

# EET&D

## MAGAZINE

Quarterly Issue 4, 2021 — Volume 24

A photograph of three wind turbines in a green field under a blue sky with clouds. The image is overlaid with a red rectangular box containing white text.

**ON A MISSION: CONNECTICUT  
GREEN BANK STRIVES FOR  
ENERGY EQUITY AMONG  
LOW-INCOME CONSUMERS**



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\* The Elastimold Tru-Break switchgear module is considered maintenance-free because it contains no oil or gas to monitor or maintain.



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### **CLIMATE CHANGE ISN'T NEW, BUT THE BATTLE IS JUST BEGINNING**

Elisabeth Monaghan, Editor in Chief

Whether or not others believe climate change is a problem, I only need to feel the pressure in my lungs and the burning in my eyes, or see the thick veil of smog obscuring my view of the Rocky Mountains to understand that something is affecting the air, and ultimately, our weather system.

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### **ON A MISSION: CONNECTICUT GREEN BANK STRIVES FOR ENERGY EQUITY AMONG LOW-INCOME CONSUMERS**

Bryan Garcia, President/CEO, Connecticut Green Bank

*EET&D Magazine* recently spoke with Bryan Garcia, president and CEO of the nation's first state-level green bank, the Connecticut Green Bank, about how his organization is expanding access to clean energy through several initiatives.

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## GREEN OVATIONS

### **SMART GRID RECLOSERS PROVE VALUE OVER TRADITIONAL HYDRAULIC DEVICES FOR RURAL NEW ZEALAND CUSTOMERS**

Jason Lander, S&C Electric Company

On the South Island of New Zealand lies a wide range of medium-voltage electrical distribution topologies. Mountainous terrain, thousands of lakes, numerous glaciers and extinct volcanoes dot the landscape, making it an outdoorsman's dream. But that same beauty also creates challenges, particularly for rural electrification.

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### **MANAGE GROWING DERS WHILE IMPROVING GRID RELIABILITY**

Andy Bennet, MPrest Inc

The California Independent System Operator and the Electric Reliability Council of Texas markets, along with their respective distribution system operators, represent a living laboratory for DER and the role these assets play in balancing supply and demand across the grid. With climate change, extreme weather events will only become more frequent and intense, underscoring the need for grid modernization solutions to withstand these crises.

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### **TAKING TOWER MAINTENANCE TO A HIGHER LEVEL WITH DRONE-BASED VISUAL INSPECTIONS**

Renner Vaughn, Cyberhawk

By halfway through 2021, 6,540 fires had been recorded in California, burning over 1,161,027 acres across the state. Colorado, Idaho and Montana also suffered from unprecedented wildfires. Given the abundance of forests and deep canyons in these states, assuring that transmission towers and power lines are properly maintained and cleared of vegetation is a vital program for utilities.

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## GUEST EDITORIAL

### **THE MACHINE ECONOMY, INTELLIGENT SYSTEMS & THE FUTURE OF THE ENERGY INDUSTRY**

Thomas Rosén, Wind River

The rise of a new machine economy will have smart, connected, autonomous machines and devices carry out the necessary activities of production, distribution and operations, with little or no human intervention. And this new economy will be powered by intelligent systems.

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GUEST EDITORIAL

## ESTABLISHING A DOMESTIC SUPPLY CHAIN FOR CRITICAL BATTERY MATERIALS WILL DRIVE EXPLOSIVE JOB GROWTH

Megan O'Connor, Ph.D., Nth Cycle

By 2050, about 4.5 million people will be working in the energy storage industry globally. The majority of transportation workers will shift from building and servicing internal combustion vehicles to electric vehicles. Overall, an estimated 42 million people will be employed by a renewable energy or EV company by mid-century. This is a new industrial revolution.

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GUEST EDITORIAL

## THERE ISN'T TIME TO REPLACE AMERICA'S TRANSMISSION INFRASTRUCTURE

Adam Grosser, Up Partners

It's imperative that we focus our intellectual, financial and civic resources on developing the most effective technologies for addressing climate change and its consequences. When it comes to the wildfires decimating the West Coast, that means rethinking the way electricity is delivered from power stations to end-users.

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POWHERFUL FORCES

## WOMEN'S RESOURCE NETWORK

Amber Deighton, Oatey Company and Elisabeth Monaghan, Editor in Chief

For our final issue of 2021, we are taking a different approach to this quarter's *Powherful Forces* column by spotlighting the work Oatey Company is doing to educate STEM students about careers in manufacturing and plumbing. Amber Deighton who is the co-chair of Oatey's newly established Women's Resource Network, discusses the recent STEM Career Education Workshop.



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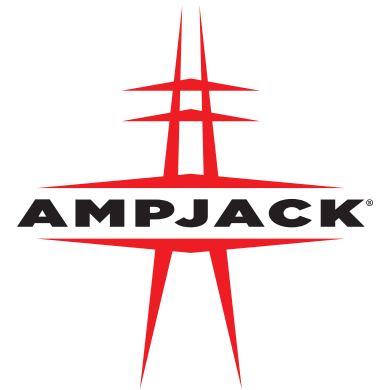
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## NYPA TO INVEST \$70 MILLION TO MODERNIZE LONG ISLAND SOUND CABLE

*Planned Reconductoring Project to Help Ensure the Continued Reliable Transmission of 600 Megawatts of Electricity to Long Island*

January 2022

The New York Power Authority is moving forward with a \$70 million upgrade and modernization of the Long Island Sound Cable (Y-49), an underground transmission line that transverses the Long Island Sound from Westchester County to Nassau County, carrying up to 600 megawatts of electricity to Long Island. The NYPA Board of Trustees today (Jan 25) approved a nearly \$38 million contract with Elecnor Hawkeye, an engineering and construction firm based in Hauppauge, to undertake the project's design, manufacturing, delivery, assembly, and commissioning. The transmission project will enable accelerated progress against New York State's goal for 70 percent of the state's electricity to come from renewable sources by 2030. It also advances the State's path to realize a zero-emission grid by 2040 as outlined in the Climate Leadership and Community Protection Act (the Climate Act).

***“The Power Authority is dedicated to developing and improving transmission throughout the state as a resilient network is critical to transitioning New York to a clean energy economy,” said Michael Balboni, NYPA trustee and Long Island resident. “The modernization for the Long Island Sound Cable will help to ensure reliable transmission of power to the nearly three million New Yorkers that make Long Island their home.”***

The reconductoring project, which is slated to begin this fall and complete in 2023, will include the replacement and commissioning of the Nassau County section of the cable, in addition to the installation of additional manholes, fiber optic replacements, and instrumentation improvements to bring operational flexibility to the line and alleviate the risk of faults. Today's action by the NYPA trustees builds on the Oct. 2021 board approval to purchase the high-pressure fluid-filled cable needed for the reconductoring project

\$70  
MILLION  
UPGRADE

from The Okonite Company for \$28 million.

***“The reconductoring of NYPA's Long Island Sound Cable is an important part of a reliable Long Island electric grid,” said Thomas Falcone, CEO of the Long Island Power Authority. “This investment connects the Long Island grid to the rest of New York, delivering clean, lower-cost power to local residents and businesses.”***

The scope of the project will be submitted to the Department of Public Service within the next few months.

The 26-mile, 345-kilovolt transmission line was placed into service in May 1991 and is part of a statewide network of approximately 1,400 circuit-miles of high-voltage transmission lines and associated substations owned by NYPA. As part of the Power Authority's 10-year



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strategic plan, VISION2030, NYPA is committed to growing transmission throughout New York State. →

The modernization of the Long Island Sound Cable is one of several transmission improvement and development projects NYPA is working on independently, or with other industry partners, across the state, including:

- Smart Path, a \$484 million project to improve 78 circuit-miles of transmission from Massena in St. Lawrence County to the Town of Croghan in Lewis County.
- Smart Path Connect, a \$605 million, multi-faceted project that includes rebuilding more than 50 circuit-miles of transmission between Massena and the Town of Clinton, rebuilding approximately 55 circuit-miles of transmission southward from Croghan to Marcy, and rebuilding and expanding several substations along the impacted transmission corridor.
- Central East Energy Connect, a \$276 million project that includes the construction of more than 90 circuit-miles of new 345 kV and 115 kV transmission lines and two substations between Marcy in the Mohawk Valley and New Scotland in the Capital Region.
- Clean Path NY, an \$11 billion clean infrastructure project that includes a new 174-mile underground

transmission line that will enable the delivery of more than 7.5 million megawatt-hours of emissions-free energy into New York City every year.

### New York State's Nation-Leading Climate Plan

New York State's nation-leading climate agenda is the most aggressive climate and clean energy initiative in the nation, calling for an orderly and just transition to clean energy that creates jobs and continues fostering a green economy as New York State recovers from the COVID-19 pandemic. Enshrined into law through the Climate Leadership and Community Protection Act, New York is on a path to achieve its mandated goal of a zero-emission electricity sector by 2040, including 70 percent renewable energy generation by 2030, and to reach economy wide carbon neutrality. It builds on New York's unprecedented investments to ramp-up clean energy including over \$33 billion in 102 large-scale renewable and transmission projects across the state, \$6.8 billion to reduce buildings emissions, \$1.8 billion to scale up solar, more than \$1 billion for clean transportation initiatives, and over \$1.6 billion in NY Green Bank commitments. Combined, these investments are supporting nearly 158,000 jobs in New York's clean energy sector in 2020, a 2,100 percent growth in the distributed solar sector since 2011 and a commitment to develop 9,000 megawatts of offshore wind by 2035. Under the Climate Act, New York will build on this progress and reduce greenhouse gas emissions by 85 percent from 1990 levels by 2050, while ensuring that at least 35 percent with a goal of 40 percent of the benefits of clean energy investments are directed to disadvantaged communities, and advance progress towards the state's 2025 energy efficiency target of reducing on-site energy consumption by 185 trillion BTUs of end-use energy savings.

\$11

BILLION CLEAN  
INFRASTRUCTURE  
PROJECT



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# NEW ONTARIO CLEAN ENERGY REGISTRY WILL MAKE PROVINCE EVEN MORE ATTRACTIVE FOR INVESTMENT

January 2022

As environmental and sustainability goals increasingly influence corporate decisions on where to invest and grow, the Ontario government is taking action and leveraging the province's world-class clean electricity grid by developing a voluntary clean energy credit (CEC) registry to boost Ontario's international competitiveness and attract jobs.

*“Ontario families have done the heavy-lifting and built one of the cleanest electricity grids in the world. Our government is ensuring Ontario is leveraging this competitive advantage to drive investment and create jobs.” said Todd Smith, Minister of Energy. “The creation of a clean energy credit registry will give businesses the opportunity to meet their corporate environmental and sustainability goals when choosing to operate in Ontario and will also generate revenue which could be returned to Ontario ratepayers to help lower electricity costs.”*

Voluntary CECs are certificates that each represent 1 megawatt-hour (MWh) of clean electricity that has been generated from a non-emitting source, such as solar, wind, bioenergy, hydroelectric and nuclear power. A provincial CEC registry will leverage Ontario's already world-class clean electricity system, that was 94 per cent emissions-free in 2020, and allow businesses to voluntarily purchase and retire these CECs to meet their corporate sustainability goals and demonstrate that their electricity has been sourced from a non-emitting resource. A CEC registry could return funds raised through the purchase of CECs to Ontario ratepayers and could support future clean energy generation in the province.

The Ontario government has directed the Independent Electricity System Operator (IESO) to research and report back on the design of a provincial CEC registry, that would give businesses more choice in how they achieve their corporate sustainability goals. The IESO will deliver its report by July 4, 2022. The government will consider the report as well as stakeholder input, with the intention of having the registry available by January 2023.

*“A voluntary clean energy credit market could be a key tool to help Ontario electricity customers realize their clean energy preferences,” says Lesley Gallinger, President and CEO of the IESO. “We will engage with industry stakeholders, businesses, and others as we assess options for a potential market.”*

The commitment to develop a registry builds on continued government action to make Ontario the best place to create jobs by cutting red tape and electricity prices all while helping businesses reduce emissions to meet the Made-in-Ontario Environment Plan's climate targets. This will make life easier for Ontarians by returning more money to their pockets as they continue to deal with financial challenges presented by the pandemic and will help protect the environment for future generations.

*“By lowering taxes, reducing electricity costs and cutting red tape, our government has reduced the cost of doing business in Ontario by \$7 billion a year,” said Vic Fedeli, Minister of Economic Development, Job Creation and Trade. “Developing a clean energy credit registry with flexible options adds to the list of benefits to businesses looking to expand and invest in Ontario.” →*



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## QUICK FACTS

- There is currently no official centralized registry that tracks and enables purchase of CECs for electricity generated and consumed in Ontario.
- Developing a CEC registry would allow for the simplified creation, trading, and retirement of CECs in Ontario.
- CECs, or similar voluntary registries, exist in other competing North American jurisdictions, such as Ohio, Pennsylvania, Illinois, Indiana, Wisconsin and the New England states.
- Purchasers will be able to source CECs from one or multiple solar, wind, bioenergy, nuclear, and hydroelectric generation facilities in Ontario to meet their individual or corporate goals.



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## QUOTES

**“The best places to do business are those that are forward-thinking. Access to a clean energy mix is becoming one of the driving factors for companies when thinking about where to grow their business. This is an important initiative that positions the province as a smart partner for companies looking to reduce their carbon footprint.”**

– Trevor Dauphinee, CEO, Invest Ontario

**“Retail Council of Canada (RCC) supports the Ontario government’s commitment to develop a Clean Energy Credit system. Delivering products - be it clothing or groceries, toys or power tools - to our customers in an environmentally friendly way is a top of mind imperative for retailers. This Made-in-Ontario initiative will lead to a competitive marketplace, wherein businesses can voluntarily make commitments which will green our grid, drive local innovation, all while delivering competitively priced credits to business.”**

– Diane J. Brisebois, President and CEO,  
Retail Council of Canada

**“GM applauds the Ontario government’s announcement of a new program to introduce a voluntary clean energy credit registry that gives businesses options to meet environmental and sustainability goals.”**

– David Paterson, Vice President, Corporate and  
Environmental Affairs, General Motors Canada

**“OPG has seen a strong increase in interest, and uptick in sales, for environmental attributes from our non-emitting hydroelectric and nuclear facilities. The government’s proposed centralized CEC registry is a significant step that will benefit ratepayers and support Ontario electricity consumers wishing to track and report on their emissions goals.”**

– Ken Hartwick, President and CEO,  
Ontario Power Generation (OPG)



# SDG&E AND CLEVELAND NATIONAL FOREST ANNOUNCE COMPLETION OF MAJOR FIRE-HARDENING PROJECT

*Cleveland National Forest Fire Hardening and Safety Project furthers goal of providing safe and reliable energy*

January 2022

San Diego Gas & Electric (SDG&E) and the Cleveland National Forest announced today (Jan 24) the completion of the Cleveland National Forest Fire Hardening and Safety (CNF) Project, a cornerstone of the San Diego region's community fire safety and electric system-hardening efforts.

The CNF project encompassed a variety of wood-to-steel pole conversions and replacement or undergrounding of equipment to improve the fire-resistance of electric infrastructure throughout approximately 880 square miles in eastern San Diego, including the communities of Julian, Pauma Valley, Descanso, Pine Valley, Mount Laguna and Campo.

***"This is an enormous accomplishment for our region and the result of incredible partnerships at the local, state and federal levels, as well as the patience of so many of our customers whose lives have been disrupted over the life of the project," said Caroline Winn, SDG&E's Chief Executive Officer. "Many dedicated crews and individuals worked for more than a decade, often in challenging conditions, and we are so proud and excited to announce its completion knowing that it plays a vital role in SDG&E's commitment to making our electric system safer, cleaner and more reliable."***

Planning and design for one of the first fire-hardening programs to be developed by SDG&E followed devastating 2003 and 2007 wildfires, and construction began shortly after the company received unanimous approval from the CPUC and a Master Use Permit from the United States Forest Service (USFS) in 2016.

The CNF project is comprised of 20 different projects that include a total replacement of 607 miles of new conductor and equipment built to withstand winds more than 85 miles-per-hour and high temperatures, 17 new miles of undergrounded distribution lines located in high-priority areas, and the replacement of more than 2,100 wood poles with new-fire resistant, weatherized steel poles. With completion of the CNF project, 30% of San Diego's backcountry electric infrastructure has been fire-hardened to date.

***"This fire hardening project will not only safeguard communities within and adjacent to Forest from potential wildfire threats. It also protects priority watersheds improves sensitive wildlife habitats and scenic areas," said Cleveland National Forest Supervisor Scott Tangenberg. "This project was indeed a team effort, and it strengthened relationships and fostered new partnerships that will have lasting results for the cultural and natural resources we manage."***

The project was not only one of SDG&E's first large-scale fire hardening projects but was also one of the most challenging so far due to its size, complexity, rugged terrain, remote locations, the amount of undeveloped land, and the abundance of cultural resources that were discovered during the project. Recognizing the importance of avoiding and protecting these sensitive resources, SDG&E worked with the U.S. Forest Service to consult with the local Kumeyaay and Luiseño Tribes to fire harden the electric infrastructure on National Forest System lands, as well as other lands within the high fire threat district. Tribal consultation efforts continue as SDG&E enters the post-construction phase of the project. The team responsible for completing the project in an environmentally and culturally sensitive manner included dedicated staff from SDG&E, the CPUC and U.S. Forest Service who worked together to ensure all mitigation measures and compliance requirements were met. SDG&E was able to successfully complete construction of the project with zero agency issued non-compliances.

The CNF portfolio of projects is just one of many wildfire resiliency projects included in SDG&E's Wildfire Mitigation Plan (WMP) filed with the CPUC each year. In accordance with Senate Bill 901, the WMP outlines the ongoing practices and additional improvements SDG&E will make beyond the investments the utility already has made to combat the effects of the changing climate and threat of year-round wildfires. For more information on SDG&E's WMP, please visit [SDGE.com/2021-Wildfire-Mitigation-Plan](https://sdge.com/2021-Wildfire-Mitigation-Plan).

# CANADA INSTALLED ALMOST 1 GW OF WIND AND SOLAR ENERGY IN 2021, DRIVEN BY STRONG GROWTH IN ALBERTA

January 2022

CanREA's new industry data for 2021 shows that Canada saw the biggest build-out of new utility-scale wind and solar energy capacity since 2015, but this was far below what is required to achieve net-zero GHG emissions by 2050.

The Canadian Renewable Energy Association (CanREA) today (Jan 26) announced the industry's year-end data, reporting that Canada's wind and solar energy sectors grew significantly in 2021, adding nearly 1 GW of new generation capacity.

***"2021 was a positive year for our industries, with 677 MW of new wind energy and 288 MW of new utility-scale solar energy commissioned," said Robert Hornung, President and CEO of CanREA, "but this rate of growth is not nearly enough. We must dramatically accelerate and expand the deployment of these technologies."***

Alberta accounted for more than 60% of new Canadian capacity installed in 2021, with Saskatchewan accounting for another 20%.

