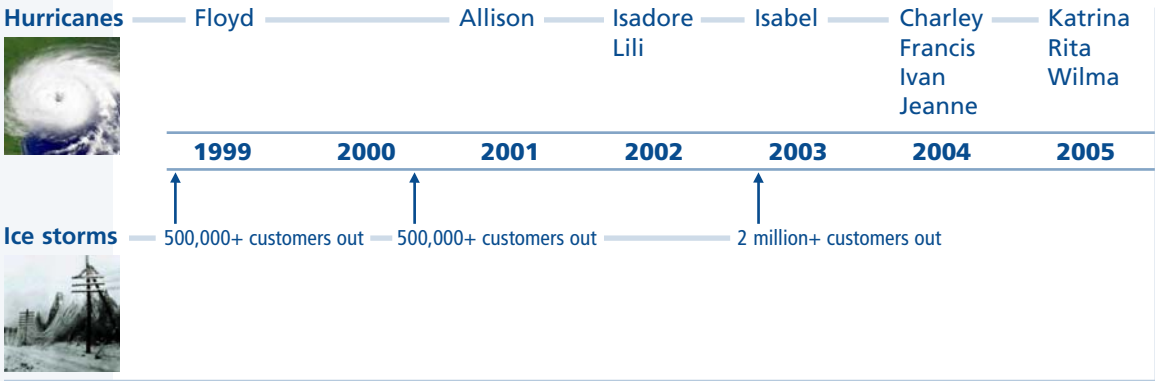


# Improving Storm Restoration Performance

Natural disasters can disrupt utility operations, with repercussions that last for years. In 2005, for example, hurricanes Katrina, Rita, and Wilma affected millions of people, destroying and damaging homes and businesses and requiring considerable electric infrastructure to be rebuilt. The four hurricanes that hit Florida in 2004 also destroyed a large swath of electric infrastructure. These storms will have economic impacts, in the form of cost recovery rate surcharges, on utilities and their customers for years to come.

### Select major events



Hundreds of smaller events, including tornadoes, blizzards, earthquakes, and ice storms occur each year as well, disrupting electric service on a local level. All of these events present significant operational, public communications, and project management challenges for utilities.

Success or failure in handling such natural events is typically driven by both a utility's service restoration performance and its ability to inform the public. Fast or slow restoration, responses to customers' inquiries, and interactions with the media all have a major impact on a company's reputation. And of course, storm-related performance can affect the trajectory of a Distribution Operations executive's career.

Successful restoration performance must be based on well-conceived planning and effective execution against the plans.

## Elements of a plan

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To prepare for future crises and develop ways to reduce the impact of storms, there are two areas that senior management should focus on:

- *Improving the restoration process* – raising the company’s ability to plan and prepare for the response, restore service, and repair the damage
- *Hardening the infrastructure* – reducing the impact of future storms by assessing the infrastructure to identify ways to make it more resilient

## Elements of focus

Improving the restoration process	Hardening the infrastructure
<ul style="list-style-type: none"><li>■ <b>Service restoration</b><ul style="list-style-type: none"><li>– Timeliness</li><li>– Effectiveness</li></ul></li><li>■ <b>Communications and expectation-setting</b><ul style="list-style-type: none"><li>– Selecting, prioritizing, and restoring “essential” customers such as hospitals, police, fire, shelters, nursing homes</li><li>– Coordinating with emergency management agencies, government</li><li>– Setting expectations and communicating with customers on estimated restoration times<ul style="list-style-type: none"><li>–As a group through the media</li><li>–Individually through call centers</li></ul></li></ul></li><li>■ <b>Planning and working with partners</b><ul style="list-style-type: none"><li>– Other utilities and crews</li><li>– Tree-trimming and line contractors</li><li>– Suppliers of poles, cables, transformers, etc.</li><li>– Hotels, caterers, other logistics partners to stage and support the work force</li><li>– Police, state, and municipal workers</li></ul></li><li>■ <b>Flexibility</b><ul style="list-style-type: none"><li>– Establishing and renewing restoration strategies and plans</li><li>– Adapting plans to the nuances of individual events</li></ul></li></ul>	<ul style="list-style-type: none"><li>■ <b>Storm-resistant system</b><ul style="list-style-type: none"><li>– Maintenance program changes such as vegetation management</li><li>– Asset replacement strategies</li><li>– System design changes incorporating equipment and material strength, underground versus overhead lines, etc.</li></ul></li><li>■ <b>Business continuity</b><ul style="list-style-type: none"><li>– Resilience of non-electric infrastructure, such as call centers, corporate offices</li><li>– Adequacy of redundant or back-up systems for communications and IT</li><li>– Employee availability, including ability to support employees who have sustained losses</li></ul></li><li>■ <b>Business justification and feasibility</b><ul style="list-style-type: none"><li>– Understanding of vulnerabilities</li><li>– Potential benefits of hardening the system (CAIDI, SAIFI)</li><li>– Life-cycle costs<ul style="list-style-type: none"><li>– Initial capital</li><li>– Ongoing O&amp;M</li></ul></li></ul></li></ul>

Addressing these elements can help to improve restoration performance, maintain a positive public image, and support strong relationships with regulators and governmental leaders.

