



The connected utility:

Delivering a new level of productivity
and customer service







A balancing act: managing consumer, regulatory and investor demands

Today's utilities face many new challenges that threaten profitability. Ever-volatile energy prices are reaching new highs, pressuring margins and forcing price increases. Consumer demand is on the rise. Safety and security are a major concern. An aging workforce is being replaced by a new workforce with less experience. Customer service has become even more critical than ever before in maintaining customer retention and regulatory compliance. The Energy Policy Act of 2005, Public Utilities Commission (PUC) guidelines and mandates effecting Smart Metering and AMI as well as SAIDI, CAIDI, SAIFI and MAIFI all require or strongly urge utilities to meet increased metrics for uptime and customer satisfaction. And in the face of increasing environmental regulatory demands, key stakeholders — including investors, customers and regulators — are concerned about the utility's ability to continue to meet cost containment expectations.

To address these challenges, the utility must find a way to balance multiple initiatives without significantly impacting operational costs. Production must be increased to meet rising demand. Customer service must be improved. And shareholder value must be increased to spur investment in the company. To manage these seemingly overwhelming issues without a significant rise in pricing, the utility needs to achieve an extraordinary level of efficiency throughout all operations — from production to field and customer service and accounting. An enterprise-wide strategy that enables the interconnection of the utility's infrastructure, workforce and customers can unlock the efficiencies that are trapped in manual processes — helping utilities meet the many challenges today while providing a platform to support the challenges of tomorrow.



The solution: the connected utility

Imagine if you could create a real-time network in which information could flow seamlessly between work teams, customers and critical infrastructure — regardless of location or how many networks might be involved. Imagine the visibility required to detect and respond to equipment issues before service interruptions occur. Imagine the impact on your cash flow if you could automatically transmit billing information into your billing systems. Imagine the impact on production and customer service levels if workforce productivity was significantly increased. Imagine the impact on your business and profitability if you could do more — without adding people or assets.

You have just imagined the connected utility.

In the connected utility, information easily moves to the point of most impact — instantly, automatically and virtually without error — delivering a new level of operational efficiency. Information flows seamlessly throughout the grid, to and from employees and customers inside and outside the enterprise as well as your many assets. This enterprise-wide solution provides real-time accurate data and real-time visibility into the performance of your field workforce, consumer consumption, equipment performance, and the whereabouts and utilization of your many assets — from trucks on the road to parts on the warehouse shelves. This complete interconnection of all aspects of the utility enables a new level of information agility — the ability to instantly disperse the right information to the right person at the right time — providing the foundation for many applications that drive inefficiencies and cost out of the utility — and productivity and profitability in. And the resulting advanced streamlining of operations can yield dramatic results: a new level of workforce efficiency, system uptime, employee safety and customer service and satisfaction levels — and a new level of cost-efficiency in production and delivery.



The architecture of the connected utility

The connected utility replaces a patchwork quilt of point solutions that are not only difficult and expensive to manage, maintain and upgrade, but also create silos of information within the enterprise — silos that are implemented to improve efficiencies, but actually hinder visibility into the business. The foundation for the connected utility is a single cohesive standards-based enterprise-wide platform capable of providing the coverage, capacity, control and capabilities you need today and tomorrow.

The connected utility requires:

The right networks

Creating a network capable of interconnecting workers, customers and equipment requires a 'network of networks', since the typical utility covers an expansive area. Motorola's mesh-enabled wireless LANs can provide the cost-effective extension of voice and data services to workers and equipment inside and outside the four walls. Out in the field, Motorola's point-to-point and point-to-multipoint solutions enable the wireless interconnection of plants, substations and more to automate equipment monitoring and distribution. And Motorola's two-way radio networks and private wireless WANs enable the extension of voice and data to workers in the field, eliminating monthly fees for cellular service and providing the control needed to ensure the continuity of on-the-spot communications — even in the face of natural disasters that might disrupt service in the public networks.

