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## **Frost Fight**

**Winter Utility  
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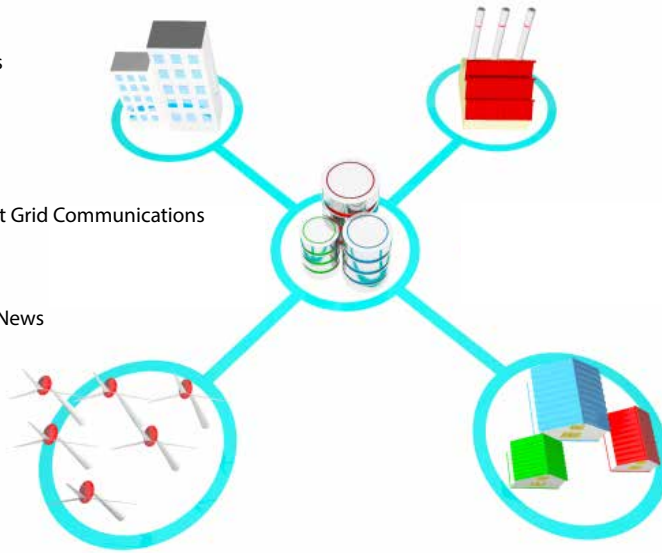
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## SUNSHARE & MORTENSON ANNOUNCE STRATEGIC AGREEMENT TO DEVELOP & BUILD COMMUNITY SOLAR GARDENS IN MINNESOTA

SunShare, a rapidly growing community solar company with offices in Minneapolis and Denver, and Mortenson, one of the nation's top construction firms, today announced a strategic relationship to develop and build solar gardens in Minnesota. The announcement comes just a week after Xcel Energy announced its plan to more than double its renewable energy by 2030, including exponential growth in solar from 14 megawatts today to 2,400 megawatts in 2030.

"This is the story of one of the largest, nationally recognized construction firms forming a strategic alliance with an innovative, up-and-coming community solar company to bring access to solar energy to everyone in Xcel Energy's service territory in Minnesota," said Jonathan W. Postal (J.W.), SunShare's senior vice president.

Mortenson will serve as the full engineering, procurement and construction (EPC) contractor, while SunShare will develop, finance, own the solar gardens and sign-up energy users for the program. The renewable electricity generated will be available to Xcel Energy residential, municipal and commercial subscribers as part of its community solar program throughout Hennepin, Dakota, Wright, Ramsey, Carver, Scott, Anoka, and Washington Counties.

"Minnesota's community solar program dramatically expands the ability for companies, governmental entities and residents to utilize solar," said Trent Mostaert, vice president and general manager at Mortenson Construction. "This is a great partnership and an op-

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portunity for Mortenson to work with SunShare, a leading community solar company, and bring our significant solar experience home to Minnesota.”

“This partnership with Mortenson ensures that we have the best local talent and team to build our solar gardens at scale,” said David Amster-Olszewski, CEO and founder of SunShare. “This relationship shows our commitment to deliver state of the art, long-term, scalable energy solutions to residents and businesses in Minnesota. We look forward to our partnership boosting the local economy, creating jobs and delivering clean solar power to thousands of Minnesotans.”

In 2013, the Minnesota State legislature established a landmark community solar law through the “Solar Energy Jobs Act,” allowing electric customers who either can’t or don’t want to put solar panels on their homes or businesses to buy electricity generated from a solar array located elsewhere in the community. Customers, including schools, businesses, homeowners, libraries, and other municipal buildings, may purchase a community solar garden subscription from SunShare and will then receive credits on their Xcel Energy bills during the contract term.

Customers interested in becoming a part of SunShare’s community solar gardens should email: [contactus@mysunshare.com](mailto:contactus@mysunshare.com) or call 800.793.0786.

#### About Mortenson

Founded in 1954, Mortenson is a U.S.-based, family-owned construction and development services company. As one of the nation’s top builders, Mortenson provides a complete range of construction services, including planning, program management, preconstruction, general contracting, construction management, and design-build.

Mortenson is currently ranked as the number one wind contractor in the United States, according to Engineering News Record and is rated as the third largest EPC firm for utility-scale solar by Bloomberg New Energy Finance. Mortenson has additional capabilities within the high voltage transmission industry and provides operations and maintenance support services for completed renewable energy facilities. Mortenson has offices in Chicago, Denver, Iowa City, Madison, Milwaukee, Minneapolis, Phoenix, Portland, San Antonio, Seattle and Toronto. For more information, visit [mortenson.com](http://mortenson.com).

#### About SunShare

SunShare is one of the nation’s first community solar companies with a mission to make solar energy simple, affordable, and accessible to everyone. The company develops, builds, maintains, and operates community solar gardens, allowing businesses and residents anywhere in a utility’s service territory to use solar energy, regardless of roof space or home ownership. SunShare’s first two 500 kilowatt community solar gardens in Colorado are the first fully subscribed solar projects like them in the country. SunShare has over 100 MW of solar gardens built or under development and offices in Denver and Minneapolis. •



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Peter M. Poulin Appointed as CEO of Motion Computing®



Industry veteran to execute growth strategy for Austin, TX-based rug-

ged tablet PC manufacturer. Motion Computing® has appointed Peter M. Poulin as its Chief Executive Officer (CEO). With more than 25 years of sales, marketing and general management experience in the public and private sectors, Poulin will capitalize on the company's deep mobility expertise to expand Motion's reach within target vertical markets. Specifically, he will define and drive execution of product and go-to-market strategies that increase the value of Motion to its customers and shareholders. Aggressive investments in the design and development of ruggedized tablet platforms and integrated mobility solutions have resulted in new growth channels and solidified the company's segment leadership position within the utility, public safety, healthcare, manufacturing and natural resources sectors.

Poulin has served as Motion's

vice president of marketing since July 2012 and was responsible for driving the company's multi-faceted product strategy and global marketing programs. He has successfully elevated Motion's brand awareness among customers and partners and introduced new sales growth opportunities for the company with his establishment of targeted channel marketing, business-to-business demand generation, marketing communication and lead management initiatives.