In total, Canada's new wind and solar energy capacity created approximately 2,400 person-years of employment, primarily in the construction of new facilities, but also in the ongoing operations and maintenance of these sites.

CanREA projects that 2022 and 2023 will see significantly more growth in the deployment of wind and solar energy, with numerous projects currently under construction or in advanced stages of development.

More than 3,000 MW are expected to be commissioned in 2022 and a similar number in 2023. In addition, new commitments were made across Canada in 2021 (for example, in Saskatchewan, Quebec and Nova Scotia) that will result in new wind and solar energy deployment after 2023. "Canada is just starting to take advantage of its massive untapped wind and solar energy potential," said Hornung.

1 GW  
OF WIND  
AND SOLAR  
ENERGY

***"As the lowest-cost source of new decarbonized electricity generation available in Canada today, wind and solar energy will be a cornerstone of Canada's efforts to address climate change. Success, however, will require several policy, regulatory and infrastructure barriers to be addressed, enabling a dramatic increase in the scale and speed of deployment," he said.***

CanREA's 2050 Vision, Powering Canada's Journey to Net-Zero, demonstrates that we need to deploy more than 5,000 MW of new wind and solar energy annually for the next 30 years if Canada is to meet its commitment to net-zero greenhouse gas emissions by 2050.

For more information on CanREA's latest industry data for Canada, visit the "By the Numbers" webpage. →



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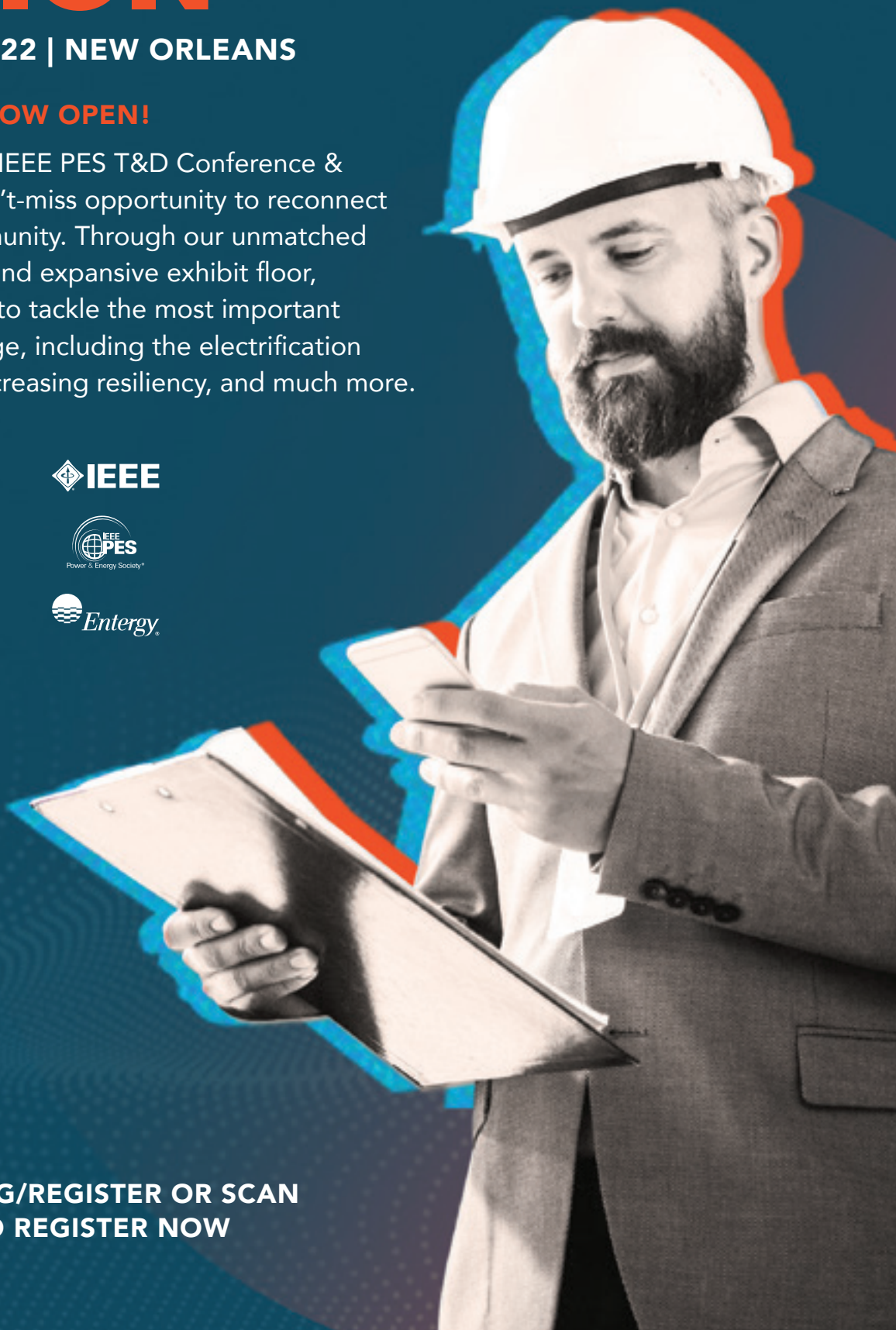
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## FACTS AT A GLANCE

### WIND ENERGY EXPANDED IN 2021

- Total wind energy capacity in Canada (as of Dec 31, 2021): 14,304 MW, up from 13,627 MW in 2020.
- New wind power generation installed in 2021: 677 MW
- Growth in wind energy in 2021: 4.9%
- Nearly half of this growth occurred in Alberta (358 MW) with additional growth in Saskatchewan, Ontario and British Columbia.

### SOLAR ENERGY SHONE IN 2021

- Total major\* solar energy capacity in Canada (as of Dec 31, 2021): 2,399 MW, up from 2,111 MW last year.
- New major\* solar power generation installed in 2021: 288 MW
- Growth in solar energy in 2021: 13.6%
- Almost all of this growth occurred in Alberta (250 MW), with small amounts added in Saskatchewan (21 MW), Quebec (9.5 MW), Nova Scotia (4.8 MW), Ontario (0.3 MW), Yukon Territory (1.5 MW) and Prince Edward Island (0.1 MW).
- Canada added its biggest solar farm in 2021, the 132 MW Claresholm Solar project in Alberta.

### TAKING STOCK OF ENERGY STORAGE

- There was significant growth in energy storage this year, including Canada's largest battery storage facility, the 20 MW Buffalo Creek Storage project in Alberta.
- There were also smaller energy storage projects in Ontario, Nova Scotia, Prince Edward Island and Yukon Territory.
- "Electricity system decision makers are now starting to discover the value of energy storage, a powerful set of technologies that can provide a broad range of services to support electricity system operators, and we expect to see rapid growth in the utilization of energy storage going forward," said Hornung.

### WHAT'S NEXT FOR 2022?

- Solar surge: We anticipate at least 1,000 MW of new solar energy this year. 18 new "major" (10 MW and up) solar projects should become operational in 2022, of which 16 are anticipated to be in Alberta and two in Saskatchewan. Canada's biggest solar farm will become the new Travers Solar Project in Alberta, with a capacity of 465 MW.
- Wind expansion: We anticipate at least 2,000 MW of wind energy growth this year. 23 new wind farms should launch in 2022: one in Saskatchewan, one in New Brunswick, and all the rest in Alberta.

### MEETING CANADA'S ENERGY NEEDS

- Province with the greatest proportion of energy demand met by wind and solar energy: Prince Edward Island (41%)
- Provinces with more than 10% of energy demand met by wind and solar energy: Nova Scotia (13.5%) and PEI (41%)
- Jurisdictions with more than 5% of energy demand met by wind and solar energy: Quebec (5.7%), Northwest Territories (6.5%), New Brunswick (6.6%), Alberta (9.6%), Ontario (9.9%), Nova Scotia (13.5%) and PEI (41%). Overall, Canada met 6.5% of its energy demand with wind and solar.
- Jurisdictions with less than 5% of energy demand met by wind and solar: Yukon Territory, British Columbia, Saskatchewan, Manitoba, Nunavut and Newfoundland and Labrador.

(source: Statistics Canada 2020)

\*Here, "major" is defined as grid-connected solar projects, not net-metered projects for electricity use on-site. Rooftop and on-site solar data for 2021 will be included in CanREA's mid-year data update.

## QUOTES

“2021 was a positive year for our industries, with 677 MW of new wind energy and 288 MW of new utility-scale solar energy commissioned. This rate of growth, however, is not nearly enough to move Canada to net-zero greenhouse gas emissions. We must dramatically accelerate and expand the deployment of these technologies.”

“Canada is just starting to take advantage of its massive untapped wind and solar energy potential.”

“As the lowest-cost source of new decarbonized electricity generation available in Canada today, wind and solar energy will be a cornerstone of Canada's efforts to address climate change. Success, however, will require several policy, regulatory and infrastructure barriers to be addressed, enabling a dramatic increase in the scale and speed of deployment.”

“Electricity system decision makers are now starting to discover the value of energy storage, a powerful set of technologies that can provide a broad range of services to support electricity system operators, and we expect to see rapid growth in the utilization of energy storage going forward.”

– Robert Hornung, President and CEO,  
Canadian Renewable Energy Association



## UPDATE ON THE APPALACHES-MAINE INTERCONNECTION PROJECT

January 2022

Connect (NECEC) project, Hydro-Québec's U.S. partner has suspended construction in the United States at the request of Maine's Governor Mills.

In Québec, the overall Appalachies-Maine interconnection project has slowed down, although some work, such as engineering, is still under way. Hydro-Québec has put clearing work and the building of access roads on hold.

Hydro-Québec and its U.S. partner filed a motion for declaratory judgment with the courts of Maine in order to allow the project to move forward and to have the new law resulting from the referendum initiative declared unconstitutional.

A ruling is expected in the summer, and we are hopeful that work on this important clean energy project will quickly resume thereafter. Hydro-Québec remains convinced of the NECEC's value, merits and importance.



# CLIMATE CHANGE ISN'T NEW, BUT THE BATTLE IS JUST BEGINNING



**ELISABETH MONAGHAN**  
Editor in Chief

By mid-October of this year, 66% of Colorado, the state in which I live, experienced moderate drought conditions, or worse, 29% of the state was in severe drought and 14% saw extreme drought.\* Late this past summer, because of the wildfires burning in California, and a few burning in Colorado, we had several days in a row when our air quality was poor. One day in August, our air was ranked the worst in the world. So, whether or not others believe climate change is a problem, I only need to feel the pressure in my lungs and the burning in my eyes or see the thick veil of smog obscuring my view of the Rocky Mountains to understand that something is affecting air, and ultimately, our weather system.

As Adam Grosser, venture capitalist and managing partner of Up Partners, cautions in his article, “There Isn’t Time to Replace America’s Transmission Infrastructure,” the damage wildfires are doing to California is a precursor to what we are likely to see throughout the country going forward. Grosser writes, “From years of devastating droughts to long seasons of deadly, out-of-control wildfires, these events are stark reminders that we must change the way we live and interact with our environment.”

Grosser is among the contributing subject matter experts in this issue, who continue the drumbeat that climate change is a serious threat to our future, pointing out the critical need to address aging infrastructure while embracing and implementing green technology.

With the recent passage of the Infrastructure Investment and Jobs Act, it looks like the momentum to mitigate climate change is building. Utilities in the U.S. will now have a clearer path towards upgrading power infrastructure and increased research and development of emerging transmission and distribution technology, which in turn, will benefit energy users. For an industry that has long lamented the lack of a unified attempt at shoring up the old and investing in the new infrastructure, the passage of this bill is welcome news.

However, Grosser makes the case in his article that building the transmission infrastructure the industry requires will cost billions in taxpayer dollars and take time we do not have for these improvements to occur. While Grosser does not brush lightly over his concerns about the work that must be done immediately, while acknowledging the financial toll it will take on taxpayers, he explains early on in his article that he is a “stubborn optimist” who has confidence in his home state of California as well as the innovators in our industry who have developed technologies that can solve the transmission challenges we face.

\* <https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?CO>



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fighting climate change.”

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Grosser's pragmatic observation that the industry and government must join forces to take immediate action on climate change is beyond what the majority of us can control, but I take comfort in knowing that we no longer are in a position where we can only bemoan the damage natural disasters are inflicting upon our planet, or fret over aging infrastructure that will continue to crumble.

The passage of the Infrastructure Investment and Jobs Act is one avenue that will lead to an improved electrical grid, but industry trailblazers are not sitting by idly waiting for the government to save us. The Connecticut Green Bank, whom we feature in this month's Grid Transformation Forum, has used public funding to attract private investment for energy projects since its inception in 2011. The nation's first green bank, the Connecticut Green Bank strives to accelerate green energy adoption in Connecticut by making green energy financing accessible and affordable for homeowners, businesses and institutions.

In this issue, Bryan Garcia, president and CEO of the Connecticut Green Bank, explains his organization's mission to “confront climate change and provide a healthier, more prosperous future by increasing and accelerating the flow of private capital into markets that energize the green economy.”

Garcia talks about their project with the East Windsor Housing Authority, which included the installation of a 39.6 kW solar photovoltaic system for a housing complex that serves low-income individuals and families. The Authority agreed to a 20-year power purchase agreement (PPA), and they'll save approximately \$130,000 on their electricity costs over the agreement term.

For the Connecticut Green Bank to meet its climate goals, Garcia says they will need significant capital, which is why they recently created the Green Liberty Bond, a sub-category of green bonds that offer lower-dollar denomination bonds to individual investors.

As we wind down 2021 and gear up for 2022, it is clear we have a lot of work to do and cannot afford to waste any time to make progress in fighting climate change. There are countless reasons why this is a daunting challenge, but there are also significant steps the industry has already taken, and while the Infrastructure Investment and Jobs Act may provide significantly less funding than is needed for strengthening and securing the power grid, it is an encouraging sign that industry innovators and infrastructure projects have the government and financial support to make headway.

If you would like to contribute an article or if you have an idea about interesting technology, solutions, or suggestions, please email me at:

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*Elisabeth*



# ON A MISSION: CONNECTICUT GREEN BANK STRIVES FOR ENERGY EQUITY AMONG LOW-INCOME CONSUMERS



*EET&D Magazine recently spoke with Bryan Garcia, president and CEO of the nation's first state-level green bank, the Connecticut Green Bank, about how his organization is expanding access to clean energy through several initiatives.*

**EET&D:** Bryan, it is wonderful to connect with you. The Connecticut Green Bank has received significant attention over the last year as the U.S. considers adopting the green bank model at the federal level. For our readers who might not be aware, what exactly is a green bank, and how did the Connecticut Green Bank come to be?

**Bryan Garcia:** Thanks Elisabeth, I appreciate the opportunity to share the Connecticut Green Bank story with EET&D readers. Simply put, a green bank is a mission-driven organization — typically public or quasi-public and always nonprofit — that leverages limited public funds and deploys innovative financing to attract private capital investment for clean energy projects. There are green banks across the country from Maine to Hawaii.

We were established by a bipartisan act of the Connecticut General Assembly in 2011, becoming the first green bank in the United States. This past summer, we celebrated our 10<sup>th</sup> anniversary. Since our inception, we have supported the Governor and the legislature's energy strategy to achieve cleaner, less expensive and more reliable energy sources while creating jobs and supporting economic development.

In total, we have mobilized more than \$2.14 billion of investment into the state's green economy. To do this, we invested \$288.4 million in Green Bank (public) dollars to attract \$1.85 billion in private investment. In FY2020, despite challenges presented by the pandemic, we attained our best single-year leverage ratio of \$8.50 in private investment for every public dollar. →









**EET&D:** We recently learned about the Connecticut Green Bank's project with the East Windsor Housing Authority, which is why I was so eager to connect with you and learn more about your organization. Can you tell us about the project, any similar projects you've completed, and why they're so crucial to the Connecticut Green Bank's mission?

**BG:** Our project with the East Windsor Housing Authority included the installation of a 39.6 kW solar photovoltaic system at Park Hill, a housing complex owned by the authority that serves low-income, elderly and non-elderly individuals and families. The authority agreed to a 20-year power purchase agreement (PPA), and they'll save approximately \$130,000 on their electricity costs over the agreement term. These savings go a long way in helping the authority's overall operations, which in turn helps the residents while supporting a carbon-free future for us all. This is just one of the housing authorities that our multifamily program, which is primarily focused on low-and-moderate income residents, has helped since 2014.

Overall, our mission at the Connecticut Green Bank is to confront climate change and provide a healthier, more prosperous future by increasing and accelerating the flow of private capital into markets that energize the green economy. We envision a world empowered by the renewable energy of community, or "a planet protected by the love of humanity." That means we work to ensure that the benefits of clean energy don't just reach a select few but all Connecticut residents and families, businesses of all sizes, nonprofit organizations, and communities. We measure our impact in terms of economic development, environmental protection, equity, and energy.

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the renewable energy of community, or  
“a planet protected by the love of humanity.”

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We offer customized programs and financing solutions to ensure low-income homeowners and underserved markets can access rooftop solar and energy efficiency. In 2018, in partnership with the Kresge Foundation and the Connecticut Department of Energy and Environmental Protection (DEEP), we helped launch Inclusive Prosperity Capital (IPC), a nonprofit investment fund that scales energy financing solutions and channels investment capital to program partners in communities that need it most, including nonprofits like East Windsor Housing Authority. IPC is taking the knowledge and experience gained in Connecticut programs and sharing it across the United States.

For nonprofits that can't monetize the investment tax credits offered by the federal government, the PPA model works well and allows them to harness all the benefits of solar. We completed similar projects in Connecticut with the Bridgeport Islamic Community Center, Boys and Girls Club of the Lower Naugatuck Valley in Shelton and the Washington Montessori School in New Preston, to name a few. We partnered with IPC to own and maintain these systems on behalf of the organizations. →





**EET&D:** I've read that the Connecticut Green Bank has a couple of new initiatives to bring new forms of clean energy to customers in the state, and support environmental infrastructure and resiliency. Can you tell me more about them?

**BG:** Sure. In June of this year, Governor Ned Lamont signed legislation into law that set the statewide goal of deploying 1,000 megawatts of energy storage by the end of 2030, making Connecticut the eighth U.S. state to establish a storage target. The Connecticut Green Bank will collaborate with the state's utilities to administer this new energy storage program, working closely with the Connecticut Public Utilities Regulatory Authority (PURA) to launch in January 2022 and reach our goals by the end of 2030.

While the program will seek to reach all residential, commercial and industrial customers and provide incentives for projects, the program aligns with PURA's Equitable Modern Grid Framework that prioritizes the need to improve access to clean, affordable, and reliable energy sources for vulnerable communities. This establishes a priority of deploying no less than 40% of installations in vulnerable communities, which includes underserved and environmental justice communities, low-income households, affordable multifamily properties, and medical hardship customers. We'll offer additional incentives to those who would most benefit from resilience measures, such as low-income customers, customers in underserved communities, small businesses, and customers who historically experience the most frequent and longest duration of storm-related outages.

