RESPONDING TO

NATURAL DISASTERS & EXTREME WEATHER EVENTS

When a natural disaster or extreme weather event such as a hurricane, flood, wildfire, blizzard or ice storm happens, our workers stand ready to respond. We keep the lights on, heat flowing and communications connected.

Extreme weather events struck many parts of the country in 2021, impacting nearly one in three Americans, according to a *Washington Post* analysis released in September 2021.[1] These events included Hurricane Ida in the Gulf Coast, Hurricane Henri and the remnants of Hurricane Ida in the Mid-Atlantic and Northeast, repeated severe thunderstorms and tornadoes in many parts of the Midwest and catastrophic wildfires in the West. The summer of 2021 also brought severe weather to many parts of the Midwest. The pattern is illustrated by the experience in Michigan, where nine storms with tropical-force winds (39 to 74 miles per hour), including numerous tornadoes, caused significant damage to buildings, trees and energy infrastructure.

[1] washingtonpost.com/nation/interactive/2021/weather-disasters-2021/

GRID RESTORATION & HARDENING

QUANTA'S STORM RESPONSE

2021 IN REVIEW

12,700
total lineworkers deployed for named storms in 2021

1.8 M
man-hours spent restoring power services in response to named storms in 2021

HURRICANE IDA

2,162
lineworkers deployed at the peak of Hurricane Ida

1.2 M
end users whose power was restored

140
consecutive days response

1.1 M
man-hours spent restoring power services in response to Hurricane Ida

BUILDING

Hurricane Ida

Hurricane Ida was a deadly and destructive Category 4 Atlantic hurricane that became the second-most damaging and intense hurricane on record to make landfall in Louisiana, behind Hurricane Katrina in 2005.[2] The remnants of the storm also caused widespread tornadic destruction and catastrophic flooding across the Northeastern United States. Making landfall on August 29, Hurricane Ida caused severe devastation in parts of Louisiana and Mississippi. At the storm's peak, approximately 1.2 million customers on the Gulf Coast lost power. Ida's remnants later also caused approximately 212,000 customers in parts of the Northeast and Mid-Atlantic to lose power several days later.

In the hardest-hit areas, Hurricane Ida caused catastrophic damage. Ida's fury resulted in some communities being temporarily uninhabitable due to storm surges that were more than 15 feet high. Impacted electric companies needed to repair or replace more than 30,000 power poles, more than 36,000 spans of wire and more than 6,000 transformers. In total, Hurricane Ida destroyed more power poles than hurricanes Delta, Ike, Katrina and Zeta combined. In many places, damage from Ida meant that crews were forced to rebuild the entire energy grid, with many customers unable to receive power to their homes and businesses even after restoration was complete.

[2] nhc.noaa.gov/data/tcr/AL092021_Ida.pdf

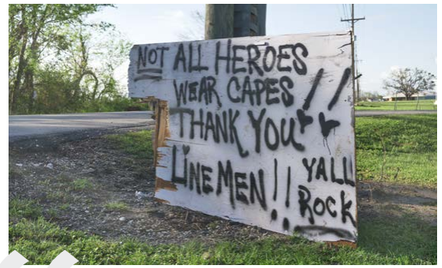
Restoration & Building Grid Resiliency in Grand Isle, Louisiana

138 days after Hurricane Ida flattened more than 700 structures in the Town of Grand Isle and cut basic utilities to its homes and businesses, Quanta companies helped restore permanent power to the small barrier island community.

Those who had been able to return in the five months since Ida blew through had been using power supplied by large temporary generators positioned on either side of the island.

Reconstruction of the electrical infrastructure is now producing a more resilient system. For example, Class 1 utility poles (the largest available) that have been installed are anchored through steel sleeves that go 15 feet into the ground. In some areas where the soil wasn't strong and poles were bent over by the wind, stronger fill has been added. One of the two main distribution feeders serving Grand Isle has now been placed underground to help the system withstand future storms. In addition, many of the traditional "T" shaped poles where the lines are hung on the cross bar were replaced by direct attachment to the pole itself, resulting in less resistance to high winds.

Put together, Grand Isle's power supply system, including the upgraded substation, is now rated to withstand winds of up to 150 miles per hour.



"I CAN'T SAY ENOUGH ABOUT THE **GENEROSITY AND GRATITUDE** WE RECEIVED FROM the people of the communities we served. There were groups of people bringing us food, hosting whole crews for meals, helping with laundry and so much more. There was a definite sense of community throughout. From the people who lived in the area, to other power line companies, to the contractors, we were all there to get the job done safely and as efficiently as possible—trying to get the power back on so those who still had homes could get back to them.

MARK MILLER

Stringing Supervisor, Quanta operating company

GRID RESILIENCY

IN FOCUS

STAYING SAFE DURING STORM SEASON: PERSONAL VOLTAGE DETECTORS

In 2021, Quanta issued 3,157 personal voltage detectors (PVDs) to storm responders. PVDs are non-contact voltage and current detectors that are designed to alert users when they approach an electrified source. The PVD's advanced notification system is designed to warn the user that a source is present and to inform them of its approximate location. In this manner, the internal sensors in the PVD are designed to detect both electrical fields (voltage) and magnetic fields (current). Worn on the underside of a hard hat brim, directly in front of the user's face, the unit is within the user's field of peripheral vision to maximize the visibility and effectiveness of voltage and current alerts. When the PVD detects voltage or current, it issues audio (beeping) and visual (flashing LED) proximity alerts. As the user approaches an electrified source, LED flashing and audio alerts will steadily increase.