Nextronex Inc. Inverter Solution Selected by Indiana Municipal Power Agency for 9.74 MW Utility Solar Projects

Nextronex, Inc. is pleased to announce that the Indiana Municipal Power Agency (IMPA), a wholesale electric power provider serving

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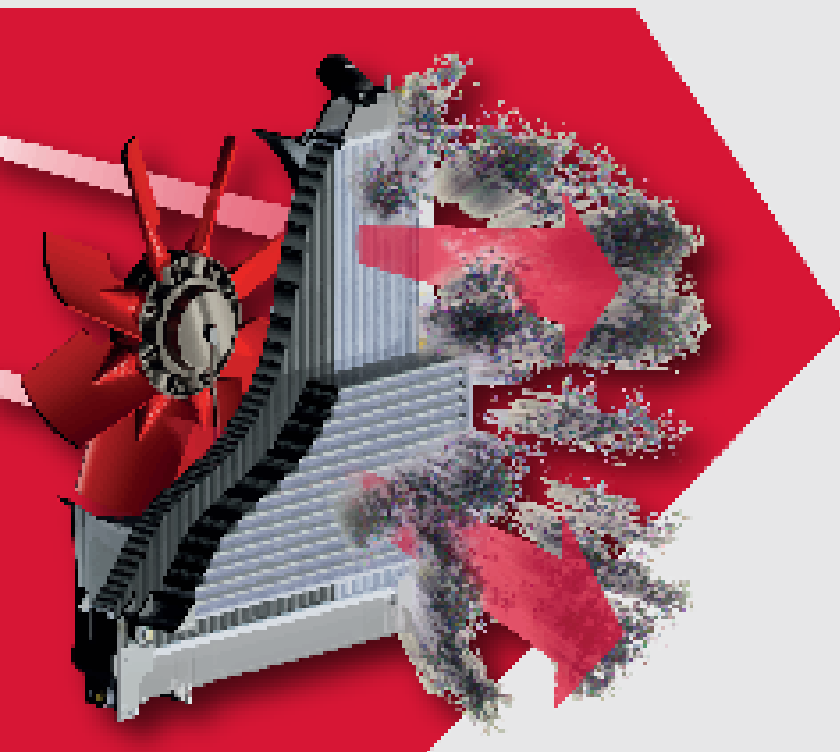
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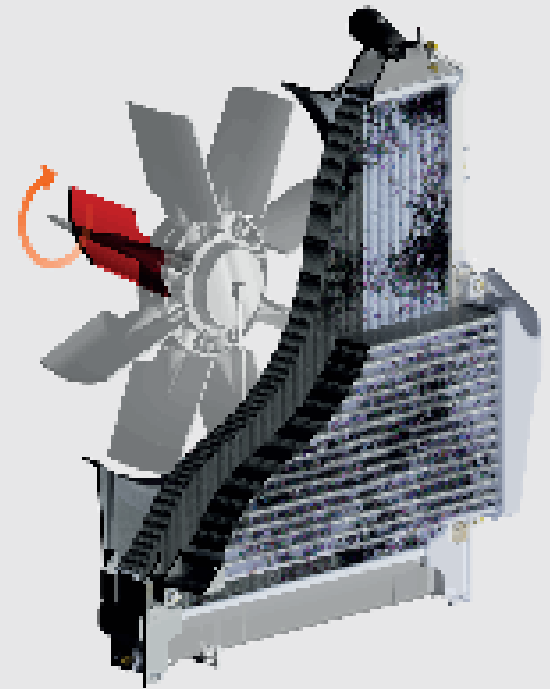
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60 municipally-owned electric utilities in Indiana and Ohio, has selected the Nextronex Ray-Max® Inverter system for various member's sites as they expand their solar photovoltaic generation capacity. The sites are two (2) 2.41 MW DC solar projects to be located in the cities of Crawfordsville and Peru, Indiana and four (4) 1.23 MW projects to be located in other Indiana cities throughout the IMPA system.

Jay Troger, CEO of Nextronex, Inc. observes, "As a result of the successful installation and operations of our patented Distributed Architecture™ inverter system during 2014 at two IMPA sites in Frankton and Rensselaer, IMPA chose Nextronex again for their utility scale projects in 2015. It is always gratifying when our customers are satisfied with our performance and continue to order from us. We will be providing our plug-and-play Power Podium™ solution which is skidded, pre-wired and

tested, saving construction time and labor cost, as well as assuring factory level quality control."

The projects are scheduled to be commissioned in the middle of 2015. Crawfordsville and Peru will be the largest solar project installations to date within IMPA's service territory.

About Indiana Municipal Power Agency (IMPA)

The Indiana Municipal Power Agency is the wholesale electric power provider serving the needs of 59 cities and towns in Indiana, as well as one community in Ohio. IMPA was formed so its member utilities could share power resources, allowing cities and towns to provide electricity more economically to their customers. IMPA members deliver electric service to approximately 330,000 individuals throughout Indiana and Ohio. IMPA's active management of power costs and service quality has made

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About Nextronex

Nextronex, Inc. is a manufacturer of commercial and utility scale proprietary solar inverter systems for applications 150 kW and larger. The company is focused on solar energy optimization through its patented Distributed Architecture™

Reading Truck Body And OEM Systems, LLC Announce Partnership

Reading Truck Body, LLC, premier manufacturer of vocational truck bodies, and OEM Systems, LLC, leader in compressed natural gas (CNG) conversions, are pleased to announce a strategic partnership that offers customers the best one-stop solution in CNG systems for service trucks and fleets.

