 days longer than for the comparable storms. For the comparable storm Hurricane Isabel in 2003, PECO had 1,689 outage cases as compared to 1,847 for Irene.
- PECO had significant problems with their customer call center and its ability to handle the high volume of calls in the first day and a half of the storm. PECO noted that their overflow call contractor had a software problem that caused approximately 60,000 callers to receive busy signals. Also, the Commission did receive some general complaints about inaccurate and misleading restoration estimates from PECO's IVR system.
- While there were a few general complaints from individual customers in regards to PECO's phone system and restoration estimate problems, overall PECO did a satisfactory job in communications with state legislators' offices and county emergency management agencies. PECO offers, and frequently places, a PECO staffer in the county 9-1-1 centers in its service territory during major outage events. This has proven to be very helpful to both PECO and the counties.
- **Penelec**
  - After 72 hours, Penelec restored approximately 89.3% of customers from the peak amount of outages on August 28, 2011 at 10 p.m.
  - Penelec did not have full restoration until September 5, 2011, which was approximately 9 days after the initial storm-related outage. This was also 2 days longer than PPL and PECO. The number of Penelec customers experiencing outages at Penelec was less than 10% of total customers as compared to 46.7% for Met-Ed, 30.4% for PECO and 30.9% for PPL.
  - As compared to similar storms (see page 27) from historical events, Penelec ranked Irene sixth in terms of number and duration of outages. However, restoration was almost 3-4 days longer than for the comparable events. For the comparable Hurricane Ike storm in 2008, Penelec had 876 outage cases as compared to 738 for Irene.
  - The Commission received general complaints from customers and county emergency managers on the lack of specific restoration information provided by Penelec's IVR system. Specifically on August 30, 2011, the Susquehanna County Emergency Manager put a request through PEMA to ask the PUC to

inquire about the restoration estimates for the Halstead, Hartford, Hot Bottom, Kingsley, Montrose, New Milford, Susquehanna, Thompson and Uniondale areas in order for the County to more effectively provide support and resources. The County asked for support from Penelec in terms of paying for a truck load of ice that was arranged for the Pennsylvania Department of Agriculture. During this storm, Penelec did not appear to have an effective communication plan with Susquehanna County.

- During this storm, Penelec did not offer a liaison to county 9-1-1 centers or emergency management agencies.
- On September 30, 2011, Penelec submitted a request for exclusion of major outage for reliability reporting purposes at Docket M-2011-2265890 on the outages caused by Irene. Penelec claimed 60,912 sustained outages for Irene, but 5,855 of the outages were in the Erie service area. Without the 5,855 outage in the Erie area, the outages caused by Irene would not meet the major event threshold of 10% of total customers. TUS requested additional information on the Erie outages and how they related to Irene. TUS then denied the request for exclusion for lack of nexus between the outages in Erie and those caused by Irene. Penelec appealed and the appeal was denied by the Commission. Therefore, the number of customers affected by Irene for Penelec will be 55,057, not the 60,912 listed in their report of outage.
- Penelec claimed in their request for exclusion and in their appeal, that during the recovery from Irene, they were stressed in the Erie area and other areas, due to the shifting of crews to the areas affected by Irene in the east and that Penelec Erie was operating with only 28 linemen instead of the normal 61 linemen.
- On November 30, 2011, TUS requested additional information on the response to Irene from the EDCs that were affected by Irene (see pages 33 through 35), specifically if any of those EDCs sent internal line crews out of their service territory from August 22 to September 10, 2011. As can be seen, Penelec sent 61 linemen, 10 managers and 2 mechanics out of their service territory on August 22, 2011 despite the forecasted arrival of Irene. Crews were on their way to Florida Power & Light first and then were rerouted to go to PEPCO in Maryland. Ultimately, they went to Met-Ed territory, where they remained unavailable to Penelec until September 5, 2011. Penelec also sent 34 linemen to Met-Ed on September 2 and 3, 2011 (12 and 22, respectively), where they were unavailable

to Penelec until September 5, 2011. As can be seen on page 26, Penelec only received 22 linemen as mutual aid from affiliate and other utilities.

- While it is unclear if this personnel movement impacted the ability of Penelec to restore service to customers affected by Irene, and it seems it was their intent to assist Met Ed with restoration, Penelec itself admits that restoration efforts in the Erie area were stressed.

- **Pike**

- After 72 hours, Pike restored approximately 83.9% of customers from the peak amount of outages on August 28, 2011 at 5 p.m.
- Pike did not have full restoration until September 3, 2011, which was approximately 7 days after the initial storm-related outage. 97.2% of Pike customers experienced sustained outages as a result of Irene.
- As compared to similar storms (see page 27) from historical events, Pike ranked Irene first in terms of number and duration of outages. However, the customer outage hours were almost twice as many in Irene as compared to the comparable events.
- Pike had problems with their ability to intake calls to their telephone system from their “cloud” based IVR system. The number of lines from the cloud is insufficient to handle high-call volumes. Customers received an IVR message, but could not get through to the Orange & Rockland (Pike’s parent company) system due to inbound line limitations. Orange & Rockland was able to add some additional lines and limit the amount of busy signals by August 30, 2011.
- Pike has a very proactive approach to communications with elected officials and local and county emergency management officials.

- **PPL**

- After 72 hours, PPL restored over 90.2% of customers from the peak amount of outages on August 28, 2011 at 5 p.m.
- PPL had full restoration on September 3, 2011, which was approximately 7 days after the initial storm-related outage. 30.9% of PPL customers experienced sustained outages as a result of Irene.
- As compared to similar storms (see page 27) from historical events, PPL ranked Irene second in terms of number and duration of outages. Restoration was about a day longer than for the comparable storm Hurricane Isabel from 2003. PPL had 3,940 outage cases in Isabel as compared to 3,102 in Irene.

- PPL had significant problems with their customer call center and its ability to handle the high volume of calls in the first two days of the storm. PPL had a staggering 804,189 calls from 217,654 unique callers receive a special busy message informing them that PPL was experiencing high-call volumes and that all lines were busy and to call back later. For that message, there was no option for the caller to hold or to use the IVR system – callers were just disconnected after the message. PPL’s call center handled approximately 213,294 calls and answered 180,758 while 32,536 customers hung up while in queue for a representative. The ability to handle high-volume calls was caused by a limited number of inbound lines as well as an internal software issue.
- PPL’s outage management system (OMS) experienced problems due to overloading from the high-call volume and customer self-service input on the IVR system. The OMS overload caused some calls to be dropped and caused problems with customers and PPL representatives entering outage data in to the OMS. This problem was mostly rectified by August 29, 2011 and there were far less calls that received the special busy message.
- Despite the call center and OMS problems, PPL was able to provide system and regional restoration estimates by August 30, 2011 and continually updated those regional restoration estimates until full restoration on September 3, 2011.
- The Commission did receive numerous general complaints on the call center problems. On August 29, 2011, the Commission received a request from PEMA to have a representative from PPL call State Representative Gary Day’s office. On August 30, 2011, PEMA forwarded a request from Monroe County for more specific information on restoration in the eastern part of the county. PPL seems to need a better outreach plan to legislative offices and county emergency managers.
- For this storm, PPL did not offer a liaison to county 9-1-1 centers or emergency management agencies.
- **UGI**
  - After 72 hours, UGI restored approximately 84.5% of customers from the peak amount of outages on August 28<sup>th</sup> at 5 p.m.
  - UGI did not have full restoration until September 7, 2011 which was approximately 10 days after the initial storm-related outage. 58% of UGI



customers experienced sustained outages as a result of Irene. Of all of the EDCs, UGI had the longest restoration time.

- As compared to similar storms (see page 27) from historical events, UGI ranked Irene first in terms of number and duration of outages. However, UGI had 617 outage cases in Irene and 161 outage cases in the comparable thunderstorm event from 2008. UGI rarely has PUC reportable-level outage events.
- UGI did not have many customers (4) receive a busy signal during the high-call volume due to Irene. However, about 40% of customers waiting in the call queue hung up before a representative could get to them. The IVR system did provide an automated message upfront with area restoration estimates.
- After several days, UGI held public meetings for customers to receive restoration information. Daily public announcements through local media and radio were made as well as their website and Facebook provided updates and outbound phone calls to customers. UGI worked with the local Red Cross and Salvation Army to provide support to any shelters. UGI proactively contacted the Luzerne County 9-1-1 Center and Emergency Management Agency to ensure an open line of communications.
- UGI noted problems with acquiring mutual aid resources both before the storm hit and during the recovery. However, this was exacerbated by UGI's handling of a mutual assistance offer during a Mid Atlantic Mutual Aid (MAMA) conference call. During that MAMA call on August 28, 2011, an offer of 15 contractor linemen was made to UGI. The UGI staff person on the call had only been authorized to accept 8 linemen. Following the UGI procedure at that time, the staffer attempted to reach upper management at UGI to receive permission to go over the 8 linemen. Due to UGI management being in other meetings, the staffer was unable to reach them and could not accept the offer of 15 contractor linemen. The offer was all 15 linemen as a group or they would move on to other utilities requesting assistance. The 15 contractor linemen went to a utility in New Jersey instead. UGI did acquire those same 15 contractor linemen for work on September 2, 2011 after they were released from the utility in New Jersey. UGI subsequently changed the procedure to allow staffers on MAMA calls more leeway in accepting crew offers.
- UGI did not have a mutual aid agreement in place with any of the neighboring rural electric cooperatives (COOPs) or the Pennsylvania Rural Electric

Association. FirstEnergy has agreements with rural electric COOPs and Met-Ed received mutual aid from several rural electric COOPs during Irene. TUS encouraged UGI to pursue agreements with rural COOPs and UGI has begun the negotiations for agreements as of the time of the writing of this report.

- UGI rarely experiences storms severe enough to cause high number outage events such as from Irene. UGI has only had 2 PUC reportable outage events in the past 9 years. This inexperience affected UGI's ability to plan restoration efforts, especially as it relates to requesting and then managing increased manpower in the field. The ability to utilize the rural electric COOPs in addition to the MAMA group will hopefully aid in that regard.

## CONCLUSION

After review of the preparation and response of the electric utilities to Irene and the EDC's outage reports, there were several key findings. The findings are noted below and recommendations based on those findings follow in the next section. Overall, it can be said that the utility crews and support workers all performed admirably to restore a large portion of affected customers in a relatively short period of time. The longer-duration outages were limited in number of customers, but still gave rise to the question of whether these customers experienced frequent long-duration outages with the number of severe storms this spring and summer. This question was taken up with the Joint Motion of the Chairman and Vice Chairman and a review is underway at Docket No. I-2011-2271989.

The problems related to this storm arose from overloading of customer call centers and poor or inaccurate messaging on the EDCs' IVR systems. TUS requested that all EDCs furnish their procedures for handling excessive call volume and for ensuring IVR system and CSRs provide accurate and meaningful restoration information to customers. Those responses will be summarized (along with some recent severe weather data) in a forthcoming report from TUS. The responses and summary report are only the first step in ensuring the communication problems do not arise again. TUS will be participating in the EDCs' winter and spring table-top exercises to review how the procedures are being implemented. Also, the PUC is working towards a program where the winter and summer reliability meetings will now feature a section where all EDCs will review recent storm events and any projected reliability projects for the upcoming season. As future storms and severe weather affect the Commonwealth, communications and customer outreach will be one of the main focuses of the storm response and post-storm review.

Irene, along with the severe storms in spring and Tropical Storm Lee in the fall, presented many learning opportunities and challenges. It is hoped that the findings identified, below, and recommendations suggested in the next section will address these challenges and memorialize those learning opportunities.

## Findings

- **All EDCs**
  - All affected EDCs experienced high-call volume during the first 48 hours of the storm and had unanswered customer calls.
  - All affected EDCs experienced problems managing their restoration estimates (ETRs) for customers. The automated responses by the EDCs' systems in the initial stages of the storm provided inaccurate ETRs due to the systems not taking in to account the scope of the storm and that reasonable estimates were available for at least 24 hours. Some EDCs continued to have ETR issues after the damage assessment was completed and only provided large regional ETRs, rather than by specific geographic areas or service center locations.
  - All EDCs realized the potential of utilizing alternative communication methods such as text messaging, email, Twitter and Facebook to disseminate information and restoration estimates.
  - PECO and PPL were able to have full restoration almost 2 days before both Met-Ed and Penelec, despite having more customers affected and significantly more physical damage in number of broken poles, replaced transformers and replaced spans of wire.
  - While over 93% of customers out of service at the peak of the outages were restored within 72 hours, the remaining customers were not fully restored for 4 or more days.
  - As compared to similar storms from the EDC's recent history (see page 29, below), full restoration for Irene appeared to take longer. Even if a day or two is removed from the restoration time, given that the tropical storm force winds lasted for much of the full day on August 28, 2011, the full restoration for Irene was still longer.
  - All EDCs noted the lack of sufficient mutual aid assistance availability from utilities in the eastern portion of the United States due to the large regional impact of Irene.
- **Met-Ed**
  - Met-Ed had problems implementing effective communications to local and county elected officials and emergency managers.
  - Met-Ed does not currently offer a staff member to county 9-1-1 centers or emergency management offices during large scale events.