The right application software

Regardless of your application requirements or where in the world you are located, Motorola's global partner ecosystem brings the expertise you need, right to your doorstep. Motorola offers an unmatched array of applications that incorporate industry best practices — including SCADA networks, field service automation, automated meter reading and asset management — with end-to-end implementation that includes seamless integration with your existing front and back end systems.

The right mobile devices

The utility environment is one of the most demanding — workers spend a majority of the workday outside, where devices will be exposed to the elements and subjected to ongoing shocks and impacts. Motorola offers a complete line of rugged industrial class devices designed to endure a wide range of environmental conditions, including heat, cold, moisture and dust. This class of devices is also subjected to some of the industry's most stringent impact testing, providing reliable performance in spite of the inevitable drops. And to cost-effectively meet the diverse needs throughout your workforce, Motorola offers a comprehensive device portfolio with a wide range of capabilities — from two-way radios to all-in-one handheld mobile computers that offer voice, data, bar code scanning and imaging.

Regardless of which rugged device you choose, you can count on a comprehensive breadth of features, quality and thoughtful design inside and out. Advanced power management ensures full shift

Middle Tennessee Electric Membership Corporation (MTEMC)

...distributing electricity to thousands of homes in a four county area

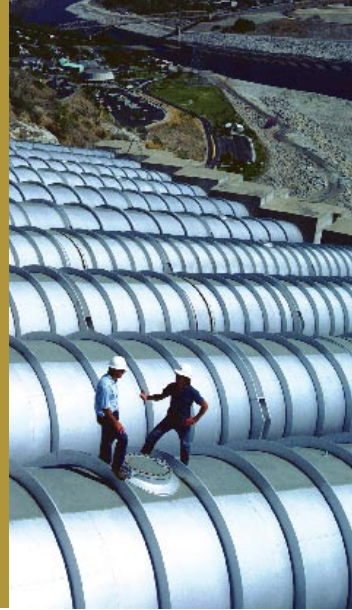
Issue: When the utility tripled in size over three decades, the aging communications system was no longer able to handle the company's needs — which accounted to an average of 50,000 minutes per month. The company was seeking to upgrade to an advanced system that would offer the latest in voice and data communications as well as the reliability and availability the company required during emergencies — including weather-related events. **Solution:** Motorola's Harmony system, a private WAN offering low-cost IP connectivity, provided all the functionality the company would need over time: traffic handling, private and group calling, telephone interconnect, paging, multiple talk groups, emergency calls and more. **Result:** "The Harmony system is the ideal solution, with features and functions that will enhance our efficiency, at a cost comparable to that of a traditional trunked radio system. The partnership of Motorola and Middle Tennessee offers new opportunities to provide greater service, more security for our personnel in the field and higher reliability levels to our growing membership." — Shawn Long, Telecommunications Specialist, MTEMC



CenterPoint Energy Company

...a natural gas utility serving over 730,000 residential, commercial and industrial customers in five states

Issue: The obsolete equipment in CenterPoint's aging communication system was unable to offer the expanded capabilities the company required to support company growth, the expansive geography and expanded service to customers. The company was seeking a system that would provide the capabilities needed to improve responsiveness and meet pending government regulations. **Solution:** The company migrated from the public network to a private wireless digital network delivering integrated voice and data. **Result:** Today, CenterPoint enjoys greater voice capabilities, faster response times, vastly improved voice clarity, and a dramatic improvement in coverage and the reliability of coverage. And, says Randy Jones, Mobile Data and Radio Process Coordinator for CenterPoint Energy Company, "The mobile data component has had a large impact on our operations too, since we relay all orders to our service technicians across three states. Now we are able to transmit and track orders and receive completion reports in real time." Said Jones in summary, "The new Motorola System provides us with the ability to respond more effectively in all situations."



availability, while the right ergonomics provide all-day everyday user comfort. The latest in processing power and memory provides support for the most demanding applications. And patented features ensure superior voice quality as well as first-time every-time accurate data capture.