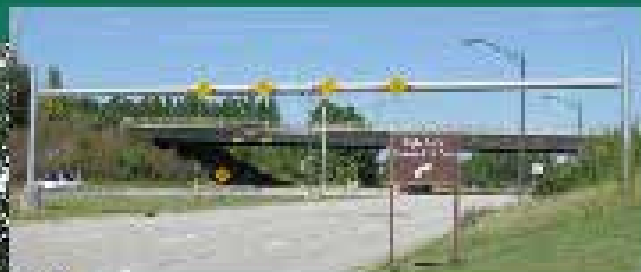
"With OEM Systems' expansive knowledge and experience with CNG conversions, Reading will deepen its portfolio and broaden its ability to deliver a best-in-class solution for our customers," said Craig Bonham, Vice President of Sales for Reading Truck Body. "An added benefit is that OEM Systems is an authorized Reading Truck distributor, so they are very familiar with Reading's complete offering of steel and aluminum truck bodies."

Curtis Stephenson, Director of Sales for OEM Systems, adds, "The infrastructure for CNG service stations continues to grow across the country with companies either investing in private stations or working collaboratively in order to share the cost. Continued growth in our industry drives demand and makes this the ideal time to partner with Reading. With their nationwide distributor network and national accounts team, it's a natural fit."

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***Challenging winter utility installations have a Calgary contractor seeing infra-red***

No matter where you live, underground utility installations get a lot more difficult when the ground freezes. However, the last several years have proven to be especially tough for Calgary contractors, ever since their traditional ground-thawing techniques of coal burning have been outlawed. In fact, the new rules have severely slowed most wintertime utility installations in the city, as contractors have struggled to find new ways to fight the frost.

Perhaps no one has felt the effects as much as ATCO Gas, the area's natural gas distributor. During December of 2010, Calgary's Skyview Ranch development was in a bind to supply services to the new commercial buildings on its property. By this point all utilities were installed except for gas. Three

commercial buildings urgently needed gas by January 1st, and several more buildings requested it soon thereafter. Christmas was rapidly approaching, so schedules were extremely tight. To complicate matters even more, one meter of frost had already formed in the ground.

Several years ago, the frost might not have presented such a problem. Calgary's utility contractors would have laid straw beds and used burning coals to thaw a path of frozen ground. Then, excavators could trench along the path for the gas lines. Despite the lack of sophistication, this method worked somewhat effectively. Nonetheless, the environmental concerns were too great for legislators, causing them to put a stop to the practice.

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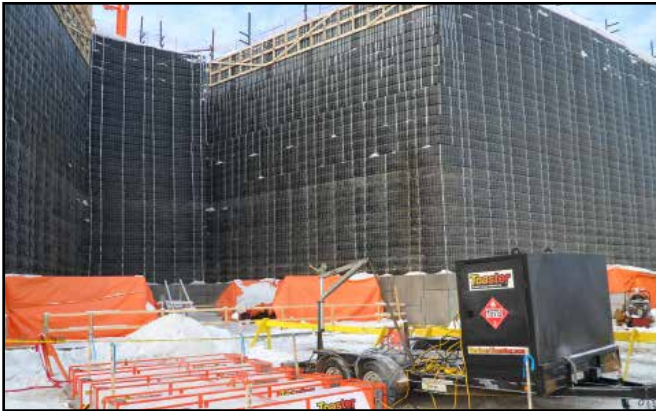


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The coal-burning ban created serious issues for everyone involved with underground utility work, including ATCO's service contractor for the Skyview Ranch job. The contractor couldn't bring large excavators in to rip through the frost – partly because of the heightened risk of damaging existing underground utility lines, but also because mini excavators were the only machines small enough to access the jobsite. Unfortunately, mini excavators didn't have the power to dig through frost, so without some method of heating the ground, the contractor couldn't install the gas lines.

Not just any heating source would work for the Skyview Ranch, however. It needed to thaw ground as quickly as coal and straw – if not quicker – in order to make the deadline. Without an effective solution, the building tenants could have been forced to wait until spring to receive natural gas services. But since their contracts stated a January 1st occupancy, delaying the process was simply not an option.

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When it was determined that the service contractor simply didn't have the tools or the time to complete the task, ATCO started considering other options. That's when ATCO heard its seasoned mains-installation contractor, Dunwald & Fleming Enterprises Ltd., had recently purchased some infrared heating devices. The new technology boasted to thaw ground faster than any other method, so ATCO quickly asked Dunwald & Fleming to step in and put the heaters to the test.

The new infrared heaters were Serious Toasters from Serious Thermal Products. Each Toaster measures only 10 feet long by 2 feet wide, but multiple units can be placed together in a series according to the route of the proposed trench. They are powered by propane and run from a 110-volt power source. Using targeted reflectors, the infrared technology of the Toasters efficiently directs heat into the ground with minimal heat loss. Thanks to these advantages, the units appeared to be an ideal solution for the Skyview Ranch job.

"We explored several options before finally finding the infrared heaters," said Marv Dunwald, owner of Dunwald & Fleming who struggled to identify alternatives to coal and straw. First, he tried glycol boiler systems to heat the ground, but they proved to be extremely inefficient for utility work. "There was so much heat loss that it would take three to four days just to thaw one foot of ground," he said.

Next, Dunwald experimented with trailer-mounted units, which he found to be cumbersome. "A trailer only

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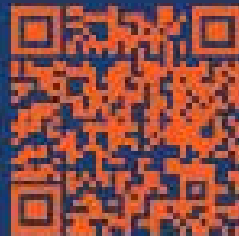
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thaws about 12 feet at a time," he said. "Plus, there are only about 10 units in all of Calgary, so nobody can get their hands on one."

Upon discovering the Toasters, Dunwald ended his long, frustrating search and purchased 10 units. Therefore, his plan for the Skyview Ranch job was to line all 10 of them up to thaw 100 feet of ground at a

time. After one stretch of ground had thawed, he would move the Toasters ahead to start heating more frozen ground while his crew trenched the first 100 feet. The process would be repeated until 1,000 feet of ground had been thawed and trenched with gas lines installed and the dirt backfilled.

The infrared units provided a safe, quiet heat source, allowing Dunwald to place the Toasters against buildings and fences, and let them operate overnight without close supervision. "Glycol boilers would have been too noisy to operate overnight near residential areas," said Dunwald, "and most other systems use open flames, which would have been a fire hazard on our jobsite."

