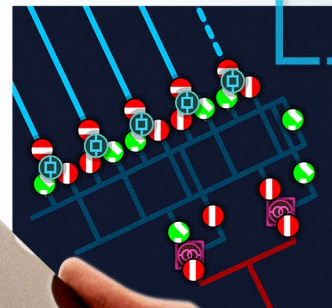
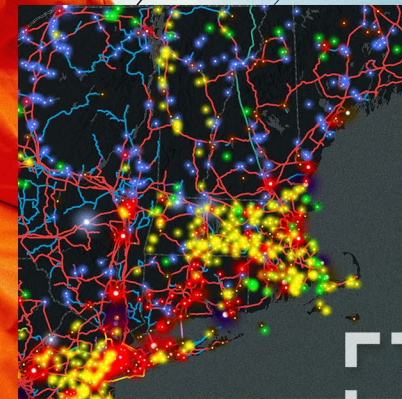


Electric and Gas Utilities

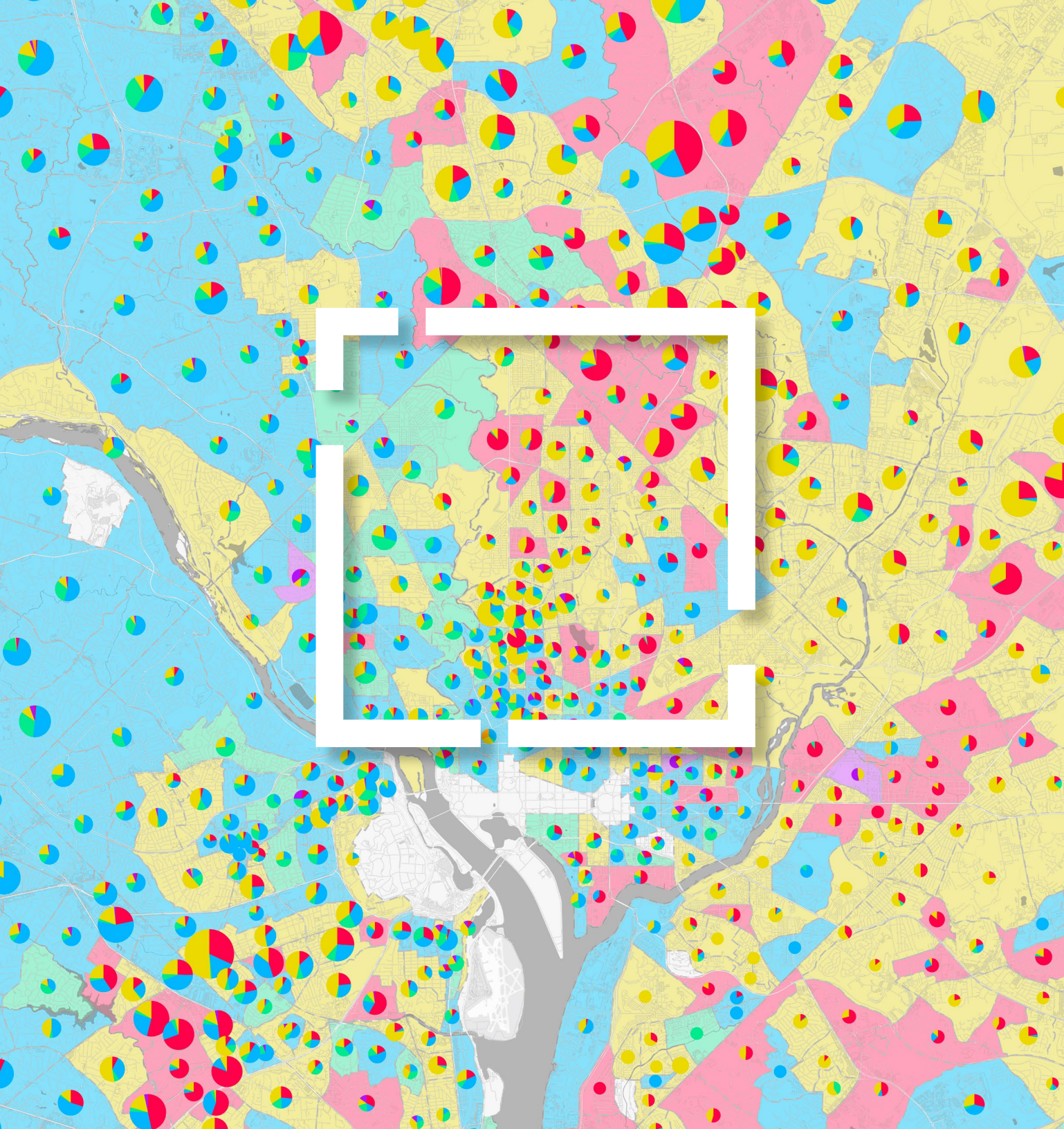
Successful Digital Utilities Enabled by Modern Network Information Management