The right management solutions

Management of a mobility solution can be a cumbersome and very expensive task, with ongoing costs heavily outweighing that of the mobility solution itself. To address this need, Motorola offers management solutions with a difference. Motorola enables centralized and remote control of the entire enterprise mobility solution — from wireless infrastructure to mobile devices and mobile applications — helping to dramatically slash the time and costs typically associated with the management of mobile solutions. These solutions include the ability to:

- Stage devices and update applications, operating systems and firmware on thousands of devices no matter where they are located — all at the press of a button
- Monitor statistics for thousands of devices — including mobile computers and wireless infrastructure — enabling remote identification and resolution of support issues as well as the ability to identify and eliminate issues before service is affected

- Detect unauthorized users
- Separate the wired and wireless networks for superior security
- Collect and analyze data on all security breaches, providing the forensics to understand the steps required to prevent reoccurrence in the future

The right services

Since enterprise mobility solutions are the lifeline between your mobile employees and your critical business systems, service becomes an essential component. Motorola's Enterprise Mobility Services offer the end-to-end support you need to get and keep your enterprise mobility solution up and running at peak performance. Professional Services including Advanced Services provide assistance with planning and assessment through system design and deployment. Our Network Monitoring services offer peak network and operational performance, keeping mission critical networks operating smoothly and with little or no downtime.

Customer Services offer service levels well above and beyond standard warranty coverage, including a choice of repair turn-around times, response options, same day shipping for replacement units, on site service and more. The result is a solution designed from the start to deliver a maximum return on investment — and a low total cost of ownership.

Enterprise-wide applications for enterprise-wide efficiency

The connected utility enables the true mobilization of the enterprise — an interconnection of workers in the field and office, customers, business systems and your many assets, including production equipment, your fleet of vehicles and your inventory. Now, information can seamlessly flow throughout the grid, instantly reaching the point of most impact through mobile voice and data applications designed to deliver immediate return in the utility:

Distribution Automation and SCADA

Distribution Automation and computerized remote control of substations and power grids help electric utilities achieve higher reliability of supply and reduce operating and maintenance costs. Utilities can seamlessly interface with a wide range of high performance control centers. No longer tied to the desk, mobility allows workers to be deployed inside and outside the enterprise as needed to perform tasks while continuing to monitor the utility infrastructure. And the integrated substation solutions with connected backhaul empower utilities to:

- Automate substation assets through control, protection management and monitoring solutions
- Provide a secure perimeter for remote enterprise access to both operational and non-operational real time information
- Integrate SCADA and network management information networks for real-time analysis and reporting and visibility across the service territory
- Improve service levels, worker productivity and safety

Automated meter reading and advanced metering infrastructure

The automation of meter reading and the deployment of an advanced metering infrastructure deliver a host of benefits for the utility, including:

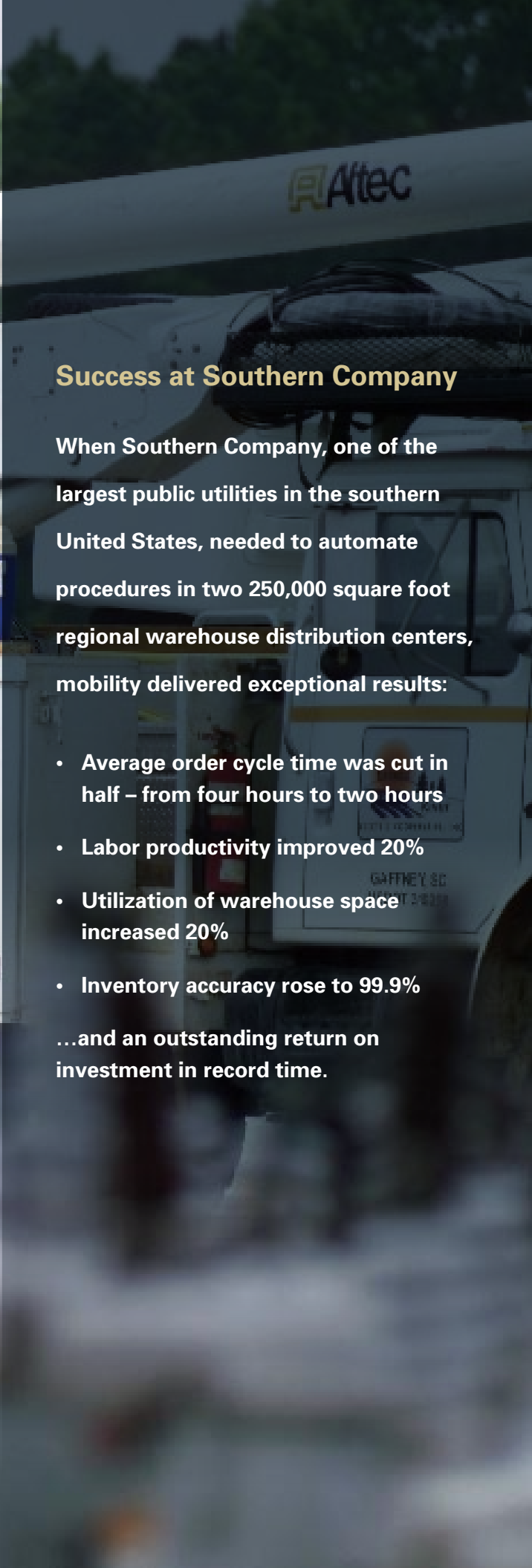
- Shorter wait time in the cycle between the time information is collected in the field and when the invoice reaches the consumer or

other end-customer — increasing the velocity of the billing and collections cycle and reducing the cash-to-cash cycle, directly impacting cash flow and profitability

- Improved billing accuracy and energy demand forecasts through the instant availability of Time of Use and load profiling information
- The ability to help customers to better manage their energy consumption through the availability of more timely information
- More accurate data collection through a direct machine interface that eliminates the errors that can occur in manual reading, as well as the subsequent potential loss of revenue
- More efficient data collection, which eliminates the manpower required to manually collect data, enables the re-deployment of personnel to more critical business tasks and provides better control over staffing costs
- Real-time monitoring of energy consumption and demand at any given point in time provides better control over production needs and costs
- The ability to deliver enhanced customer services, such as Time of Use and Critical Peak Pricing options as well as Outage Detection and Restoration Services

Business and mission critical communications

The extension of mobile voice and data in the utility improves productivity and customer service levels by allowing workers to maintain contact with customers, co-workers and managers — and can access critical resources, such as the company directory and email. Flexible voice services include one-to-one private calls and well as instant one-to-one or group-style walkie-talkie communications. The ability to monitor email throughout the day enables workers to stay on top of important messages — for example, an alarm message triggered by a customer outage notification that sets in motion work order dispatch and restoration activities.



Success at Southern Company

When Southern Company, one of the largest public utilities in the southern United States, needed to automate procedures in two 250,000 square foot regional warehouse distribution centers, mobility delivered exceptional results:

- Average order cycle time was cut in half – from four hours to two hours
- Labor productivity improved 20%
- Utilization of warehouse space increased 20%
- Inventory accuracy rose to 99.9%

...and an outstanding return on investment in record time.

The benefits of the connected utility

When you invest in the connected utility, you can expect real business advantage. By extending information availability to every literal and virtual corner of the utility, people and things throughout the grid achieve a new level of efficiency and effectiveness. And as those across-the-board performance improvements drive worker productivity, customer service, production levels and service interruptions to an all time high, the cost of doing business is reduced — without investing in additional staff or assets.

In addition, the connected utility makes smart investment sense. The standards-based enterprise mobility solution is built to support all the technologies of today, and easily upgradeable to enable the technologies of tomorrow — from new security protocols to new mobile device features.

The result is an architecture capable of serving business needs now and well into the foreseeable future, providing outstanding investment protection as well as a superior total cost of ownership (TCO) and return on investment (ROI).