It took approximately 24 hours for the Toasters to thaw one meter (deep enough to install the gas lines). Therefore, every morning when the crew got to the jobsite, they could move the Toasters, and the ground would be ready for trenching. "With coal and straw we would only thaw about one foot every 24 hours," said Dunwald. "The infrared heat worked up to three times faster."

Not only did the infrared heat system increase Dunwald's productivity, but it also helped his crew work safely next to the existing utility lines. "We had the inside path, so we were constantly crossing our lines with other utilities," he said. But, thankfully, the ground was thawed well enough that Dunwald didn't have to be too forceful when trenching

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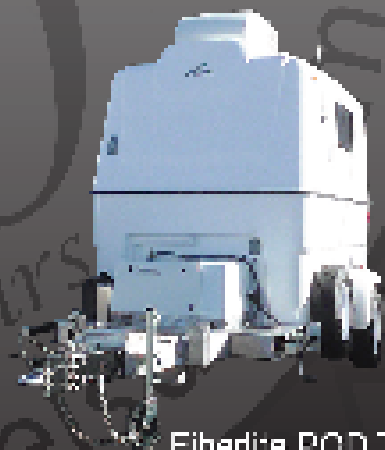
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with his Yanmar mini excavator. "We could have used a shovel to dig," he said.

The gas line installation spanned 10 days, and all buildings were ready to be occupied by the January deadline. Without the infrared heaters, Dunwald isn't sure what might have happened. Consequently, both ATCO and the developer were fully enthused by Dunwald's work. "The developer wanted to buy our Toasters on the spot," Dunwald said.

His only regret was not having enough units to get the job done even faster. "We could have worked a lot quicker if we had more than 10 Toasters," he said. "Then again, the same job might have taken us 30 days if we didn't have any."

Since working on the Skyview Ranch project, Dunwald has better prepared himself for future underground installations. He eventually purchased 20 more Toasters, giving him a total of 30. He's used them on a

variety of other jobs – both commercial and residential. "The Toasters have given us the upper hand in Calgary, and more work has started to flow our way," Dunwald said.


With happy clients and an increasing workload, Dunwald is thankful for the infrared technology that allows him to trench during winter months. And the coal-burning ban that once hampered his business has finally provided a silver lining. Now that he offers services that no other contractor in Calgary can match, when it comes to underground utility installations, Dunwald definitely has the hot hand. •



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# WIRELESS SMART GRID COMMUNICATIONS

A Mesh versus Point-to-Multipoint Comparison

TWO APPROACHES TO WIRELESS UTILITY COMMUNICATIONS:  
WHAT WORKS BEST FOR AMR, AMI, DA, AND SCADA?

Utilities have discovered the benefits of wireless communications and now deploy them widely for Automated Meter Reading (AMR), Advanced Metering Infrastructure (AMI), Distribution Automation (DA) and Supervisory Control and Data Acquisition (SCADA). Two approaches have come to dominate the industry among electric, water and gas service providers seeking a backbone for their smart grid communications:

1. Privately licensed spectrum signals carried over a point-to-multipoint network architecture, and
2. Publicly available spectrum signals carried over a mesh network architecture.

The two approaches differ in architecture and signal type, yet both are used in all four types of applications. This paper provides guidelines for utilities selecting and designing their wireless utility networks. It will compare, contrast and evaluate the two approaches as they relate to real utility challenges. This paper will begin with a brief look at the two distinct architectural designs; then examine the wireless spectrum characteristics of each approach. Next, it will introduce the opportunities and challenges of wireless networking for each type of utility communications project: AMR, AMI, DA and SCADA. Individual charts will outline the evaluative criteria most important in assessing wireless communications for each application. Having thoroughly examined signal attributes, business and regional challenges, architectural impacts, and many other factors impacting wireless utility communications, the paper will conclude with a general recommendation to help buyers make smart choices when investing in a wireless communications network.



## ARCHITECTURAL APPROACHES

Mesh and point-to-multipoint are two distinct architectural approaches to two-way radio communication networks. In a mesh network, many radios (also referred to as endpoints) can talk to each other, peer-to-peer. Each point on the network can receive, store and transmit signals to other points in many directions. In a point-to-multipoint network, there is a "master/slave" relationship in which a single point can talk to all the other points individually and they can talk back to it—but not to each other.

There are advantages and disadvantages to the two topographies and this paper will consider them as they can be applied to meet the needs of four important types of mission-critical utility communications: AMR, AMI, DA and SCADA.

## SIGNAL TRANSMISSION CHARACTERISTICS PRIVACY

All mesh networks all use unlicensed spectrum for their communications channel. They operate on public, not private channels. Often referred to as the industrial, scientific and medical (ISM) frequency band, this spectrum is shared with a wide range of devices including cordless telephones, baby monitors, and wireless Internet access modems. Internationally, ISM bands are defined by the International Telecommunication Union (ITU) Table of Frequency Allocations, in sections 5.138 and 5.150 of the Radio Regulations. Individual countries' use of the bands designated in these sections may differ due to variations in national radio regulations. Typical global ISM bands are 900 MHz, 2.4 GHz, and 5.8 GHz.

In the United States, ISM devices are regulated by the Federal Communications Commission (FCC) under Code of Federal Regulations 47 Part 15. Specifically, CFR 47§15.5 contains a general provision that devices may not cause interference and must accept interference from other sources. It also prohibits the operation of devices once the operator is notified by the FCC that the device is causing interference. Currently the FCC has type accepted (approved for use) over 9,000 different models of devices that can be sold and operate in the 902-928 MHz ISM band.

With these many devices operating without specific coordination or oversight, interference is not just probable, it is palpable.

On the contrary, licensed spectrum networks are private. Government regulators lease or sell use of an assigned bandwidth range which may only be used by a specific licensed user in a particular region. Interference is not tolerated within that region, and is protected by government agency enforcement, as noted above.