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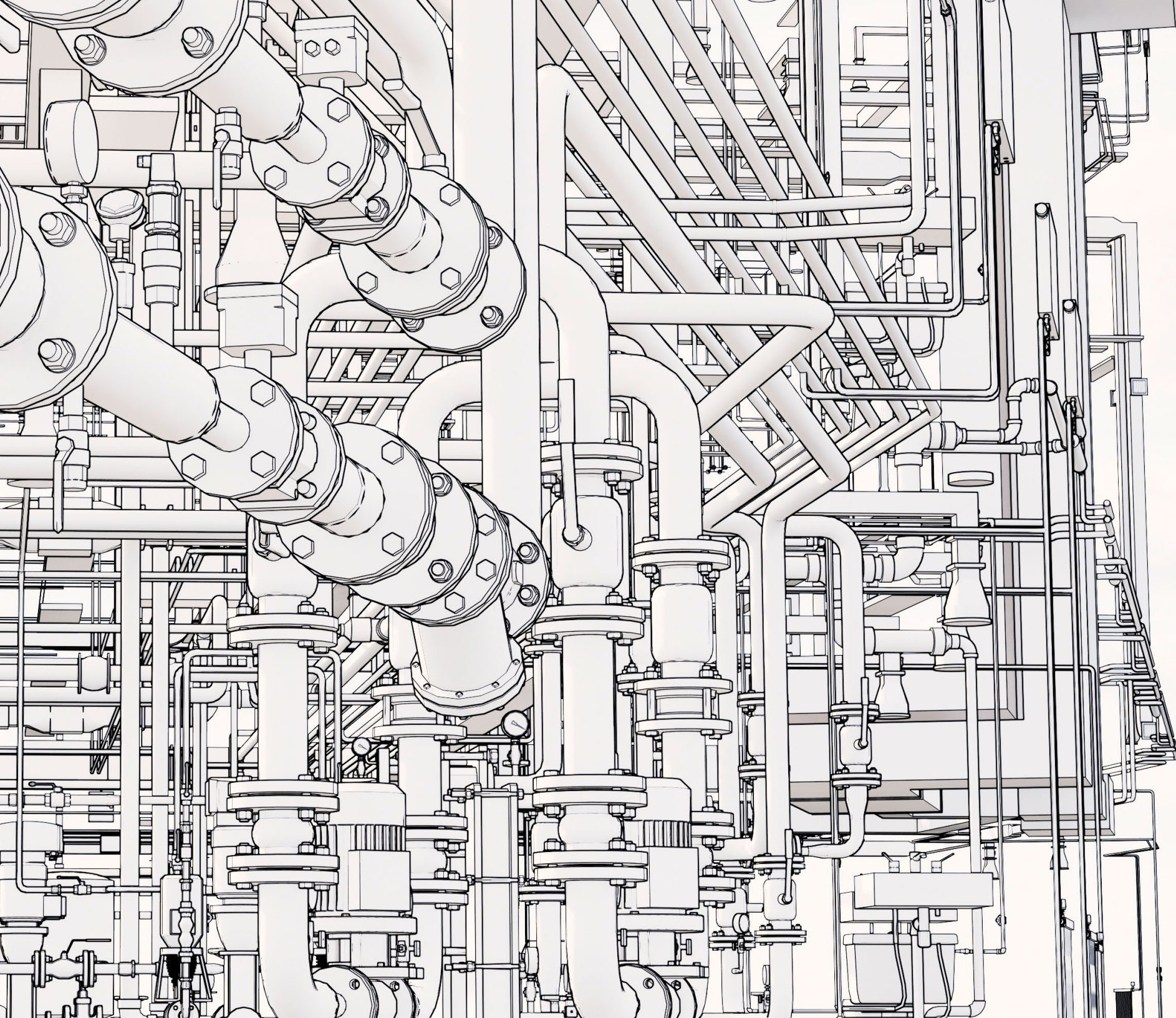
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// This effort is about transforming utilities, a journey we embarked on a decade ago, and we have now reached a significant milestone. //

—Jack Dangermond



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Preface

A message from Jack Dangermond, owner and founder of Esri, the world's largest provider of geographic information system (GIS) software:

"We are transforming our GIS to support a next-generation data model and utility applications. A decade ago, we challenged our product users to envision a new strategy for GIS in utilities. This led to developing a software capability that addresses challenges like decarbonization, the Internet of Things (IoT), Advanced Metering Infrastructure (AMI), and corporate and operational systems integration.

We've invested hundreds of person-years in building this new capability within ArcGIS® technology. It's not a separate product but an alternative way for users to manage massive amounts of data—hundreds of millions of objects—representing a complete digital utility. The model is scalable for both large and small utilities. Smaller customers with simpler networks can still benefit from the system's flexibility and scalability.

The capability supports various tools, from simple mapping to integrated engineering design. It seamlessly integrates with technologies like Advanced Distribution Management Systems (ADMS), Supervisory Control and Data Acquisition (SCADA), and work and asset management tools.

We've also created an integrated model representing all utility objects—from generation to transmission and distribution—at scale.

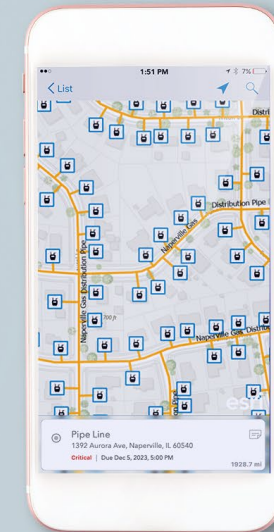
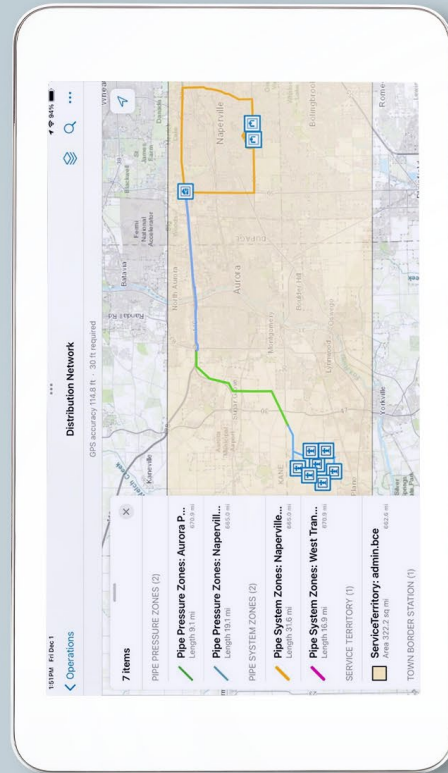
We now have hundreds of utilities globally, ranging from large to small, each implementing our technology with varying levels of detail. Applications like engineering, schematic, and dashboard maps are supported, helping modern utilities operate efficiently in the 21st century.

We are committed to working closely with our customers as they migrate to this new system. We provide direct support and tools to facilitate this transition, enabling customers to manage the process themselves. Additionally, our extensive partner community, specializing in utility networks, has developed tools and applications for many utility workflows.

This effort is about transforming utilities, a journey we embarked on a decade ago, and we have now reached a significant milestone. This is our strategic direction for utilities, and we deeply appreciate the support and collaboration of our customers and partners in implementing these systems.

We, alongside our partners, are fully prepared to support user migrations and will continue to advance and refine the technology in the coming years. This undertaking is a bold vision, a bold step, but I believe it's worthwhile. We have reached two important milestones: the technology is now mature and utilities globally are reaping significant benefits." ■





Introduction

The utility business is changing rapidly. Energy demand is growing substantially. And the decarbonization of the energy system is straining utilities. Extreme climate is stressing the resilience of the energy supply system.