Another exciting development for us is that legislation, which was passed during the summer with bipartisan support, will advance the green bank model that we have pioneered to extend beyond clean energy and include environmental infrastructure. This increased scope will encompass structures, facilities, systems, services, and improvement projects related to water, waste and recycling, climate adaptation and resiliency, agriculture, land conservation, parks and recreation, and environmental markets such as carbon offsets and ecosystem services. We are in the process of soliciting feedback from stakeholders across the state to help inform our plan moving forward and should have more to share on our expanded scope soon.

**EET&D:** Can you tell me more about Green Liberty Bonds and how they can help achieve climate goals?

**BG:** To meet our aggressive climate goals, we know we will need significant capital, including everyday citizens rolling up their sleeves and joining the fight. With this in mind, we considered new ways for more people to invest in combating climate change and created the Green Liberty Bond, a new sub-category of green bonds that offer lower-dollar denomination bonds to individual investors. The use of proceeds is independently certified and verified as supporting projects with climate and environmental benefits. The Green Liberty Bonds were designed with the Series-E War Bonds of the 1940s in mind. More than 85 million Americans purchased Series-E War Bonds totaling \$185 billion back in the 1940's – or about \$3 trillion today. This is the scope of investment and engagement we need every year to confront climate change.

In honor of the 50<sup>th</sup> celebration of Earth Day in 2020, our first Green Liberty Bonds were sold in \$1,000 denominations. These climate-certified bonds sold out with nearly \$17 million issued in two days and earned The Bond Buyer's Deal of the Year award in the Innovative Financing category. In 2021, a second issuance of \$25 million in bonds also sold out, drawing more than four times as much demand as could be fulfilled from retail investors in Connecticut and across the U.S., as well as institutional investors interested in sustainability investments. We intend to offer Green Liberty Bonds on every Earth Day.

Recently, we took it a step further and partnered with Raise Green, a regulation crowdfunding marketplace for impact investing, to offer Green Liberty Notes and allow citizens to invest in the Green Bank's mission to confront climate change. The Green Liberty Notes will support the Connecticut Small Business Energy Advantage program, which enables small businesses to reduce their energy costs by making energy efficiency upgrades in their offices, shops, restaurants, and factories, using zero-interest loans. We've had two successful issuances of Green Liberty Bonds, which proved the high demand for independently certified, verified green investment products. Now, we hope to allow even more citizens to get involved with our lower-minimum investment crowdfunding offering.

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To meet our aggressive climate goals, we know we will need significant capital, including everyday citizens rolling up their sleeves and joining the fight.

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**EET&D: Are there any notable achievements you would like to share?**

**BG:** Connecticut's Residential Solar Investment Program (RSIP) recently achieved its statutory target of 350 megawatts of residential solar deployment one year ahead of its deadline. Since its launch in 2012, the program, through a network of contractors and installers, has helped more than 47,000 households add solar systems. It's worth noting that these were not just solar projects, but 98% of these installations included an energy audit to help reduce usage.

Through the RSIP, Connecticut has become a solar with justice state, which means communities of color and low-and-moderate income homeowners are demanding and installing solar at the same rate as white communities and wealthier neighborhoods. Half of the RSIP projects have been deployed in vulnerable communities.

The RSIP supported the creation of 16,355 direct, indirect, and induced jobs and generated more than \$45 million in tax revenue. The lifetime reduction of greenhouse gases is the equivalent of 6 million tons of carbon dioxide. The RSIP has enabled Connecticut to become the state with the highest installed watts per capita in the northeastern U.S. while keeping public incentives at the lowest rates.

While homeowners are reducing their energy burden, the solar systems also produce Solar Home Renewable Energy Credits (SHRECs). Our Connecticut utilities buy these SHRECs to comply with policy programs, and that revenue stream allows us to issue Green Liberty Bonds. Bond revenues support the RSIP incentive and administrative costs, so bond buyers are completing the cycle through their investment.

Successful policies like RSIP are a win for everyone.

**ABOUT BRYAN GARCIA:**

Bryan Garcia is the president and CEO of the Connecticut Green Bank – the nation's first state-level green bank. Before joining the Green Bank, Garcia was program director for the Yale Center for Business and the Environment. At Yale, Garcia led efforts to develop a leading global program responsible for preparing environmental leaders for business and society. Prior to Yale, he served as Connecticut's Climate Change Coordinator where he supported the Governor's Steering Committee on Climate Change.

Garcia serves on the Secretary of Energy Advisory Board. He is on the Board of Directors of the Energy Foundation, Institute for Sustainable Communities, Center for Sustainable Energy, and Sustainable CT. And he serves on the Advisory Board of the Yale Center for Business and the Environment.

He holds a BS degree in political economy of natural resources from Berkeley, MPA in public and non-profit administration from NYU Wagner, MBA in finance from NYU Stern, and an MEM degree from the Yale School of the Environment.

# SMART GRID RECLOSERS PROVE VALUE OVER TRADITIONAL HYDRAULIC DEVICES FOR RURAL NEW ZEALAND CUSTOMERS





## **JASON LANDER**

On the South Island of New Zealand lies a wide range of medium-voltage electrical distribution topologies. Mountainous terrain, thousands of lakes, numerous glaciers and extinct volcanoes dot the landscape, making it an outdoorsman's dream. But that same beauty also creates challenges, particularly for rural electrification.

Despite being the larger of the two islands, only about 25% of New Zealand's 5.1 million people reside there. The lush vegetation and open space make the island ideal for animal husbandry and agricultural production. These two industries are the leading economic drivers for the entire South Island, which has more sheep than people living on it.

To provide electricity effectively and efficiently to its more than 70,000 customers, PowerNet Limited operates one of the country's largest single-wire-earth-return (SWER) networks. These lines were originally designed in New Zealand nearly 100 years ago as a cost-effective way to bring electricity to rural communities. Because of its simple construction and low cost compared to two- or three-phase systems, the design is still preferred across parts of New Zealand and Australia for rural power distribution.

As New Zealand's fourth-largest investor-owned utility based on the regulatory value of the network it manages, PowerNet needed to conscientiously provide excellent customer satisfaction but also maintain costs. Because PowerNet's customer base was spread throughout a sparsely populated area, the region was vulnerable to frequent outages that were causing escalating operations and maintenance (O&M) costs. That was also a major problem for energy-intensive industries such as farming, ranching, and general manufacturing that rely on consistent power to function as a business. An outage impacting a large lateral line could knock out operations for an entire farming community. →





PowerNet, as were many other utilities, was using hydraulic reclosers for protection and fault-testing along its SWER lines. However, because its fleet of hydraulic reclosers was aging, the vast majority were disabled to avoid potential catastrophic failures. Because reclosing had been turned off, this led to more frequent outages and resulted in higher O&M costs to operate the lines. And, critical to the community, more customers were without power when faults occurred. Moreover, because these problem areas were impacting approximately 15 farms spread over several miles, it created lengthy delays in restoring power because a single truck roll could take several hours.

PowerNet needed a solution that could help it transition away from hydraulic reclosers and meet customer expectations.

### Hydraulic recloser replacement

Hydraulic reclosers have many downsides compared to modern vacuum-based SWER-line reclosers. For one, because hydraulic reclosers rely on oil and relatively complex mechanical parts for operation, when they become older there is a constant need for frequent maintenance and lengthy repairs. When significant repairs were needed, PowerNet found it difficult and expensive to procure parts. It had to procure spare parts from backup inventory and refurbished units, which added to the overall operation costs because backup inventory of reclosers was also needed to cover emergency replacements when units failed in the field. Storing the units also adds additional costs.

That's only one drawback in using hydraulic reclosers. Other performance issues are caused when oil purity and temperature are not maintained properly, which is an ongoing task throughout the lifecycle of the device. To maintain oil quality, service is required every 3 to 5 years for every single hydraulic recloser. Failing to properly service an aging fleet of hydraulic reclosers could create gaps in a lateral protection strategy because of compromised reliability and lagging coordination between devices.

Another concern that emerges involves setting protection parameters. Because hydraulic reclosers' protection capabilities are mechanically bound, changing TCC curves is difficult and curve options are limited. Mechanical limitations for hydraulic reclosers mean there are only three or four fixed TCC curves, and utilities have limited options to address this drawback. On one hand, they can continuously send reclosers in for re-configuration, which can be a hassle, especially with larger fleets. Or they could build up a large inventory of backup hydraulic reclosers to account for multiple TCC curve profiles, adding additional storage fees to a utility's O&M costs.

PowerNet was contending with most of these issues. As the overall fleet of hydraulic reclosers aged, the devices rarely altogether worked properly. The growing O&M costs, limitations around TCC curves, a need for backup inventory to service existing devices and a constant maintenance schedule caused PowerNet to reexamine its protection strategy.

### Discovering a new solution

After struggling with servicing and replacing hydraulic reclosers, PowerNet explored alternatives that required less maintenance, could also reclose up to four times, reduce inventory requirements and ultimately decrease the number of outages — all while improving upon the limited basic protection-operation characteristics found in hydraulic devices.

The utility found the solution in a new generation of vacuum-based automatic lateral reclosers. These devices provided PowerNet adaptability and configuration options, but they also provided several benefits over other SWER-line protection options. Unlike hydraulic reclosers, which are fixed mechanical devices, automatic reclosers are user-configured and contain a microprocessor-based relay that gives utilities programmable precise, highly repeatable TCC curves and improved coordination capabilities — including fuse-saving features.

The reclosers' integrated intelligent controls record and log operational and fault data, allowing PowerNet to better analyze events and optimize its system. Using the automatic reclosers also means PowerNet could reduce inventory costs, trim annual maintenance expenses and allow crews to avoid multi-hour road trips for outages.

For line crews, cutout-mounted vacuum reclosers are designed for easy adoption with existing infrastructure because they are installed and operated similar to a fuse and do not require separate power or control modules. Like legacy fuses, cutout-mounted reclosers visibly drop out of the cutout mount when a permanent fault occurs, making it easier for line crews to recognize the location of the fault. And because the automatic reclosers offer an unlimited amount of TCC curves and are configurable from 4 to 200 amps, PowerNet was able to achieve the flexibility it lacked from having hydraulic reclosers. It also led to rapid deployment because the automatic lateral reclosers could easily slot into the existing coordination scheme by using the same TCC curves used previously for both fuses and hydraulic reclosers.

This flexibility and accuracy provide utilities with options in how to approach a deployment. These vacuum-based automatic lateral reclosers are designed to be easily deployed in any quantity. PowerNet could target a troublesome area without committing to a full deployment. Recognizing how the automatic reclosers could improve reliability in its most remote locations and better serve its customers, PowerNet moved forward with an initial trial of six units.

## Results

PowerNet's lead project manager, Jacques Vergottini, said the new generation of automatic reclosers was exactly the solution the utility needed. "[Automatic] reclosers are projected to save us 10 truck rolls per week, resulting in a significant reduction in O&M costs versus conventional hydraulic reclosers. More importantly, it means improved reliability for our customers located in the most remote areas of our system."

PowerNet was thrilled with the initial success of the project and decided to increase the number of devices deployed on its power grid. The expanded trial, composed of roughly two-dozen units, has already saved the utility more than 121 truck rolls. By successfully keeping temporary faults from becoming permanent, the automatic lateral reclosers have saved an average of eight truck rolls per unit per year, providing PowerNet a swift return on investment.

The clear benefits have led PowerNet to expand the pilot to a deployment of 65 reclosers across all its SWER lines in the next few years. When the devices are fully deployed, PowerNet expects they will save approximately 520 truck rolls annually, or more than 1,000 crew hours per year on avoided fault-management tasks. That translates to roughly 10 avoided truck rolls per week for PowerNet and a significant reduction in the utility's O&M costs versus conventional hydraulic reclosers.

### ABOUT THE AUTHOR:

**Jason Lander** is S&C Electric Company vice president, EMEA and Asia Pacific, where he has overall responsibility for the day-to-day operations and strategic direction for S&C's business in those regions.

Lander joined S&C in 2008 in the Europe, Middle East, Africa (EMEA) regional office after spending more than 12 years working in the power generation and petrochemical sector. In 2013, he moved to S&C's Asia Pacific business unit in Melbourne to establish the local Power Systems Solutions Group.

He studied mechatronics and electrical engineering at the University of Glamorgan in South Wales, United Kingdom. He is a member of the Institution of Engineering and Technology (IET) and the Australian Institute of Directors. Lander has presented at IET, at the American Wind Energy Association (AWEA) conference and various smart grid and energy storage conferences and he has co-authored several industry technical papers. He is a member of the Australian Institute of Directors.

# MANAGE GROWING DISTRIBUTED ENERGY RESOURCES WHILE IMPROVING GRID RELIABILITY

ANDY BENNETT

California and Texas are no strangers to challenges with their electrical grid infrastructure amid the climate-related events impacting both states as of lately. The California Independent System Operator (CAISO) and the Electric Reliability Council of Texas (ERCOT) markets along with their respective distribution system operators represent a living laboratory for distributed energy resources (DER) and the role these assets play in balancing supply and demand across the grid. With climate change, extreme weather events will only become more frequent and intense, underscoring the need for grid modernization solutions to withstand these crises. The need for integrated, scalable systems capable of coordinating varied distributed energy resources online has never been greater.

Part of the solution to the issues facing these states is the increased use of distributed resources, including microgrids, community energy storage and other distributed energy solutions that can provide partial or full support of geographically dispersed customers during major events.

With the national digitization and decarbonization movement gaining momentum, DER assets are infinitely more valuable when integrated into consumer sites, markets and the grid in a way that takes evolving demand into account to identify solutions that bolster reliability for more customers in the service area, not just the

owners of the assets. This calls for a rethinking of systems operations and a broader introduction of scalable, automated management solutions that keep pace with the growth of DER networks.

## **The case for DERMS**

Utilities and grid operators must take advantage of this transformational time to adopt automated, grid-edge orchestration platforms, including distributed energy resource management systems (DERMS), alongside new DER technologies and management processes.

With the increase in DER, and in particular energy storage flexibility, with solar PV in the coming years, there is a significant increase in the amount of flexibility available to utilities through different types of programs in California, for example. Some programs may address one type of DER, for example, EV charging, while others may “bundle” multiple behind-the-meter capabilities together, like solar, home battery and EV, or water heater and HVAC together. By providing broader grid visibility and situational awareness, DERMS can support utilities in streamlining further penetration of renewable energy resources and in implementing innovative customer engagement efforts and incentives, such as utility-sponsored solar + storage programs, EV to grid initiatives and peer-to-peer trading. →









## DERMS effectiveness

The most intelligent, automated DERMS act as a “system-of-systems,” integrating with vendors of DER, VPPs and microgrid management systems in addition to legacy systems operators already use, such as SCADA, DMS and ADMS. DERMS, if designed as part of a system-of-systems orchestration platform, allows all distribution systems to act as a single OT and IT integrated platform, thus enabling automated end-to-end OT and IT processes. A DERMS will not only analyze and adjust based on grid behaviors, but its algorithms also efficiently scale and manage new DER classes as they emerge, thus reducing strains on the grid and incidences of brownouts and their impact on consumers when they do occur.

Once in place, the most effective DERMS platforms provide grid operators with topology awareness, a crucial feature to help manage supply and demand in a system that includes varied, distributed resources. In a market like California, for instance, where there might be a high concentration of residential solar + storage systems available for dispatch, a DERMS will offer operators insights into that segment of assets, generation, and customer usage patterns. By tracking the behaviors of a variable asset like solar, the system can provide insights into how and where the utility may be able to tap into stored customer energy to offset peak periods or even keep customers online during an outage.

Demand response programs are already in use across many states, aimed to shift customer behaviors and use of distributed assets in ways that support the grid at large and maintain favorable rates. These programs will only continue to emerge and mature as new projects and technologies come online and show potential as viable assets for grid services. Take EVs, for instance. Charging for every EV represents a major load for a transformer. Current distribution systems are not designed to handle uptake of these types of assets at the volume we can expect, with more customers investing in EVs. The solution? A combination of rate-based programs, which encourage charging behaviors at times when they will be least disruptive to the grid as well as integrating EV charging into existing demand response programs. Both can be introduced and managed over the long term, with the help of a DERMS.

The same goes for a residential virtual power plant community, in which a collective of solar + storage systems, owned by customers, can be monitored, and dispatched by the utility in times of need. Across the board, as new technologies cause changes in the amount of flexible capacity, DERMS will become an increasingly valuable solution for management, providing grid operators with enhanced options to visualize activity, manage loads and prepare for adverse events.



Rather than investing in upgrading and replacing existing assets or doubling down on costly, wired solutions such as transformers and cables to manage these new challenges, there is an opportunity for all states, including California and Texas, to optimize management of DERs against the existing loads. This would more efficiently provide energy to customers in times of high demand and consume energy during times of high supply, which could alleviate stress on the network, reduce capital investments and operational costs, improve reliability and lower the cost of delivering energy to its customers.

#### Where DERMS fit into the big picture

A DERMS is the missing link in the broader energy transition. Utilities must view them as an investment in their technologies, infrastructure, and customer experience. Both California and Texas need the support of their respective state governments and regulators to continue to promote and support the rate cases that will enable utilities in both states to prepare for distributed energy resources. Ultimately, that support will help drive a more reliable and resilient energy experience for the customers in both states.



#### ABOUT THE AUTHOR:

**Andy Bennett** CEO of mPrest, Inc., a developer of world-leading distributed asset orchestration and optimization software.



# TAKING TOWER MAINTENANCE TO A HIGHER LEVEL WITH DRONE-BASED VISUAL INSPECTIONS





### **RENNER VAUGHN**

Approximately seven million miles of transmission and distribution lines stretch across the U.S. which, for the most part, are decades old. In the West, the pressure is immense for utilities to keep the power flowing without contributing to wildfires. This year marks one of the worst wildfire seasons in history. By halfway through the year, a total of 6,540 fires had been recorded in California, burning over 1,161,027 acres (405,000 ha) across the state. Colorado, Idaho and Montana also suffered from unprecedented wildfires. High heat, droughts and winds were a significant factor and wreaked havoc for utilities to properly maintain their lines and transmission structures – especially in the backcountry. Given the abundance of forests and deep canyons in these states, assuring that transmission towers and power lines are properly maintained and cleared of vegetation is a vital program for utilities. →



**Figure 1:** Cyberhawk field team preparing to perform a routine integrity inspection.

### Taking to the skies

Traditionally, utilities have deployed teams of ground crews and helicopters to inspect and repair transmission structures, lines and associated equipment. These inspection methods are time-intensive, limited in their capabilities and often dangerous, requiring linemen to work at height and/or trudge through thick brush or deep mud for miles. Because of these limitations, it can be difficult for utilities to meet the National Grid requirement to patrol every fault within seven days. Helicopter surveys can be faster but are frequently unable to capture detailed images of specific critical areas of a transmission structure due to obstructions or inclement weather.

For the most part, utilities are still reactive, responding to maintenance issues as problems arise or customers report concerns. With aging assets and the increased frequency of severe weather events, soon this will no longer be acceptable.

Fortunately, rapid advances in Unmanned Aircraft Systems (UAS) or drones, along with digital image capturing software and cloud storage, make it possible to be proactive and identify maintenance needs safely before they cause problems.