- Met-Ed provided only general area restoration information via its IVR system and customers had to speak to a customer service representative to receive specifics on their outage.
- Met-Ed's restoration was 2 days longer than PPL's and PECO's restoration, despite having less damage in terms of replaced poles, transformers and spans of wire.
- Met-Ed had 41 linemen and 2 mechanics that were stationed out of the Met-Ed service territory until after the storm passed on August 28, 2011. Met-Ed dispatched those workers for mutual aid to Florida Power & Light on August 22, 2011 and then rerouted them to Baltimore Gas & Electric on August 23, 2011. Based on forecasts from the NWS and the NWS National Hurricane Center, it was obvious very early on that there was a potential for Irene to have significant impacts on the Met-Ed service territory in central and eastern Pennsylvania.
- **PECO**
  - For most of the morning of August 28, 2011, PECO had problems with their call center overflow/backup provider, 21<sup>st</sup> Century Solutions. The service outage caused approximately 59,000 callers to receive a busy signal or an "all lines are busy" message.
  - PECO had issues with initial and incorrect estimated restoration times being provided by their IVR system before the system was updated based on the scale of the storm and outages.
  - PECO has an effective plan to communicate with local, county, and state emergency management and elected officials during storm events. The PUC received very little in the way of legislative inquiries and no unmet need requests from PEMA for PECO issues.
  - PECO offers all of the 9-1-1 centers in their territory a PECO liaison to work issues such as lines-down, road closures and priority customers. This program greatly reduces miscommunications between PECO and county and local emergency managers and also assists PECO in their restoration efforts by allowing them to target priority areas and resolve travel restraints such as closed roads and detours.

- **Penelec**
  - Penelec provided only general area restoration information via its IVR system and customers had to speak to a customer service representative to receive specifics on their outage.
  - Penelec does not currently offer a staff member to county 9-1-1 centers or emergency management offices during large scale events.
  - Penelec's restoration was 2 days longer than PPL's and PECO's restoration, despite having less damage in terms of replaced poles, transformers and spans of wire.
  - Penelec's staffing was depleted because it sent 61 linemen as mutual aid out of the Penelec service territory before Irene affected Pennsylvania. Penelec then exacerbated its staffing issues by continuing to send additional Penelec linemen out of the Penelec service territory as mutual aid on September 2 and 3, 2011. While the intent was to assist Met Ed with Irene, this may have affected their response capability in the Erie area.
- **Pike**
  - Pike's ability to handle the increased volume of calls on August 28, 2011 was limited by the number of inbound lines to the company's call center and resulted in an undetermined number of customers receiving busy signals.
  - Pike suspended restoration estimates until the afternoon of August 29, 2011 and provided detailed ETRs thereafter.
  - Pike has an effective communication plan with county and local emergency management personnel and elected officials.
- **PPL**
  - For most of the high-volume call periods on August 28, 2011, PPL had issues with their OMS. Those issues caused dropped calls by customers and delays in processing outage orders entered by customers and/or PPL customer service representatives.
  - PPL had issues with initial, and incorrect, estimated restoration times being provided by their IVR system before the system was updated based on the scale of the storm and outages.
  - PPL's capability to handle high-volume calling periods is inadequate and led to many customers receiving a busy signal or a message indicating all circuits were busy followed by disconnection.

- PPL does not currently offer a staff member to county 9-1-1 centers or emergency management offices during large scale events.
- **UGI**
  - UGI's procedures for staff participating in mutual aid calls did not include a procedure for accepting/rejecting offered aid when the offer was above the requested number of crews/linemen.
  - UGI would have additional mutual aid if the procedure noted above was in place.
  - UGI needs to update its emergency procedures to better handle large-scale outages and the supervision of multiple foreign crews that entails.
  - UGI did not have an MOU with the Rural Electric Association or any of the individual Rural Electric Utilities in the area.
  - UGI did have proactive outreach to the community through town hall public meetings and outbound phone calls.
  - While UGI had almost no customers experience a busy message during high-call periods, customers did have to experience long wait times to speak to a customer service representative.

### **Recommendations**

Instances where recommendations have already been acted upon or have had some action taken, have explanatory notes. For those where no action has been taken, a follow-up suggestion is noted.

- **Recommendation 1:** EDCs need to improve their ability to handle high-volume call periods during major outage events as well as implementing a procedure to prevent inaccurate or misleading restoration messaging during expected long-term outage events.
  - On November 3, 2011, an interrogatory letter from TUS Director, Paul Diskin, was sent to all EDCs. That letter required all EDCs to outline how high-volume calling is handled and how restoration messaging is managed during expected long-term outage events. For those EDCs affected by Irene, the letter required submission of corrective action procedures and expected completion dates for resolution of the high-volume call handling and restoration messaging problems. The letter also requested information on extreme weather events and storms over the past 3 years. The summary report based on these responses will be forthcoming from TUS.

- Continued follow-up by TUS on this issue is required. Also, should EDCs continue to experience these same problems in future outage events, TUS recommends complaints be filed on the basis of the EDCs providing inadequate service.
- **Recommendation 2:** EDCs need to strengthen their relationships with local and county emergency management and elected officials.
  - TUS conducted a meeting with all EDCs on November 29, 2011 to discuss best practices as it related to storm response and communications. Best practices discussed at that meeting included: offering trained EDC liaisons to county 9-1-1 centers or county emergency management centers; utilizing county emergency management communication platforms such as Knowledge Center; increased use of social media (Twitter, Facebook, etc.) for outage and restoration messaging; inviting local emergency responders or county emergency management to the EDC drills and tabletop exercises.
  - TUS plans to participate in the 2012 EDC seasonal exercises and tabletop exercises and plans to invite PEMA representatives to those exercises.
  - Continued follow-up by TUS on this issue is required. TUS will continue to encourage proactive communication between the EDCs and the counties.
- **Recommendation 3:** The Commission and the industry should partner to study whether Pennsylvania is experiencing increased extreme/severe weather events. Particularly, more information is required on the recent long-term outages experienced by the EDCs: (1) Were the outages caused by the damage of the severe storms in more remote and hard-to-reach locations of circuits? or (2) Are these the same troublesome circuits that have experienced multiple long-term outages?
  - As noted in the explanatory notes in Recommendation 1 above, weather and storm data was requested of the EDCs by TUS. In addition, the long-term outage question is being studied with the information requested by the Joint Motion of the Chairman and Vice Chairman at Docket No. I-2011-2271989. A summary report on the information will be produced by TUS.
  - If significant long-term outage events continue (those lasting over 3 days), TUS recommends consideration of a study to determine if the condition of EDC infrastructure can adequately hold up against increasingly stormy weather and if there is a need for storm-hardening, or undergrounding, of certain electrical infrastructure.



- **Recommendation 4:** When performing major storm reviews, TUS should examine EDC crew movements not only for the external crews received, but also any internal crews moved outside of the affected EDCs service territories and whether it has a detrimental effect on restoration.
  - While the Commission's role is not to micromanage the internal operations of utilities, it has a responsibility to ensure that utilities are providing safe, reliable service and that restoration of interruptions is done as expeditiously as possible.
  - TUS will add this to their major storm reviews.

### Key Information Reported on the Report of Outage Form

- Number of customers affected and as a percentage of total customers

<b>Met-Ed</b>	255,981	46.7%
<b>PECO</b>	511,102	30.4%
<b>Penelec</b>	55,057 <sup>1</sup>	10.4%
<b>Pike</b>	4,366	97.2%
<b>PPL</b>	428,503	30.9%
<b>UGI</b>	35,975	58%

- Date and time of first information of a service outage

<b>Met-Ed</b>	22:00 8/27/11
<b>PECO</b>	12:44 8/27/11
<b>Penelec</b>	03:25 8/28/11
<b>Pike</b>	02:15 8/28/11
<b>PPL</b>	18:30 8/27/11
<b>UGI</b>	02:27 8/28/11

- Date and time that service was restored to the last affected customer

<b>Met-Ed</b>	14:00 9/5/11
<b>PECO</b>	15:14 9/3/11
<b>Penelec</b>	24:00 9/5/11
<b>Pike</b>	11:30 9/3/11
<b>PPL</b>	20:22 9/3/11
<b>UGI</b>	9/7/11 (no time given)

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<sup>1</sup> The number of customers affected as reported in Penelec's Report of Outage Form was 60,912. Penelec filed a request for exclusion of major event for reliability reporting purposes at Docket No. M-2011-2265890. The request was denied by staff due to outages being included from the Erie area, which was not directly impacted by Hurricane Irene. Penelec appealed the decision and the denial was upheld. Without the outages from the Erie area, the number of customers affected for Penelec as a result of Irene would have been 55,057 customers and, therefore, that is the number reported here.

- Total number of utility workers and others assigned specifically to the repair work

<b>UTILITY</b>	<b>LINEMEN</b>	<b>TROUBLEMEN</b>	<b>TREE CREW</b>	<b>SUPPORT</b>	<b>TOTAL</b>
<b>Met-Ed</b>	555	-	340	889	1,784
<b>PECO</b>	1,042	62	-	429	1,533
<b>Penelec</b>	173	-	50	317	540
<b>Pike</b>	35	2	7	11	55
<b>PPL</b>	900	52	465	633	2,050
<b>UGI</b>	74	-	-	32	106

#### **Summary of Requested Additional Information**

- The number of outage cases exceeding 6 or more hours in duration.

<b>Met-Ed</b>	1,935
<b>PECO</b>	2,113
<b>Penelec</b>	336
<b>Pike</b>	9
<b>PPL</b>	2,642
<b>UGI</b>	318

- A listing of each outage case exceeding 6 or more hours in duration, including the following: the approximate geographic location (county, city, municipality, or township); the total number of customers affected by the outage case; and the duration of the outage including the initial date and time of the outage and the restoration date and time.
  - Due to the large number of outage cases exceeding 6 or more hours in length because of the large geographic impact of the storm, the response to this question would take several hundred pages. Staff has copies of the utility responses if any person desires to review the data.
- A listing of the number of utility workers assigned specifically to the repair work by company and by general function, that is linemen, troublemen, tree crew and the like (support workers may include damage assessors, trouble crews, staff at substations, engineers, supervisors, meter readers and others utilized in the restoration effort outside of their normal duties).

<b>UTILITY</b>	<b>LINEMEN</b>	<b>TROUBLEMEN</b>	<b>TREE CREW</b>	<b>SUPPORT</b>
<b>Met-Ed</b>	202	-	-	467
<b>PECO</b>	326	62	-	344
<b>Penelec</b>	151	-	-	311
<b>Pike</b>	11	2	-	7
<b>PPL</b>	278	52	-	523
<b>UGI</b>	8	-	-	32

- A listing of the number of contract workers received as mutual aid by company and by general function that is linemen, troublemen, tree crew and the like.

<b>UTILITY</b>	<b>LINEMEN</b>	<b>TROUBLEMEN</b>	<b>TREE CREW</b>	<b>SUPPORT</b>
<b>Met-Ed</b>	41	-	189	-
<b>PECO</b>	361	-	-	49
<b>Penelec</b>	-	-	50	1
<b>Pike</b>	24	-	7	4
<b>PPL</b>	409	-	465	110
<b>UGI</b>	51	-	-	-

- A listing of the number of workers received as mutual aid by company and by general function that is linemen, troublemen, tree crew and the like. Please indicate whether they were received before the storm hit (14:00 on 8/27/11), or after that time/date.

<b>UTILITY</b>	<b>LINEMEN</b>	<b>TROUBLEMEN</b>	<b>TREE CREW</b>	<b>SUPPORT</b>	<b>RECEIVED</b>
<b>Met-Ed</b>	312	-	151	422	Some affiliate mutual aid pre-staged before storm and some of the forestry contractors were pre-staged before storm
<b>PECO</b>	355	-	-	36	Before storm
<b>Penelec</b>	22	-	-	5	Affiliate mutual aid pre-staged before storm and some of the forestry contractors were pre-staged before storm
<b>Pike</b>	-	-	-	-	Contractors arrived on 8/27 for 8/28 deployment

<b>UTILITY</b>	<b>LINEMEN</b>	<b>TROUBLEMEN</b>	<b>TREE CREW</b>	<b>SUPPORT</b>	<b>RECEIVED</b>
<b>PPL</b>	213	-	-	-	Internal contractors and affiliate mutual aid was alerted and pre-staged before storm – external mutual aid received after storm
<b>UGI</b>	15	-	-	-	After storm

- A general description of the physical damage sustained by the utility facilities as a result of the event. The description must include facilities replaced due to damage, and a listing of the number of poles, transformers and spans of wire.

<b>UTILITY</b>	<b>POLES</b>	<b>TRANSFORMERS</b>	<b>WIRE</b>	<b>CROSSARMS</b>
<b>Met-Ed</b>	143	130	18 miles	211
<b>PECO</b>	316	278	90.6 miles	-
<b>Penelec</b>	30	10	3 miles	132
<b>Pike</b>	10	5	45 spans	-
<b>PPL</b>	215	281	47.7 miles	458
<b>UGI</b>	39	23	1,043 spans	-

- To the best of the ability of the company to access historical data, please provide the historical ranking of this event in terms of the number and duration of outages and provide examples of two comparable events, including the number and duration of outages for those comparable events.