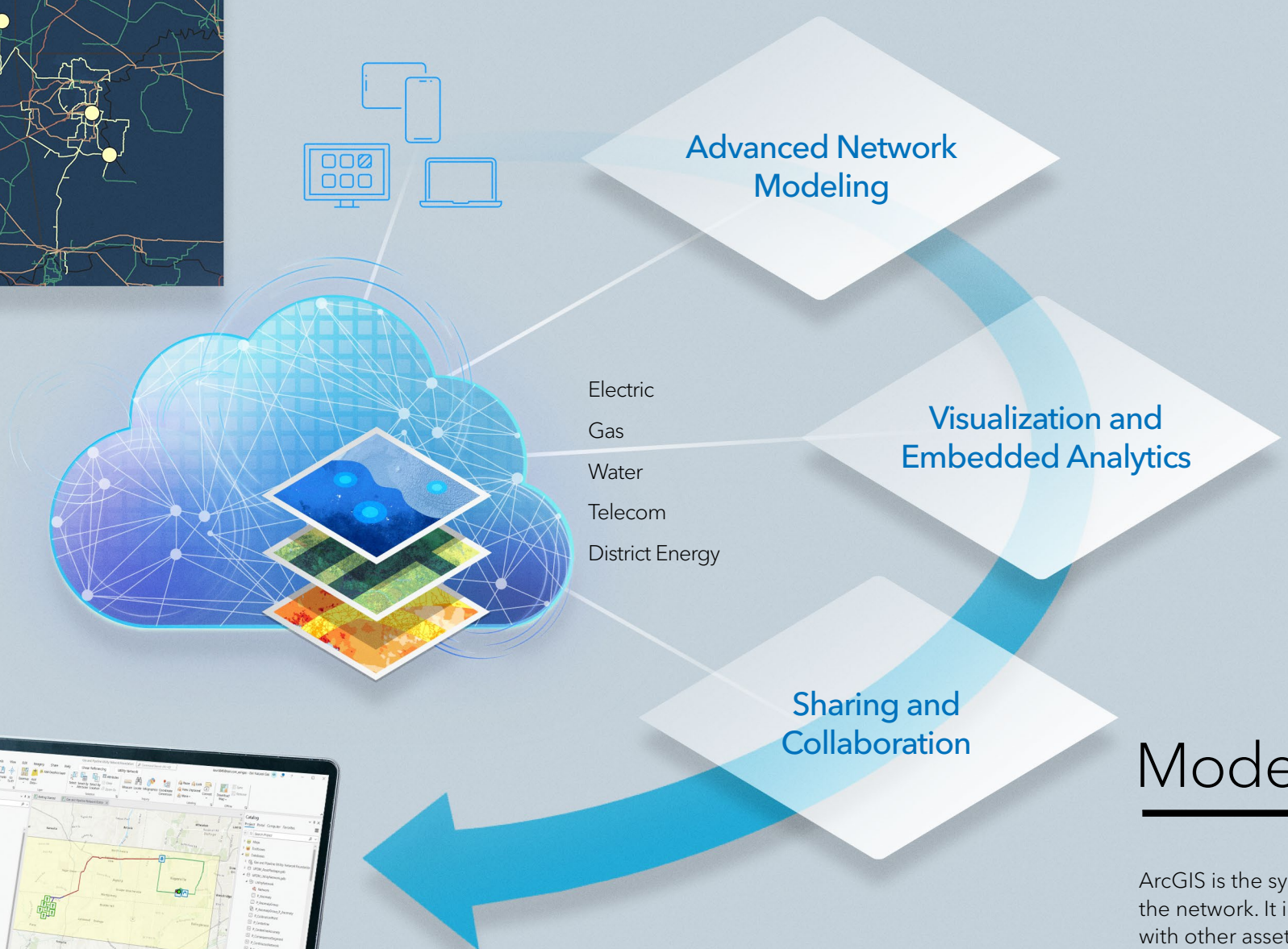
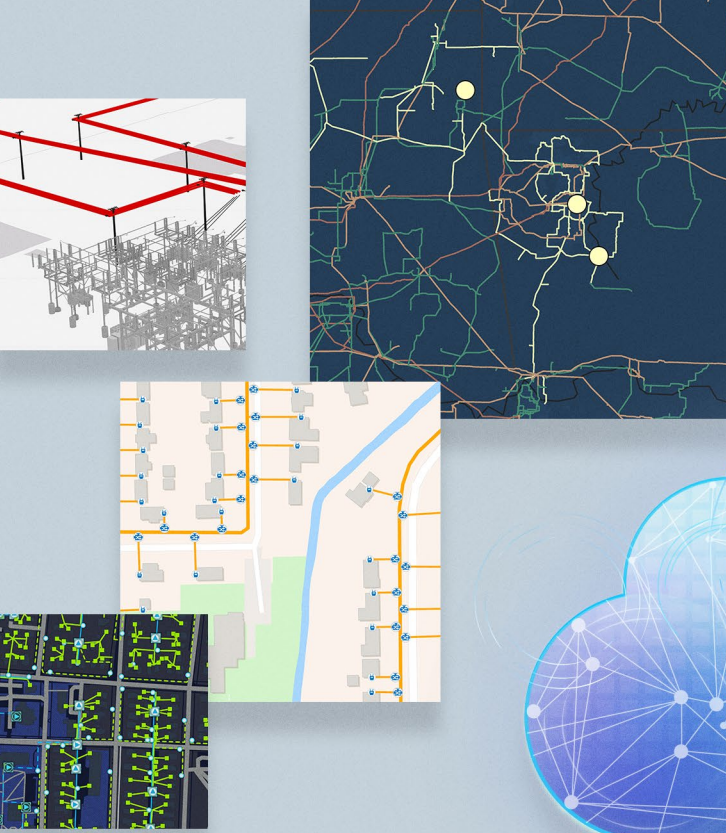
Utilities must transform and do it quickly. Technology will be key to that transformation. Location plays an enormous role. GIS is growing and evolving to meet these challenges. It underpins the transformation to a digital utility, where disparate control, management, and operational systems come together using geography as the common linkage.

GIS has many capabilities that contribute to this transformation, which is happening to meet the challenges above. Those capabilities include network modeling, spatial analysis, image processing, digital mobility, real-time data streaming, and advanced visualization.

This ebook focuses on ArcGIS Utility Network, a capability embedded in the ArcGIS system. ArcGIS Utility Network supports modern network management in many ways—here are some specific examples:

- Modeling
- Interoperability
- Enterprise access
- Data quality

The ArcGIS Utility Network capability is not just a mapmaking tool or a map or asset management tool. It is a model that integrates all aspects of a utility, the connected network—from customers to transmission to generation to distribution systems of all types. ■



Utility Network

- Service Based (SOA)
- Schematics
- Containments
- Generation to Customer
- Connectivity and Tracing
- Network Rules and Logic
- 3D Enables

Modeling Utility Network

ArcGIS is the system of record for spatial and nonspatial data describing the network. It includes data about assets, connectivity, and relationships with other assets outside the network. It unlocks that data throughout an organization, providing decision support, collaboration, and field mobility. ArcGIS also functions as a system of engagement and insight.

ArcGIS complements other systems used by organizations to manage the physical network. ArcGIS provides sophisticated data management, visualization, and analysis capabilities to improve the organization's understanding of the network so that staff can work more efficiently and effectively. A modern GIS accelerates business value by integrating operational technology (OT) and information technology (IT) to create value across the enterprise. ■



Why Location Matters for a Digital Utility

Customers, crews, assets, and buildings are scattered throughout the utility service territory.