## SIGNAL-TO-NOISE RATIO (SNR) & INTERFERENCE

Unlicensed mesh networks often have a high noise floor. A noise floor is like people talking during a movie; due to the number of voices being heard, understanding what's being said during the movie becomes more difficult. When industrial, institutional and medical devices are all sharing spectrum, the noise floor is high. With more devices "talking" above, below, and even on the same operating frequency, utilities that deploy a mesh system architecture face challenges in the signal-to-noise ratio because the public spectrum receiver sensitivity is reduced, causing signal to noise ratios to fall. High signal-to-noise ratios are ideal because they offer superior throughput and reliability. Unfortunately mesh networks are vulnerable to high noise levels generated in shared frequencies. This reduces the ratio and provides inferior throughput and reliability.

A common tactic to combat low signal-to-noise ratios is to reduce the distance between a transmitter and receiver in which an access point/ collector can operate. Within a dramatically smaller operating area, endpoints are physically closer and signal-to-noise ratios are increased. Even if noise is prevalent in an area, stronger SNRs can overcome interference but with a significant loss of range.

Another approach to avoiding interference is to exploit access to a wide or large band by either: (1) sending a Direct Sequence, high speed transmission to disperse the signal across the band, much like a garden hose spray can be fanned out to a wide fast flow; or (2) Frequency Hopping, in which the signal switches rapidly from one frequency to another according to a pseudorandom code.

Licensed spectrum systems have a naturally low noise floor, maintaining excellent signal-to-noise ratios even across larger distances and in the presence of signals on nearby bands. And like an open highway, signal traffic can move swiftly and travel further than when plagued by congestion.

## RANGE

Unlicensed mesh networks, being public, are prohibited from generating more than one watt of output, so their signals' range is limited. (This is the case in the U.S.; allowable power output varies from country to country and ISM band to ISM band.) Even if they could transmit further, they would suffer poor signal-to-noise ratios across longer distances. For these reasons, mesh networks locate many points close together and move signals across a larger area through a series of short range transmissions to intermediate nodes.

Licensed spectrum systems enable utilities to use higher power levels to optimize performance. Because of

this flexibility, licensed spectrum networks are virtually interference-free and untroubled by crowded channels, as opposed to mesh networks whose power allotment largely relegates architecture to line-of-sight coverage only. Licensed spectrum signals routinely reach many times the distance of mesh signals.

#### BANDWIDTH REQUIREMENTS

Unlicensed mesh networks use a lot of bandwidth for each transmission because the data 'hops' from node to node and requires a new slice of spectrum for each step. As such, the cumulative sum of bandwidth for sending a signal from its source to a final endpoint can really add up.

Licensed spectrum systems can work with a narrower band; however private spectrum is not as abundant as public spectrum. It's not free, either; but must be purchased or leased, sometimes in auctions where bidders must compete for licensed bandwidth.

#### LATENCY

Unlicensed mesh networks involve a processing step with each node they reach, and this slows the signals process to its destination. This lag or latency increases not only with distance but when there is traffic from voice communications or a high volume of other data.

In the example below, a 100 Kbps data stream is affected by latency issues. As data travels from endpoint to a collector via two nodes, the wide bandwidth is reduced to only 5 Kbps throughput. Assuming an average of only one hop, a theoretical 100 byte packet can be transmitted only 12 times a second.

The only way to reduce latency to improve data throughput is to reduce the number of hops but this means more backhaul. Mesh networks' backhaul typically consists of collectors connected to a DSL line, fiber, microwave or cellular 3G+ connection. Assuming a two square mile collector coverage area within a typical 400 square mile territory (20 miles by 20 miles), 200 collectors would be needed to support the entire territory. This would mean 200 broadband connections, one to each collector. Prices for backhaul will differ depending on methodology and system requirements, but for many sites, both costs and system complexity increase.

Licensed spectrum systems allow signals to move through fewer or no midpoint nodes, so processing time is minimal and the signal moves swiftly to its destination. Low latency, or reduced delay time, may be increasingly important in the data-heavy smart grid era of the 21st century.

#### TOP EVALUATIVE CRITERIA FOR UTILITY COMMUNICATIONS APPLICATIONS: WHAT MATTERS AND WHY

What factors should utilities consider when planning their communications networks? Which should they weigh most heavily? Now that we've established the radio qualities and architectural considerations that differentiate each approach, we will note which of these and other top considerations most impact the performance of a wireless network.

The Top Factors To Consider Include:

1. Cost
2. Privacy and Security
3. Reliability
4. Redundancy
5. Range
6. Signal to Noise Ratio/Interference
7. Latency
8. Interoperability
9. Scalability
10. Resistance to obsolescence
11. Ruggedness in weather
12. Geographic challenges

Which matters most? It depends on your project requirements. Each of these factors is of varying importance depending on whether the deployment will be for an automated meter reading program, advanced meter infrastructure, distribution automation program or SCADA. This paper will consider the evaluative criteria for each program in turn.

#### AUTOMATED METER READING (AMR)

The basic improvement from reading analog meters by hand (and writing and sending written reports) to automated data gathering, whether by a walk-by or drive-by utility worker, can significantly increase operational efficiency, accuracy and control.

Which factors in wireless communications matter most when selecting a solution for an AMR program? While each utility will have unique needs that can impact the urgency of particular considerations, this chart is a simple

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way to begin sorting and prioritizing the factors needed for a successful wireless network deployment.

#### ADVANCED METERING INFRASTRUCTURE (AMI)

When a utility establishes a fixed infrastructure—in which data moves from homes and businesses into utility operations and business processes systems (providing data to manage the flow of power and to inform billing and maintenance services)—it gains a platform for true smart grid applications. Equipped with real-time, two-way communications, utilities receive data at greater frequency and can use it to build improved customer service and to enable consumer participation in time-of-use pricing programs and other peak shifting programs that benefit utility and customer alike.