## A management framework to organize the effort

In our work with utilities, we have found the following framework to be useful in preparing for and managing storm responses, as well as for improving restoration performance.

	Improving the restoration process			Hardening the infrastructure
	Preparation	Restoration	Recovery	Prevention
<b>Electric system restoration</b>	<ul style="list-style-type: none"> <li>Emergency preparation and storm plans                             <ul style="list-style-type: none"> <li>– Designed responses, triggers, contingencies</li> <li>– Training and drills</li> </ul> </li> <li>Requests for mutual assistance</li> <li>Restoration lists of priority customers</li> <li>Pre-positioned assets</li> </ul>	<ul style="list-style-type: none"> <li>Damage assessment, triage                             <ul style="list-style-type: none"> <li>– System make-safe</li> <li>– Resource deployment</li> </ul> </li> <li>Restoration and repair work practices (productivity, safety)</li> <li>Release and timing of crews</li> </ul>	<ul style="list-style-type: none"> <li>Post-event network assessment</li> <li>System operation, such as return to standard configuration</li> <li>Rebuild system beyond make-safe and quick repair conditions</li> <li>Workforce recognition and recovery, such as time off</li> </ul>	<ul style="list-style-type: none"> <li>System condition assessment and upgrade, such as asset replacement strategies and schedules</li> <li>System and network design, such as overhead versus underground facilities</li> <li>Preventive maintenance, such as vegetation management</li> <li>Continuity of corporate systems and call centers</li> </ul>
<b>External coordination and communication</b>	<ul style="list-style-type: none"> <li>Emergency planning coordination with outside entities, including media</li> <li>Critical liaisons and relationships</li> <li>Coordination with authorities to set priority of essential services</li> </ul>	<ul style="list-style-type: none"> <li>Coordination, status updates on outages, restoration times, resources                             <ul style="list-style-type: none"> <li>– Emergency management and government entities</li> <li>– Media</li> <li>– Essential and large customers</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Update emergency management plans to reflect lessons learned</li> </ul>	<ul style="list-style-type: none"> <li>System investment options shared with legislators, regulators, and customers</li> <li>Rate recovery mechanisms developed as appropriate</li> </ul>
<b>Program management</b>	<ul style="list-style-type: none"> <li>Storm management team defining roles, locations, shifts</li> <li>Logistics plans for staging sites, people, material, food and lodging, fuel, communications</li> <li>Contingency plans</li> </ul>	<ul style="list-style-type: none"> <li>Priority-setting and resource allocation</li> <li>Management of external support</li> <li>Ongoing planning and re-planning</li> <li>Cost management</li> </ul>	<ul style="list-style-type: none"> <li>Storm restoration performance evaluation</li> <li>Lessons learned</li> <li>Financial assessment, such as cost compilation, storm fund management, and recovery</li> </ul>	<ul style="list-style-type: none"> <li>Root cause analysis</li> <li>Financial analysis</li> </ul>

### Questions for managers

- Have we taken action to upgrade our storm plans based on lessons learned during prior events? How would we evaluate our preparation, restoration, and recovery plans?
- Have we identified initiatives to harden the infrastructure? Do we know what characteristics (specifications, construction standards, maintenance history) distinguish the assets that performed reliably during prior storms from those that did not?
- What actions can most improve both actual restoration performance and the public's perceptions?

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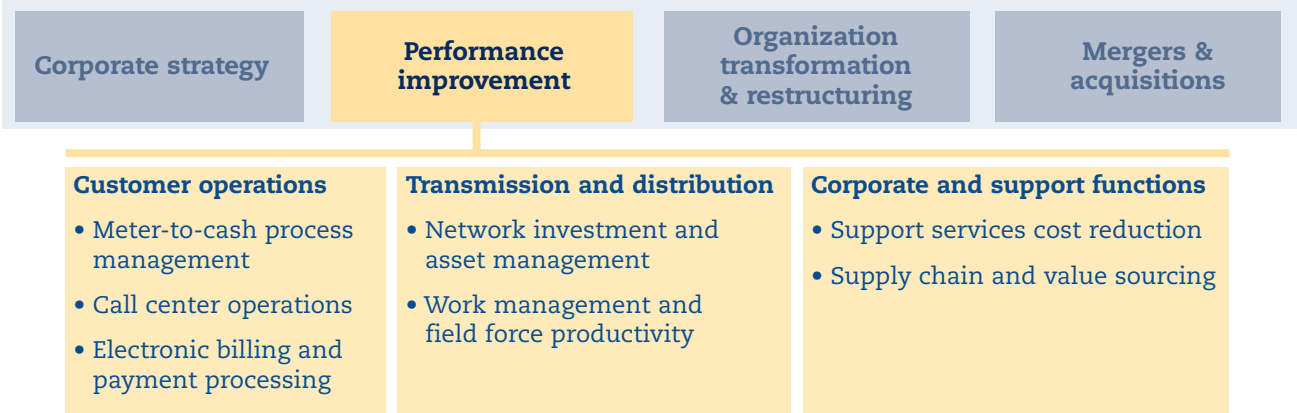
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