Understanding where assets are most vulnerable is crucial. For example, the best location to stage crews and equipment before an approaching hurricane must be fully understood. Questions like where to harden the network, where vulnerable populations are at risk, or where to prioritize recovery must be answered. Utilities must always know what's happening and where.

GIS provides the required location intelligence. Situations change quickly, and GIS analysis can help workers adjust at a moment's notice. The ability to transform data into useful information is essential for coordination, navigation, supplemental data collection, and asset monitoring.



ArcGIS Utility Network underpins modern network management in these ways:

Modeling

Historically, GIS focused on replicating paper maps digitally. Users came to realize these digital maps contained valuable network models for analysis and engineering. Initial transformations prioritized visual accuracy over functional representation. ArcGIS Utility Network enhanced these capabilities, enabling precise modeling of modern utility networks with new capabilities. ArcGIS offers robust tools and configurable data models for various utilities, accurately modeling real-world assets, connectivity, and network behavior in 2D and 3D.

Interoperability

ArcGIS is used to create, manage, analyze, and map all types of utility data. ArcGIS is a platform that helps users understand patterns, see relationships, and understand the complex nature of a modern grid in a geographic context. ArcGIS has transitioned from a singular mapping system to multiple systems across many departments, integrating and supporting other utility enterprise systems such as SCADA, work management, advanced distribution management, and Enterprise Resource Planning (ERP) systems. ▶



Why Location Matters for a Digital Utility (continued)

Enterprise Access and Collaboration

ArcGIS provides secure, pervasive user access to network information, enabling data sharing across organizations and among stakeholders. It uses a user-identity-based security model, granting specific permissions to manage data quality and protect against unauthorized access. Self-service portals offer access to data on any device without re-creating content. The ArcGIS identity and sharing model helps control access, reduce risk, and maintain security. ArcGIS supports a comprehensive view of business operations, enhancing executives' and mobile workers' situational awareness.

Improved Data Quality and Governance

ArcGIS Utility Network ensures data quality through network rules, attribute rules, and validation, preventing invalid configurations, like incorrect network connections. Advanced topology rules provide real-time quality control and modeling system connections to devices. Visualization tools offer detailed network models, reducing visual clutter while maintaining data accessibility and security. Editing rules and validation prevent logically inconsistent data from being entered. The network tracks new objects, marking updates as needed and flagging invalid objects during validation, highlighted on maps as errors. ■



Modeling

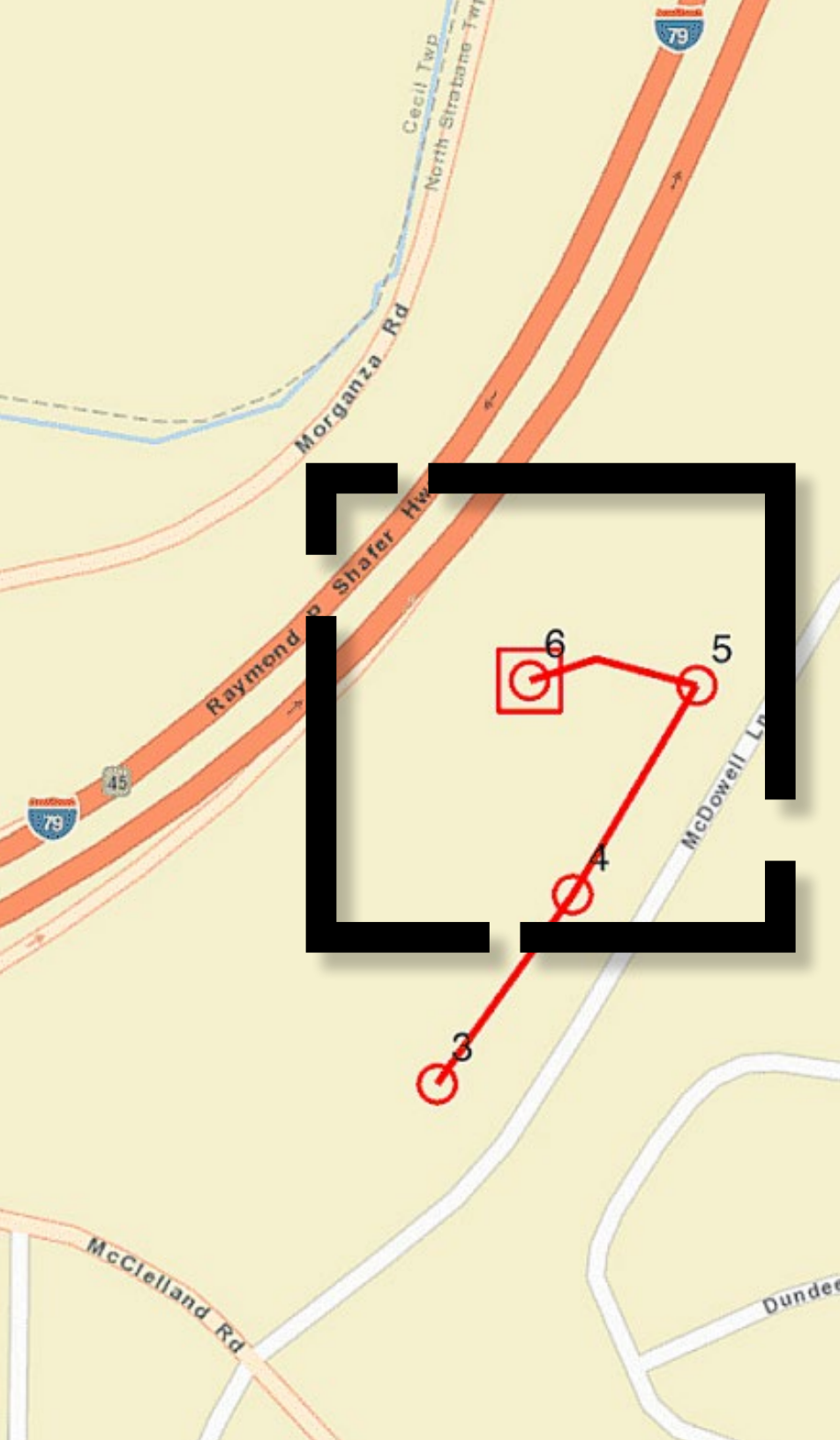
For much of its history, GIS has been used to improve productivity by making network maps of higher quality in a shorter time. It wasn't long until utilities realized the digital map contained a network model buried within the graphic representation. Further, the focus of the digital map was to attempt to replicate the old paper maps exactly. The location of labels and attributes had to be placed in the same position as their former paper counterparts. Despite the digital nature of the maps, the end user often printed maps with large-scale plotters. Hanging blueprints of the old paper maps on conference room walls was replaced by hanging plotted maps on those same walls. Despite digitization, the processes were largely unchanged. However, savvy users realized that a digital representation of a gas or electric network could be useful for various purposes, such as network analysis, engineering and design, and customer connection workflows.