<b>UTILITY</b>	<b>RANK</b>	<b>EVENT 1</b>	<b>EVENT 1 CUSTOMER OUTAGES AND DURATION</b>	<b>EVENT 2</b>	<b>EVENT 2 CUSTOMER OUTAGES AND DURATION</b>
<b>Met-Ed</b>	1	9-2003 Hurricane Isabel	201,227 – 6.4 days	12-2002 Ice Storm	178,820 – 4.3 days
<b>PECO</b>	3	1-1994 Ice Storm	520,016 – 4 days	9-2003 Hurricane Isabel	517,343 – 4.6 days
<b>Penelec</b>	6	9-2008 Hurricane Ike	100,977 – 5 days	5-2011 – Wind Storm	75,725 – 6.25 days
<b>Pike</b>	1	3-1997 Ice Storm	3,908 – 96,974 customer hours	6-2009 Thunderstorms	4,369 – 76,968.82 customer hours
<b>PPL</b>	2	9-2003 Hurricane Isabel	502,516 – 5,043,457 customer hours	9-1999 Hurricane Floyd	392,382 – 2,481,107 customer hours
<b>UGI</b>	1	6-2008 T-Storm	21,723 – 6 days	9-1999 Hurricane Floyd	11,000 – 6 days

- A description of how the customer call center performed during the course of the event and the recovery. Please provide this information: how many outage and hazard calls were received; how many calls were answered and what was the average answer time; how many calls were not answered; how many calls received a “special message” indicating all lines are busy and to please call back; and how were restoration messages provided when customers called in.

<b>UTILITY</b>	<b>CALLS RECEIVED</b>	<b>CALLS ANSWERED</b>	<b>AVERAGE ANSWER TIME</b>	<b>NOT ANSWERED</b>	<b>BUSY MESSAGE</b>	<b>RESTORATION MESSAGING</b>
<b>Met-Ed and Penelec<sup>2</sup></b>	168,634	164,290	12.5 seconds	4,344 (abandoned)	- <sup>3</sup>	Upfront IVR, area IVR, CSR, website
<b>PECO</b>	618,942	586,829	3.05 minutes (CSR)	32,113 (abandoned)	59,091	Upfront IVR, individual IVR, CSR
<b>Pike</b>	65,636	60,309	19 seconds	5,327	- <sup>4</sup>	Upfront IVR, CSR, or on website
<b>PPL</b>	213,294	180,758	2 minutes 39 seconds (CSR)	32,536 (abandoned)	804,189 calls from 217,654 unique numbers	Self-serve IVR, CSR, outbound calls, and emails
<b>UGI</b>	13,884	9,903	8.45 minutes for CSR (8/28/11)	3,981 (abandoned)	4	IVR message at prompt

- A description of how the utility prepared for the storm, including what planning measures were taken and when; what pre-deployment of assets occurred and when; what type of outside resources were requested and received and when; what proactive outreach to special-needs populations occurred; and what proactive outreach to county and local emergency management agencies occurred.

<sup>2</sup> Met-Ed and Penelec have the same call center.

<sup>3</sup> FirstEnergy did not report on the number of callers that received a busy message or special “all lines are busy, please call back” message.

<sup>4</sup> Pike did not list the number of customers receiving a busy signal, but Pike indicated that some customers did receive a busy signal during the first two days of storm recovery due to limitations in the number of available lines in to the company’s system from the upfront “cloud” IVR system.

- Met-Ed – Met-Ed noted that storm preparations began several days in advance of the storm through their storm emergency plan. Based on the plan, corporate and regional conference calls are held as well as calls with the regional mutual aid groups. Pre-arrangements for any incoming crews are made and internal crews received from FirstEnergy affiliates (approximately 94 linemen) were pre-staged on the evening of August 27, 2011. Met-Ed requested up to 200 external linemen, but due to the regional nature of the storm, no external crews were available until after the storm hit. Met-Ed received about 40 linemen from the PA Rural Electric Association on August 30, 2011 and the first external lineman arrived on September 1, 2011. On August 25, 2011, FirstEnergy sent out a press release to the media as well as state and local officials noting that an impending storm was coming and could cause extended and numerous power outages. Met-Ed noted that they make contact with the county emergency management officials every year prior to the summer storm season to ensure contact information is up to date. There was no specific outreach to local/county emergency management officials for this storm.
  
- PECO – PECO reported the information, below, in response. It should be noted that PECO offers a PECO staffer to each 9-1-1 center in Bucks, Chester, Delaware, Montgomery and Philadelphia Counties. That staffer is trained to be a liaison with the county officials to address mutual concerns for safety and outage restoration. PECO noted that all 5 counties did accept a PECO staffer for some time period during the response and recovery.
  - In preparation for Irene, PECO held a pre-event strategy conference call with our on-call teams on August 24, 2011,
  - In order to focus on planning for Irene's arrival, our EOC opened on August 25, 2011, at 0830.
  - Regional Emergency Response Managers prepared for full staffing for the weekend.
  - A safety plan was developed communicated during a stand down at the start of each shift. A detailed part of the plan addressed the issues around working aloft in high winds.
  - The Operations Control Center arranged an around-the-clock coverage plan.
  - The Contract Crew Emergency Response Manager arranged and verified contractor crew availability, including local and closest additional 100 crews.

- Vegetation Management Emergency Response Manager's arranged and verified the number of local crews and closest additional 100 crews.
  - Arranged and set up a Sub-center staffing/planning strategy.
  - Mutual Assistance arranged with ComEd for 40 crews with full support – available for work Sunday morning.
  - Call Center Emergency Response Manager arranged and verified staffing availability for the weekend.
  - PECO requested a Mid-Atlantic Mutual Assistance call to request resources on August 25, 2011.
  - Accommodations were arranged for crews and staffing.
  - August 27, 2011, Mutual Assistance crews and staff stayed in hotels near locations where they were scheduled to work. PECO had 15 centers and sub centers staffed and stocked to dispatch the crews.
  - Vegetation management participated in two days of intensive preparation meetings at the Plymouth EOC in advance of the storm.
  - An additional 100 off system crews and 15 patrollers were brought in to assist in the restoration efforts following Irene.
  - The Vegetation Management storm center was opened and staffed around the clock from 3p.m. Saturday, August 27, 2011, until 3p.m. Saturday, September 3, 2011.
  - A total of 766 tree trimmers and 20 back office personnel assisted in the restoration work.
  - An estimated 3,300 vegetation jobs were worked.
- Penelec – Penelec noted that storm preparations began several days in advance of the storm through their storm emergency plan. Based on the plan, corporate and regional conference calls are held as well as calls with the regional mutual aid groups. Penelec pre-staged linemen, service men, hazard responders and dispatchers in advance of the event. Mobilization of line, forestry, and hazard crews began on the evening of August 27, 2011. Penelec did not receive external crews (non-affiliated companies) other than forestry and a helicopter contractor. Penelec did receive 22 linemen from affiliate companies. Penelec avers they made contact with local emergency management agencies and 911 coordinators to verify correct contact numbers and to share weather and potential impact information.



- Pike – Pike and Orange and Rockland began preparations in the morning on August 24, 2011 with conference calls. Beginning on the August 24, 2011, internal conference calls were conducted every 12 hours and mutual aid conference calls were conducted daily. On the August 25, 2011, life support equipment customers were notified of the impending storm and encouraged to prepare for potential outages. Pike and Orange and Rockland also notified county emergency management agencies and municipal authorities of their preparations, safety procedures and contact numbers. On the August 25, 2011, the request for mutual aid line crews was made based on the forecasts. On the August 26, 2011, the company employee storm schedule and assignments were enacted and retirees were contacted for potential deployment. Industrial, commercial and priority customers were notified of the impending storm and advised to prepare for potential outages. On the August 27, 2011, both outside and internal contractors arrive on system and the scheduled shifts began for all on storm duty.
  
- PPL – PPL noted that they began monitoring the National Weather Service information a week before the storm was expected to impact their service territory. PPL began elevated storm operations on August 23, 2011. Staff plans were prepared for 24X7 coverage of the regional and system storm rooms. Beginning on August 24, 2011, PPL held regular daily system pre-storm conference calls. The discussion on the calls included weather updates, operational system updates, manpower, supplies, contingency plans for the major electrical facilities, and other concerns to ensure proper response to any outages. A final pre-storm call was held on August 27, 2011 at 8:00 p.m. to confirm all pre-storm activities were completed. PPL performed the following additional actions:
  - PPL required all available internal contractors and vegetation line crews to report for work on August 28, 2011.
  - Arrangements were made to bring in additional assessor and line crews from PPL's affiliate in Kentucky as well as from other utilities and contractors in Ohio, Kentucky, North Carolina, Tennessee, Arkansas, and Lewisburg, PA. This mutual assistance was staged near Allentown by the evening of August 27, 2011 for work on August 28, 2011.

- The Customer Call Center was staffed with additional personnel for the expected increased volume of calls. All scheduled maintenance of call systems was postponed.
  - All available PPL crews reported for work at 7 a.m. on August 28, 2011. Internal contractors began work at 8 a.m. and outside contractors and mutual aid began at 9 a.m. PPL noted the staggered start allowed for easier job dispatching and prioritization of job packages. Due to the numerous transmission outages, primary focus on the first day was on switching to reduce the impact on distribution feeders and to restore larger blocks of customers.
  - Throughout the restoration efforts, system-wide conference calls were held at 5 a.m., 1 p.m., and 7 p.m. every day.
  - PPL also initiated a customer outreach program where calls started on August 28, 2011 and ended them on August 30, 2011. This effort included calling residential customers that were likely to be out of service for over 24 hours and informing them of available emergency services and the location of stores distributing ice, dry ice and drinking water (PPL offers free ice and water for customers at participating grocery stores). PPL contacted approximately 78,000 customers with this program.
- UGI – UGI held a storm planning meeting on August 26, 2011 with all Operations supervisors and engineers. The storm restoration process was reviewed and job assignments were made. UGI and UGI contractors were scheduled to report to work on August 28, 2011 in advance of the storm. UGI based storm preparations on the assumption that Irene could have a similar impact to Hurricane Floyd, which hit on September 16, 1999. At the meeting on August 26, 2011, it was noted that there were no mutual assistance linemen crews available from the Mid-Atlantic Mutual Aid (MAMA) group. However, on a MAMA conference call on the August 28, 2011, an offer of 15 Henkels and McCoy linemen was made. Due to an internal error, the UGI representative did not believe they had clearance to accept more than 8 linemen and did not accept the offer<sup>5</sup>. UGI was eventually able to get the same 15

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<sup>5</sup> This information was not in UGI's 67.1 outage report, but was discussed in a post-storm review meeting with UGI at the Commission on October 7<sup>th</sup>. This information was subsequently discussed as a learning opportunity for UGI at the October 12<sup>th</sup> Special Reliability Hearing and UGI has implemented a procedural change to ensure it does not occur again.

Henkels and McCoy linemen for work on September 2, 2011. On August 28, 2011 UGI's Superintendent of System Operations made telephone contact with the Luzerne County 911 Center and Luzerne County Emergency Management Agency to ensure the lines of communication were open and to make sure the county had the contact information for UGI.

- From August 22 through September 10, 2011, were any Met-Ed, PECO, Penelec, Pike Electric, PPL or UGI linemen, troublemen, forestry workers, hazard responders, damage assessors - or any other restoration support workers - deployed outside of their own service territory as mutual aid or other assistance to other utilities? This includes assistance to subsidiary companies.
  - Met-Ed - yes
  - PECO - no
  - Penelec - yes
  - Pike - no
  - PPL - no
  - UGI - no
  
- If yes, please provide the following information:
  - The number of workers and their general job function (linemen, forestry, hazard, etc.).
  - The date each worker was sent and the receiving utility and the general location of the expected work area.
  - The date each worker was released back to their home utility from the receiving utility.
  - The date the returned workers returned to work duty on the home utility system.

### Met-Ed

Receiving Utility	Date Workers Sent	Number of Workers	Job Function	Location of Expected Work Area	Release Date	Date Returned to Work at Met-Ed
Florida Power & Light	8/22/11	41	Linemen	Florida	8/23/11	Released to BGE
		2	Mechanics	Florida	8/23/11	
Baltimore Gas & Electric	8/23/11	41	Linemen	Baltimore area	8/28/11	8/28/11
		2	Mechanics	Baltimore area	8/28/11	8/28/11
JCP&L	8/31/11	25	Hazard Responders	Newton, NJ	9/4/11	9/5/11
		6	Public Protectors	Northern NJ	9/4/11	9/5/11
	9/1/11	18	Hazard Responders	Phillipsburg, NJ	9/4/11	9/5/11
	9/2/11	2	Hazard Responders	Phillipsburg, NJ	9/4/11	9/5/11
	9/3/11	13	Bird Dogs	Northern NJ	9/4/11	9/5/11

Met-Ed averred that the crews were originally going to be sent to Florida Power & Light beginning on August 23, 2011<sup>rd</sup> based on a request from the Southeastern Electric Exchange mutual aid group. Met-Ed claims that the crews were diverted to Baltimore Gas & Electric on the afternoon of August 23, 2011 based on what they claim was a new projected path for Irene. The crews were staged at the BWI Airport with the proviso that they would return to Met-Ed if it became evident that Met-Ed would be affected by Irene. Met-Ed averred that they decided to keep the crews in Baltimore until Irene passed on August 28, 2011. As one can see by the weather forecasts, below, it was evident that Pennsylvania would be affected by Irene as early as August 22, 2011 and the forecasts only became worse for Pennsylvania as time progressed.