While drone-based inspections (**Figure 1**) are new to the utility industry, they are proving to be a critical asset in utilities' outage and fire mitigation programs. By quickly inspecting conductor clamps, insulator fittings, cotter pins and other integral infrastructure components for defects, repairs can be prioritized and carried out quickly. For critical issues, the repair can happen within 24 hours. With digital eyes in the sky, pilots can see other hazards such as encroaching vegetation, dangerous campfires and other issues that pose threats to people and the grid.

### Experience makes the difference

Some utilities have in-house drone programs and others utilize professional visual data solution providers. Because visual site inspection using drones is a relatively new field, many of the drone-based visual data capture companies are small and use freelance pilots. The pilots typically have obtained training for the Federal Aviation Administration's (FAA) Small UAS Rule (known as Part 107) test implemented in 2016. This was a simplification of previous FAA requirements that had not yet evolved to specifically address drones. Current training courses to prepare students for this written theory test certification can range from 2-hour online programs costing as little as \$50 to 4-year university aviation degree programs.



While FAA Part 107 is the baseline certification necessary to operate a drone commercially, it is only a theory test and its requirements do not begin to encompass the specific skills needed to meet exacting standards for detailed drone surveys and inspections.

The best-of-breed visual data solution companies rely primarily on pilots who are direct employees instead of contracted labor to ensure professionalism, sharing of lessons learned, team building and evolving skill sets specific to client needs. These pilots undergo comprehensive testing that evaluates a pilot's skill level on risk mitigation, target identification, digital geographic information systems and communication skills. Once this evaluation is complete, pilots move on to practice working on utility assets to ensure proficiency.

Some utilities have implemented their own drone pilot testing to ensure competence. One of the nation's largest utilities requires all pilots to undergo a 50-point practical test performed on a live asset that includes conducting flight and risk assessments, a team debriefing, communication of safety factors from possible interference, battery status and other details.

### Data transfer is key

Pictures are worth a thousand words once they are in the customer's hands. If gathering data to be analyzed is the primary objective of drone operations, seamlessly transferring that data becomes its priority, especially when a utility stipulates that quality teams have to approve images before drone pilots can move on to the next area. When the distance of remote locations makes it logistically impractical to hand-deliver the photos on hard drives from the field to quality assessment teams, or the available wireless connections are too spotty to accommodate the vast quantity of data that must be transferred, premier visual data solution companies have developed processes using cellular routers installed in RVs outfitted as field offices to transmit data to Quality Control (QC). Once QC has access to the data, they can quickly assess the images and any related metadata and determine quickly if any areas need to be reshot, saving time, money and frustration.



**To meet our aggressive climate goals, we know we will need significant capital, including everyday citizens rolling up their sleeves and joining the fight.**



### It's all in the data

While on the outset, drones are cool tech, it's the capture and handling of the mass amounts of critical data that can make or break the success of drone-based inspections. The proper management of terabytes of data is key to managing network assets and is central to how operational teams can manage inspections, maintenance, safety and compliance. It's not uncommon for inspection teams to collectively capture 100,000 images per day that must be reviewed, encrypted and submitted to the utility for analysis.

Visualization software provides actionable insights and unprecedented levels of access to terabytes of multi-level data. By having visual data at their fingertips, utility engineering, operation and maintenance teams can instantly gain a comprehensive visual understanding of their transmission lines, substations and switching substations. The in-depth visual and thermal analyses expose integrity risks and reveal potential opportunities for improvement. This significantly reduces safety risk, downtime, environmental impact and costs due to the inspection speed and by removing the need for linemen to work at height, near live lines or in generally hazardous areas.

### The digital strategy

One utility, SSEN (Scottish and Southern Electricity Network) Transmission, takes digital innovation very seriously, and along with AI and digital twins, the company has adeptly incorporated drone-based inspection into its digital strategy, which outlines the company's commitment to safety, innovation and environmentally-friendly practices. Drones provide data on over 11,500 transmission towers and almost 150 substations and as part of this comprehensive digital plan that also includes data analysis and actionable insights via a cloud-based, IoT-enabled visualization platform.

By using cloud-based visual asset management software to capture and manage the data, strategic planning across the North of Scotland's transmission and distribution networks can be coordinated, even informing other utilities of planned developments. This has offered SSEN Transmission real value in that the visual data has supported substantial monetary investment decisions. →





**The use of data collection software gives SSEN Transmission teams rapid access to historic information in one centralized place, categorized and easy to navigate.**



For instance, a common regulation in the industry dictates that electricity distribution and transmission companies must inspect and maintain accurate records of their assets. The use of data collection software gives SSEN Transmission teams rapid access to historic information in one centralized place, categorized and easy to navigate. They can pinpoint critical information, such as the general condition data, the number of defects reported during any given period and in any given area or circuit, even be able to detail the work orders that had been raised. As a result, SSEN Transmission demonstrated its commitment to safety and compliance with the regulation.

### Personal touch

What about the intangibles that a skilled drone inspection team can offer? In the field, drone pilots become ambassadors of the utilities as they navigate public and private lands flying the drones and ensuring the quality of the inspection. Beyond their primary inspection goals, best-in-class companies emphasize the human aspects of their work to encourage open communication, good judgment, vigilance and a sense of stewardship for the areas where they are working. Anna Dille, a Cyberhawk Planning Supervisor who has also previously served as a pilot for the company, shared, "This work is especially rewarding when making property access arrangements as we plan our flight schedules. The utility customers have been both receptive and relieved to see the efforts undertaken to ensure that the structures near them will be inspected for safety in great detail."

This part of pilot training can pay off in ways large and small: from optimizing efficiency and productivity to covering more territory with the best possible accuracy to being especially sensitive to their surroundings, like when a drone inspection crew noticed something amiss near a structure they were surveying. It turned out to be the beginnings of a fire that they were able to quickly extinguish with tools they had in their kit.

Ultimately, proper drone-based inspection is community relations, sustainability efforts and digital innovation all rolled into one, valuable service that can bring immediate, tangible benefits to utility operations.

### Not all drone-based inspection firms are the same

When considering a drone-based visual inspection company to help mitigate outages and fires and strengthen digital strategies, consider these important questions:

1. Do they have extensive global, decade-long experience surveying utilities' mission-critical assets?
2. Can they scale quickly to meet expanded inspection needs?
3. Do they have world-class pilots, inspection engineers and highly skilled in-house software developers?
4. Is their visual asset management software state-of-the-art, IoT enabled and cloud-based, delivering ultra-high-resolution images?
5. Can they help you manage terabytes of data captured from drones, helicopters and/or ground patrols, convert it into usable management information and deliver that quality assurance-inspected data quickly?

### What can drones do for you?

We all know a country's electric grid plays a vital role in keeping the power on in homes and businesses, meaning that a power outage can have major consequences. The nation's electric grid is facing critical integrity issues due to its age, and faulty or damaged power lines can instigate wildfires which can lead to deadly blazes, a prominent issue in parts of the U.S.

There is a clear need for an innovative approach to inspecting and maintaining these networks. By regularly conducting drone-based inspections to efficiently capture, process and access data, utility operational teams can identify issues early, focusing interventions on the highest priority items before they are allowed to fail. By ensuring their transmission lines are kept in top condition, utilities can retain the current, high level of network reliability at the lowest cost possible, ensuring they deliver the best value for consumers.

#### ABOUT THE AUTHOR:

**Renner Vaughn** leads the Utility Sector for Cyberhawk in North America. Starting with Verizon in 2005, his career in operations and engineering led to a global business development role at ABB, before making the switch to drones and robotics in early 2018. Vaughn is based in Reno, Nevada.



# THE MACHINE ECONOMY, INTELLIGENT SYSTEMS & THE FUTURE OF THE ENERGY INDUSTRY





### **THOMAS ROSÉN**

Seventy percent of GDP growth in the global economy between now and 2030 will be driven by machines, according to PwC.

The rise of a new machine economy will have smart, connected, autonomous machines and devices carry out the necessary activities of production, distribution, and operations with little or no human intervention. And this new economy will be powered by intelligent systems.

Visionary leaders in the energy and utility industry and many other industries will implement new technologies and combine them with capital investments in ways that help them grow, expand, diversify and improve lives.

About 10 years ago, an insightful CTO at a major carrier shared his prediction that edge cloud computing, AI/ML and 5G connectivity will enable mind-blowing innovations that will help us get to net zero carbon emissions. At the time, that seemed like a bold statement, and perhaps it still does, but today placing workloads at the edge seems to be exactly what's top-of-mind for many of the industry leaders. →

## KEY



OVERALL IMPORTANCE LOW-HIGH



We don't need to be storytellers to convey the message that it is time to make changes; every day the world itself is telling us why it's time. It is no longer about the "why," it's about the "how." So how do we get there? The humongous amount of data we have at hand will help us shape and form the coalitions we need to create across the industries with colleagues, partners and competitors.

But right now, the energy and utility industry isn't the one leading the charge towards an intelligent systems future. Spoiler alert: it's the telco industry, and it makes sense, given that companies like Verizon and Vodafone have been investing heavily in 5G in recent years to support future innovations like smart cities, smart manufacturing, advancements in telemedicine and more.

But the good news is that it's not at all too late for the energy industry — in fact, the timing is just right — and there are plenty of lessons learned from other forward-looking industries that can be applied.

## State of the union for energy companies & intelligent systems

The right infrastructure and foundational investments for the energy industry's intelligent systems needs could shift the way the industry functions and delivers.

A recent study shows that at least 59% of executive leaders in energy see the value of intelligent systems for their future success whether it's the ability to predict system failures and resolutions, seamlessly link all systems between supplier and end customer or make business decisions autonomously.

But for many, the pathway to the future is not clear and only 26% are currently benefiting from optimized ROI related to intelligent systems. More than 40% of energy companies are in a nascent state of implementing intelligent systems. The gap shows that while the belief is there, the promise of intelligent systems hasn't yet been fully realized.





**Eighty-one percent of leaders believe that embedded devices and applications will increasingly be used in innovative ways that are still undiscovered, in a dynamic sector rife with possibilities.**



For many energy industry executives, the ambition for five years from now includes a much more aggressive focus on data-centric decision-making on the far edge of the cloud. Eighty-one percent of leaders believe that embedded devices and applications will increasingly be used in innovative ways that are still undiscovered, in a dynamic sector rife with possibilities.

My many discussions with energy companies illustrate that while the destination is clear, the roadmap for how to tap into the promise of the machine economy and the intelligent edge is anything but. So, let's dig a little deeper on that topic.

### **Blueprinting for the intelligent edge future**

In the energy sector, there are 13 common characteristics that will drive intelligent systems' success. While all these characteristics are important, a handful must be addressed first. The sequencing of these characteristics will matter.

#### **Highest impact:**

- True compute on the far edge
- Simulating and emulating in near real time
- Digital feedback loops that influence product development
- Customized device experience in the cloud
- Real-time collaborative workflow platform
- Detection of events and resolution

This shows that the ability to compute on the far edge is the most important characteristic of intelligent systems success in the energy industry, according to executives that were interviewed. It's of foundational importance for the next three to five years. And you can see how the other characteristics unfold from there.

Proper investment is essential. Companies must make a core initial investment in customization in the cloud, performance on the edge and prediction of stresses and failures, along with a real-time workflow environment allowing teams and business units to bring it all together on the far edge.

### **A dialog about intelligent systems for a better future**

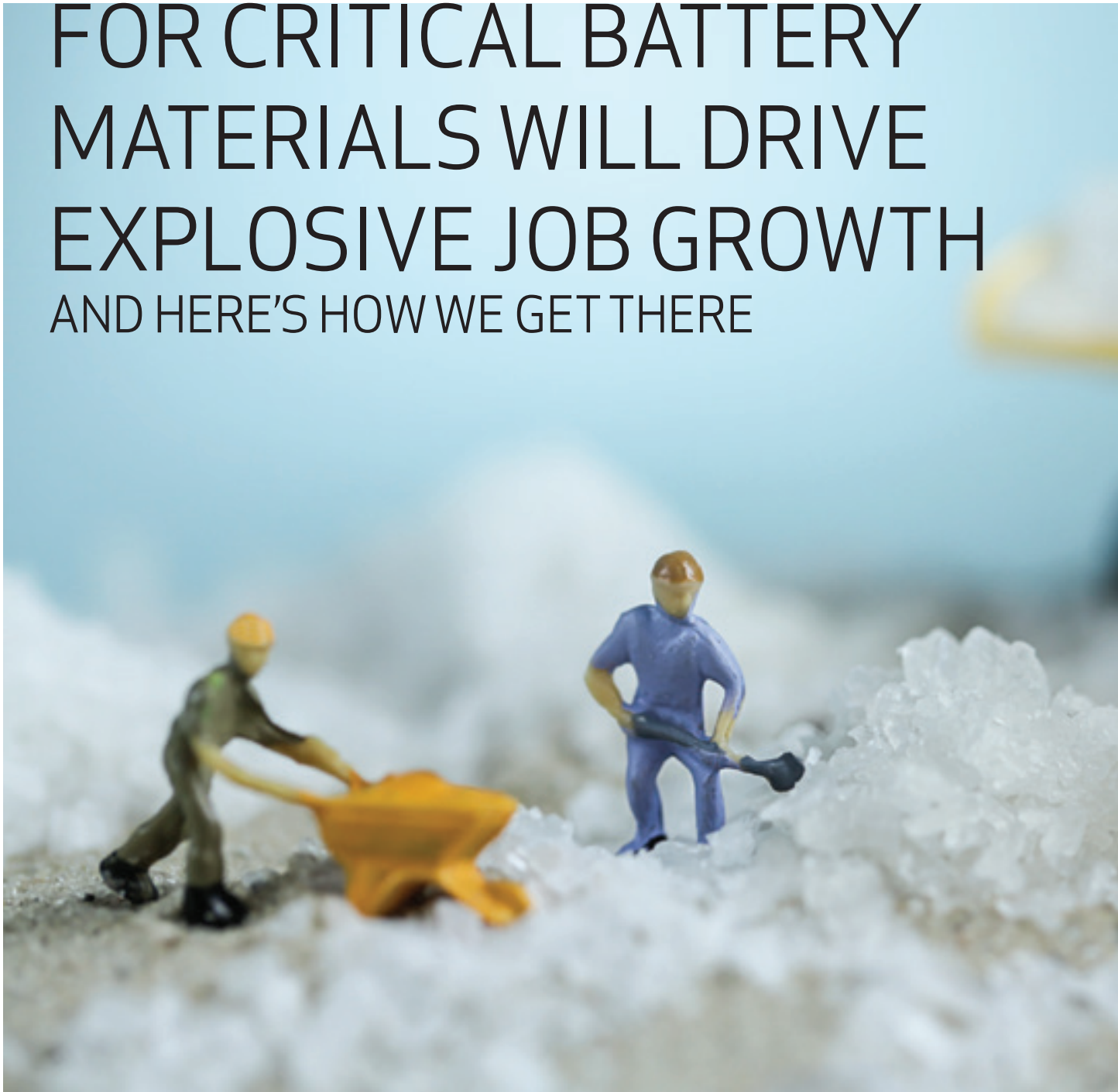
In closing it may for us all to continue to discuss what the future of embedded devices and solutions looks like in an intelligent systems world, the barriers to and drivers for adoption of intelligent systems, the factors that would accelerate the adoption of intelligent systems for the energy industry specifically, how to best prioritize investments and what key metrics for success look like.

And if blueprinting is about the "how," it's also important not to forget about the "why," but I am sure mother nature will keep reminding us. I look forward to a collaborative dialog about how intelligent systems in the energy and utility sector will not only protect against cyberattacks, but drive a clean, affordable, reliable and data-driven new reality. It's a small step for everyone, but a giant leap for humankind.

#### **ABOUT THE AUTHOR:**

**Thomas Rosén** leads the EMEA sales organization for Wind River. In this role, he is responsible for the go-to-market strategy, ecosystem development, sales growth strategy and sales organization for the EMEA region. He possesses more than 25 years of business and technical experience in intelligent systems, embedded software for mission-critical markets including Energy and Telecom. Rosen holds an MSc in data telecommunications & networks from University of Salford and a BSc in computer science from Mälardalen University.

# ESTABLISHING A DOMESTIC SUPPLY CHAIN FOR CRITICAL BATTERY MATERIALS WILL DRIVE EXPLOSIVE JOB GROWTH AND HERE'S HOW WE GET THERE





### **MEGAN O'CONNOR, PH.D.**

By 2050, about 4.5 million people will be working in the energy storage industry globally, and 19 million men and women will be working in solar across the planet. The majority of transportation workers will shift from building and servicing internal combustion vehicles to electric vehicles. Overall, an estimated 42 million people will be employed by a renewable energy or EV company by mid-century. This is a new industrial revolution.

If the United States is to take a leadership role and truly take advantage of this new industrial revolution, we need to invest in the foundational building blocks of clean energy that allow these jobs to land in our own backyard. We need a massive investment in creating a domestic supply of the critical minerals that build batteries, magnets and a clean energy manufacturing industry.

Today, critical minerals are often dug — by hand — from African soil by Chinese companies, then transported to China for refinement and production into lithium-ion batteries, powerful magnets for wind turbines and more. Rare earth metal mining has played an important role in the rise and strength of China's economy and workforce. As a result of their supply and the willingness to mine it, we're reliant on a somewhat less-than-friendly supplier for the inputs we need to build a robust clean energy manufacturing industry. →







## New technologies are enabling supply through mining & recycling

The United States has enough critical minerals in ground reserves to create our leadership supply. Yet in many cases, we're restricted from accessing these supplies by today's dirty and capital-intensive processes for refining metals. The large, dirty furnaces and harmful acids and solvents used to turn mined dirt into valuable minerals create massive pools of hazardous chemical waste and powerful emissions that can violate stringent (and appropriate) U.S. environmental regulations. China has been substantially more lax on those regulations and has, therefore, taken an almost insurmountable leadership role in the energy revolution. But it doesn't have to be that way.

The battery recycling industry is also poised to take off, with new recyclers entering the market and existing players gearing up for massive expansion as more EV batteries reach end of life. Yet, again, the recycling industry is dependent on old, emissions-heavy technologies like pyrometallurgy and hydrometallurgy to extract critical minerals from e-waste for new battery manufacturing.

To properly capitalize on this moment — and without sacrificing our environmental standards — we need cleaner alternatives to our existing refining processes to open the doors for cleantech manufacturing and the jobs it brings. Emerging processing technologies that use only electricity (which can be clean) or advanced filtration membranes can allow the U.S. to economically create supply while still protecting our environment. If we are true to our goal of decarbonization, we need to ensure the medicine for a decarbonized world is as clean as the cure.