However, the original data migration processes were mainly focused on the look and feel of the maps and not on the network representation. The precision and modeling were relatively primitive due to the software's limitations. Thankfully, utilities have modified their GIS implementations over the years to capture the connection between the networks.

ArcGIS Utility Network has removed historic GIS limitations so that utility systems—including new technologies such as synchrophasors, inverter-based resources, and grid-enhancing technologies—can be precisely located within the GIS.

The following are stories of just a few utilities that have implemented ArcGIS Utility Network to enhance their network modeling. ■





How **FirstEnergy** Modernized Grid Operations with ArcGIS Utility Network

FirstEnergy, a large electric utility company operating in five states, faced the challenge of modernizing the geospatial model of its network. The company implemented a solution integrating Advanced Distribution Management System (ADMS) technology, distribution automation, and mobile graphic design with ArcGIS Utility Network. This solution included enhancements such as internal substations, mesh networks, duct systems, and capabilities for analytics, capacity planning, and load management. As a result, FirstEnergy achieved a high-accuracy foundation for all operational technology, allowing near real-time updates to its ADMS, benefiting 650 employees, and significantly improving network management and efficiency.

[Read the complete story.](#)

FirstEnergy worked with SSP Innovations—an Esri partner specializing in GIS and data services, work and asset management solutions, and management consulting—and RAMTeCH, who partnered with FirstEnergy to successfully complete enterprise GIS migration and supporting data assessment.

In addition to providing the planning and technical expertise throughout the implementation project, SSP staff led the effort to create the new data model and provided oversight for migrating the data to ArcGIS Enterprise led the effort to create the new data model.

“GIS is being used by more and more departments. Data reporting and analytics run faster, are easier to generate, and make more sense.”

—Jamie Chips, Manager of Application Support for Distribution, FirstEnergy

“As a solution architect and consultant in the utility industry, I’ve witnessed firsthand how the Esri® ArcGIS Utility Network has revolutionized how electric and gas utilities operate. Utility Network has enabled our clients to streamline their operations, improve decision-making, and enhance service reliability by offering a comprehensive, real-time view of their assets and network. This advanced technology provides detailed insights into network performance, facilitates better resource management, and supports proactive maintenance strategies, ultimately delivering significant customer value through increased efficiency and reduced downtime.”

—Phil Dunn, Principal Solution Architect, SSP Innovations

“RAMTeCH understands the importance of a modern network and how critical it is for utilities to be fully prepared when transitioning to Utility Network.”

—Jeffrey Nash, Sr. Vice President at RAMTeCH

“GIS is the foundation for keeping our ADMS populated with current, accurate network information.”

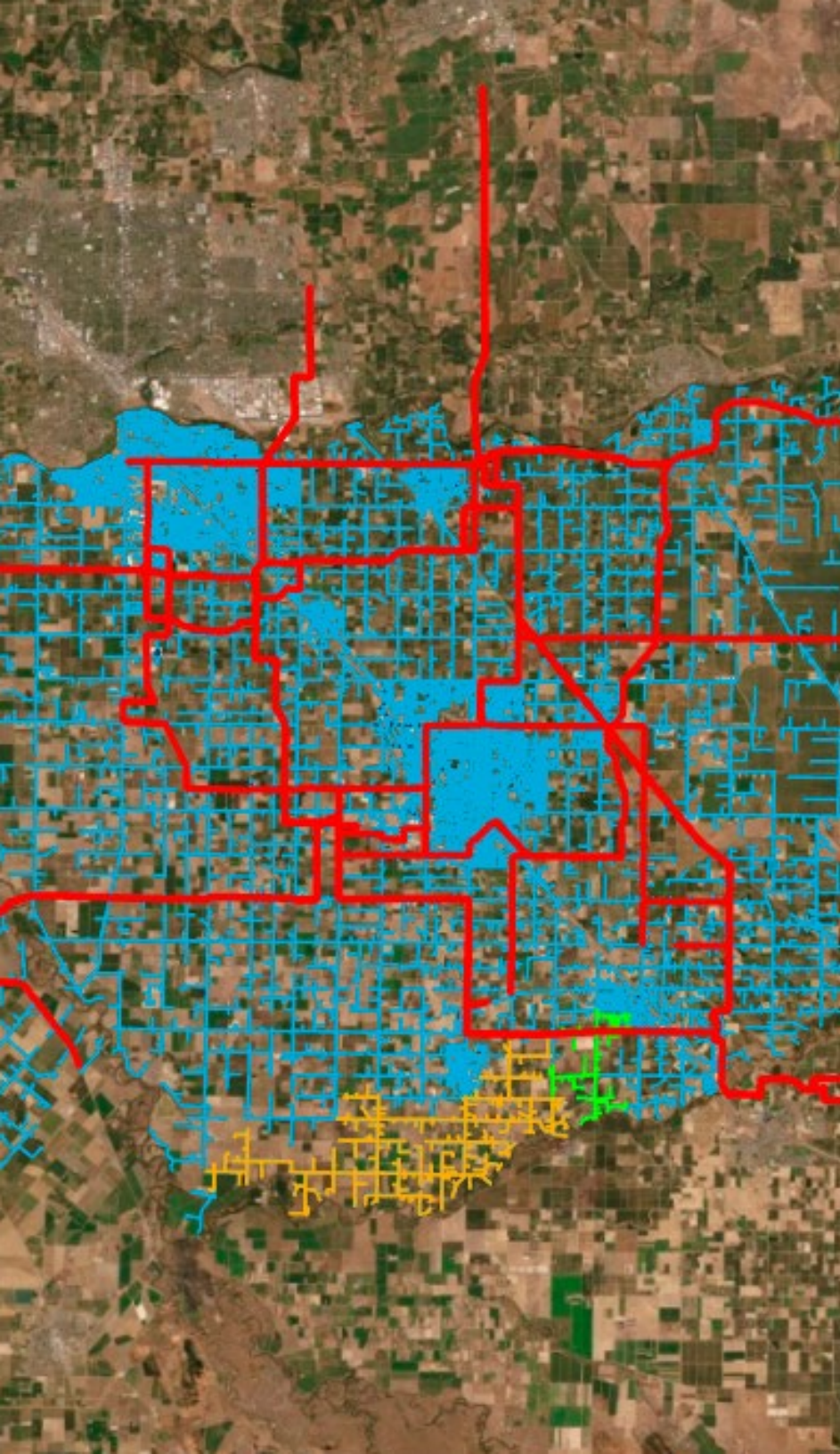
—Ted Allan, Director of the GIS/ADMS Project, FirstEnergy

SSP Innovations

SSP Innovations helps utility, pipeline, and telecom organizations optimize their existing systems and software. With over 800 years of combined expertise, SSP’s domain experts understand project complexities and deliver tailored solutions, ensuring safe and secure operations 24/7.