By eliminating the need for walk-by or drive-by meter reading, utilities can reduce their carbon footprint and the costs associated with training, insuring and transporting workers to meter sites. Utilities that provide a combination of services can streamline data gathering into a single system, delivering operational efficiencies, conserving resources and reducing or eliminating redundant and/or siloed data collection and communications systems for electricity, gas and/or water customers.

#### DISTRIBUTION AUTOMATION

Wireless communications in distribution automation unlock the intelligence of the grid by enabling real-time monitoring of a wide array of automation technologies across dispersed assets where physical communication lines would be costly to install and difficult to access for maintenance or monitoring. Wireless networks communicate with distribution automation assets including reclosers, capacitor controls, switch controls, faulted circuit indicators, voltage regulators, breakers and other status monitoring applications. Many routine operations that formerly required sending personnel to visit distant sites can be supervised from the operations center, allowing faster response to events. Engineers can view operations history and other historical data, such as load data from line reclosers, for improved system planning. Faster power restoration and greater efficiency and reliability in transmission and distribution efforts ultimately deliver results that build satisfaction among investors and rate payers.

The challenge of “last mile” communications is ideally treated with wireless communications, often providing utilities the first affordable and reliable link to remote substations. By strengthening this weakest link in utility enterprise communications, wireless networks help enable end-to-end smart grid operations.

#### SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA)

Wireless communications networks for Supervisory Control and Data Acquisition (SCADA) provide affordable, fast and reliable communications that work with any configuration or architecture. They help give “legs” to SCADA’s oversight authority. They add flexibility and can enhance security for SCADA when prudently deployed. Communications between a substation’s intelligent devices and control center SCADA provides essential data for multiple, simultaneous mission-critical operations, including protection, automation, control and testing; asset monitoring and management; remote configuration management; engineering access; and remote data collection and analysis.

#### CONCLUSION: A BUYER’S GUIDE TO SMART WIRELESS INVESTING

The factors that affect a utility’s choice of a wireless network are highly influenced by the individual organization’s resources, goals and challenges. In practice, a combination of mesh and private/point-multipoint approaches may exist across a utility’s different applications or even within them as projects scale and grow. For example, a small metering mesh network may connect to a point-multipoint communications network for backhaul of data to a centralized control center.

Both approaches are based on open standards and can be scaled to grow. To maximize return and “future proof” an investment, avoid any network that requires all proprietary communications and lacks interoperability with other vendor solutions.

While private spectrum offers greater privacy, security, range, signal-to-noise ratio and latency, public spectrum is free and its topography provides innate redundancy. Consider the cost of spectrum and infrastructure installation as well as maintenance expenses throughout the lifecycle of the assets.

By weighing the factors outlined in this paper and building a business case carefully, utilities can select a wireless communications network that will fit their current budget and future needs, deliver equal or improved reliability and support long term customer satisfaction with rates and services. •

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Greenlee® launches new 6-ton Pistol Grip Crimping Tool



Greenlee® / A Textron Company (NYSE: TXT) continues to drive innovation by adding to its extensive line of crimping tools with the new 6-ton Pistol Grip, model EK622PLU. This crimping tool offers the ergonomics, intelligence and accountability that is found in all Greenlee Gator crimping products.

The 6-ton Pistol Grip is developed for underground and overhead utility applications, as well as industrial and commercial environments. Its lightweight, ergonomic design is perfect for work in overhead or tight environments at just 6.5 pounds. This crimper offers a two-stage hydraulic system that has fast feed and power stroke features, automated retraction, and single trigger operation controls.

The new crimping tool comes with proven Intelli-CRIMP™ technology that monitors the tool 32 times every second, and is the most intelligent crimping tool on the market today. Its compatibility with Greenlee's Gator Eye™ allows users to get the most from their tool with the ability to track work history, generate reports, performance logs, and indicates when the tools needs to be recalibrated.

The 6-ton Pistol Grip is compatible with all major lug and splice manufacturers - UL and cUL classified with Anderson®, Blankburn®, Burndy®, ILSCO®, Panduit®, Penn Union® and Thomas & Betts®, and both U and W style dies. It accepts Greenlee KC22 and KA22 series crimp dies and includes 04292 die adaptors, which can be used with all industry "W" style crimping dies and Greenlee KD6 style dies. It can also be used on copper material #8AWG-600MCM and aluminum material #8AWG-350MCM.

For product videos and demonstrations visit [www.youtube.com/GreenleeDEMO](http://www.youtube.com/GreenleeDEMO)

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is proud to introduce its newest additions in fiber optic installation and maintenance tools as part of its Greenlee Communications line. Greenlee Communications' Mini fiberTOOLS are small, lightweight and rugged, and designed to be used in demanding environments. They include, Optical Light Sources (OLS), Optical Power Meters (OPM) and Video Inspection Scopes.

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The Video Inspection Scopes' unique focusing mechanism allows for convenient singlehanded operation. The GVIS 400-HDP Video Inspection Scope is equipped with industry leading field of view that allows the technician to view and analyze outside all zones of the ferrule end face, and is equipped with automatic PASS/FAIL analysis software compliant to IEC 61300-3-35 standards. Live images and data can be transmitted through USB or Wi-Fi to smart phones and tablets from the GVIS 400-HDP probe via the GPAD 250 for analysis in the GVIS application utilizing Andriod platforms. The GVIS application will also be available soon for Windows and iOS platforms.

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New Load Support Kits For 2009-2015 Ram 1500 From Air Lift Company



New load support solutions from towing safety experts Air Lift Company are available for the suspension system on 2009- 2015 RAM 1500 half-ton pickup trucks. The LoadLifter 5000(tm) and LoadLifter 5000(tm) ULTIMATE are industry-leading air spring kits designed to

improve ride quality, handling and safety when towing and hauling heavy loads.

To provide additional support for the new five-link-coil rear suspension system of the two-wheel and four-wheel drive RAM 1500 models, Air Lift engineered two heavy-duty towing options featuring application-specific brackets and air springs. Air Lift adjustable air spring kits ensure that weight is properly distributed to all four tires to maximize vehicle stability, safety and comfort. Working with the existing suspension, air springs improve braking and steering, eliminate squat and sway and maintain ideal ride height.