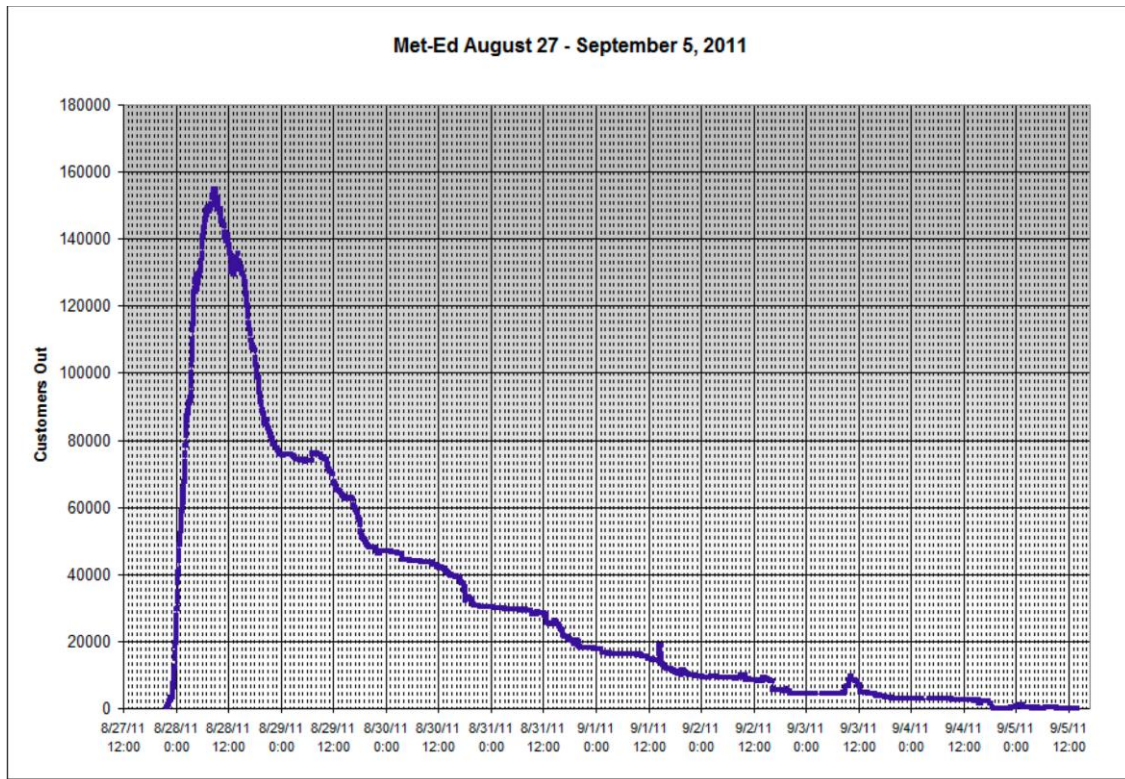
## Penelec

Receiving Utility	Date Workers Sent	Number of Workers	Job Function	Location of Expected Work Area	Release Date	Date Returned to Work at Penelec
Florida Power & Light	8/22/11	10	Management	Florida	8/23/11	Released to PHI
		61	Linemen			
		2	Mechanics			
PHI	8/23/11	10	Management	Gaithersburg, MD	8/28/11	Released to Met-Ed
		61	Linemen			
		2	Mechanics			
Met-Ed	8/28/11	10	Management	Reading area	9/4/11	9/5/11
	8/28/11	61	Linemen			
	8/28/11	2	Mechanics			
	8/28/11	5	Line Support	Reading area	9/3/11	9/4/11
	8/28/11	5	Stores	Reading area	9/2/11	9/3/11
	8/30/11	4	Damage Assessors	Reading area	9/2/11	9/3/11
	8/31/11	42	Service	Reading area	9/2/11	Released from Met-Ed and sent to JCP&L
	9/2/11	12	Linemen	Stroudsburg	9/4/11	9/5/11
	9/3/11	22	Linemen	Stroudsburg	9/4/11	9/5/11
	9/2/11	6	Line Support	Stroudsburg	9/3/11	9/4/11
JCP&L	8/27/11	1	Stores/Warehouse	Red Bank, NJ	9/4/11	9/5/11
	8/29/11	2	Forestry Support	Red Bank, NJ	9/2/11	9/3/11
	8/30/11	2	Stores/Warehouse	Central NJ	9/2/11	9/3/11
	8/30/11	44	Hazard Responder	Northern NJ	9/4/11	9/5/11
	9/1/11	7	Bird Dogs	Flemington, NJ	9/3/11	9/4/11
	9/2/11	2	Stores/Warehouse	Northern NJ	9/3/11	9/4/11
	9/2/11	42	Bird Dogs	Summit, NJ	9/3/11	9/4/11

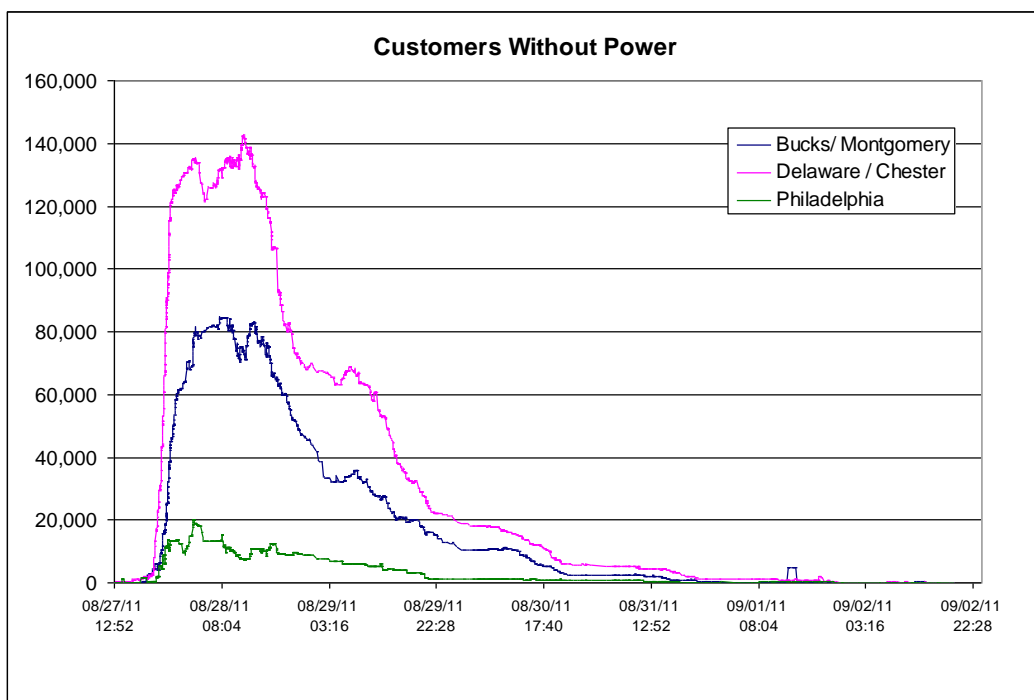
Penelec averred that the crews were originally going to be sent to Florida Power & Light beginning on August 23, 2011 based on a request from the Southeastern Electric Exchange mutual aid group. Penelec claims that the crews were diverted to Pepco Holdings (Washington, D.C. area) on the afternoon of August 23, 2011 based on what they claim was a new projected path for Irene. The crews were staged in Gaithersburg, Maryland with the proviso that they would return to Pennsylvania if it became evident that Penelec would be affected by Irene. Penelec averred that they decided to keep the crews at the Gaithersburg staging area until Irene passed on the August 28, 2011. As one can see by the weather forecasts, below, it was evident that Pennsylvania would be affected by Irene as early as August 22, 2011 and the forecasts only became worse for Pennsylvania as time progressed.

### Outage Restoration Graphs

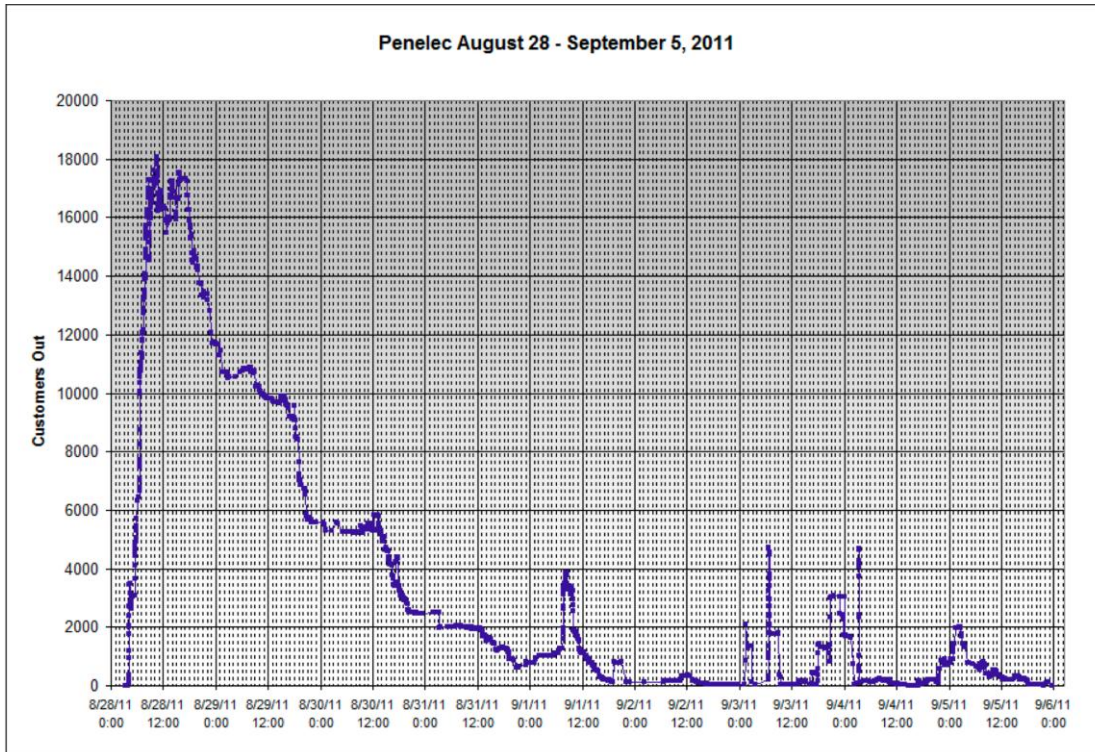
Met-Ed:



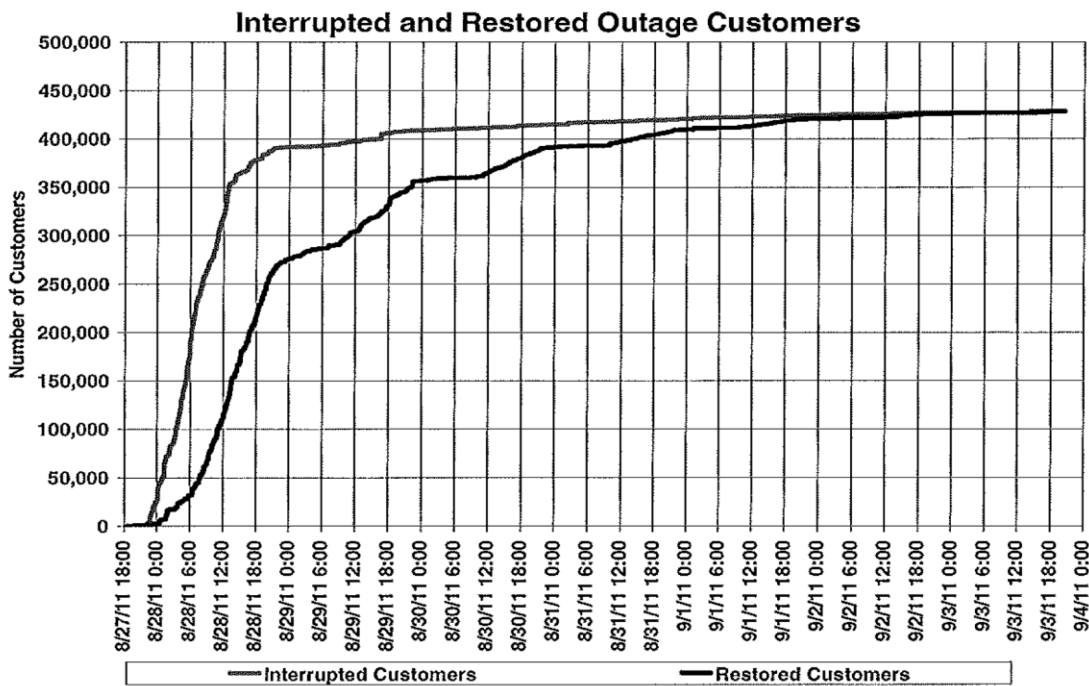
PECO Electric:



Penelec<sup>6</sup>:

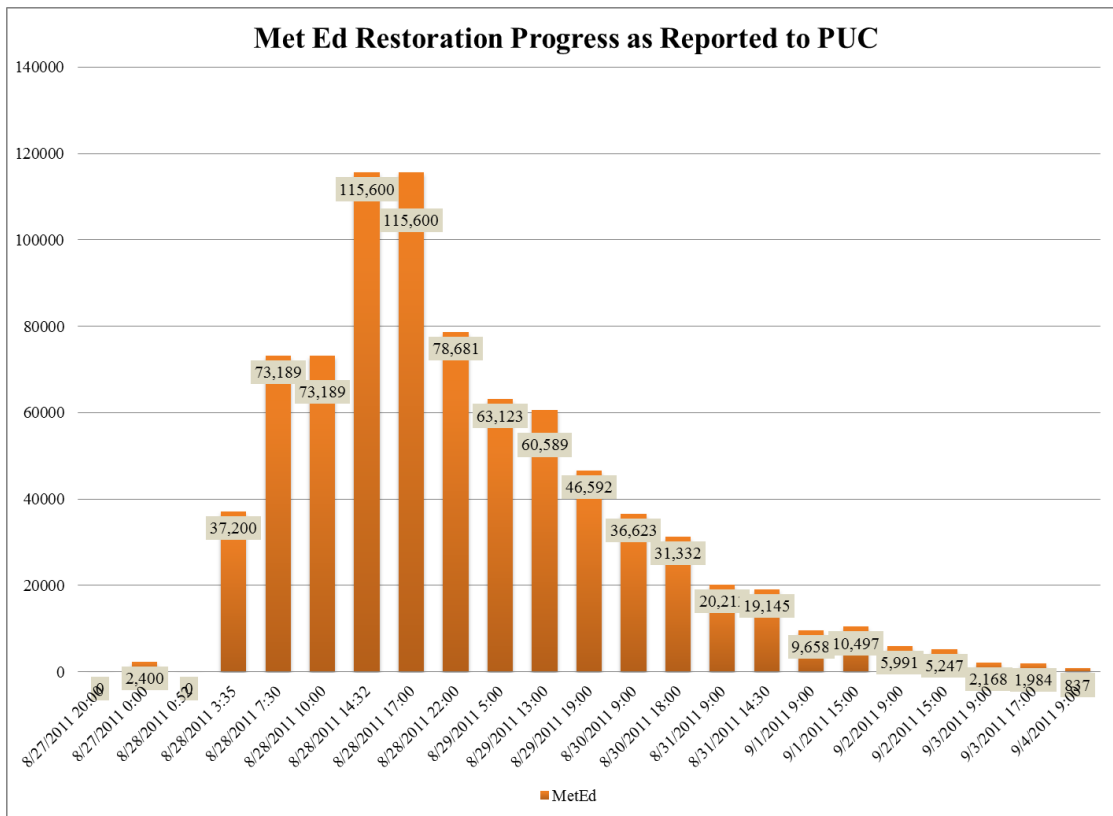
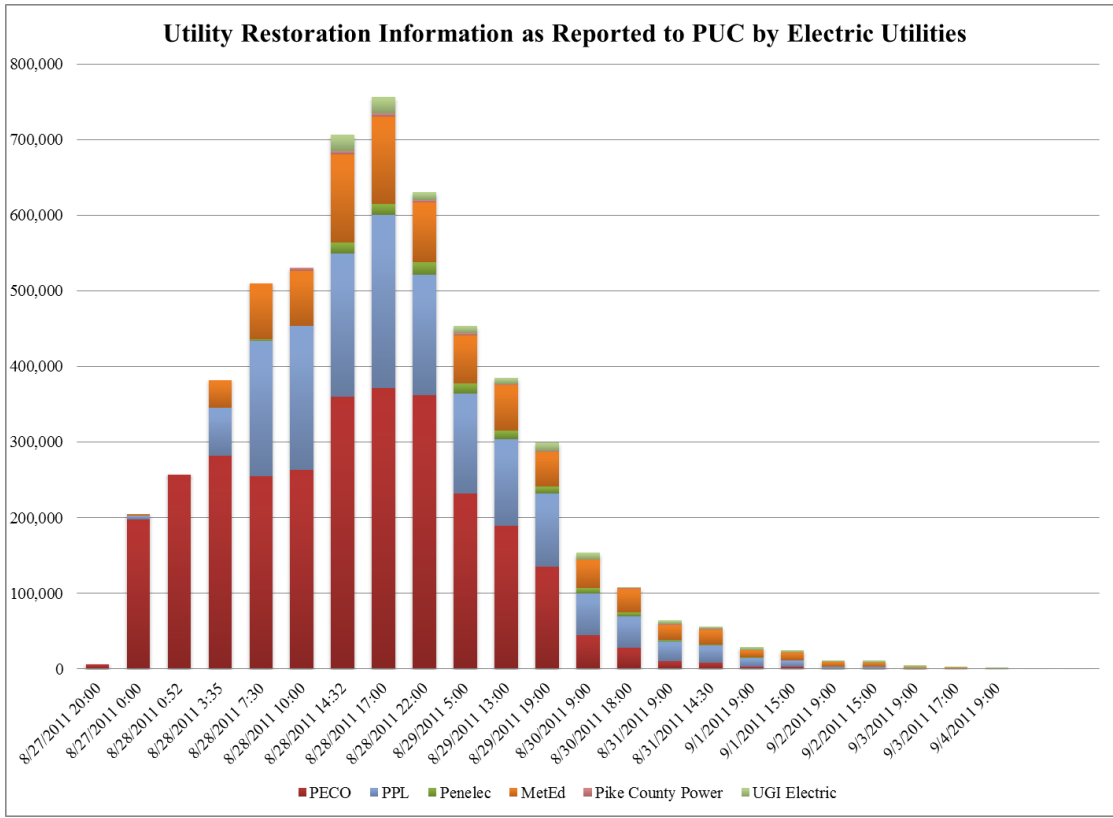


PPL Electric:

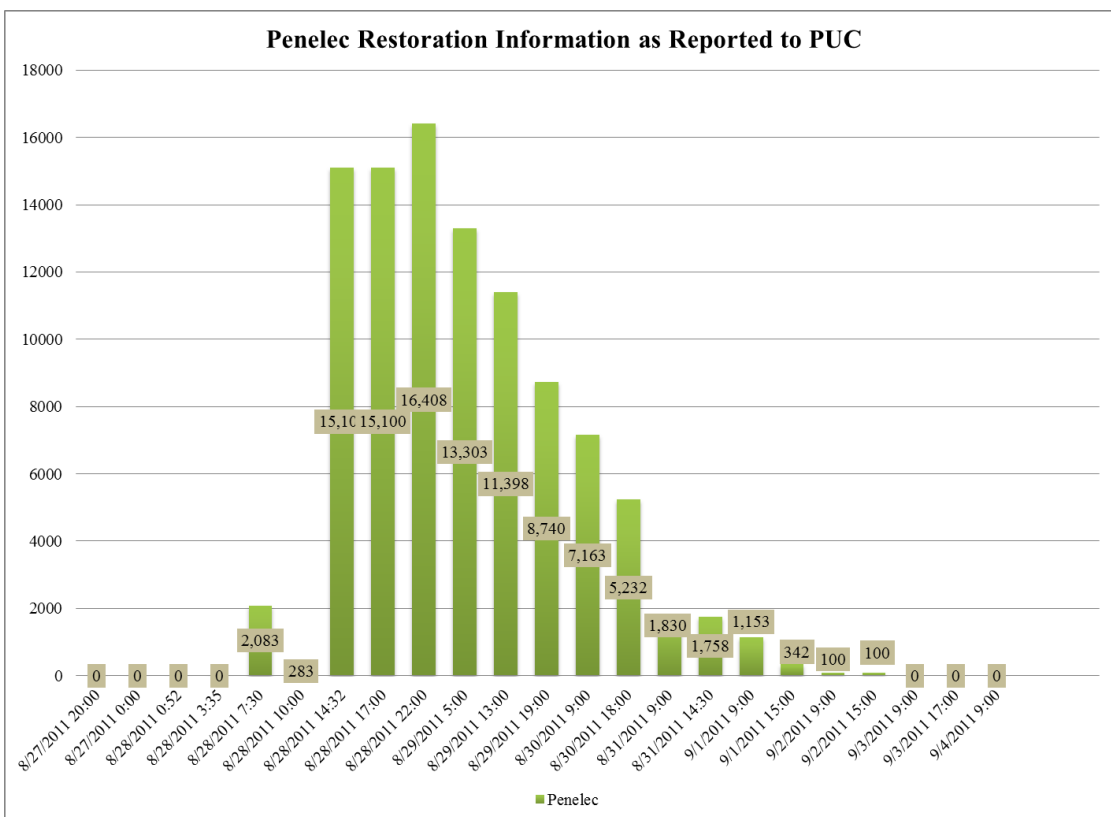
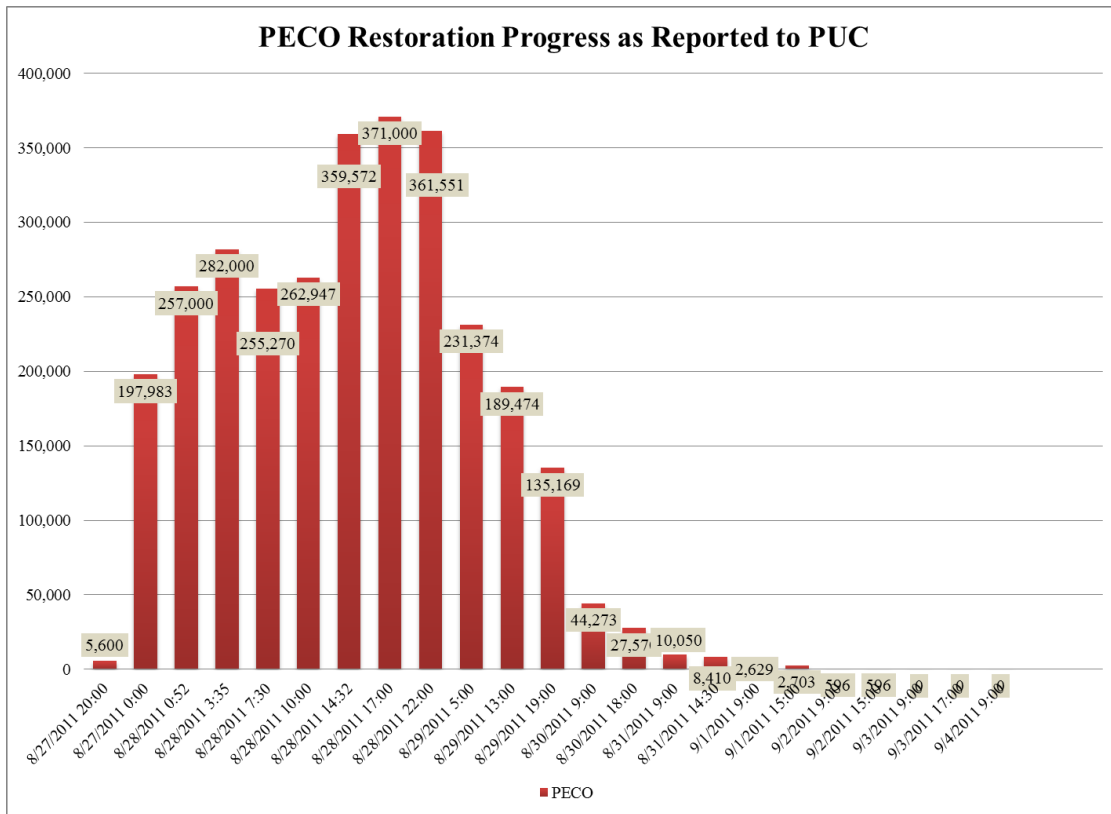