RAMTeCH

RAMTeCH prioritizes “Customer First” and “Enabling Excellence.” As an integrated solution provider, RAMTeCH engages proactively across the business value chain, offering tailor-made solutions. Industry experts help customers achieve operational and functional excellence, ensuring they reach their business goals. ■



Turlock Irrigation District Uses ArcGIS Utility Network to Prepare for Grid Modernization

Turlock Irrigation District (TID) is undergoing a significant digital transformation, modernizing its grid in response to the increasing complexity brought by renewable energy sources, electric vehicles, and customer demands. By implementing ArcGIS Utility Network, TID aims to improve data accuracy, system analysis, and operational efficiency. This technology allows TID to integrate its water and electric networks into a single platform, enhancing visualization and management capabilities. With this upgrade, TID can better support critical applications like outage management, asset management, and engineering analysis.

ArcGIS Utility Network also lays the groundwork for TID to potentially adopt a digital twin, which would offer a comprehensive, real-time digital representation of the utility's entire infrastructure. This modernization effort is expected to increase reliability, reduce operational costs, improve customer service, and make the grid more resilient and adaptable to future needs. The collaboration with POWER Engineers provided a strategic road map for this transformation, ensuring that TID could effectively navigate the challenges and opportunities presented by evolving energy technologies and regulations.

[Read the complete story.](#)

ArcGIS will help bridge the gap between the utility's information and operational technologies. As a result, it will sharpen insights into the performance and vulnerability of TID's water and electric systems. TID will benefit by detecting potential disruptions and necessary system improvements. Consequently, TID expects more reliable water and power service for its customers.

“At POWER Engineers, our experience guiding ArcGIS Utility Network implementations has taught us that no two implementations are alike. TID’s project involved unique challenges with source data reconciliation and required innovative extensions of the model to accommodate the nuances of their network. While their challenges might have been unique, we’ve come to expect every utility’s implementation to have its challenges. So, that’s something we thrive on, and I think it contributed to our mutual success with TID’s implementation.”

—Joe Paniccia, Senior Project Manager, POWER Engineers

“POWER Engineers assisted TID in diagnosing the shortfalls of our data networks and guided us in developing a road map to grid modernization. TID appreciates POWER Engineers’ proven track record of leading utilities in fulfilling their grid modernization goals. We believe ArcGIS Utility Network will be the best foundation to support our push for system modernization.”

—Manjot Gill, Assistant General Manager, Electrical Engineering & Operations, Turlock Irrigation District

[POWER Engineers](#)

Our name says it all—we’re nuts-and-bolts engineers, scientists, and consultants who team together to create integrated, multidiscipline solutions. ■



GIS Improves Network Data Management and Field Operations for **South Jersey Industries**

South Jersey Industries (SJI) is a union of South Jersey Gas and two acquisitions, Elizabethtown Gas and Elkton Gas. SJI has 1,100 employees and delivers gas to over 700,000 customers.

Before the acquisitions, GIS support had been outsourced. With the acquisitions, SJI decided to consolidate its assets into one authoritative system of record, integrated with IBM Maximo. SJI selected ArcGIS as its GIS platform, including Esri's Utility and Pipeline Data Model, ArcGIS Utility Network, and mobile field operations applications. TRC Companies assisted SJI in this implementation. SJI is leveraging these cutting-edge technologies to streamline leak management in the field, automate business processes, and simplify SJI's enterprise architecture.

Utility Network enhanced SJI's ability to manage and visualize assets. Service tap features were linked with meter settings to provide a virtual connection that could be represented visually on the map.

Implementation of ArcGIS enabled SJI to envision its business processes. The new leak survey process improved the lives of field crews, supervisors, and managers. Crews managed their daily activities more effectively, supervisors assigned work, and managers tracked progress better through dashboards and map-based visualizations daily. Integration of the leak survey process with IBM Maximo enabled centralized management and proved superior to separate homegrown systems for leak management. [Read the complete story.](#)

TRC Companies

TRC Companies, an Esri partner, holds the distinction of successfully going live with the first two large gas enterprise Utility Network projects. TRC Companies is a full-stack spatial technology integrator, driving business performance through geospatial IT solutions and services. The company helps clients make spatial technologies work in organizations of all sizes, integrates spatial technologies with enterprise systems, and supports field users with mobile spatial solutions. ■



The First Step Toward **Ameren's** Network Model Manager for Electric Transmission

Ameren, a utility company serving Illinois and Missouri, embarked on modernizing its electric transmission (ET) management by implementing Esri's ArcGIS Utility Network. This initiative marked the first step toward developing a comprehensive network model manager for ET. Previously, Ameren's data management involved manual entries across multiple systems, leading to data quality challenges. The outdated data model lacked the connectivity required for modern network management.

Ameren partnered with UDC to address these issues, leveraging UDC's expertise to migrate to ArcGIS Utility Network. This migration involved creating a new data model, configuring subnetwork rules, and integrating unique data elements such as dampers and crossarms. The process was iterative, with continuous data cleanup and validation to ensure accuracy and completeness.

As a result, Ameren transitioned to a connected, advanced network management model, utilizing the latest ArcGIS Enterprise and ArcGIS Pro tools. This upgrade improved data quality, scalability, and security while aligning with industry best practices. Completing this phase within 10 months set the stage for further developments, including modeling internal substations and integrating network models to support Ameren's broader data management goals.

Benefits to Ameren from the project include best practices alignment, future system scalability, structured GIS data editing, better data quality and completeness, streamlined architecture, and increased security with authentication.

“Enterprise GIS is the platform that can best connect all other utility enterprise systems, which has been the case for years. More utilities are beginning to recognize that truth and view enterprise GIS as a pivotal system that informs energy delivery and resource aspects of their business. The ability to model the network to improve that connection with other enterprise systems makes this viewpoint even more compelling and urgent; that’s why it’s hard to overstate the impact of Utility Network modeling.”

—Mark Nordheim, Senior Software Engineer, Ameren

“Ameren’s overall electric transmission GIS infrastructure has never been in a better place. We have best practices on hardware and software deployments, and now, we’re using the newest versions of what Esri has to offer. We look forward to editing in a structured network that is easier to validate and check.”

