Connecticut Legislature
Tropical Storm Irene Hearing
September 19, 2011
I. Restoration & Communication Processes
   A. Pre-Event Planning
   B. Severity of Irene
   C. Damage to the Electric System
      1. Damage Across UI's Electric System
      2. Example - Damage Across One of Our Towns
      3. Examples – Damage on One Circuit in One Town
      4. Examples – Specific Locations
   D. Primary & Secondary Assessment
   E. Coordinate the Work, Ensure Safety

II. Communications – Irene Performance, Future Objective

III. Best Practices, Plan for the Future

IV. Results and Lessons Learned
Preparations, e.g.:
- Model predictions
- Mutual assistance coordination
- Communications to government leaders
- Notify towns – 4-7d outages likely

Damage Assessment: ~ 9500 locations
  Work: ~ 10,000 locations to sequence & execute work

Communications included: resources deployed, restoration glide path, locations of work, restoration times

Assessment and execution good, but …
Recognize customer/stakeholder desire for more information faster.
We began planning many days before the storm ... here are some examples:

<table>
<thead>
<tr>
<th>Day</th>
<th>Operations</th>
<th>Communications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mon 8/22</td>
<td>UI Activates Storm Plan</td>
<td>8/25: Town Notif. of UI Conting. Plans</td>
</tr>
<tr>
<td>Tue 8/23</td>
<td>State/Local Agencies Notified UI Storm Center Open Impact &amp; Damage Prediction Developed</td>
<td>8/25: Muni. Liaison at EOC Pre-Storm Prep Meetings</td>
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<tr>
<td>Thu 8/25</td>
<td>NEMAG Call Acquire KCP&amp;L Line Crews And Lewis Line Clearance Crews</td>
<td>8/25-26 UI Conducts radio/Print/TV interviews</td>
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<td>Fri 8/26</td>
<td>UI Staffs State EOC Storm Preparation Complete</td>
<td>8/27: Outbound Calling for Medical Hardship Customers</td>
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<td>Sat 8/27</td>
<td>Storm Center Fully Staffed</td>
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<tr>
<td>Sun 8/28</td>
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Irene was an extreme event...

Storm Severity:
- 3-6” of rain
- Wind gusts > 60 mph (2 am to 2pm Su.)
- Tidal Flooding

Communications During the Event:
- Storm updates every few hours to Selectman/Mayors/Legislators and EOC Directors. The Company began using social media to disseminate information.
- Multiple news releases per day:
  - Status of electric system
  - Updates on restoration progress and goals.
- UI personnel gave 106 separate interviews with electronic, print, radio and television outlets – local, regional and national.
... and the damage to the electric system was also extreme.

**Damage:**
- 263 circuits w/ outages
- 10,300 locations worked by crews
- 9,700 locations visited to assess damage
- 158,000 peak customers out

**UI’s Distribution System Outages**
(UI’s System: 443 circuits, 3,275 miles of O/H lines)

*Total outages shown – includes all over duration of storm and recovery/restoration period.*
UI's Distribution System in Fairfield
(Fairfield is served by numerous circuits - see colors above)

Damage in Fairfield:
- 570 interrupting devices reported open (circuit breakers, fuses, transformers)
- Each may have required 1 or more work locations to resolve.
Damage – One Circuit, in One Town

Damage On One Circuit:

- In Eastern Fairfield
- Circuit 2686
- 70 Isolating devices reported open
- 113 work locations
Example:
- Ferncliff Rd., Fairfield, CT
- Pole down
- Electric wires down
- Phone/Com wires down
- UG service to house damaged

Example:
- Catamount Rd., Fairfield, CT
- In addition to the damage ...
- Note how completely the tree canopy blankets the area.
Damage – Single Locations

Examples:
- Peak of storm roughly coincidental with high tide.
- Extensive flooding at two substation properties
- One of two flooded substations taken off line as a precautionary measure.
- Put back in service quickly

- Substations affect large numbers of customers
- Permanent damage limited, but ...
- Impractical to work in station during the event (if that had been necessary)
Assessment is critical ... and was performed exceptionally quickly ...

Public Safety, Town Priorities

Restoration, main line work

Restoration, branch line work

Sun. 8/28
Mon. 8/29
Tues. 8/30
Wed. 8/31
Th. 9/1

... It must be complete to:

• Identify quantity, location, nature of work
• Assign resources efficiently
• Provide information, predict restoration times
Coordinate the Work, Ensure Safety

Much of the work required extensive coordination both within the company and among companies

Approximately 9,700 locations were investigated by damage assessment crews

Example - Replace Broken Pole:

Example - Wires Down/Make Safe:

Safety is job-one – until we can fix it, we need to protect the public, and we cannot sacrifice safety for speed.

• 1115 workers safety trained during the event.
• 39,000 restoration crew hours of work without a lost-time accident.

Approximately 10,300 locations were visited by overhead line crews, line clearance crews, and service crews
The ultimate objective: provide accurate status & predictions earlier ... both to government leaders and individuals.

Customers & government leaders want this to commence sooner, and our customers want us to advise them “we know you’re out” so they’re not wondering.
**Ultimate Objectives:** (1) restore faster, (2) preserve current level of safety, (3) provide earlier, accurate status & predictions to individual customers & government leaders.

<table>
<thead>
<tr>
<th>Best Practices (examples)</th>
<th>March 2010 Storm</th>
<th>Irene (Today)</th>
<th>Short Term (&lt;1 yrs)</th>
<th>Ult. Goal (1-3 yrs)</th>
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<tbody>
<tr>
<td>Incident Command Structure*</td>
<td>✓</td>
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<tr>
<td>Pessimistic Storm Damage Predictions*</td>
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<td>State &amp; Municipal Communication Plan*</td>
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<td>Rapid Determination of Global Restoration Times*</td>
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<td>Optimal Restoration Strategy</td>
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<td>Consistent &amp; Correct Communications*</td>
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<td>Extend Two-Way Meter Deployment</td>
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<td>External Outage Reporting Tools</td>
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<td>Technology Enabled Damage Assessment</td>
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*Included Recommendations from October 2010 Jacobs Report to DPUC*
Communications expectations are rising – we’ll respond.

Lessons Learned, Continued
- Event revealed some technology-related weaknesses.
- We need to continue to improve communication & coordination with towns, especially during the early stages of the event.

Plan, Next Steps
- Conduct customer survey(s)
- Meet with each of our towns/cities
- Complete our after action assessment
- Accelerate UI’s technology implementation plans (see slide 14).
  - During future event(s), at completion of the assessment phase, accelerate conversion of results/data to useful information and disseminate more rapidly.

Lessons Learned
- As well as we did, restoration could be shorter if damage can be reduced ...
  - More aggressive tree management
- We didn’t always meet the information-expectations of our customers and government leaders …
  - Need to further develop and add methods & processes for conveying useful information.