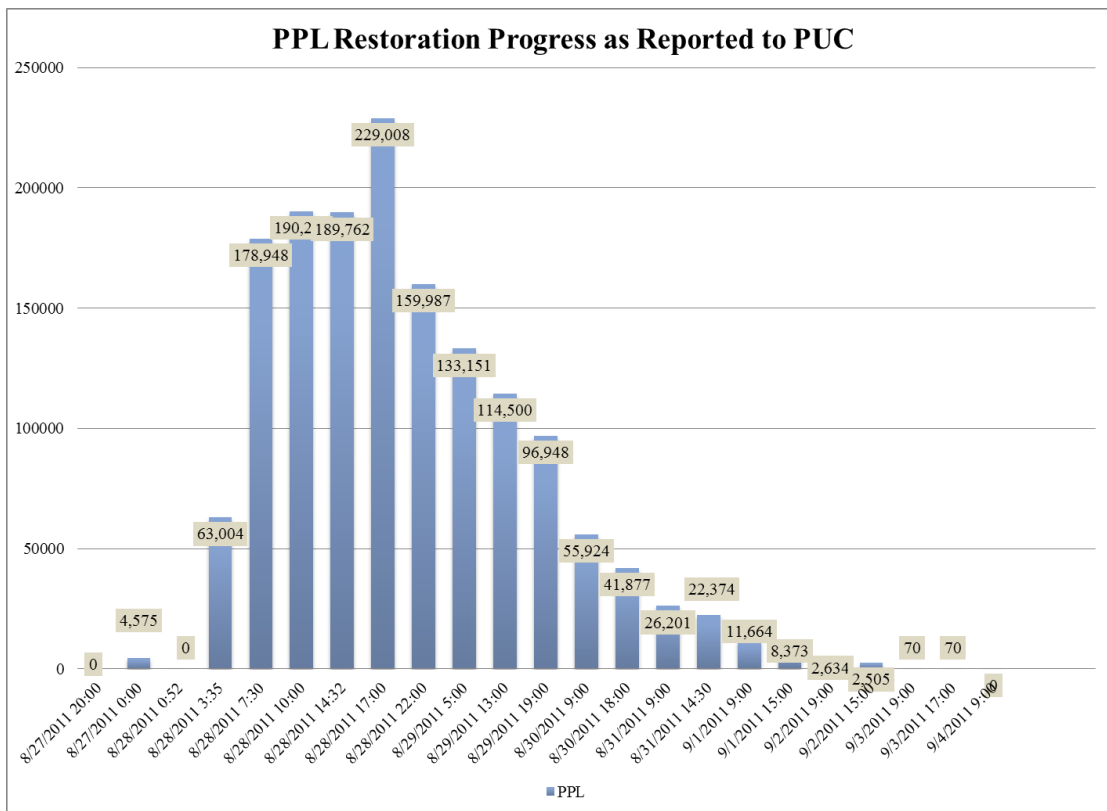
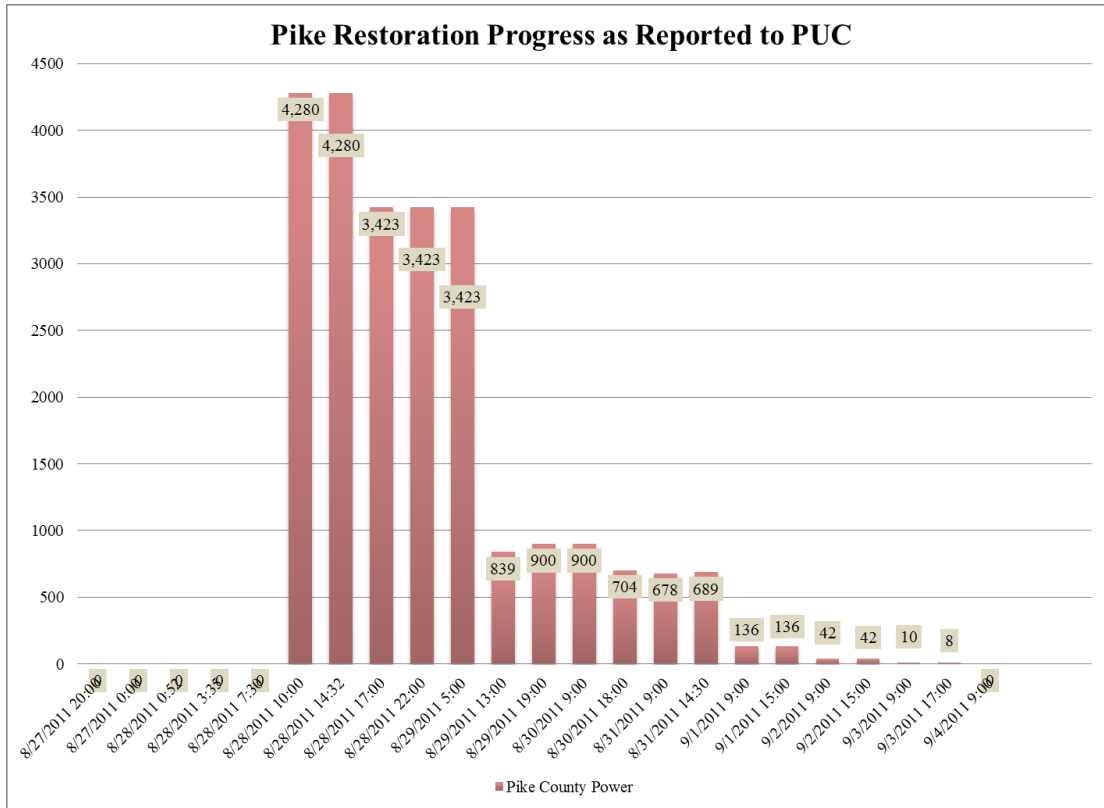
<sup>6</sup> This graph likely includes outages from the Erie area (see footnote 1, above).

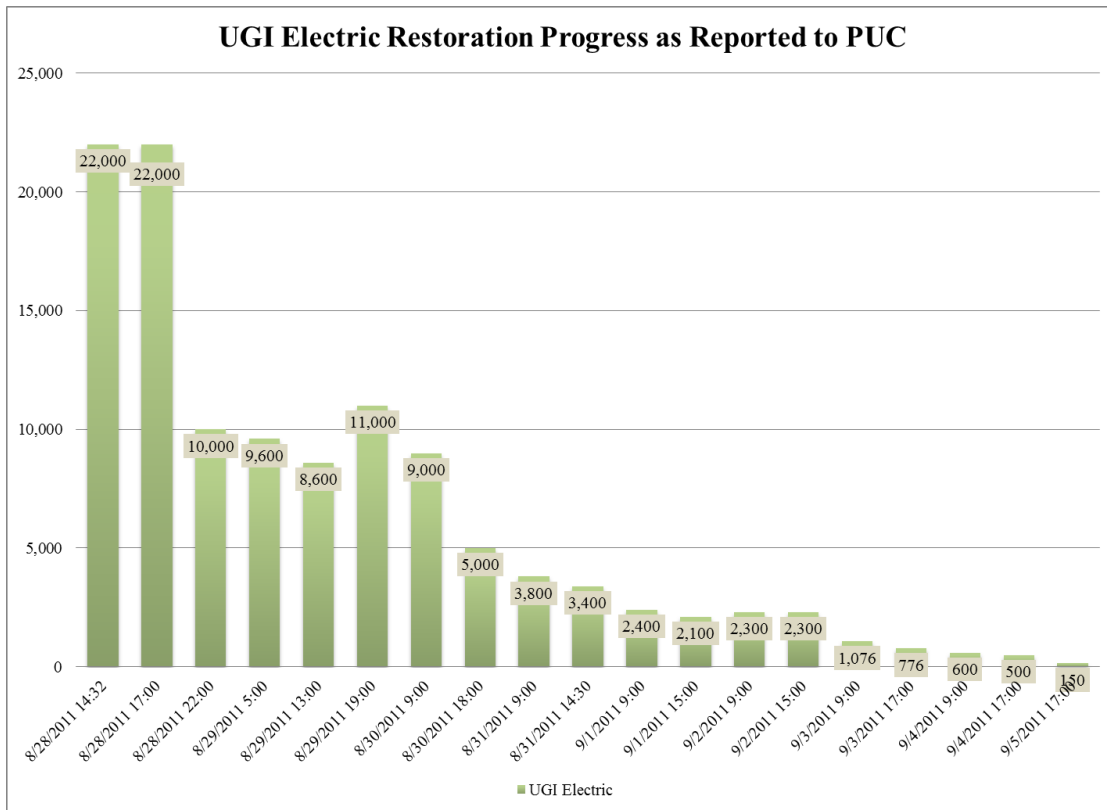
**Outage Restoration Progress as Reported to PUC by EDCs During Restoration**