Workforce automation

The ability to extend critical voice and data applications to the field enables the streamlining of a wide variety of applications that improve productivity and customer service:

- Service personnel can access repair history and other pertinent data to improve 'fix times' and 'first time fix rates'
- The ability to enable an inspector to complete and transmit an electronic form in real time eliminates the time and errors associated with completing a paper form and entering that data into a computer at a later time
- Mobile dispatch of field service and inspectors enables the dynamic changes needed throughout the workday to improve customer response times for increased customer satisfaction, as well as perform more timely equipment inspections to prevent unplanned service disruptions

Asset Management

When you can see which employee is in which truck, where that truck is located and what inventory is in the truck, the worker closest to the job with the right skills and the right tools and parts can be easily identified and dispatched to the right job. As a result:

- Vehicle utilization is improved, reducing mileage and repairs
- Workforce utilization is improved through the ability to match skill level and tasks
- Real-time inventory tracking enables enterprises to provide the right tools and parts at the right time
- Worker safety is improved through the instant visibility into the location of all employees



Santee Cooper Power

...delivering power to over 1.7 million South Carolina residents in 46 counties through 20 electrical cooperatives

Issue: An aging analog system was prone to interference and often unreliable. In addition, the power giant sought interoperability among its electrical cooperatives to ensure communications during power outages, emergencies and natural disasters. **Solution:** A private WAN, Motorola SmartZone Omnilink, provided coverage to two-thirds of the state, with 64 sites, over 2,200 subscriber units and 35 dispatch console positions. **Result:** Coverage, capacity and system reliability were dramatically improved, proven during devastating ice storms that knocked power out for 300,000 customers and involved at least six electrical cooperatives, including Mid-Carolina Electric. Said Lee Ayers, System Engineer for Mid-Carolina Electric: "It was wonderful to be able to switch to talk groups, receive transmissions from Santee Cooper, communicate directly with field personnel, and do it all safely. I've never experienced this kind of interoperability before in my 20 years on the job. We would not have had interoperability with a public system, nor the throughput and availability we could count on from a private system like Motorola's."

Palmetto Electric Cooperative

...providing power to nearly 60,000 homes in a three county area

Issue: The utility's older radio system did not provide the bandwidth or speed necessary to transmit critical SCADA data from 25 substations over a 650 square mile area. As a result, there were many time-consuming trips to the substations to collect the data. The company sought a cost-effective solution that would provide real-time access to the information — phone and T1 lines were not an option due to cost and complexities. **Solution:** Motorola's Canopy system met all the requirements, offering higher bandwidth, high reliability and plug-and-play simplicity with a short payback period. This T1 replacement now supports the company's SCADA network, providing backhaul and point-to-point communications between substations and the main office. **Result:** Walk-up meter readings that used to take a week are completed in hours. Says Gary Jeger, Vice President of Information Systems for Palmetto Electric Cooperative, "We have eliminated a lot of travel; we now access data in five minutes across 90 miles, end to end. We received a quality product with an excellent support network that helped us reduce costs and pass savings on to our customers." A definite competitive advantage.



Motorola... making the connected utility a reality

While connecting the utility makes smart business sense — making it happen can seem like an overwhelming and complicated initiative. When you choose Motorola to connect your utility, you choose an industry leader who offers the expertise required to turn your standalone point solutions into a cohesive network — quickly and cost-effectively. Motorola offers the expertise that comes from decades of technology and industry leadership.

As the developer of many wireless firsts, Motorola offers an in-depth understanding of the breadth of technology required to connect the enterprise. And the implementation of mobility solutions in many utility companies around the world ensures the

deep understanding of the processes and unique challenges in the utility for successful deployment. You can count on Motorola to bring a superior level of simplicity to planning, building and implementing your connected utility strategy. Our end-to-end solutions offer everything you need — from wireless networks, mobile devices, and a best-in-class global partner network offering proven and tested applications to management and security solutions and pre- and post-deployment services.

For more information on how you can reap the benefits of the utility of tomorrow today, contact Motorola at www.motorola.com/enterprise or 1-800-722-6234.



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