Personal Voltage Detectors Saving Lives

On a storm worksite, a three-phase distribution line was unexpectedly energized by a third party. The lineworkers working on house services were alerted to the energization when their personal voltage detectors alarmed. Due to the alarm, before work began, **lineworkers implemented preventative controls that ensured no injuries occurred.**

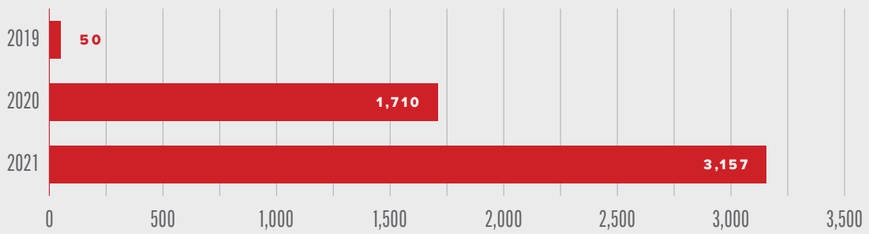
01

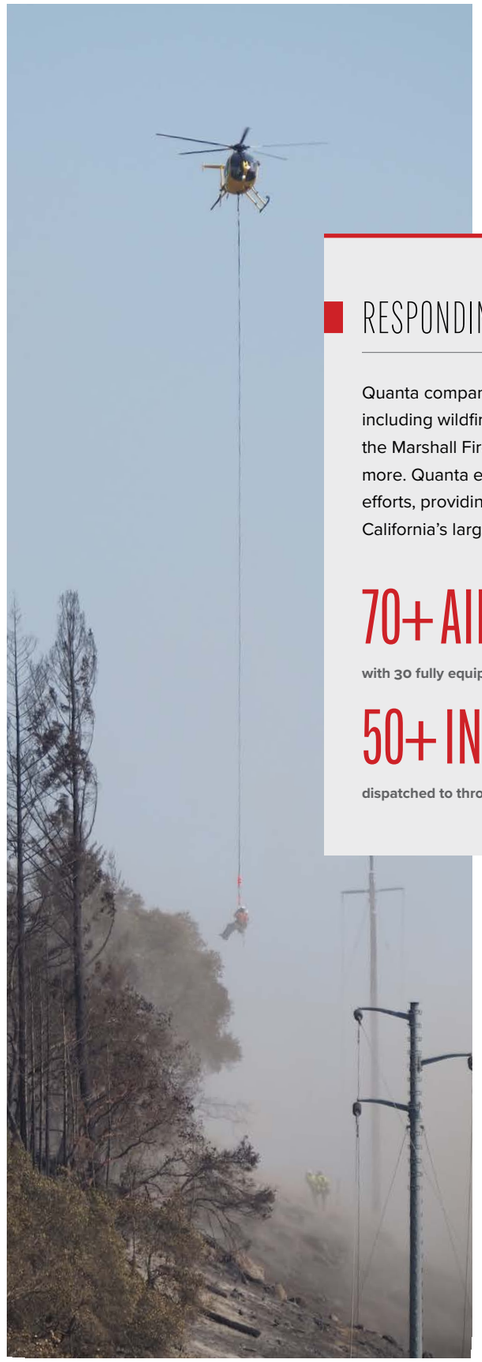
02

While walking to access a cracked transmission pole with distribution underbuilt during a storm restoration project, a lineworker's PVD alerted him to an energized secondary line on the ground. The lineworker was able to **immediately stop and alert nearby coworkers that the secondary line could be hot.** Listening to the lineworker's warning, the crew then requested a shotgun and tester to test the line and confirm that the line was indeed energized. Continuing to follow protocol, the crew de-energized the line before continuing to perform storm restoration.

PERSONAL VOLTAGE DETECTORS PURCHASED FOR STORM RESPONSE ACTIVITIES

In 2021, Quanta purchased 3,157 PVDs, an 85% increase compared to 2020.





Supporting Indigenous Communities

A Quanta company worked to get power restored to two First Nations in eastern Manitoba after wildfires swept through the area, forcing communities to evacuate because of the wildfire threat. Crews needed to replace around 100 poles that were damaged by flames that disconnected approximately 1,500 customers in Pauingassi and Little Grand Rapids First Nations from power.

RESPONDING TO WILDFIRES

Quanta companies always stand ready to respond to the devastation of all natural disasters, including wildfires. Quanta companies have supported the emergency restoration work from the Marshall Fire (Colorado), Napa Valley Firestorm (California), Dixie Fire (California) and more. Quanta employees worked multiple shifts to offer 24-hour support to the restoration efforts, providing dozens of crews, including over 50,000 man-hours to the Dixie Fire, California's largest single wildfire in history.

70+ AIRCRAFT
with 30 fully equipped to fight fire

5,000+ HOURS
flown on active fires

50+ INCIDENTS
dispatched to throughout the U.S.

7M+ GALLONS
of water deployed from helicopters

Grid Hardening & Undergrounding

As extreme weather caused by climate change becomes more frequent, Quanta is working with its customers to make America's power infrastructure more resilient to severe weather events and wildfires.

Replacing aging infrastructure vulnerable to these extreme weather events with stronger, more resilient upgrades is one of the most important approaches. This physical "hardening" of the grid encompasses various strategies, including moving power lines underground, replacing wooden poles with steel and concrete ones and raising the height of transformers, so they remain out of the path of floods.

These actions are typically combined with weather modeling to understand how and when distinct types of weather might impact the grid. By doing so, companies can identify system needs and prioritize the type of grid hardening required to meet these needs.