**The battery recycling industry is on a full-out sprint, predicted to reach \$18.3 billion by 2026 and will have many sustainable, well-paying jobs along with it.**



## Recycling and mining create the high-paying jobs we need, in the places that often need it most

The overwhelming need for these materials is creating tens, if not hundreds, of thousands of jobs to meet upcoming demand. These are good-paying jobs, like the \$80,000 a year jobs currently being offered at a lithium mine in Nevada, which began operations this year, and in a community where the average income is about \$21,000 annually. The battery recycling industry is on a full-out sprint and is predicted to reach \$18.3 billion by 2026 and will have many sustainable, well-paying jobs along with it. An added benefit of battery recycling is that it's best done locally — reducing the need for transportation of dangerous batteries. As a result, many expect that jobs will pop up in a diversity of communities, not just at manufacturing hubs or on the coasts.

Why are we surrendering these opportunities to other countries when the mining and recycling industry could very easily serve as a good-paying alternative to oil and coal jobs, which are quickly disappearing? Investment in these new technologies cannot come soon enough, and luckily, they're right around the corner.

This inevitable global energy transition requires pure and plentiful critical minerals, significant domestic manufacturing capabilities, and a robust, resilient and secure supply chain. It also needs a significant and well-paid workforce. American workers and working families have always been the engine of our leadership, and this transition to an electrified economy stands as an exciting opportunity to completely reinvigorate our stagnant workforce. We need to ensure we have the technologies that can give us a competitive advantage, and catalyze a workforce ready to compete for what will certainly be competitive industries. Let's not lose out on this once-in-a-lifetime opportunity to once again lead the way to a better future.

### ABOUT THE AUTHOR:

Dr. **Megan O'Connor** is the founder and CEO of Nth Cycle, a company that has developed and deployed an electro-extraction technology to recover critical minerals from battery waste. Dr. O'Connor holds a Ph.D. in environmental engineering from Duke University and was previously an entrepreneurial fellow in the Innovation Crossroads program at Oak Ridge National Laboratory.

# THERE ISN'T TIME TO REPLACE AMERICA'S TRANSMISSION







### **ADAM GROSSER**

I have spent most of my life living and working in California helping startup companies solve some of the key challenges of our time. From my college days at Stanford to various engineering and executive roles at Apple and LucasArts, California is more than a home — it is core to who I am. And when my home state is burning, I feel the pain.

The facts are sobering. More than 73% of California is in extreme or exceptional drought, compared with just 3% a year ago. As a result, the 2021 fire season started early and burned three times the land area compared to this time last year.

Some look at these facts and pack their bags. I am a stubborn optimist and am not ready to give up on either California or my confidence in passionate teams of entrepreneurs and engineers striving to solve difficult problems. But not all solutions are created equal. It's imperative that we focus our intellectual, financial and civic resources on developing the most effective technologies for addressing climate change and its consequences. When it comes to the wildfires decimating the West Coast, that means rethinking the way electricity is delivered from power stations to end-users. →



California is the nation's most populous state and the sixth-largest economy in the world. Californians consume an enormous amount of energy from the state's fragile power grid, which has resulted in brownouts, blackouts and wildfires. These were avoidable catastrophes that have cost billions of dollars and hundreds of lives. So why did they happen and what can be done about it?

They happened because the nation's bulk power system — including ours in California — was built in the 50s and 60s, and much of the infrastructure hasn't been substantially improved or expanded since then. Put simply, California has a 20<sup>th</sup>-century grid serving a dynamic 21<sup>st</sup>-century energy ecosystem. Since the state's grid infrastructure was built, California has added thousands of megawatts of distributed energy resources (DERs), including residential, commercial, industrial and utility-scale solar, as well as wind turbines to its grid. California is also leading the transition to electrified transit. It's the only state with a deadline for electrifying transit buses, heavy trucks and other commercial vehicles, and it is investing in EV charging stations and encouraging private-sector EV purchase via a tax-incentive program.

While these are all aggressive steps forward in ensuring we attack climate change head-on, our aged and stressed existing grid is simply not equipped to handle this kind of radical energy transition. As California and the rest of the world increasingly embrace a renewable and electrified future, balancing energy supply and demand will only become more challenging and, absent some major changes, more perilous. But I believe these changes can be safely accommodated through smart planning, and the expansive use of technologies that can safely wring every megawatt of capacity from the state's existing bulk power system.

In November, President Biden signed the infrastructure bill into law, which allocates \$65 billion for grid modernization. This law will help clear the way for expanding America's transmission capacity with new power lines. Adding new transmission capacity is not a simple proposition, however. Building the transmission we require will cost billions in taxpayer dollars and take at least a decade. That's time we don't have. The West Coast is already burning.

Thankfully, innovators have risen to the challenge and have developed grid-enhancing technologies that can solve many of our transmission problems today. Late last year, the Department of Energy released a report that identified technologies such as Dynamic Line Ratings (DLR), which use advanced sensors and analytics to unlock additional capacity on existing lines, as one of the most promising grid enhancing technologies being developed.

The leader in this field is a Somerville, MA-based monitoring company that my firm recently invested in. The company has developed a non-contact sensor technology that can unlock up to 40% additional capacity on existing lines using DLR and alerts utilities when their lines are exceeding safe operating parameters. This non-contact sensor technology company is working with leading utilities around the world and has significant projects underway in California to integrate more renewables on the grid and reduce wildfire risk.

The DOE has wanted DLR technology for years, but regulatory challenges have made it difficult for companies to innovate in the transmission sector. As the DOE wrote in a 2019 report to congress, “The U.S. currently lags behind other countries in the deployment of some advanced transmission technologies, such as DLR. One of the variables is the difference in regulatory environments; the U.S. provides transmission owners little incentive to deliver more power over existing lines or to reduce transmission congestion.” This is slowly changing. Leading utilities such as National Grid, Xcel, Dominion, Sacramento’s SMUD, and some 30 other utilities have started using sensor technology to expand their transmission capacity and gain heightened situational awareness. But our political leaders must put in place both carrots and sticks to promote the rapid adoption of DLR to address transmission challenges immediately.

Fortunately, there are several DLR supporters on the Hill. Congresswoman Kathy Castor introduced the Efficient Interconnection Cost Allocation Act of 2021, which would integrate Grid Enhancing Technologies (GETs) into the interconnection study process. FERC has proposed rules mandating the use of advanced line ratings on power lines. Both are promising steps towards optimizing our existing grid. But we must act with even greater urgency. There is far too much at stake.

What is happening in California is a precursor for what is likely to occur in the rest of America. We in the Golden State are just some of the first to confront the lasting damage resulting from global warming and climate change. From years of devastating droughts to long seasons of deadly, out-of-control wildfires, these events are stark reminders that we must change the way we live and interact with our environment. After far too many years of inaction, we are finally — inevitably — in the midst of a historic transformation of how we power the world. This prospect is both exciting and daunting.

We have so much work to do before a transition to renewables can happen — and so little time to do it. Ensuring utilities are using all existing tools to enable a modern and resilient power grid is absolutely pivotal in meeting our critical goals.

#### ABOUT THE AUTHOR:

**Adam Grosser** is the chairman & managing partner of UP Partners, an early-stage Venture Capital Fund. Additionally, he serves as a senior advisor to the Canadian Pension Plan Advisory Board (CPPIB) and on the board of First Reserve’s energy platform. He also currently serves on the board of Carbon, LineVision, a Google project and on the advisory board of Beta Technologies.



# WOMEN'S RESOURCE NETWORK

## OATEY COMPANY



*For our final issue of 2021, we are taking a different approach to this quarter's Powerful Forces column by spotlighting the work Oatey Company is doing to educate STEM students about careers in manufacturing and plumbing.*

*Amber Deighton who is the co-chair of Oatey's newly established Women's Resource Network, discusses the recent STEM Career Education Workshop her group recently conducted with the Girl Scouts.*

**EET&D: When was the Women's Resource Network formed and why did the company establish the group?**

**Amber Deighton:** We formed Oatey's Women's Network in 2021. The group was created to support women's professional, personal and leadership development. We have a diverse group of associates both in manufacturing and distribution, and the resource network helps ensure that each group's needs are met across the country and internationally.

Our industry is largely male-dominated and male-focused, so we formed the network to reinforce the idea that women can successfully climb the ladder and have their voices heard. We start by cultivating professional development internally, but the ultimate goal is for that message to reach women across the country to see what opportunities are available to them in our industry.

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Our industry is largely male-dominated and male-focused, so we formed the network to reinforce the idea that women can successfully climb the ladder and have their voices heard.

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**EET&D: What is the network's mission and goals?**

**AD:** Our mission is focused on the professional, personal and leadership development of all women at all career levels. The goal is to provide a platform for engagement and development throughout the company by facilitating professional development, recruitment, retention and visibility for women, thereby advancing corporate diversity, equity and inclusion objectives.

Some of our objectives include assisting in driving organizational initiatives that maximize the engagement and development of Oatey Women's Resource Group associates as well as contributing to the growth and development of local communities with a particular focus on educating young women and girls, exposing them to career opportunities in manufacturing.

**EET&D: What types of programs does the network offer or plan to offer in the future?**

**AD:** Key programs are the community engagement events, like our recent STEM Career Education Workshop with the Northeast Ohio Girl Scouts. The major project on our radar next year is to expand the Girl Scout program nationally.

Cleveland was our pilot program to understand the curriculum and eventually roll it out at our manufacturing and distribution locations across the country. We will identify two additional sites, either manufacturing or distribution, and launch the STEM Career Education Workshop there.

The Women's Resource Network also hosts general body meetings where we discuss important topics with the women within our organization, such as professional and personal growth. We'll often cover important matters of the day; for example, returning to work during the COVID pandemic.

In December 2021, we hosted a wellness event with some meditative aspects to focus on stress management self-care and mindfulness during the holiday season.

**EET&D: Can you provide some details on the STEM Career Education Workshop? How did it go?**

**AD:** Oatey developed the event as part of the Girl Scouts' BADGE BOSS program, which connects local professionals with Girl Scouts to share their expertise, advice and passion while enabling them to earn a relevant Girl Scout badge. Through our program, the Girl Scouts gained hands-on exposure to careers across manufacturing while also exploring their interests and passions.



A key component of the two-hour workshop included a personal-reflection exercise to help Scouts identify how their interests connect to real-world careers. At the beginning of the night, we had the Scouts identify their passions and what they really enjoy, whether about school, family or personal life. From there, we made a direct correlation to a particular career or role in manufacturing. For example, some loved math and science, so we made a connection with accounting or engineering.

The program also included a panel discussion in which associates from our organization explained their roles. Additionally, we provided a tour of the Oatey University training facility with hands-on demonstrations and an interactive tower-building team competition, using Oatey Plumber's Putty and spaghetti. All Girl Scouts who completed the workshop qualified for their STEM Career Exploration Girl Scout badge.

**EET&D: Is this the first time you worked with the Girl Scouts?**

**AD:** Yes. We hope to partner with Girl Scout organizations across the country.

**EET&D: Why did you choose to partner with the Girl Scouts?**

**AD:** We wanted to collaborate with an organization that had a presence nationwide. After conducting research, it seemed that there was a great interest in supporting young girls through career exploration, but also opening their eyes to see what opportunities are available in the world of manufacturing. The Girl Scouts were a great fit because they already had the curriculum prepared to earn a badge for career exploration.

It was a privilege to host this group of energetic Girl Scouts and share more with them about the many career paths available in STEM and manufacturing. Our Women's Resource Network is passionate about supporting girls and women in our communities, and we are thrilled to establish this partnership with the Girl Scouts. →





**EET&D:** Do you have any success stories of women that benefited from the network's efforts?

**AD:** The Women's Resource Network is a fairly new initiative, so we hope to share some strong testimonials from women in the future. However, we did receive great feedback from parents who organically reached out to us and shared how impactful the Girl Scout Workshop activities were.

**EET&D:** Do you have any measurable goals for the next five or ten years?

**AD:** Overall, our goal in 2022 is to host quarterly Women's Resource events for the entire company. In terms of the Girl Scouts Program, our goal is to continue adding new sites to utilize the program.

We have manufacturing facilities across the country and globally. That'll be our major project next year. We hope that the initiative will continue to compound, incorporating more sites to utilize the program and customize it to their communities.

**EET&D:** Do you see any trends emerging that will attract more STEM students to the utility industry?

**AD:** The rise of social media influencers. The plumbing social media community is very active, and I have seen more and more female social media influencers promoting the trades.

Social media is one of the best ways to reach and influence newer generations. There is an educational value to consider, with industry influencers able to communicate more easily with a wide audience. Young people are also more exposed via social media to the day-to-day of a particular profession, such as skilled trades, manufacturing, utilities, etc. This can, in turn, encourage them to explore these types of careers further.

Another trend is the number of schools that are including the STEM curriculum and it becoming part of state standards. It creates a positive pipeline and provides exposure to those types of opportunities for all students, particularly girls who are unaware that they can work in an industry that is perceived as male-focused.



# 2021 BUYER GUIDE | SUPPLIERS INDEX

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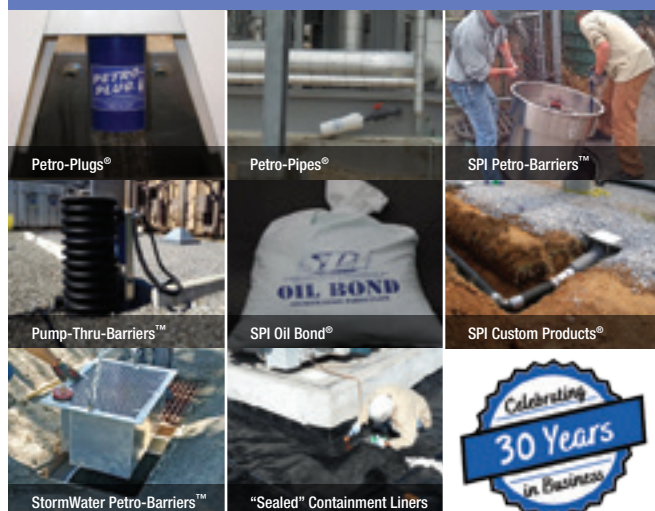
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Tel: 205-788-2437 | Fax: 205-780-4015  
[www.voncorp.com](http://www.voncorp.com)

The most trusted name in high voltage test and underground cable fault location equipment. Also the manufacturer of the Servisavor® line of temporary service restoration devices.

Z

#### ZENSOL AUTOMATION INC.

2281 Guenette Street  
St-Laurent, QC, Canada H4R 2E9  
Tel: 514-333-3488 | Fax: 514-333-3499  
[www.zensol.com](http://www.zensol.com)

# 2021 BUYER GUIDE



# PRODUCTS AND SERVICES

## A

### ABSORBENTS

#### **Solidification Products International, Inc.**

Tel: 203-484-9494 | 800-758-3634  
[www.oilbarriers.com](http://www.oilbarriers.com)

### ABSORBENTS - MATERIALS

#### **Solidification Products International, Inc.**

Tel: 203-484-9494 | 800-758-3634  
[www.oilbarriers.com](http://www.oilbarriers.com)

### AERIAL LIFTS - TESTING & INSPECTION

#### **Phenix Technologies Inc.**

Tel: 301-746-8118  
[www.phenixtech.com](http://www.phenixtech.com)

### AERIAL PHOTOGRAPHY

#### **SAM Companies**

Tel: 512-447-0575  
[www.sam.biz](http://www.sam.biz)

### AERIAL SURVEY

#### **Pickett and Associates, Inc.**

Tel: 813-304-2898  
[www.pickettusa.com](http://www.pickettusa.com)

#### **SAM Companies**

Tel: 512-447-0575  
[www.sam.biz](http://www.sam.biz)

### ANALYZERS - GAS-IN-OIL

#### **Morgan Schaffer Ltd.**

Tel: 514-739-1967  
[www.morganschaffer.com](http://www.morganschaffer.com)

### ANALYZERS - POWER QUALITY

#### **OMICRON electronics Corp. USA**

Tel: 1-713-830-4660  
[www.omicronenergy.com](http://www.omicronenergy.com)

### ANCHOR BOLTS CAGES

#### **Meyer Utility Structures**

Tel: 901-566-6500 | 800-501-0962  
[www.meyerutilitystructures.com](http://www.meyerutilitystructures.com)

### ANIMAL & WILDLIFE FENCING

#### **TransGard**

Tel: 717-900-6140  
[www.transgardsolutions.com](http://www.transgardsolutions.com)

### ANIMAL & WILDLIFE GUARDS

#### **TransGard**

Tel: 717-900-6140  
[www.transgardsolutions.com](http://www.transgardsolutions.com)

### AREA - LIGHTING

#### **Evluma**

Tel: 425-336-5800  
[www.evluma.com](http://www.evluma.com)

### ARRESTERS, LIGHTNING, DISTRIBUTION - LINE TYPE

#### **ABB Installation Products**

Tel: 1-800-326-5282  
[www.tnb.abb.com](http://www.tnb.abb.com)

#### **ABB Installation Products (Canada)**

Tel: 1-905-635-7855  
[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)

### ASSET MANAGEMENT

#### **Doble Engineering Company**

Tel: 617-926-4900  
[www.doble.com](http://www.doble.com)

#### **Dynamic Ratings, Inc.**

Tel: 262-746-1230  
[www.dynamicratings.com](http://www.dynamicratings.com)

#### **Kinectrics Inc.**

Tel: 416-207-6000  
[www.kinectrics.com](http://www.kinectrics.com)

#### **VIZIMAX Inc.**

Tel: 1-450-679-0003  
[www.vizimax.com](http://www.vizimax.com)

### AUTOMATION PRODUCTS

#### **ABB Installation Products**

Tel: 1-800-326-5282  
[www.tnb.abb.com](http://www.tnb.abb.com)

#### **ABB Installation Products (Canada)**

Tel: 1-905-635-7855  
[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)

#### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

### AUTOMATION SYSTEMS

#### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

## B

### BATTERIES & ACCESSORIES - DC BATTERY CHARGERS

#### **HindlePower**

Tel: 610-330-9000  
[www.hindlepowerinc.com](http://www.hindlepowerinc.com)

### BATTERY CAPACITY AND MONITORING EQUIPMENT

#### **HindlePower**

Tel: 610-330-9000  
[www.hindlepowerinc.com](http://www.hindlepowerinc.com)

### BATTERY CHARGERS

#### **HindlePower**

Tel: 610-330-9000  
[www.hindlepowerinc.com](http://www.hindlepowerinc.com)

### BIRD CONTROL

#### **TransGard**

Tel: 717-900-6140  
[www.transgardsolutions.com](http://www.transgardsolutions.com)

### BLOCKS - CONDUCTOR STRINGING

#### **Condux Tesmec, Inc.**

Tel: 507-387-8069 | 1-888-980-1209  
[www.conduxtesmec.com](http://www.conduxtesmec.com)

### BUCKET LINERS - AERIAL LIFT ACCESSORIES

#### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541  
[www.hfgp.com](http://www.hfgp.com)

## C

### CABLE FAULT CURRENT LIMITING, UNDERGROUND

#### **G&W Electric Co.**

Tel: 708-388-5010  
[www.gwelec.com](http://www.gwelec.com)

### CABLE - ALUMINUM

#### **American Wire Group, Inc.**

Tel: 954-455-3050 | 1-800-342-7215  
[www.buyawg.com](http://www.buyawg.com)