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GPS Insight Now Providing Garmin Custom Forms For Mobile Data Collection

GPS Insight, a top technology provider of GPS



fleet and asset tracking for commercial fleets, announced today the release of Garmin custom forms. This new feature improves the way businesses manage their mobile workforce from the field without all the traditional paperwork.

GPS Insight customers are now able to design and send their own custom forms through the GPS Insight portal. Drivers can easily fill out the forms and take the Garmin device from the cab to record data on-the-spot. Customers are also able to receive form submittals over-the-air from drivers using the devices and analyze the data as it is collected in real-time.

This new feature came at the request from a number of customers that needed to integrate unique data collection, based on their specific business needs, with GPS Insight's fleet tracking software. Garmin custom forms eliminate time wasted with paper submission and allow customers to gather data from the field in real-time. Businesses can use custom forms to expedite billing, identify crew members for payroll, track inventory, log pre and post trip inspections, and much more.

"With the ability to create our own custom forms, this will allow West Coast Sand & Gravel

to gather billing information in real-time as to expedite our billing and invoicing processes to suppliers and customers. This new custom form feature will also remove the timely process of converting data from paper to digital," said William Nyenhuis, IT Helpdesk at West Coast Sand & Gravel.

Rob Donat, Founder & CEO of GPS Insight stated, "GPS Insight continually improves our product in order help customers become more efficient and save more money. Integrating custom forms through our GPS fleet tracking platform will allow customers to gather and analyze mobile workforce data specific to their businesses, and give them more insight to better drive efficiencies."

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

KEMTRON Technologies Introduces New Tango 600HD2™ Packaged Mud Recycling at 2015 Underground Construction Technology Conference & Exhibition

KEMTRON Technologies introduces new and improved Tango 600HD2™ packaged mud recycling system for the trenchless and underground construction industry.

KEMTRON Technologies has become a leading manufacturer of effective mud recycling systems in North America. Designed for today's HDD drilling contractor with 80k to 150k pullback rigs in the trenchless, waterwell, or geothermal industry. Capable of processing 600 gallons per minute of drilling fluid, the Tango unit is a high performing recycling system with a compact user-friendly design.

Featuring an industry first touch screen control panel with Wi-Fi capabilities, the Tango 600HD2™ allows the operator to run the system from a smart phone, tablet or laptop. In addition, the Tango 600HD2™ features the new Hyper-G™ six-panel linear motion shaker with increased G-force output & single-point leveling jack, Firestone™ single-piece vibration isolation system, independent centrifugal pump pockets for direct maintenance access and eight 4" desilter hydrocyclone manifold capable of cleaning fluid down to 25 microns.

Trailer mounted systems feature a Dexter™ rated heavy-duty dual-axle configuration and hydraulic leveling jacks for efficient unit placement at rig site. The Tango 600HD2™ tank has been significantly increased from 3,000 gallons to an impressive 4,000 gallon capacity with new fold out / walk up ladder and increased working deck space. Combine all this with a sound-attenuated 100kw generator package, the Tango 600HD2™ packaged mud recycling is the perfect solution for your solids control needs.

KEMTRON Technologies has been manufacturing solids control and waste management equipment for over 25 years. Visit our booth #1415 at the UCT 2015 Conference and Exhibition to see the new Tango 600HD2.

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## TUS NEW PRODUCT NEWS

Motion Introduces the Ideal Sidekick for your Work Day with the CL920 Rugged Tablet Platform

Motion Computing today released its next generation of CL-series mobile technology. The Motion CL920 Rugged Tablet Platform includes a 69% faster Windows®-based 10.1" rugged tablet along with a line of purpose-built accessories for service contractors, manufacturing and retail distribution. Integrated features like 4G LTE and SnapWorks™ by Motion further streamline the workday.

"With every product we create, Motion promises to deliver benefits for both the user and the company," said Peter Poulin, VP of Marketing for Motion. "For the company we reduce deployment risk and lower total cost of ownership. For the user we increase efficiency, accuracy and safety. Our sleek and small CL920 Platform fulfills our brand promise and does so much more than it looks like it can. With a line of productivity-enhancing accessories, it is the perfect technology partner for uses at the plant, in the field, or anywhere in between."

Weighing under 2 pounds, running Windows® 7 or Windows® 8.1 and featuring the latest Intel® Pentium® quad core processor, the new CL920 is 69% faster than the previous CL model. 4G LTE ensures rapid connectivity while SnapWorks™ by Motion image capture software increases efficiency and productivity. The CL920 Tablet is MIL-STD-810G and IP52 tested, built around an internal magnesium

frame and fortified with Corning® Gorilla® Glass 3. The CL920 also features a new signature Motion dot-pattern design for a ruggedized, non-slip surface texture. A line of purpose-built accessories includes SlateMate™ with a barcode scanner and magstripe reader, ReadyDock™ storage and charging cabinet, mobile dock with key lock in-vehicle mount, cases and straps.