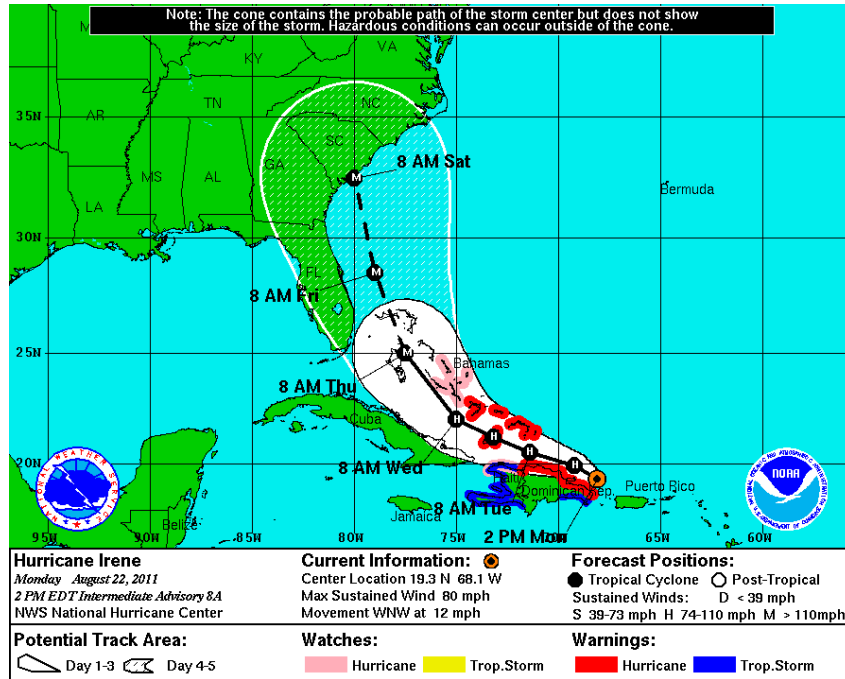




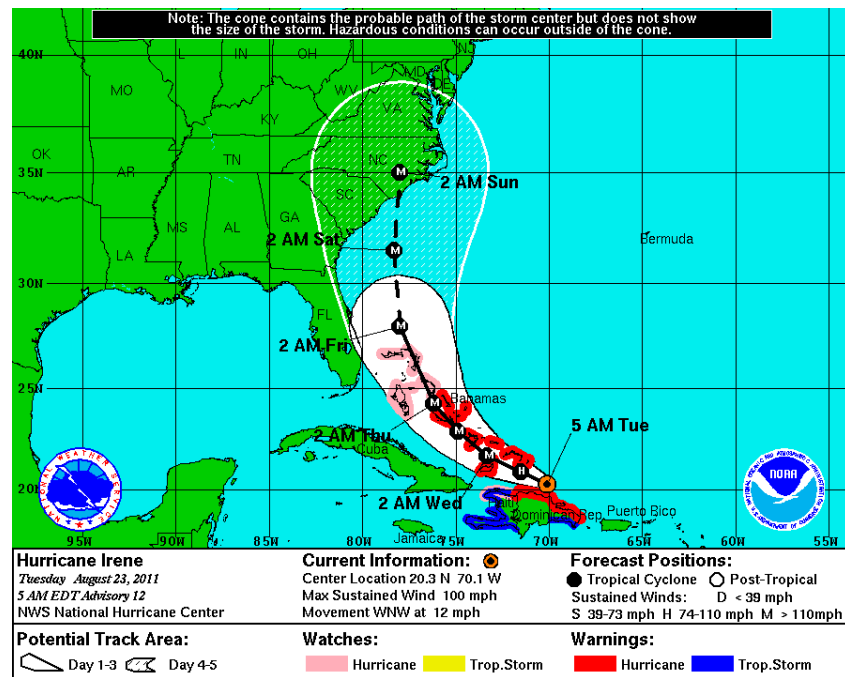


## Forecast Path Of Hurricane Irene – National Weather Service Hurricane Center

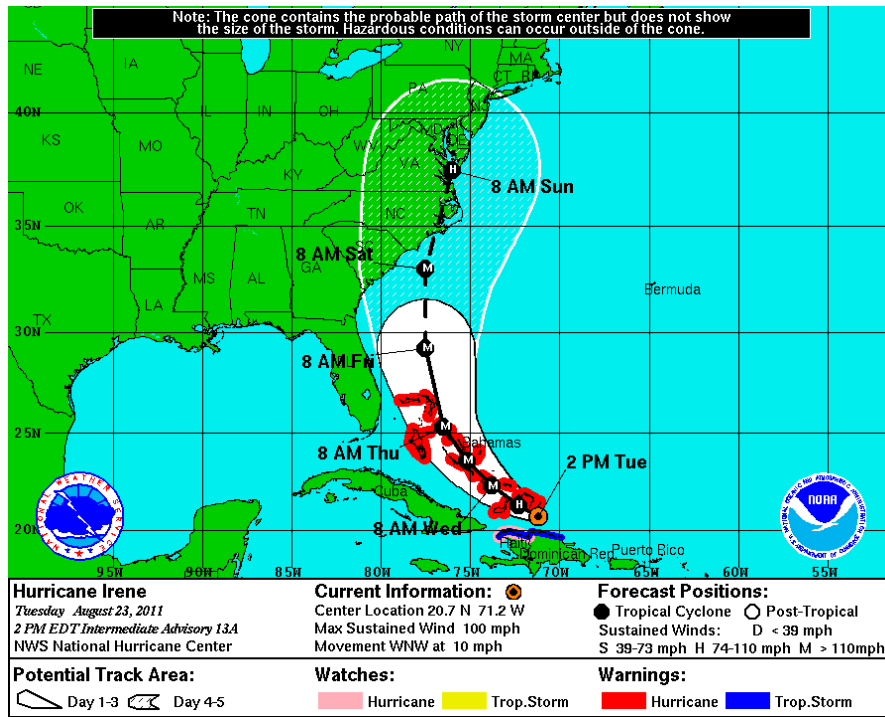
August 22, 2011 at 2 p.m. EDT



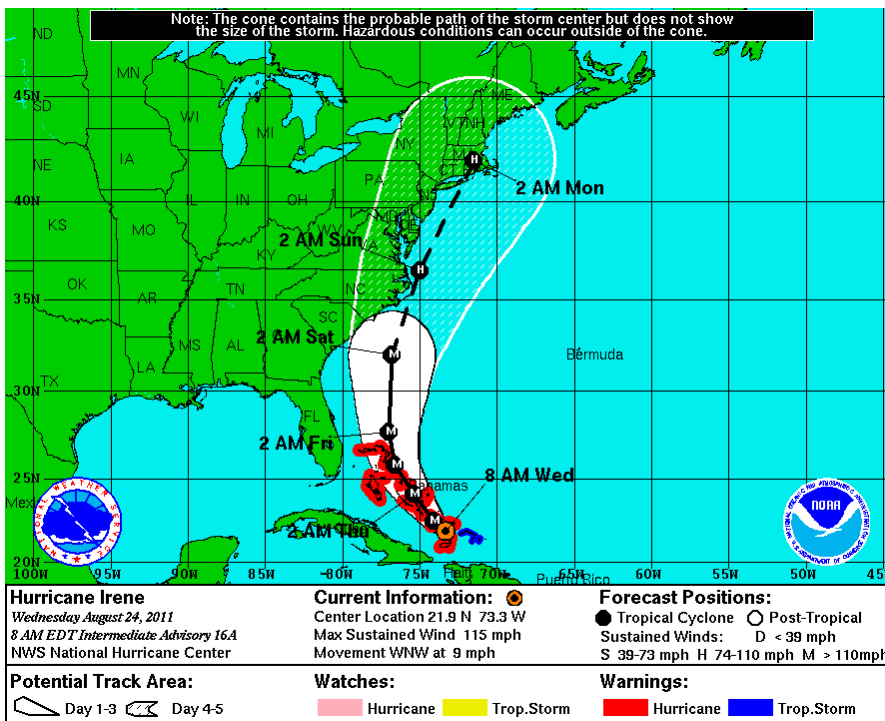
August 23, 2011 at 5 a.m. EDT



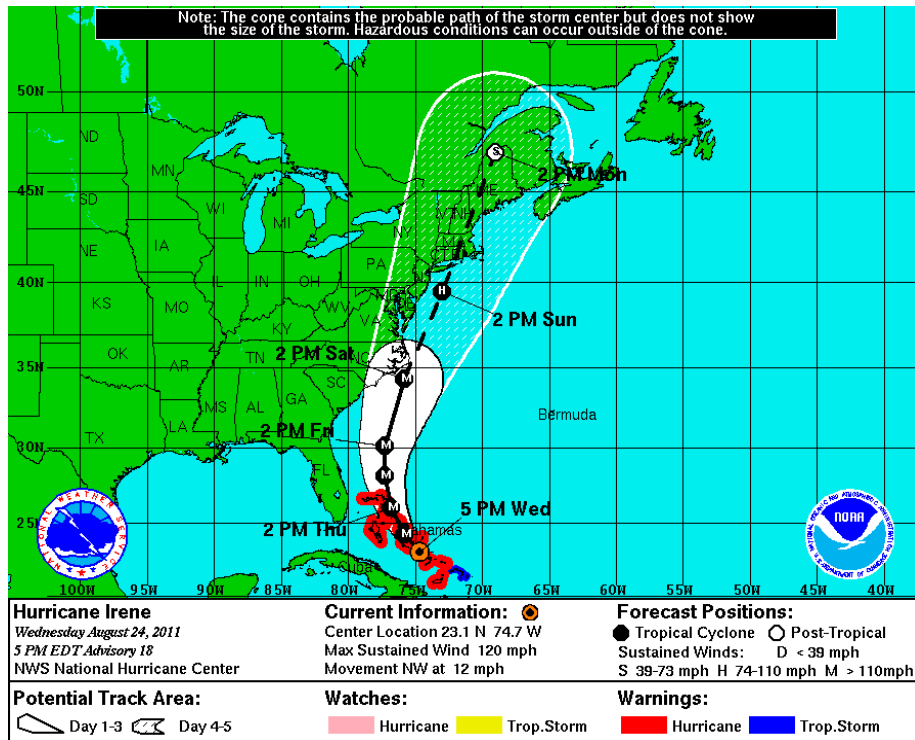
August 23, 2011 at 2 p.m. EDT



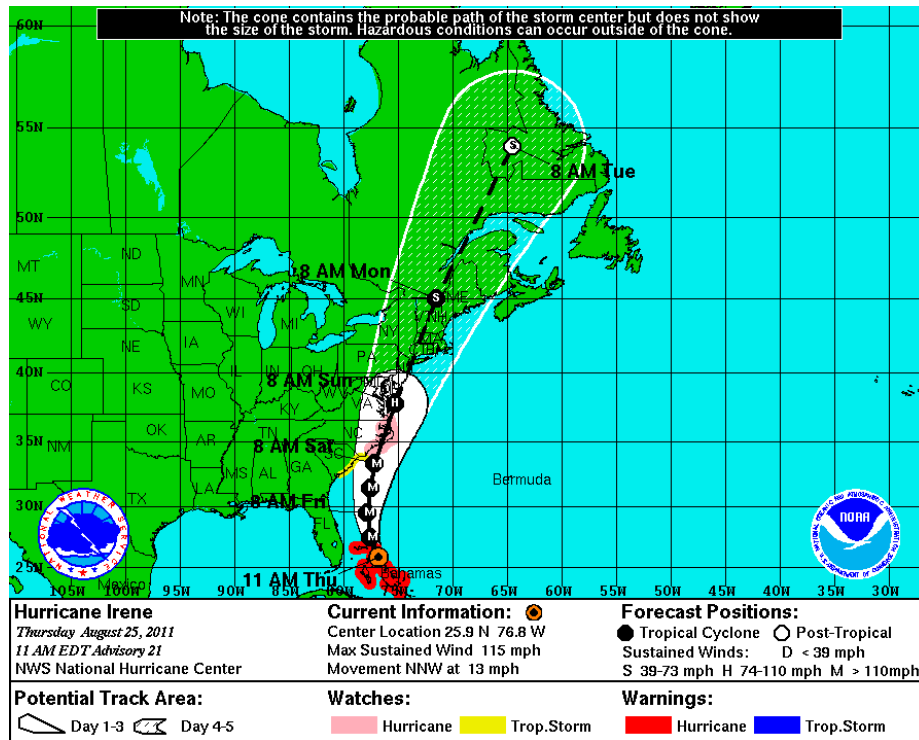
August 24, 2011 at 8 a.m. EDT



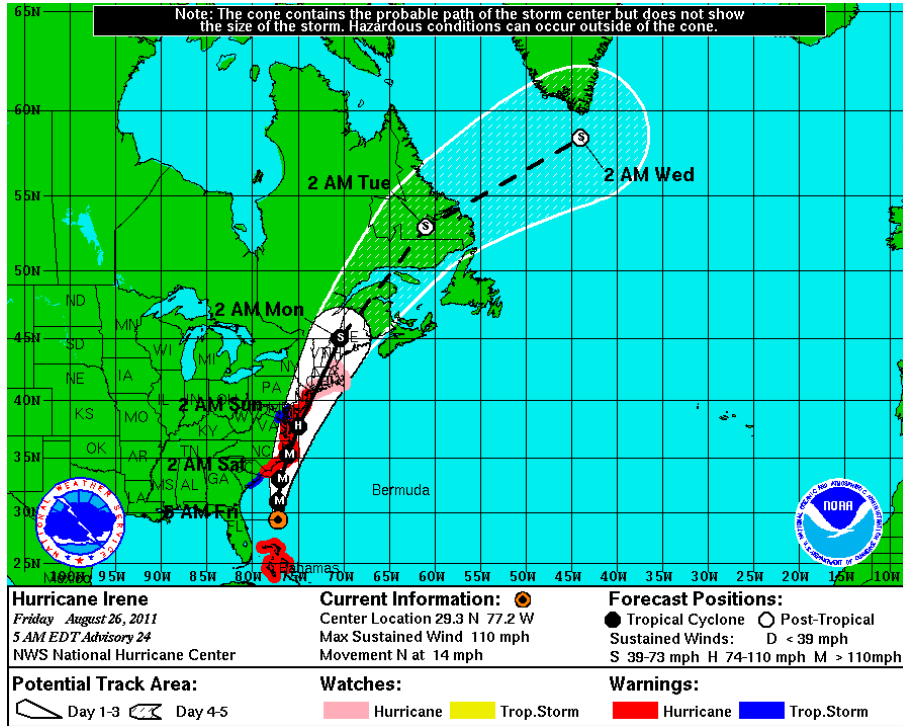
August 24, 2011



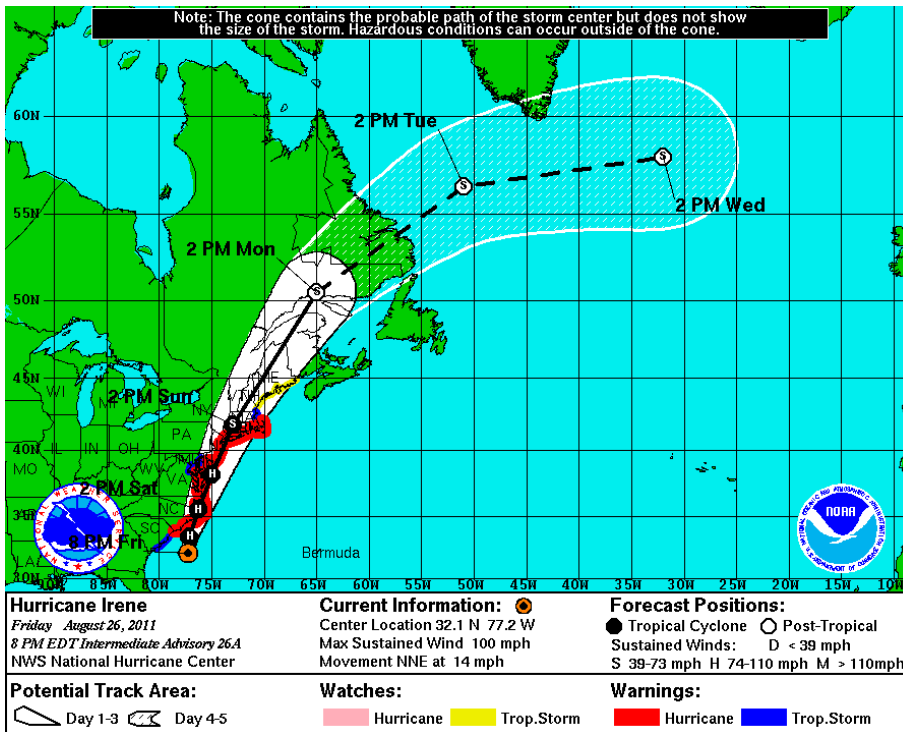
August 25, 2011 at 11 a.m. EDT



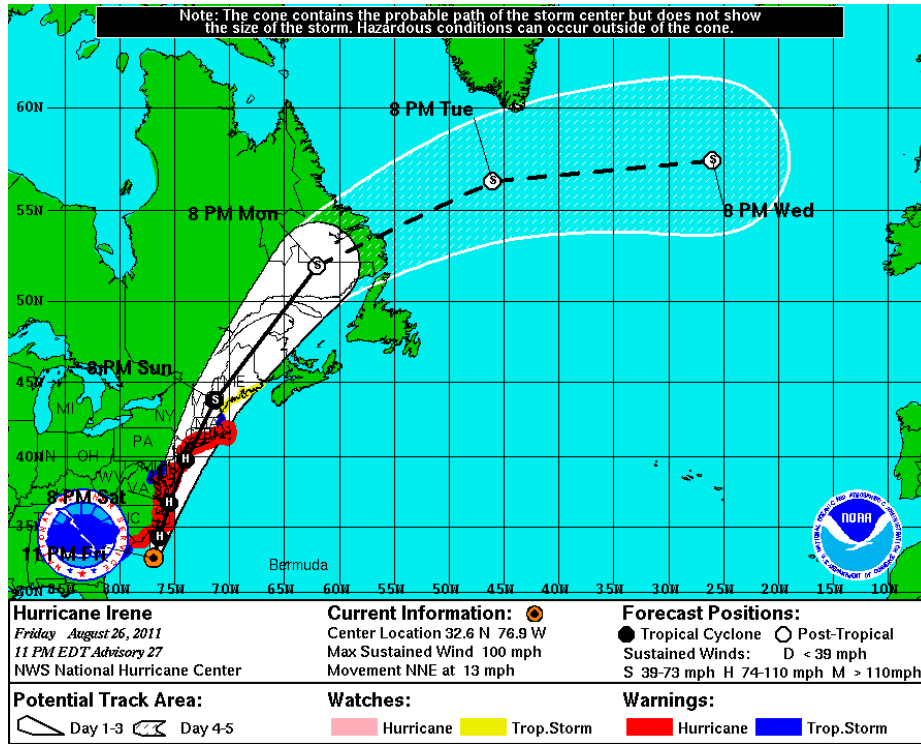
August 26, 2011 at 5 a.m. EDT



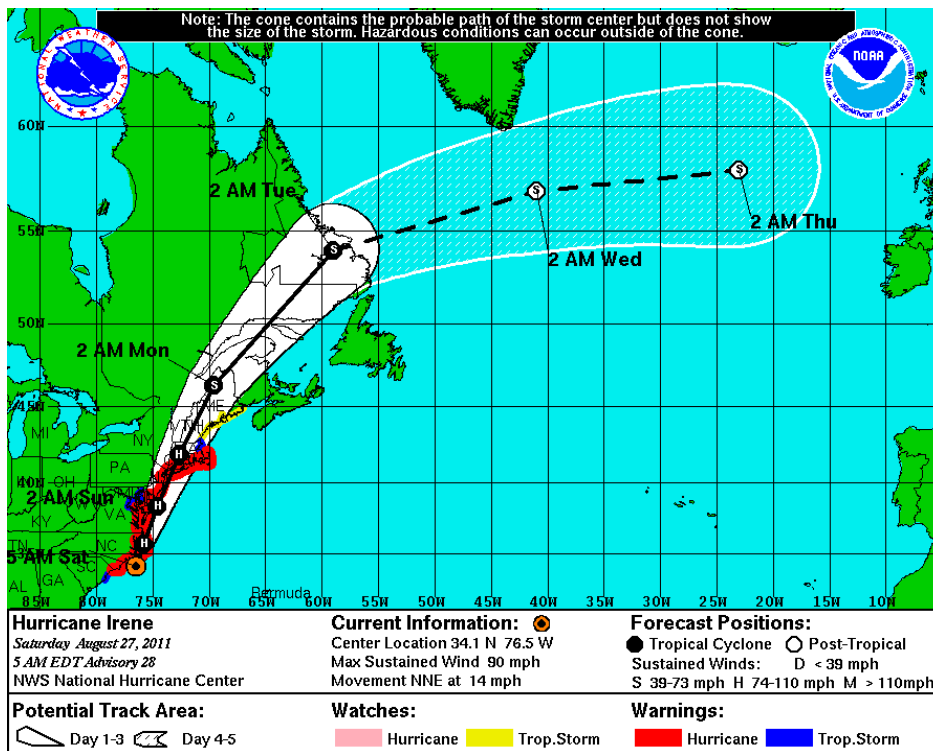
August 26, 2011 at 8 p.m. EDT



August 26, 2011 at 11 p.m. EDT

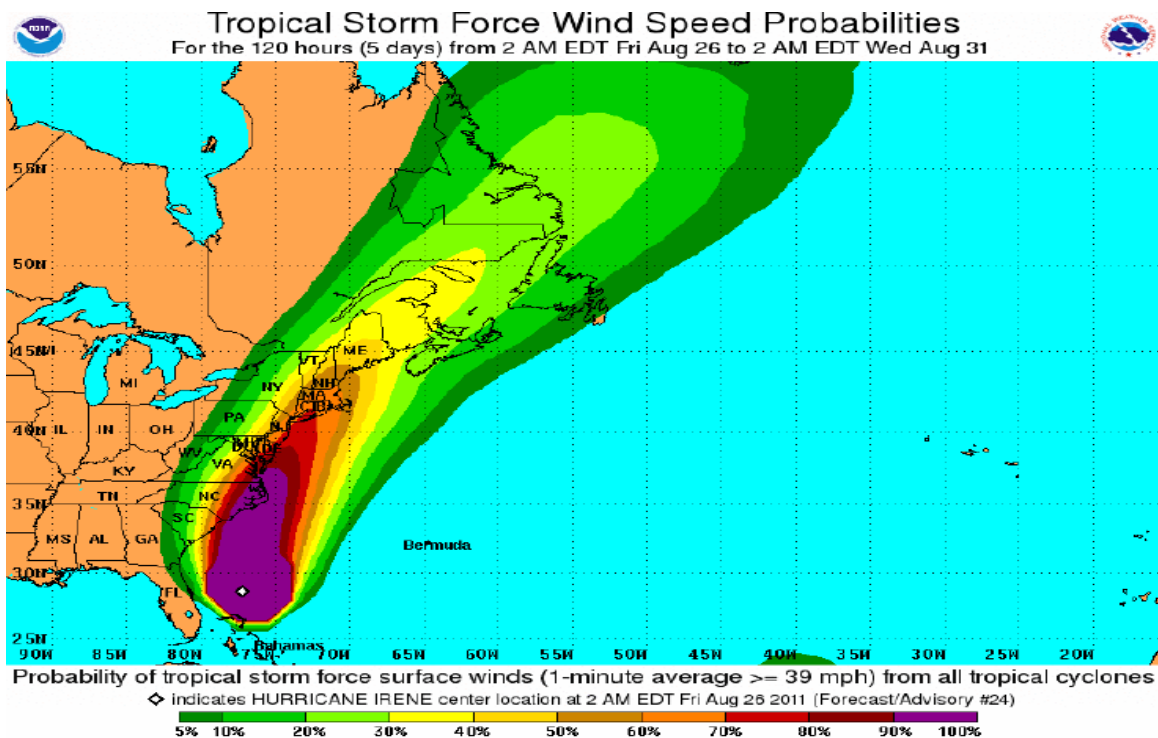
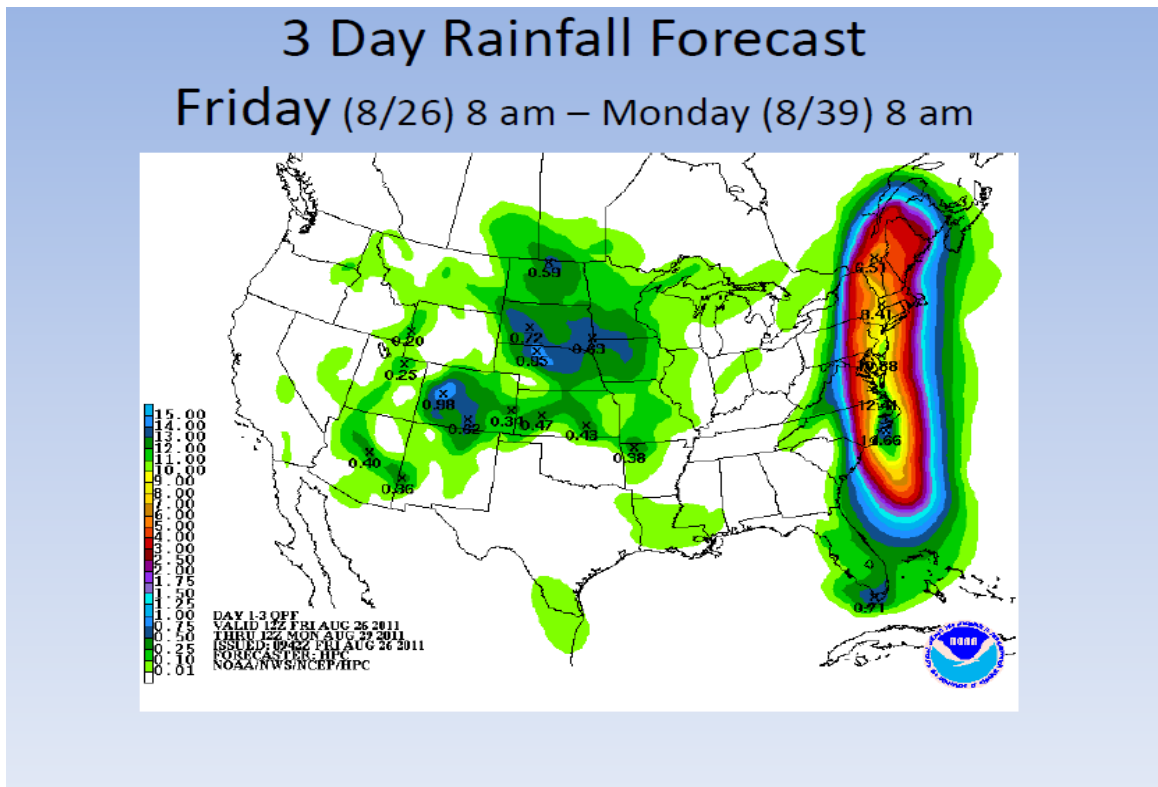


August 27, 2011 at 5 a.m. EDT

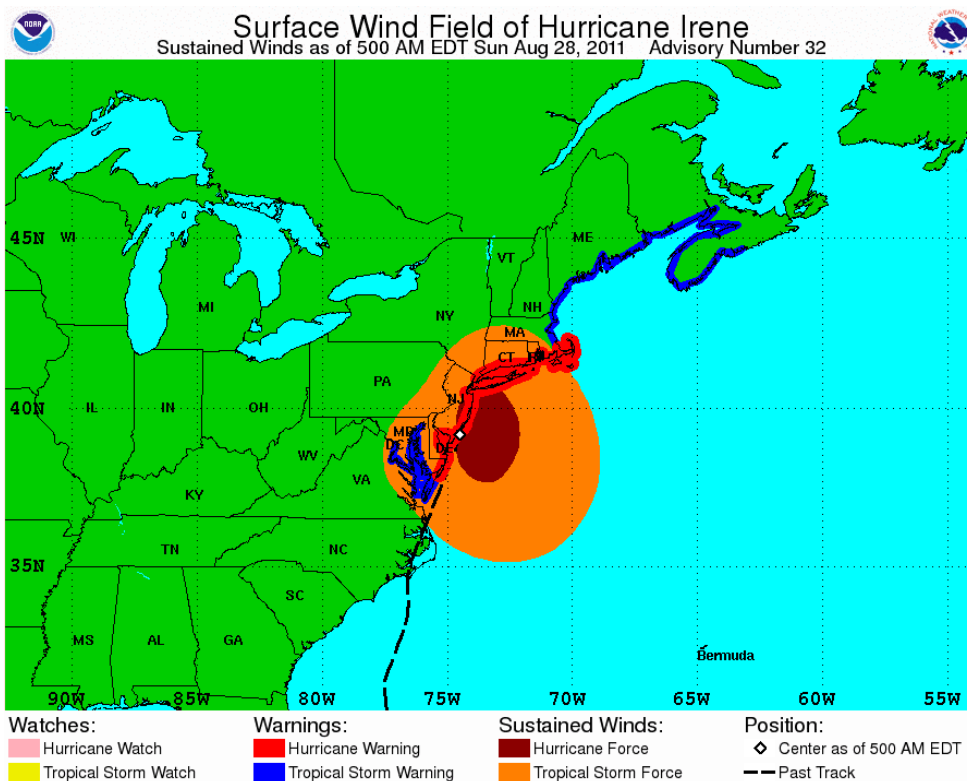




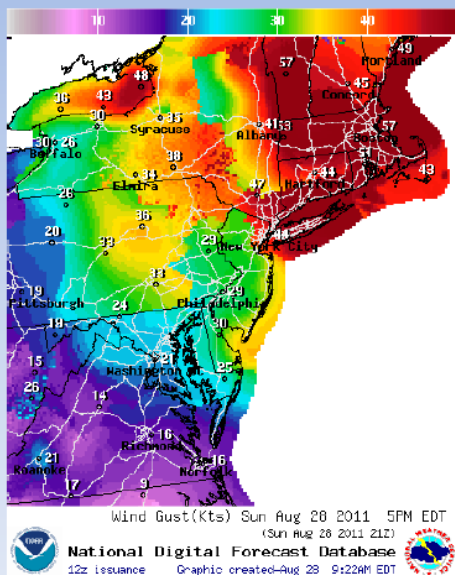