### CABLE - COPPER

#### **American Wire Group, Inc.**

Tel: 954-455-3050 | 1-800-342-7215  
[www.buyawg.com](http://www.buyawg.com)

### CABLE - DIAGNOSIS

#### **OMICRON electronics Corp. USA**

Tel: 1-713-830-4660  
[www.omicronenergy.com](http://www.omicronenergy.com)

### CABLE - GROUNDING

#### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541  
[www.hfgp.com](http://www.hfgp.com)

### CABLE - JUMPER

#### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541  
[www.hfgp.com](http://www.hfgp.com)

### CABLE - PULLING

#### **Condux Tesmec, Inc.**

Tel: 507-387-8069 | 1-888-980-1209  
[www.conduxtesmec.com](http://www.conduxtesmec.com)

### CABLE - TEMPORARY GROUND

#### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541  
[www.hfgp.com](http://www.hfgp.com)

#### CABLE ACCESSORIES - URD

##### **ABB Installation Products**

Tel: 1-800-326-5282

[www.tnb.abb.com](http://www.tnb.abb.com)

##### **ABB Installation Products (Canada)**

Tel: 1-905-635-7855

[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)

##### **G&W Electric Co.**

Tel: 708-388-5010

[www.gwelec.com](http://www.gwelec.com)

#### CABLE FAULT LOCATING - EQUIPMENT

##### **VON Corporation**

Tel: 205-788-2437

[www.voncorp.com](http://www.voncorp.com)

#### CABLE PULLING ACCESSORIES

##### **Condux Tesmec, Inc.**

Tel: 507-387-8069 | 1-888-980-1209

[www.conduxtesmec.com](http://www.conduxtesmec.com)

#### CABLE TRAY

##### **ABB Installation Products**

Tel: 1-800-326-5282

[www.tnb.abb.com](http://www.tnb.abb.com)

#### CABLES - MEDIUM VOLTAGE

##### **American Wire Group, Inc.**

Tel: 954-455-3050 | 1-800-342-7215

[www.buyawg.com](http://www.buyawg.com)

#### CALIBRATION - TEST AND MEASURE INSTRUMENT

##### **DILO Company, Inc.**

Tel: 727-376-5593

[www.dilo.com](http://www.dilo.com)

#### CAPACITORS - CONTROLS

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

#### CAPACITORS - POWER FACTOR CORRECTION

##### **VIZIMAX Inc.**

Tel: 1-450-679-0003

[www.vizimax.com](http://www.vizimax.com)

#### CAPACITORS - SWITCHES

##### **ABB Installation Products**

Tel: 1-800-326-5282

[www.tnb.abb.com](http://www.tnb.abb.com)

##### **ABB Installation Products (Canada)**

Tel: 1-905-635-7855

[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)

##### **Southern States, LLC**

Tel: 770-946-4562

[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### CIRCUIT BREAKERS - OIL

##### **Ae vitas Oil Division**

Tel: 519-752-7646 | 877-448-5900

[www.insulatingoilcanada.ca](http://www.insulatingoilcanada.ca)

#### CIRCUIT RECLOSERS, AUTOMATIC - THREE-PHASE

##### **G&W Electric Co.**

Tel: 708-388-5010

[www.gwelec.com](http://www.gwelec.com)

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

#### CIRCUIT SWITCHERS

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

##### **Southern States, LLC**

Tel: 770-946-4562

[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### CIRCUIT SWITCHERS - MOBILE

##### **Southern States, LLC**

Tel: 770-946-4562

[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### CLAMPS - GROUND

##### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541

[www.hfgp.com](http://www.hfgp.com)

#### CLAMPS - HOT LINE

##### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541

[www.hfgp.com](http://www.hfgp.com)

#### CLAMPS - TEMPORARY GROUND

##### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541

[www.hfgp.com](http://www.hfgp.com)

#### COATINGS

##### **Sediver Canada Inc.**

Tel: 514-739-3385

#### COATINGS - SILICONE

##### **Sediver Canada Inc.**

Tel: 514-739-3385

#### COMMUNICATION SYSTEMS

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

##### **SISCO, Inc.**

Tel: 586-254-0020

[www.sisconet.com](http://www.sisconet.com)

#### COMPRESSION DIES

##### **Condux Tesmec, Inc.**

Tel: 507-387-8069 | 1-888-980-1209

[www.conduxtesmec.com](http://www.conduxtesmec.com)

#### CONCRETE - POLES

##### **Meyer Utility Structures**

Tel: 901-566-6500 | 800-501-0962

[www.meyerutilitystructures.com](http://www.meyerutilitystructures.com)

##### **StressCrete Group**

Tel: 905-632-9301 | 800-268-7809

[www.scgrp.com/utilitypoles](http://www.scgrp.com/utilitypoles)

#### CONDITION ASSESSMENT SYSTEMS

##### **OMICRON electronics Corp. USA**

Tel: 1-713-830-4660

[www.omicronenergy.com](http://www.omicronenergy.com)

#### CONDITION MONITORING EQUIPMENT

##### **OMICRON electronics Corp. USA**

Tel: 1-713-830-4660

[www.omicronenergy.com](http://www.omicronenergy.com)

#### CONDUCTOR - HIGH CAPACITY, LOW SAG - ACCC

##### **CTC Global Corporation**

Tel: 949-428-8500

[www.ctcglobal.com](http://www.ctcglobal.com)

#### CONDUIT - ACCESSORIES

##### **ABB Installation Products**

Tel: 1-800-326-5282

[www.tnb.abb.com](http://www.tnb.abb.com)

##### **ABB Installation Products (Canada)**

Tel: 1-905-635-7855

[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)

#### CONDUIT - PLASTIC

##### **ABB Installation Products**

Tel: 1-800-326-5282

[www.tnb.abb.com](http://www.tnb.abb.com)

#### CONNECTORS - BOLTED - DISTRIBUTION

##### **ABB Installation Products**

Tel: 1-800-326-5282

[www.tnb.abb.com](http://www.tnb.abb.com)

#### CONNECTORS - COMPRESSION, DISTRIBUTION

##### **ABB Installation Products**

Tel: 1-800-326-5282

[www.tnb.abb.com](http://www.tnb.abb.com)

##### **CTC Global Corporation**

Tel: 949-428-8500

[www.ctcglobal.com](http://www.ctcglobal.com)

#### CONNECTORS - COMPRESSION, TRANSMISSION

##### **CTC Global Corporation**

Tel: 949-428-8500

[www.ctcglobal.com](http://www.ctcglobal.com)

#### CONNECTORS - DEADEND, TRANSMISSION

##### **CTC Global Corporation**

Tel: 949-428-8500

[www.ctcglobal.com](http://www.ctcglobal.com)

#### CONNECTORS - GROUNDING

##### **ABB Installation Products**

Tel: 1-800-326-5282

[www.tnb.abb.com](http://www.tnb.abb.com)

##### **ABB Installation Products (Canada)**

Tel: 1-905-635-7855

[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)

#### CONNECTORS - PLUG-IN

##### **ABB Installation Products**

Tel: 1-800-326-5282

[www.tnb.abb.com](http://www.tnb.abb.com)

#### **CONNECTORS - SUBSTATION**

##### **ABB Installation Products**

Tel: 1-800-326-5282  
[www.tnb.abb.com](http://www.tnb.abb.com)

##### **ABB Installation Products (Canada)**

Tel: 1-905-635-7855  
[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)

#### **CONNECTORS - TECK CABLE**

##### **ABB Installation Products**

Tel: 1-800-326-5282  
[www.tnb.abb.com](http://www.tnb.abb.com)

#### **CONNECTORS, UNDERGROUND - TERMINATING**

##### **ABB Installation Products**

Tel: 1-800-326-5282  
[www.tnb.abb.com](http://www.tnb.abb.com)

##### **ABB Installation Products (Canada)**

Tel: 1-905-635-7855  
[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)

#### **CONSTRUCTION - POWER LINE AND SUBSTATION - 25 TO 735KV**

##### **Ampjack Industries Ltd.**

Tel: 514-451-9511  
[www.ampjack.ca](http://www.ampjack.ca)

##### **Asplundh Construction**

Tel: 1-888-884-5426  
[www.asplundhconstruction.com](http://www.asplundhconstruction.com)

##### **PLH Group, Inc.**

Tel: 214-272-0500  
[www.plhgroupinc.com](http://www.plhgroupinc.com)

##### **Utility Lines Construction Services (ULCS)**

Tel: 1-877-884-5426  
[www.ulcsinc.com](http://www.ulcsinc.com)

#### **CONSTRUCTION AND PROJECT ENGINEERING**

##### **RMS Energy Co., LLC**

Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### **CONSTRUCTION SERVICES**

##### **Easi-Set Worldwide**

Tel: 540-439-8911 | 1-800-547-4045  
[www.easisetbuildings.com](http://www.easisetbuildings.com)

##### **PLH Group, Inc.**

Tel: 214-272-0500  
[www.plhgroupinc.com](http://www.plhgroupinc.com)

##### **RMS Energy Co., LLC**

Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

##### **Utility Lines Construction Services (ULCS)**

Tel: 1-877-884-5426  
[www.ulcsinc.com](http://www.ulcsinc.com)

#### **CONSTRUCTION SPECIALIZED**

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Tel: 514-451-9511  
[www.ampjack.ca](http://www.ampjack.ca)

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### **CONSULTANTS - CABLE TESTING AND FAULT LOCATING**

##### **RMS Energy Co., LLC**

Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

#### **CONSULTANTS - POWER QUALITY**

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### **CONSULTANTS - SCADA/EMS ENGINEERING**

##### **RMS Energy Co., LLC**

Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

#### **CONSULTANTS - SUBSTATION DESIGN & ENGINEERING**

##### **Easi-Set Worldwide**

Tel: 540-439-8911 | 1-800-547-4045  
[www.easisetbuildings.com](http://www.easisetbuildings.com)

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

##### **Sargent & Lundy**

Tel: 312-269-2000  
[www.sargentlundy.com](http://www.sargentlundy.com)

#### **CONSULTANTS - T&D ENGINEERING**

##### **CTC Global Corporation**

Tel: 949-428-8500  
[www.ctcglobal.com](http://www.ctcglobal.com)

##### **Kinectrics Inc.**

Tel: 416-207-6000  
[www.kinectrics.com](http://www.kinectrics.com)

##### **RMS Energy Co., LLC**

Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

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Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

##### **Sargent & Lundy**

Tel: 312-269-2000  
[www.sargentlundy.com](http://www.sargentlundy.com)

#### **CONSULTANTS - UNDERGROUND AND UNDERWATER CABLE**

##### **Sargent & Lundy**

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[www.sargentlundy.com](http://www.sargentlundy.com)

#### **CONSULTING**

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### **CONSULTING ENGINEERING**

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

##### **Sargent & Lundy**

Tel: 312-269-2000  
[www.sargentlundy.com](http://www.sargentlundy.com)

#### **CONTAINMENTS, INDUSTRIAL & RADIOLOGICAL**

##### **Solidification Products**

International, Inc.  
Tel: 203-484-9494 | 800-758-3634  
[www.oilbarriers.com](http://www.oilbarriers.com)

#### **CONTRACTORS**

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### **CONTRACTORS - CONSTRUCTION**

##### **Asplundh Construction**

Tel: 1-888-884-5426  
[www.asplundhconstruction.com](http://www.asplundhconstruction.com)

##### **Easi-Set Worldwide**

Tel: 540-439-8911 | 1-800-547-4045  
[www.easiset.com](http://www.easiset.com)

##### **PLH Group, Inc.**

Tel: 214-272-0500  
[www.plhgroupinc.com](http://www.plhgroupinc.com)

##### **Utility Lines Construction Services (ULCS)**

Tel: 1-877-884-5426  
[www.ulcsinc.com](http://www.ulcsinc.com)

#### **CONTROL SYSTEM**

##### **RMS Energy Co., LLC**

Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

#### **CONTROL SYSTEMS - ELECTRIC/ELECTRONIC**

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### **CONTROLLERS/CONTROLS - PROGRAMMABLE**

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### **CONTROLS**

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### **CONTROLS - LTC TRANSFORMER**

##### **RMS Energy Co., LLC**

Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

#### **CONTROLS - SUPERVISORY**

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### **CONTROLS - VAR**

##### **ABB Installation Products**

Tel: 1-800-326-5282  
[www.tnb.abb.com](http://www.tnb.abb.com)

##### **ABB Installation Products (Canada)**

Tel: 1-905-635-7855  
[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### **COOLERS - TRANSFORMER OIL**

##### **Aevitas Oil Division**

Tel: 519-752-7646 | 877-448-5900  
[www.insulatingoilcanada.ca](http://www.insulatingoilcanada.ca)

#### **CURRENT SENSORS**

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)



#### CUTOUTS, FUSED - ENCLOSED

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### CUTOUTS, FUSED - OPEN, LOADBREAK

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

### D

#### DETECTORS - PARTIAL DISCHARGE

**OMICRON electronics Corp. USA**  
Tel: 1-713-830-4660  
[www.omicronenergy.com](http://www.omicronenergy.com)

#### DIAGNOSTIC EQUIPMENT

**OMICRON electronics Corp. USA**  
Tel: 1-713-830-4660  
[www.omicronenergy.com](http://www.omicronenergy.com)

#### DISTRIBUTION AUTOMATION - COMMUNICATIONS

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### DISTRIBUTION AUTOMATION SYSTEMS

**ABB Installation Products**  
Tel: 1-800-326-5282  
[www.tnb.abb.com](http://www.tnb.abb.com)

**ABB Installation Products (Canada)**  
Tel: 1-905-635-7855  
[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)

**G&W Electric Co.**  
Tel: 708-388-5010  
[www.gwelec.com](http://www.gwelec.com)

**RMS Energy Co., LLC**  
Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

**VIZIMAX Inc.**  
Tel: 1-450-679-0003  
[www.vizimax.com](http://www.vizimax.com)

#### DISTRIBUTION MANAGEMENT SYSTEMS

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

### E

#### EMERGENCY STORM SERVICES

**Asplundh Construction**  
Tel: 1-888-884-5426  
[www.asplundhconstruction.com](http://www.asplundhconstruction.com)

**Asplundh Tree Expert, LLC**  
Tel: 1-800-248-8733  
[www.asplundh.com](http://www.asplundh.com)

**PLH Group, Inc.**  
Tel: 214-272-0500  
[www.plhgroupinc.com](http://www.plhgroupinc.com)

#### ENCLOSURES - METERING EQUIPMENT

**Easi-Set Worldwide**  
Tel: 540-439-8911 | 1-800-547-4045  
[www.easisetbuildings.com](http://www.easisetbuildings.com)

#### ENCLOSURES - NEMA TYPE

**Charles Industries**  
Tel: 1-847-258-8458  
[www.charlesindustries.com](http://www.charlesindustries.com)

**HindlePower**  
Tel: 610-330-9000  
[www.hindlepowerinc.com](http://www.hindlepowerinc.com)

#### ENGINEERING

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

**Sargent & Lundy**  
Tel: 312-269-2000  
[www.sargentlundy.com](http://www.sargentlundy.com)

**Solidification Products International, Inc.**  
Tel: 203-484-9494 | 800-758-3634  
[www.oilbarriers.com](http://www.oilbarriers.com)

#### ENGINEERING - CONSULTANTS

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

**Sargent & Lundy**  
Tel: 312-269-2000  
[www.sargentlundy.com](http://www.sargentlundy.com)

#### ENGINEERING - CONSULTANTS - CONSTRUCTION

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### ENGINEERING - DESIGN

**Albarrie GeoComposites Limited**  
Tel: 705-737-0551 | 866-269-8275  
[www.albarrie.com](http://www.albarrie.com)

**Asplundh Construction**  
Tel: 1-888-884-5426  
[www.asplundhconstruction.com](http://www.asplundhconstruction.com)

**RMS Energy Co., LLC**  
Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

**Sargent & Lundy**  
Tel: 312-269-2000  
[www.sargentlundy.com](http://www.sargentlundy.com)

**Solidification Products International, Inc.**  
Tel: 203-484-9494 | 800-758-3634  
[www.oilbarriers.com](http://www.oilbarriers.com)

#### ENGINEERING - EQUIPMENT

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### ENGINEERING - PROCUREMENT - CONSTRUCTION (EPC) TRANSMISSION LINES

**Ampjack Industries Ltd.**  
Tel: 514-451-9511  
[www.ampjack.ca](http://www.ampjack.ca)

#### ENGINEERING - PROFESSIONAL SERVICES

**Albarrie GeoComposites Limited**  
Tel: 705-737-0551 | 866-269-8275  
[www.albarrie.com](http://www.albarrie.com)

**Ampjack Industries Ltd.**  
Tel: 514-451-9511  
[www.ampjack.ca](http://www.ampjack.ca)

**Sargent & Lundy**  
Tel: 312-269-2000  
[www.sargentlundy.com](http://www.sargentlundy.com)

**Solidification Products International, Inc.**  
Tel: 203-484-9494 | 800-758-3634  
[www.oilbarriers.com](http://www.oilbarriers.com)

#### ENGINEERING - SERVICES

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### ENGINEERING - SERVICES - T & D

**Ampjack Industries Ltd.**  
Tel: 514-451-9511  
[www.ampjack.ca](http://www.ampjack.ca)

**CTC Global Corporation**  
Tel: 949-428-8500  
[www.ctcglobal.com](http://www.ctcglobal.com)

**Pickett and Associates, Inc.**  
Tel: 813-877-7770  
[www.pickettusa.com](http://www.pickettusa.com)

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

**Sargent & Lundy**  
Tel: 312-269-2000  
[www.sargentlundy.com](http://www.sargentlundy.com)

#### ENGINEERING - STRUCTURAL

**Ampjack Industries Ltd.**  
Tel: 514-451-9511  
[www.ampjack.ca](http://www.ampjack.ca)

**Meyer Utility Structures**  
Tel: 901-566-6500 | 800-501-0962  
[www.meyerutilitystructures.com](http://www.meyerutilitystructures.com)

**Pickett and Associates, Inc.**  
Tel: 813-877-7770  
[www.pickettusa.com](http://www.pickettusa.com)

**Sargent & Lundy**  
Tel: 312-269-2000  
[www.sargentlundy.com](http://www.sargentlundy.com)

#### ENVIRONMENTAL SERVICES

**Sargent & Lundy**  
Tel: 312-269-2000  
[www.sargentlundy.com](http://www.sargentlundy.com)

### F

#### FIBERGLASS - PIPE, TANK

**Hastings Fiber Glass Products, Inc.**  
Tel: 269-945-9541  
[www.hfgp.com](http://www.hfgp.com)

#### FIELD AUTOMATION

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### FIELD INSTALLATION SERVICES

##### **RMS Energy Co., LLC**

Tel: 1-888-683-3630

[www.rmsenergy.com](http://www.rmsenergy.com)

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

##### **Southern States, LLC**

Tel: 770-946-4562

[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### FILTRATION SYSTEMS - OIL

##### **Albarrie GeoComposites Limited**

Tel: 705-737-0551 | 866-269-8275

[www.albarrie.com](http://www.albarrie.com)