—Mark Nordheim, Senior Software Engineer, Ameren

UDC

UDC partners with utilities and infrastructure companies, helping them navigate migration and configuration to prepare their data for the advanced functions of Esri's ArcGIS Utility Network. Using its HEIDE tool and ArcGIS Pro add-in tools, UDC uses an automated, iterative approach to get the most value from the utility's existing data during and after migration. ■



Merging Transmission and Distribution Models at **Enbridge Gas**

Enbridge Gas supplies natural gas to over one million customers in Utah, Wyoming, and Idaho through two pressure-level systems, each previously modeled separately in its GIS.

Enbridge could not model its two pressure-level systems, which operate as one integrated system in the real world. Consequently, Enbridge's ability to perform several important analytical and management functions was inhibited. Enbridge's separate distribution and transmission data models lacked the connectivity at the regulator stations required to trace from gate stations to meters. Removing the obstacles preventing an integrated model in the GIS would be essential to meeting Enbridge's current and future business needs.

Enbridge, partnering with UDC, implemented Esri's Utility and Pipeline Data Model, ArcGIS Utility Network, and ArcGIS Pipeline Referencing. These technologies would provide the advanced GIS capabilities needed to create, maintain, and analyze a model of Enbridge's unified pipe network, from the wellhead to the customer's meter.

This initiative merged Enbridge's gas transmission and distribution assets into one network management model, providing the basis for a holistic enterprise view of gas operations and greater visibility into compliance activities. Enbridge is using its new capabilities to facilitate efficient gas workflow management, increase data integrity, enhance the data editing experience, streamline operations, support enterprise applications, and bolster pipeline safety and compliance reporting.

UDC

UDC partners with utilities, helping navigate the complexities of migration and configuration to prepare their data for the advanced functions of Esri's ArcGIS Utility Network. ■

“Utility Network provides a stable platform that will support opportunities to configure business-specific applications, reports, and maps. Getting maps and data into the hands of our teams will empower them to make data-driven decisions to operate more safely, reliably, and efficiently.”

—Matt Bartol, PE, General Manager of Gas Operations, Enbridge Gas

“The benefits of having one model that can incorporate both our transmission and distribution gas assets will be a great advantage for our team and help increase our efficiencies in how we manage the data.”

—Jeff Hansen, Director, GIS & Pipeline Safety Management Systems, Enbridge Gas



ESO's GIS Journey to Excellence

ESO, one of Lithuania's largest energy companies, undertook a significant digital transformation to modernize its operations and improve efficiency across its system. By integrating Esri's ArcGIS Utility Network, ESO was able to replace outdated, paper-based processes with a comprehensive digital solution that enhanced situational awareness and operational efficiency. The implementation included customized dashboards, mobile solutions for field operations, and web applications, streamlining data management and substantially reducing the time required to connect new customers. Additionally, ESO integrated ArcGIS Utility Network with the company's Advanced Distribution Management System (ADMS), ensuring data integrity and alignment with the Common Information Model (CIM). This modernization has improved ESO's internal processes and helped ESO provide Lithuania with more world-class electricity connectivity.

[Read the complete story.](#)

ESO replaced all paper in the field with tablets while eliminating all paper-based processes in the office. In addition, ESO created customized maps for network quality assessment.

The staff at ESO developed much of the system with the help of Ignitis Group and the local Esri distributor, Hnit-Baltic. The distributor provided consultation, configurations, and training during the data model's development, the migration of the data, and the app rollout to users.

“Today, without the GIS tool, our activities would be difficult to implement. Thanks to the modernization of ESO information systems, engineers can plan the necessary investments and network maintenance work more quickly and plan the connection of new customers faster.”

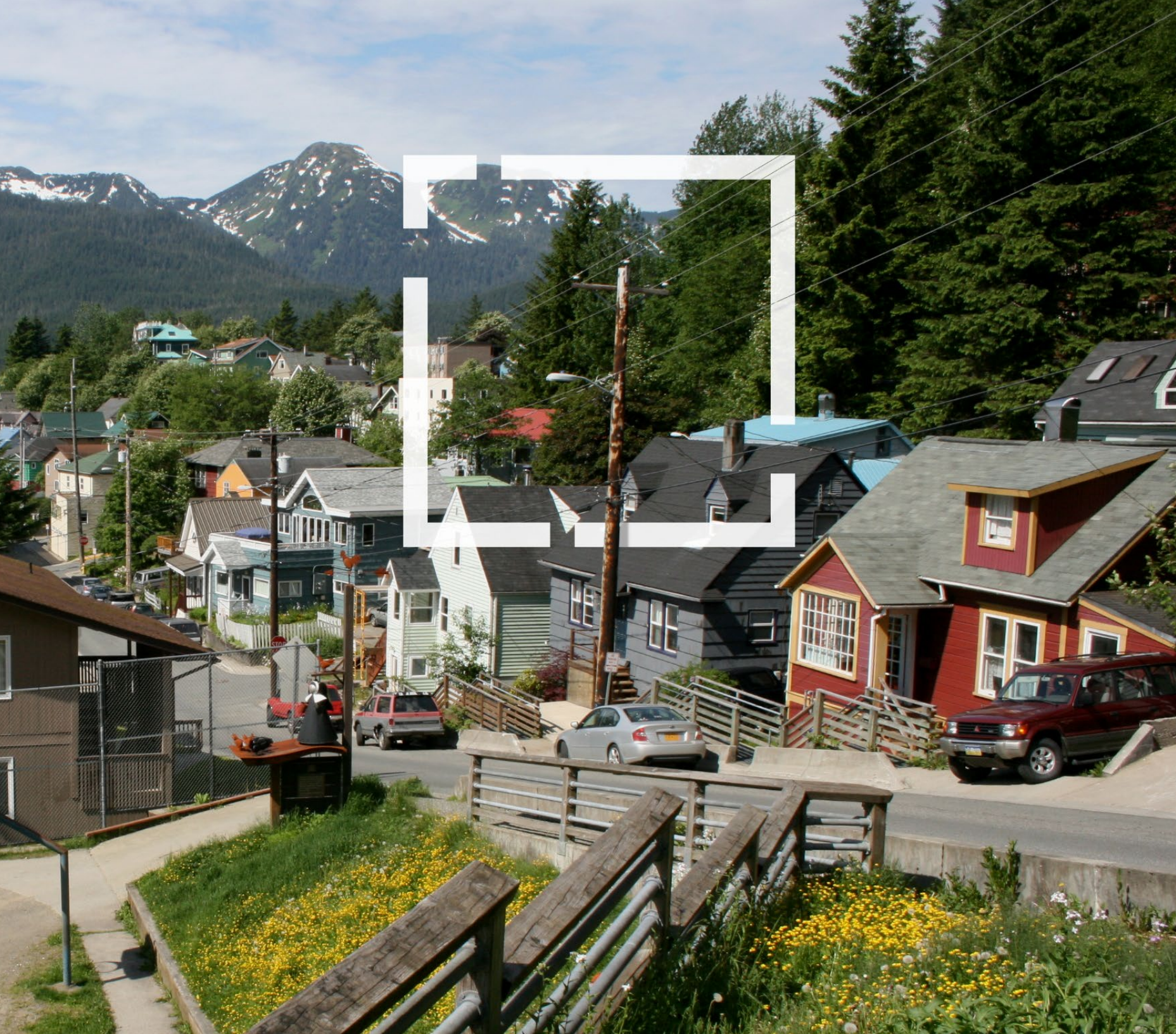
—Virgilijus Žukauskas, Director of Network Operations, ESO