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

### Youngstown Ground Glove



Youngstown's new 27 Cal Ground Glove is a high performance goat grain work glove that is designed to improve dexterity, comfort, safety and compliance for utility workers. The glove features a modern 3D design pattern and double layering of high quality goat grain

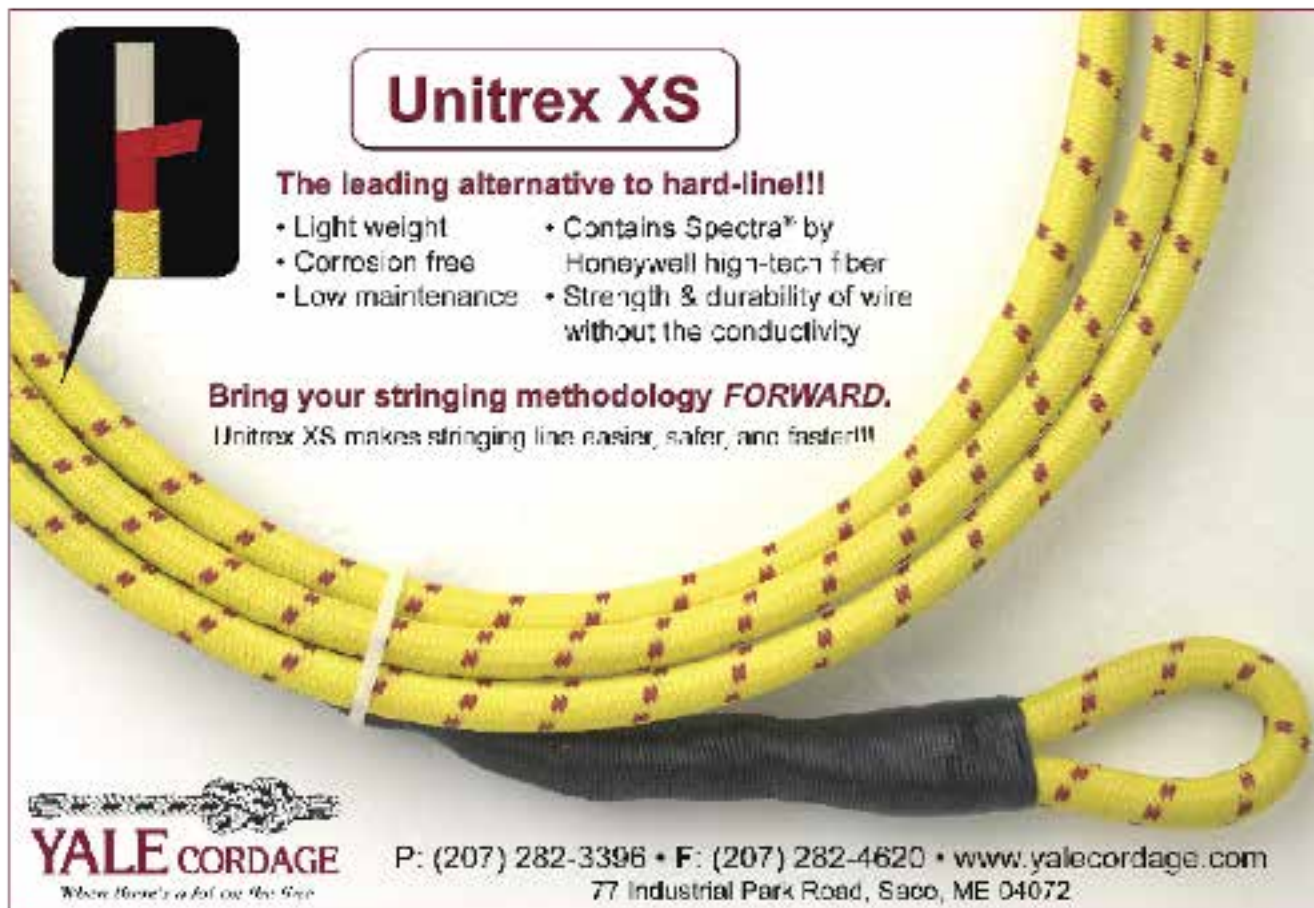
leather in all the critical wear areas. The result is a glove that fits great and offers outstanding durability. Youngstown guarantees 2 months minimum use for utility field workers with this glove. Compare that to the 'low bid driver gloves' most places use where a worker may only get 1 or 2 weeks out of a single pair. Over the course of a year this leads to significant costs savings per worker while also greatly easing the burden of continual ordering of low quality gloves. The 27 Cal Ground Glove is compliant to OSHA 1926 standards and NFPA 70e. It also has an Arc Rating of 27 Cal. Cost savings. Compliance. Comfort. Dexterity. Durability. Take Safety Into Your Own Hands!

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

### Ultra Pad from Bigfoot Outrigger Pads

The new Ultra Pad from Bigfoot Outrigger Pads is designed to reduce slipping of the outrigger as well as reduce tripping hazards with high visibility safety orange. Made in America from high-grade plastics (UHMW Blend), this new product is available in 24" x 24" x 1" and 22" x 24" x 1". "Supporting Safety" is one of our main priorities, and guides every choice from the initial design and the materials we use to the manufacturing process.

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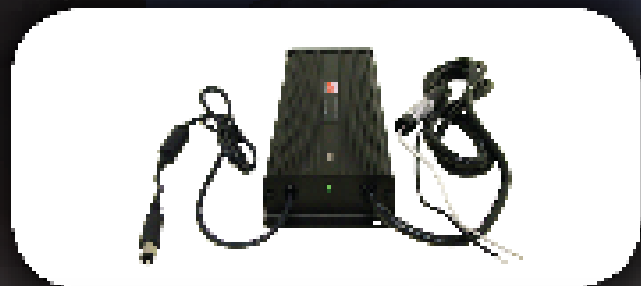
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# ISOLATED PROTECTION TO PREVENT GROUND LOOPS



The Lind Isolated Power Adapter provides a regulated, isolated DC output to power laptops, thin clients, monitors and other devices from a DC voltage source. Output and input DC returns are isolated, allowing the prevention of possible electrical noise caused by ground loops.

Lind's Isolated Power Adapter are built to work with most existing laptop brands and models. These adapters can also be designed for custom applications. Contact Lind to discuss solutions for your exact mobile power needs.

The Isolated Power Adapter's electronics are enclosed by an epoxy-sealed case to protect the internal circuits from damage caused by shock and/or vibration. Its durable construction withstands extensive wear and tear in any harsh mobile environment. Snap-in connectors make replacing missing or damaged cables from anywhere in the field easy and hassle-free.



POWER SPECIALISTS FOR  
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I-80 Truck Sales	3	www.i80equipment.com
Lind Electronics	21, 31	www.lindelectronics.com
MSA Safety	IBC	www.msasafety.com
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