##### **Solidification Products International, Inc.**

Tel: 203-484-9494 | 800-758-3634

[www.oilbarriers.com](http://www.oilbarriers.com)

#### FLUID MANAGEMENT - OIL RECYCLING

##### **Aevitas Oil Division**

Tel: 519-752-7646 | 877-448-5900

[www.insulatingoilcanada.ca](http://www.insulatingoilcanada.ca)

#### FUSELINK - CUTOUTS

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

#### FUSES

##### **ABB Installation Products**

Tel: 1-800-326-5282

[www.tnb.abb.com](http://www.tnb.abb.com)

##### **ABB Installation Products (Canada)**

Tel: 1-905-635-7855

[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

## **G**

#### GAS AND RELATED PRODUCTS - SF6 INSULATING

##### **DILO Company, Inc.**

Tel: 727-376-5593

[www.dilo.com](http://www.dilo.com)

#### GAS DETECTION - SF6

##### **DILO Company, Inc.**

Tel: 727-376-5593

[www.dilo.com](http://www.dilo.com)

#### GENERAL CONTRACTORS

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

#### GENERAL CONTRACTORS - CONSTRUCTION

##### **PLH Group, Inc.**

Tel: 214-272-0500

[www.plhgroupinc.com](http://www.plhgroupinc.com)

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

#### GIS - ENGINEERING SERVICES

##### **SAM, LLC**

Tel: 512-447-0575

[www.sam.biz](http://www.sam.biz)

##### **Sargent & Lundy**

Tel: 312-269-2000

[www.sargentlundy.com](http://www.sargentlundy.com)

#### GRIPS - CABLE-PULLING

##### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541

[www.hfgp.com](http://www.hfgp.com)

#### GROUND RODS - COPPERWELD

##### **ABB Installation Products**

Tel: 1-800-326-5282

[www.tnb.abb.com](http://www.tnb.abb.com)

#### GROUNDING - EQUIPMENT

##### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541

[www.hfgp.com](http://www.hfgp.com)

#### GUARDS - ANIMAL AND BIRDS

##### **TransGard**

Tel: 717-900-6140

[www.transgardsolutions.com](http://www.transgardsolutions.com)

## **H**

#### HERBICIDES - VEGETATION CONTROL

##### **Asplundh Tree Expert, LLC**

Tel: 1-800-248-8733

[www.asplundh.com](http://www.asplundh.com)

## **I**

#### INDICATORS - FAULT

##### **ABB Installation Products**

Tel: 1-800-326-5282

[www.tnb.abb.com](http://www.tnb.abb.com)

##### **ABB Installation Products (Canada)**

Tel: 1-905-635-7855

[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)

#### INFRARED - IMAGING

##### **Systems With Intelligence Inc.**

Tel: 289-562-0126

[www.systemswithintelligence.com](http://www.systemswithintelligence.com)

#### INSPECTION - FIELD SERVICES

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

##### **SAM, LLC**

Tel: 512-447-0575

[www.sam.biz](http://www.sam.biz)

#### INSULATING OIL

##### **Aevitas Oil Division**

Tel: 519-752-7646 | 877-448-5900

[www.insulatingoilcanada.ca](http://www.insulatingoilcanada.ca)

#### INSULATORS - GLASS

##### **Sediver Canada Inc.**

Tel: 514-739-3385

#### INSULATORS - POLYMER

##### **Polycast International**

Tel: 204-632-5428 | 1-800-665-7445

[www.polycast.ca](http://www.polycast.ca)

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

#### INSULATORS - SUSPENSION

##### **Sediver Canada Inc.**

Tel: 514-739-3385

## **L**

#### LABORATORY EQUIPMENT AND SUPPLIES

##### **RTDS Technologies, Inc.**

Tel: 204-989-9700

[www.rtds.com](http://www.rtds.com)

#### LADDERS - INDUSTRIAL

##### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541

[www.hfgp.com](http://www.hfgp.com)

#### LADDERS - TOWERS

##### **Condux Tesmec, Inc.**

Tel: 507-387-8069 | 1-888-980-1209

[www.conduxtesmec.com](http://www.conduxtesmec.com)

#### LANYARDS, SHOCK ABSORBING

##### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541

[www.hfgp.com](http://www.hfgp.com)

#### LED PRODUCTS

##### **Evluma**

Tel: 425-336-5800

[www.evluma.com](http://www.evluma.com)

#### LIDAR - INSPECTION

##### **Pickett and Associates, Inc.**

Tel: 813-877-7770

[www.pickettusa.com](http://www.pickettusa.com)

##### **SAM, LLC**

Tel: 512-447-0575

[www.sam.biz](http://www.sam.biz)

#### LIDAR - SURVEY

##### **Pickett and Associates, Inc.**

Tel: 813-877-7770

[www.pickettusa.com](http://www.pickettusa.com)

#### LIGHTING

##### **Evluma**

Tel: 425-336-5800

[www.evluma.com](http://www.evluma.com)

#### LIGHTING - COMMERCIAL & INDUSTRIAL

##### **Evluma**

Tel: 425-336-5800

[www.evluma.com](http://www.evluma.com)

#### LIGHTING - FIXTURES - MANUFACTURERS & WHOLESALE

##### **Evluma**

Tel: 425-336-5800

[www.evluma.com](http://www.evluma.com)

## **LOAD MANAGEMENT - COMMUNICATIONS**

### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

## **LOCKOUT SYSTEMS**

### **Tech Products, Inc.**

Tel: 718-442-4900 | 1-800-221-1311  
[www.techproducts.com](http://www.techproducts.com)

## **M**

## **MAINTENANCE - PREVENTIVE MAINTENANCE EQUIPMENT**

### **Albarrie GeoComposites Limited**

Tel: 705-737-0551 | 866-269-8275  
[www.albarrie.com](http://www.albarrie.com)

### **Ampjack Industries Ltd.**

Tel: 514-451-9511  
[www.ampjack.ca](http://www.ampjack.ca)

## **MAINTENANCE - SERVICES AND PRODUCTS**

### **Ampjack Industries Ltd.**

Tel: 514-451-9511  
[www.ampjack.ca](http://www.ampjack.ca)

### **RMS Energy Co., LLC**

Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

### **Solidification Products International, Inc.**

Tel: 203-484-9494 | 800-758-3634  
[www.oilbarriers.com](http://www.oilbarriers.com)

## **MAINTENANCE - TOWER RE-GUYING / PAINTING**

### **Ampjack Industries Ltd.**

Tel: 514-451-9511  
[www.ampjack.ca](http://www.ampjack.ca)

## **MAINTENANCE - UNDERGROUND, OVERHEAD**

### **Ampjack Industries Ltd.**

Tel: 514-451-9511  
[www.ampjack.ca](http://www.ampjack.ca)

### **Asplundh Construction**

Tel: 1-888-884-5426  
[www.asplundhconstruction.com](http://www.asplundhconstruction.com)

### **Utility Lines Construction Services (ULCS)**

Tel: 1-877-884-5426  
[www.ulcsinc.com](http://www.ulcsinc.com)

## **MARKERS**

### **Tech Products, Inc.**

Tel: 718-442-4900 | 1-800-221-1311  
[www.techproducts.com](http://www.techproducts.com)

## **MARKERS - CABLE**

### **Tech Products, Inc.**

Tel: 718-442-4900 | 1-800-221-1311  
[www.techproducts.com](http://www.techproducts.com)

## **MARKERS - FIBER OPTIC**

### **Tech Products, Inc.**

Tel: 718-442-4900 | 1-800-221-1311  
[www.techproducts.com](http://www.techproducts.com)

## **MARKERS - POLES**

### **Tech Products, Inc.**

Tel: 718-442-4900 | 1-800-221-1311  
[www.techproducts.com](http://www.techproducts.com)

## **MARKERS - TRANSMISSION POLES**

### **Tech Products, Inc.**

Tel: 718-442-4900 | 1-800-221-1311  
[www.techproducts.com](http://www.techproducts.com)

## **MEASURE INSTRUMENTS**

### **Vanguard Instruments Co., Inc.**

Tel: 909-923-9390  
[www.vanguard-instruments.com](http://www.vanguard-instruments.com)

## **METAL - CUSTOM FABRICATION**

### **Ampjack Industries Ltd.**

Tel: 514-451-9511  
[www.ampjack.ca](http://www.ampjack.ca)

## **METAL - CUSTOM MADE PARTS**

### **Ampjack Industries Ltd.**

Tel: 514-451-9511  
[www.ampjack.ca](http://www.ampjack.ca)

## **METER DATA MANAGEMENT - MDM**

### **RMS Energy Co., LLC**

Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

## **METERS - FREQUENCY, DIGITAL**

### **NovaTech, LLC**

Tel: 913-451-1880 | 800-253-3842  
[www.novatechautomation.com](http://www.novatechautomation.com)

## **METERS - INSTALLATION SERVICES**

### **RMS Energy Co., LLC**

Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

## **METERS - PHASE**

### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541  
[www.hfgp.com](http://www.hfgp.com)

## **METERS - TEST SETS - TEST EQUIPMENT**

### **Manta Test Systems Ltd.**

Tel: 617-926-4900  
[www.mantatest.com](http://www.mantatest.com)

## **METERS - VOLT**

### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541  
[www.hfgp.com](http://www.hfgp.com)

## **MONITORING - COMMUNICATIONS**

### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

## **MONITORING - TRANSFORMERS**

### **Dynamic Ratings, Inc.**

Tel: 262-746-1230  
[www.dynamicratings.com](http://www.dynamicratings.com)

## **MONITORS - TEMPERATURE**

### **Dynamic Ratings, Inc.**

Tel: 262-746-1230  
[www.dynamicratings.com](http://www.dynamicratings.com)

## **O**

## **OIL - CONTAINMENT EQUIPMENT**

### **Aevitas Oil Division**

Tel: 519-752-7646 | 877-448-5900  
[www.insulatingoilcanada.ca](http://www.insulatingoilcanada.ca)

### **Albarrie GeoComposites Limited**

Tel: 705-737-0551 | 866-269-8275  
[www.albarrie.com](http://www.albarrie.com)

### **Solidification Products International, Inc.**

Tel: 203-484-9494 | 800-758-3634  
[www.oilbarriers.com](http://www.oilbarriers.com)

## **OIL - SOLIDIFIERS**

### **Solidification Products International, Inc.**

Tel: 203-484-9494 | 800-758-3634  
[www.oilbarriers.com](http://www.oilbarriers.com)

## **OIL ABSORBANTS - PADS, ROLLS, BOOMS, SOCKS**

### **Solidification Products International, Inc.**

Tel: 203-484-9494 | 800-758-3634  
[www.oilbarriers.com](http://www.oilbarriers.com)

## **OIL SPILL EQUIPMENT**

### **Albarrie GeoComposites Limited**

Tel: 705-737-0551 | 866-269-8275  
[www.albarrie.com](http://www.albarrie.com)

### **Solidification Products International, Inc.**

Tel: 203-484-9494 | 800-758-3634  
[www.oilbarriers.com](http://www.oilbarriers.com)

## **ON-LINE MONITORING**

### **Lindsey Systems**

Tel: 626-969-3471  
[www.lindsey-usa.com](http://www.lindsey-usa.com)

### **Systems With Intelligence Inc.**

Tel: 289-562-0126  
[www.systemswithintelligence.com](http://www.systemswithintelligence.com)

## **OPERATION AND MAINTENANCE SERVICES**

### **Asplundh Tree Expert, LLC**

Tel: 1-800-248-8733  
[www.asplundh.com](http://www.asplundh.com)

### **RMS Energy Co., LLC**

Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

## **P**

## **PANELS (POWER DISTRIBUTION)**

### **HindlePower**

Tel: 610-330-9000  
[www.hindlepowerinc.com](http://www.hindlepowerinc.com)

## **PARTIAL DISCHARGE ANALYSIS, DETECTION**

### **Dynamic Ratings, Inc.**

Tel: 262-746-1230  
[www.dynamicratings.com](http://www.dynamicratings.com)

## **PCB DISPOSAL**

### **Aevitas Oil Division**

Tel: 519-752-7646 | 877-448-5900  
[www.insulatingoilcanada.ca](http://www.insulatingoilcanada.ca)



#### PCB HANDLING

##### **Aevitas Oil Division**

Tel: 519-752-7646 | 877-448-5900  
[www.insulatingoilcanada.ca](http://www.insulatingoilcanada.ca)

#### PLATFORMS - LINEMAN'S

##### **Condux Tesmec, Inc.**

Tel: 507-387-8069 | 1-888-980-1209  
[www.conduxtesmec.com](http://www.conduxtesmec.com)

##### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541  
[www.hfgp.com](http://www.hfgp.com)

#### POLES - DISTRIBUTION - CONCRETE

##### **Meyer Utility Structures**

Tel: 901-566-6500 | 800-501-0962  
[www.meyerutilitystructures.com](http://www.meyerutilitystructures.com)

#### POLES - DISTRIBUTION - STEEL

##### **Meyer Utility Structures**

Tel: 901-566-6500 | 800-501-0962  
[www.meyerutilitystructures.com](http://www.meyerutilitystructures.com)

#### POLES - DISTRIBUTION - WOOD, LAMINATED

##### **Laminated Wood Systems, Inc.**

Tel: 402-643-4708 | 1-800-949-3526  
[www.lwsinc.com](http://www.lwsinc.com)

#### POLES - TRANSMISSION

##### **Meyer Utility Structures**

Tel: 901-566-6500 | 800-501-0962  
[www.meyerutilitystructures.com](http://www.meyerutilitystructures.com)

#### POLES - TRANSMISSION - CONCRETE

##### **Meyer Utility Structures**

Tel: 901-566-6500 | 800-501-0962  
[www.meyerutilitystructures.com](http://www.meyerutilitystructures.com)

#### POLES - TRANSMISSION - STEEL

##### **Meyer Utility Structures**

Tel: 901-566-6500 | 800-501-0962  
[www.meyerutilitystructures.com](http://www.meyerutilitystructures.com)

#### POLES - UTILITY

##### **Meyer Utility Structures**

Tel: 901-566-6500 | 800-501-0962  
[www.meyerutilitystructures.com](http://www.meyerutilitystructures.com)

#### POWER DISTRIBUTION AND/OR TRANSMISSION POLES

##### **Meyer Utility Structures**

Tel: 901-566-6500 | 800-501-0962  
[www.meyerutilitystructures.com](http://www.meyerutilitystructures.com)

#### POWER QUALITY EQUIPMENT

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### POWER SUPPLIES - UNINTERRUPTIBLE

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### POWERLINE - CONSTRUCTION

##### **Utility Lines Construction Services (ULCS)**

Tel: 1-877-884-5426  
[www.ulcsinc.com](http://www.ulcsinc.com)

#### PROJECT ENGINEERING

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

##### **Sargent & Lundy**

Tel: 312-269-2000  
[www.sargentlundy.com](http://www.sargentlundy.com)

#### PROJECT MANAGEMENT AND CONSULTING

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

##### **Sargent & Lundy**

Tel: 312-269-2000  
[www.sargentlundy.com](http://www.sargentlundy.com)

#### PROTECTION AND CONTROL

##### **Albarrie GeoComposites Limited**

Tel: 705-737-0551 | 866-269-8275  
[www.albarrie.com](http://www.albarrie.com)

##### **RTDS Technologies, Inc.**

Tel: 204-989-9700  
[www.rtds.com](http://www.rtds.com)

##### **Solidification Products International, Inc.**

Tel: 203-484-9494 | 800-758-3634  
[www.oilbarriers.com](http://www.oilbarriers.com)

#### PULLERS - CABLE

##### **Condux Tesmec, Inc.**

Tel: 507-387-8069 | 1-888-980-1209  
[www.conduxtesmec.com](http://www.conduxtesmec.com)

#### PULLERS - CABLE, AERIAL

##### **Condux Tesmec, Inc.**

Tel: 507-387-8069 | 1-888-980-1209  
[www.conduxtesmec.com](http://www.conduxtesmec.com)

#### PULLERS - CABLE, UNDERGROUND

##### **Condux Tesmec, Inc.**

Tel: 507-387-8069 | 1-888-980-1209  
[www.conduxtesmec.com](http://www.conduxtesmec.com)

#### PULLERS - CONDUCTOR

##### **Condux Tesmec, Inc.**

Tel: 507-387-8069 | 1-888-980-1209  
[www.conduxtesmec.com](http://www.conduxtesmec.com)

#### PULLERS - ROPE

##### **Condux Tesmec, Inc.**

Tel: 507-387-8069 | 1-888-980-1209  
[www.conduxtesmec.com](http://www.conduxtesmec.com)

## **R**

#### RADIO COMMUNICATIONS

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### RADIO TWO-WAY - FIXED

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### RECLOSERS

##### **ABB Installation Products**

Tel: 1-800-326-5282  
[www.tnb.abb.com](http://www.tnb.abb.com)

##### **ABB Installation Products (Canada)**

Tel: 1-905-635-7855  
[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### RECLOSERS - CONTROLS

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### RECLOSERS - SINGLE-PHASE

##### **G&W Electric Co.**

Tel: 708-388-5010  
[www.gwelec.com](http://www.gwelec.com)

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### RECLOSERS - THREE-PHASE

##### **G&W Electric Co.**

Tel: 708-388-5010  
[www.gwelec.com](http://www.gwelec.com)

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### RECORDERS - TRANSIENT FAULT

##### **NovaTech, LLC**

Tel: 913-451-1880 | 800-253-3842  
[www.novatechautomation.com](http://www.novatechautomation.com)

#### REELS - CONDUCTOR STRINGING

##### **Condux Tesmec, Inc.**

Tel: 507-387-8069 | 1-888-980-1209  
[www.conduxtesmec.com](http://www.conduxtesmec.com)

#### REELS - HANDLING EQUIPMENT

##### **Condux Tesmec, Inc.**

Tel: 507-387-8069 | 1-888-980-1209  
[www.conduxtesmec.com](http://www.conduxtesmec.com)

#### REELS - WIRE, GROUNDING

##### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541  
[www.hfgp.com](http://www.hfgp.com)

#### RELAYS

##### **RMS Energy Co., LLC**

Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

#### RELAYS - SUBSTATION AUTOMATION

##### **RMS Energy Co., LLC**

Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### REMOTE - SITE MONITORING

##### **Systems With Intelligence Inc.**

Tel: 289-562-0126  
[www.systemswithintelligence.com](http://www.systemswithintelligence.com)

#### REMOTE TERMINAL UNITS

##### **NovaTech, LLC**

Tel: 913-451-1880 | 800-253-3842  
[www.novatechautomation.com](http://www.novatechautomation.com)

#### REMOTE VIDEO INSPECTION SYSTEMS

##### **Systems With Intelligence Inc.**

Tel: 289-562-0126  
[www.systemswithintelligence.com](http://www.systemswithintelligence.com)

#### RISK MANAGEMENT

##### **Solidification Products International, Inc.**

Tel: 203-484-9494 | 800-758-3634  
[www.oilbarriers.com](http://www.oilbarriers.com)

#### ROPE - WIRE

##### **Condux Tesmec, Inc.**

Tel: 507-387-8069 | 1-888-980-1209  
[www.conduxtesmec.com](http://www.conduxtesmec.com)