Projected Impacts Of Hurricane Irene - National Weather Service



### Actual Impacts Of Hurricane Irene – National Weather Service



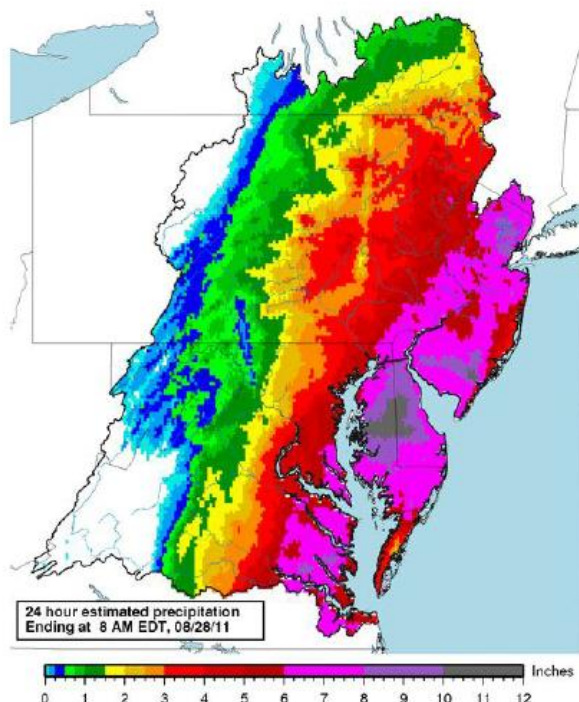
## Wind Gust 2 PM Sunday



- Winds should diminish rapidly when storm get near Albany NY about 3 PM this afternoon.
  - Wet soils make tree more vulnerable to winds
  - Expect more tree/power issues this afternoon.
- Wind reports
  - TS gusts from Lancaster (913 AM) to northeastern PA today
  - Gust 40 to 52 MPH
- Wind impacts
  - Reports trees and wires down
  - Power outages
  - Harrisburg NOAA Weather radio down by power outages.

Total Rainfall by 10 a.m. on August 28, 2011

## Total Estimated Rainfall (10 AM)



- Heaviest rain was focused over DE/NJ
- Eastern third of Pennsylvania
  - Wide area of 3-7.5 inches
  - May see amounts over 8 inches when all is said and done.

### One Day Precipitation – August 28, 2011

State College, PA (CTP): 8/28/2011 1-Day Observed Precipitation  
Valid at 8/28/2011 1200 UTC– Created 8/30/11 23:31 UTC