## **S**

#### SAFETY - CONSULTING & TRAINING

##### **DILO Company, Inc.**

Tel: 727-376-5593  
[www.dilo.com](http://www.dilo.com)

#### SAFETY - ENVIRONMENTAL - EQUIPMENT

##### **Albarrie GeoComposites Limited**

Tel: 705-737-0551 | 866-269-8275  
[www.albarrie.com](http://www.albarrie.com)

#### SAFETY - LINEMEN EQUIPMENT

##### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541  
[www.hfgp.com](http://www.hfgp.com)

#### SAFETY - SUPPLIES

##### **Tech Products, Inc.**

Tel: 718-442-4900 | 1-800-221-1311  
[www.techproducts.com](http://www.techproducts.com)

#### SCADA - EMS ENGINEERING

##### **RMS Energy Co., LLC**

Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

#### SCADA - INSTALLATION SERVICES

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### SCADA SYSTEMS

##### **NovaTech, LLC**

Tel: 913-451-1880 | 800-253-3842  
[www.novatechautomation.com](http://www.novatechautomation.com)

##### **RMS Energy Co., LLC**

Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### SECONDARY CONTAINMENT SYSTEM

##### **Solidification Products International, Inc.**

Tel: 203-484-9494 | 800-758-3634  
[www.oilbarriers.com](http://www.oilbarriers.com)

#### SENSORS - CURRENT

##### **Ampacimon**

Tel: 919-208-62211  
[www.ampacimon.com](http://www.ampacimon.com)

##### **Southern States, LLC**

Tel: 770-946-4562  
[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### SF6 GAS INSULATED SWITCHGEAR

##### **G&W Electric Co.**

Tel: 708-388-5010  
[www.gwelec.com](http://www.gwelec.com)

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### SHEAVES - CONDUCTOR - STRINGING

##### **Condux Tesmec, Inc.**

Tel: 507-387-8069 | 1-888-980-1209  
[www.conduxtesmec.com](http://www.conduxtesmec.com)

#### SIGNS

##### **Tech Products, Inc.**

Tel: 718-442-4900 | 1-800-221-1311  
[www.techproducts.com](http://www.techproducts.com)

#### SIGNS - WARNING

##### **Tech Products, Inc.**

Tel: 718-442-4900 | 1-800-221-1311  
[www.techproducts.com](http://www.techproducts.com)

#### SMART GRID SOLUTIONS

##### **G&W Electric Co.**

Tel: 708-388-5010  
[www.gwelec.com](http://www.gwelec.com)

##### **Kinectrics Inc.**

Tel: 416-207-6000  
[www.kinectrics.com](http://www.kinectrics.com)

##### **SISCO, Inc.**

Tel: 586-254-0020  
[www.sisconet.com](http://www.sisconet.com)

#### SOFTWARE - CAD/CAE

##### **MindCore Technologies**

Tel: 450-477-5959  
[www.mindcoretech.com](http://www.mindcoretech.com)

#### SOFTWARE - T&D LINE DESIGN

##### **CTC Global Corporation**

Tel: 949-428-8500  
[www.ctcglobal.com](http://www.ctcglobal.com)

#### SOFTWARE INTEGRATION

##### **SISCO, Inc.**

Tel: 586-254-0020  
[www.sisconet.com](http://www.sisconet.com)

#### SPILLS RESPONSE KIT

##### **Solidification Products International, Inc.**

Tel: 203-484-9494 | 800-758-3634  
[www.oilbarriers.com](http://www.oilbarriers.com)

#### SPLICES & ACCESSORIES - COMPRESSION JOINT

##### **CTC Global Corporation**

Tel: 949-428-8500  
[www.ctcglobal.com](http://www.ctcglobal.com)

#### SPLICES & ACCESSORIES - TENSION

##### **CTC Global Corporation**

Tel: 949-428-8500  
[www.ctcglobal.com](http://www.ctcglobal.com)

#### STATIC - VAR COMPENSATION

##### **VIZIMAX Inc.**

Tel: 1-450-679-0003  
[www.vizimax.com](http://www.vizimax.com)

#### STEEL - MANUFACTURERS

##### **Ampjack Industries Ltd.**

Tel: 514-451-9511  
[www.ampjack.ca](http://www.ampjack.ca)

##### **Meyer Utility Structures**

Tel: 901-566-6500 | 800-501-0962  
[www.meyerutilitystructures.com](http://www.meyerutilitystructures.com)

#### STEEL - STRUCTURAL

##### **Ampjack Industries Ltd.**

Tel: 514-451-9511  
[www.ampjack.ca](http://www.ampjack.ca)

##### **Meyer Utility Structures**

Tel: 901-566-6500 | 800-501-0962  
[www.meyerutilitystructures.com](http://www.meyerutilitystructures.com)

#### STEEL PRODUCTS - CUSTOM FABRICATION

##### **Ampjack Industries Ltd.**

Tel: 514-451-9511  
[www.ampjack.ca](http://www.ampjack.ca)

#### STICKS - DISCONNECT

##### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541  
[www.hfgp.com](http://www.hfgp.com)

#### STICKS - HOT

##### **Hastings Fiber Glass Products, Inc.**

Tel: 269-945-9541  
[www.hfgp.com](http://www.hfgp.com)

#### STRUCTURE - PREFABRICATED

##### **Easi-Set Worldwide**

Tel: 540-439-8911 | 1-800-547-4045  
[www.easetbuildings.com](http://www.easetbuildings.com)

##### **Meyer Utility Structures**

Tel: 901-566-6500 | 800-501-0962  
[www.meyerutilitystructures.com](http://www.meyerutilitystructures.com)

#### SUBSTATION

##### **Easi-Set Worldwide**

Tel: 540-439-8911 | 1-800-547-4045  
[www.easetbuildings.com](http://www.easetbuildings.com)

##### **Meyer Utility Structures**

Tel: 901-566-6500 | 800-501-0962  
[www.meyerutilitystructures.com](http://www.meyerutilitystructures.com)

##### **MindCore Technologies**

Tel: 450-477-5959  
[www.mindcoretech.com](http://www.mindcoretech.com)

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### SUBSTATION - BALLISTIC PROTECTION

##### **Southern States, LLC**

Tel: 770-946-4562  
[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### **SUBSTATION - CAD DRAFTING SUPPORT**

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

#### **SUBSTATION - COMMUNICATION EQUIPMENT**

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

#### **SUBSTATION - COMMUNICATIONS**

##### **Easi-Set Worldwide**

Tel: 540-439-8911 | 1-800-547-4045

[www.easisetbuildings.com](http://www.easisetbuildings.com)

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

##### **SISCO, Inc.**

Tel: 586-254-0020

[www.sisconet.com](http://www.sisconet.com)

#### **SUBSTATION - METAL-ENCLOSED**

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

#### **SUBSTATION - MOBILE**

##### **Delta Star, Inc.**

Tel: 434-845-0921 | 800-368-3017

[www.deltastar.com](http://www.deltastar.com)

##### **Southern States, LLC**

Tel: 770-946-4562

[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### **SUBSTATION - STEEL, STRUCTURE**

##### **Ampjack Industries Ltd.**

Tel: 514-451-9511

[www.ampjack.ca](http://www.ampjack.ca)

##### **Meyer Utility Structures**

Tel: 901-566-6500 | 800-501-0962

[www.meyerutilitystructures.com](http://www.meyerutilitystructures.com)

#### **SUBSTATION - UNIT**

##### **Easi-Set Worldwide**

Tel: 540-439-8911 | 1-800-547-4045

[www.easisetbuildings.com](http://www.easisetbuildings.com)

#### **SUBSTATION AUTOMATION**

##### **Kinectrics Inc.**

Tel: 416-207-6000

[www.kinectrics.com](http://www.kinectrics.com)

##### **RMS Energy Co., LLC**

Tel: 1-888-683-3630

[www.rmsenergy.com](http://www.rmsenergy.com)

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

##### **VIZIMAX Inc.**

Tel: 1-450-679-0003

[www.vizimax.com](http://www.vizimax.com)

#### **SUBSTATION CONTROL BUILDINGS**

##### **Easi-Set Worldwide**

Tel: 540-439-8911 | 1-800-547-4045

[www.easisetbuildings.com](http://www.easisetbuildings.com)

#### **SUBSTATION DESIGN & CONSTRUCTION**

##### **Easi-Set Worldwide**

Tel: 540-439-8911 | 1-800-547-4045

[www.easisetbuildings.com](http://www.easisetbuildings.com)

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

##### **Sargent & Lundy**

Tel: 312-269-2000

[www.sargentlundy.com](http://www.sargentlundy.com)

#### **SUBSTATION FENCING: ANIMAL DETERRENT**

##### **TransGard**

Tel: 717-900-6140

[www.transgardsolutions.com](http://www.transgardsolutions.com)

#### **SWITCHES**

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

##### **Southern States, LLC**

Tel: 770-946-4562

[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### **SWITCHES - AIR, GROUP-OPERATED**

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

##### **Southern States, LLC**

Tel: 770-946-4562

[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### **SWITCHES - CAPACITORS**

##### **Southern States, LLC**

Tel: 770-946-4562

[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### **SWITCHES - CAPACITORS BANK**

##### **Southern States, LLC**

Tel: 770-946-4562

[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### **SWITCHES - DISCONNECT**

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

##### **Southern States, LLC**

Tel: 770-946-4562

[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### **SWITCHES - DISCONNECT 25 TO 800KV**

##### **MindCore Technologies**

Tel: 450-477-5959

[www.mindcoretech.com](http://www.mindcoretech.com)

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

##### **Southern States, LLC**

Tel: 770-946-4562

[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### **SWITCHES - ISOLATION**

##### **Southern States, LLC**

Tel: 770-946-4562

[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### **SWITCHES - LOAD BREAK**

##### **G&W Electric Co.**

Tel: 708-388-5010

[www.gwelec.com](http://www.gwelec.com)

##### **Southern States, LLC**

Tel: 770-946-4562

[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### **SWITCHES - MOTOR-OPERATED**

##### **MindCore Technologies**

Tel: 450-477-5959

[www.mindcoretech.com](http://www.mindcoretech.com)

##### **Southern States, LLC**

Tel: 770-946-4562

[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### **SWITCHES - OIL**

##### **Aevitas Oil Division**

Tel: 519-752-7646 | 877-448-5900

[www.insulatingoilcanada.ca](http://www.insulatingoilcanada.ca)

#### **SWITCHES - PADMOUNTED**

##### **G&W Electric Co.**

Tel: 708-388-5010

[www.gwelec.com](http://www.gwelec.com)

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

#### **SWITCHES - REGULATOR, BYPASS**

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

#### **SWITCHES - SUBMERSIBLE**

##### **G&W Electric Co.**

Tel: 708-388-5010

[www.gwelec.com](http://www.gwelec.com)

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

#### **SWITCHES - SUBSTATION, DISCONNECTING**

##### **ABB Installation Products**

Tel: 1-800-326-5282

[www.tnb.abb.com](http://www.tnb.abb.com)

##### **ABB Installation Products (Canada)**

Tel: 1-905-635-7855

[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)

##### **MindCore Technologies**

Tel: 450-477-5959

[www.mindcoretech.com](http://www.mindcoretech.com)

##### **S&C Electric Company**

Tel: 773-338-1000

[www.sandc.com](http://www.sandc.com)

##### **Southern States, LLC**

Tel: 770-946-4562

[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### **SWITCHES - THROWOVER, AUTOMATIC**

##### **ABB Installation Products**

Tel: 1-800-326-5282

[www.tnb.abb.com](http://www.tnb.abb.com)

##### **ABB Installation Products (Canada)**

Tel: 1-905-635-7855

[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)



#### **SWITCHES - TRANSMISSION DISCONNECT AND LOAD BREAK**

**Southern States, LLC**  
Tel: 770-946-4562  
[www.southernstatesllc.com](http://www.southernstatesllc.com)

#### **SWITCHES - VACUUM**

**G&W Electric Co.**  
Tel: 708-388-5010  
[www.gwelec.com](http://www.gwelec.com)

#### **SWITCHGEAR**

**Southwest Electric Co.**  
Tel: 405-737-5691 | 1-800-364-5691  
[www.swelectric.com](http://www.swelectric.com)

#### **SWITCHGEAR - ARC RESISTANT - MEDIUM VOLTAGE**

**G&W Electric Co.**  
Tel: 708-388-5010  
[www.gwelec.com](http://www.gwelec.com)

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### **SWITCHGEAR - MEDIUM VOLTAGE RANGE UP TO 44 KV**

**ABB Installation Products**  
Tel: 1-800-326-5282  
[www.tnb.abb.com](http://www.tnb.abb.com)

**ABB Installation Products (Canada)**  
Tel: 1-905-635-7855  
[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### **SWITCHGEAR - METAL ENCLOSED**

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### **SWITCHGEAR - REBUILDING AND REPAIR SERVICE**

**Southwest Electric Co.**  
Tel: 405-737-5691 | 1-800-364-5691  
[www.swelectric.com](http://www.swelectric.com)

#### **SWITCHGEAR - SF6**

**ABB Installation Products**  
Tel: 1-800-326-5282  
[www.tnb.abb.com](http://www.tnb.abb.com)

**ABB Installation Products (Canada)**  
Tel: 1-905-635-7855  
[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)

**G&W Electric Co.**  
Tel: 708-388-5010  
[www.gwelec.com](http://www.gwelec.com)

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### **SWITCHGEAR - VACUUM**

**ABB Installation Products**  
Tel: 1-800-326-5282  
[www.tnb.abb.com](http://www.tnb.abb.com)

**ABB Installation Products (Canada)**  
Tel: 1-905-635-7855  
[www.tnb.ca.abb.com](http://www.tnb.ca.abb.com)

**G&W Electric Co.**  
Tel: 708-388-5010  
[www.gwelec.com](http://www.gwelec.com)

#### **SYSTEMS INTEGRATOR**

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

**SISCO, Inc.**  
Tel: 586-254-0020  
[www.sisconet.com](http://www.sisconet.com)

### **T**

#### **TAP CHANGERS - TRANSFORMERS - LOAD, NO-LOAD**

**RMS Energy Co., LLC**  
Tel: 1-888-683-3630  
[www.rmsenergy.com](http://www.rmsenergy.com)

#### **TAPE - MARKING**

**Tech Products, Inc.**  
Tel: 718-442-4900 | 1-800-221-1311  
[www.techproducts.com](http://www.techproducts.com)

#### **TAPE - UNDERGROUND MARKING**

**Tech Products, Inc.**  
Tel: 718-442-4900 | 1-800-221-1311  
[www.techproducts.com](http://www.techproducts.com)

#### **TEST & MEASUREMENT - SF6 GAS ANALYSER**

**DILO Company, Inc..**  
Tel: 727-376-5593  
[www.dilo.com](http://www.dilo.com)

#### **TEST EQUIPMENT**

**OMICRON electronics Corp. USA**  
Tel: 1-713-830-4660  
[www.omicronenergy.com](http://www.omicronenergy.com)

**RTDS Technologies, Inc.**  
Tel: 204-989-9700  
[www.rtds.com](http://www.rtds.com)

#### **TEST EQUIPMENT - AERIAL LIFT**

**VON Corporation**  
Tel: 205-788-2437  
[www.voncorp.com](http://www.voncorp.com)

#### **TEST EQUIPMENT - CIRCUIT BREAKER**

**DILO Company, Inc..**  
Tel: 727-376-5593  
[www.dilo.com](http://www.dilo.com)

**OMICRON electronics Corp. USA**  
Tel: 1-713-830-4660  
[www.omicronenergy.com](http://www.omicronenergy.com)

**Zensol Automation Inc.**  
Tel: 514-333-3488  
[www.zensol.com](http://www.zensol.com)

#### **TEST EQUIPMENT - CURRENT TRANSFORMER TESTERS**

**OMICRON electronics Corp. USA**  
Tel: 1-713-830-4660  
[www.omicronenergy.com](http://www.omicronenergy.com)

#### **TEST EQUIPMENT - GLOVE**

**VON Corporation**  
Tel: 205-788-2437  
[www.voncorp.com](http://www.voncorp.com)

#### **TEST EQUIPMENT - HIGH VOLTAGE**

**Hastings Fiber Glass Products, Inc.**  
Tel: 269-945-9541  
[www.hfgp.com](http://www.hfgp.com)

**High Voltage, Inc.**  
Tel: 518-329-3275  
[www.hvinc.com](http://www.hvinc.com)

#### **TEST EQUIPMENT - HV TEST SETS, PORTABLE**

**Hastings Fiber Glass Products, Inc.**  
Tel: 269-945-9541  
[www.hfgp.com](http://www.hfgp.com)

**VON Corporation**  
Tel: 205-788-2437  
[www.voncorp.com](http://www.voncorp.com)

#### **TEST EQUIPMENT - METER TEST SETS**

**OMICRON electronics Corp. USA**  
Tel: 1-713-830-4660  
[www.omicronenergy.com](http://www.omicronenergy.com)

#### **TEST EQUIPMENT - RELAY**

**RTDS Technologies, Inc.**  
Tel: 204-989-9700  
[www.rtds.com](http://www.rtds.com)

#### **TEST EQUIPMENT - SLEEVE, RUBBER**

**VON Corporation**  
Tel: 205-788-2437  
[www.voncorp.com](http://www.voncorp.com)

#### **TEST EQUIPMENT - TRANSFORMERS**

**OMICRON electronics Corp. USA**  
Tel: 1-713-830-4660  
[www.omicronenergy.com](http://www.omicronenergy.com)

#### **TESTING - REGULATORS**

**RTDS Technologies, Inc.**  
Tel: 204-989-9700  
[www.rtds.com](http://www.rtds.com)

#### **TESTING SERVICES**

**Kinectrics Inc.**  
Tel: 416-207-6000  
[www.kinectrics.com](http://www.kinectrics.com)

**RTDS Technologies, Inc.**  
Tel: 204-989-9700  
[www.rtds.com](http://www.rtds.com)

**S&C Electric Company**  
Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

**Southwest Electric Co.**  
Tel: 405-737-5691 | 1-800-364-5691  
[www.swelectric.com](http://www.swelectric.com)

#### TESTING SERVICES - ELECTRICAL

##### **S&C Electric Company**

Tel: 773-338-1000  
[www.sandc.com](http://www.sandc.com)

#### THERMOGRAPHIC - EQUIPMENT SALES

##### **Systems With Intelligence Inc.**

Tel: 289-562-0126  
[www.systemswithintelligence.com](http://www.systemswithintelligence.com)

#### TOWERS - EMERGENCY T & D

##### **Ampjack Industries Ltd.**

Tel: 514-451-9511  
[www.ampjack.ca](http://www.ampjack.ca)

##### **Meyer Utility Structures**

Tel: 901-566-6500 | 800-501-0962  
[www.meyerutilitystructures.com](http://www.meyerutilitystructures.com)

#### TOWERS - POLES

##### **Meyer Utility Structures**

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[www.meyerutilitystructures.com](http://www.meyerutilitystructures.com)

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