Hnit Baltic

JSC Hnit-Baltic has operated since 1993 and is an authorized Esri Inc. (USA) distributor and leader in GIS software supply in the Baltic States. More than 400 clients in Lithuania and abroad have relied on our supplied GIS software and solutions and customer-focused services. We have experience in implementing GIS solutions for public organizations and private businesses in various industries, including utilities.

Ignitis Group

We are the largest group of energy companies in the Baltic states and pursue a long-term growth of our business and society as a whole while contributing to social development and well-being. ■



A Utility Sets Its Own Pace— Avista's Journey to ArcGIS Utility Network

Avista Utilities provides electricity to nearly 340,000 customers and natural gas to about 300,000 customers in four Northwestern states. The utility gradually transitioned from its legacy GIS data model and custom applications to ArcGIS, beginning with Avista's gas business.

Avista moved to the out-of-the-box Utility and Pipeline Data Model primarily to better align with industry standards in the future. Staff also wanted to migrate gradually from gas and electric geometric networks to ArcGIS Utility Network. This capability helped Avista achieve its goal of having all commodities operate on the same GIS. Additionally, it allowed staff to begin sharing the Utility Network data internally, leveraging Esri's Portal for ArcGIS and associated application-building infrastructure.

Avista's gradual approach to ArcGIS Utility Network is providing many benefits. One of these benefits is that the gas business can manage gas distribution—including high-pressure distribution/transmission—with one data model. [Read the complete story.](#)

UDC helped Avista navigate the complexities of migration and configuration to prepare data, using automation where possible, for the advanced functions of Utility Network. UDC created ArcGIS Pro add-ins and a robust conversion strategy to meet Avista's goals. UDC supported the migration with an iterative approach, including change detection syncing from the geometric network to ArcGIS Utility Network for daily updates.

UDC

UDC partners with utilities and infrastructure companies, helping them navigate migration and configuration to prepare their data for the advanced functions of Esri's ArcGIS Utility Network. Using its HEIDE tool and ArcGIS Pro add-in tools, UDC uses an automated, iterative approach to get the most value from the utility's existing data during and after migration. ■



UPDM and ArcGIS Utility Network Prepare **SEMCO ENERGY** for the Future

SEMCO ENERGY Gas Company sought a low-risk and cost-effective way to assess its data while gaining valuable insight. With customer satisfaction in mind, it was important for SEMCO to build and implement a data model to support its growing use of GIS for the next decade. A longtime Esri customer with a highly experienced and knowledgeable GIS team, SEMCO decided to take advantage of the early adopter program for Esri's Utility and Pipeline Data Model (UPDM) and ArcGIS Utility Network.

SEMCO partnered with POWER Engineers, to develop a customized and comprehensive plan. It detailed scheduling and the level of effort to prepare for a conversion of SEMCO's data to ArcGIS Utility Network. ArcGIS Utility Network enables SEMCO to use advanced traceability within pressure subnetworks, allowing staff to make faster decisions that will increase the quality of service to the utility's customers. [Read the complete story.](#)

SEMCO selected POWER Engineers for its ArcGIS Utility Network experience, its ability to provide advanced data migration tools, and its knowledgeable team, which worked with the utility's GIS team to complete a collaborative and comprehensive Utility Network assessment.

“This project is consistent with our history of research, analysis, and learning to gain insight into GIS technology. In 2006, SEMCO was presented an Esri SAG [Special Achievement in GIS] Award for this due diligence approach to projects. We’re pleased with the outcome of our readiness with POWER’s team. The staff we worked with demonstrated POWER’s shared desire for high customer satisfaction, and we are moving forward with our current full ArcGIS Utility Network migration with POWER.”

—Scott Torello, Utility Network Project Lead, SEMCO ENERGY Gas Company

[POWER Engineers](#)

Our name says it all—we're nuts-and-bolts engineers, scientists, and consultants who team together to create integrated, multidiscipline solutions. ■



Utility Network Migration Planning Springboards Business Transformation for **Montana-Dakota Utilities Co.**

Montana-Dakota Utilities Co. wanted to use its migration to ArcGIS Utility Network as a catalyst for transforming the company's current operations. Montana-Dakota's vision is to align all three of its gas businesses. This includes standardizing the tools and technology, data model, and business processes. Standardization enables Montana-Dakota to optimize its processes more efficiently. It also helps manage operational costs. Also, Montana-Dakota needed to align its Utility Network program with other technology projects and transformation initiatives.

Montana-Dakota partnered with SSP Innovations to develop a vision and a comprehensive plan to guide SSP's Utility Network project to success. SSP's Utility Network Advantage Program (UNAP) provided a framework for defining Montana-Dakota's program road map. Montana-Dakota created a single data model based on Utility Network for its five operating brands. Over five months, SSP helped Montana-Dakota develop a clear vision, detailed scope and budget, and realistic timeline for moving to Utility Network.

Montana-Dakota's plan provides clear direction for its Utility Network program. Business leaders understand what they can and should do before moving forward, what the effort looks like, and where future opportunities lie. They have everything they need to acquire a budget, mitigate risk, and launch their program successfully. Montana-Dakota believes its return on investment (ROI) will come from significantly improving the company's workflows by taking advantage of all the tools and functionality that are part of ArcGIS Utility Network.

[Read the complete story.](#)

“Our vision is to optimize workflows across our businesses with real-time data and advanced tools and technology for operating our gas networks. Utility Network will enable us to do just that. The process of working with SSP and creating a solid plan was a critical step in bringing our vision to life.”

—Lance Elroy, Montana-Dakota Utilities Co.

With many Utility Network projects, SSP brings a wealth of technical knowledge and practical experience to large-scale Utility Network programs.

SSP Innovations

SSP Innovations helps utility, pipeline, and telecom organizations optimize their existing systems and software. With over 800 years of combined expertise, SSP's domain experts understand project complexities and deliver tailored solutions, ensuring safe and secure operations 24/7. ■

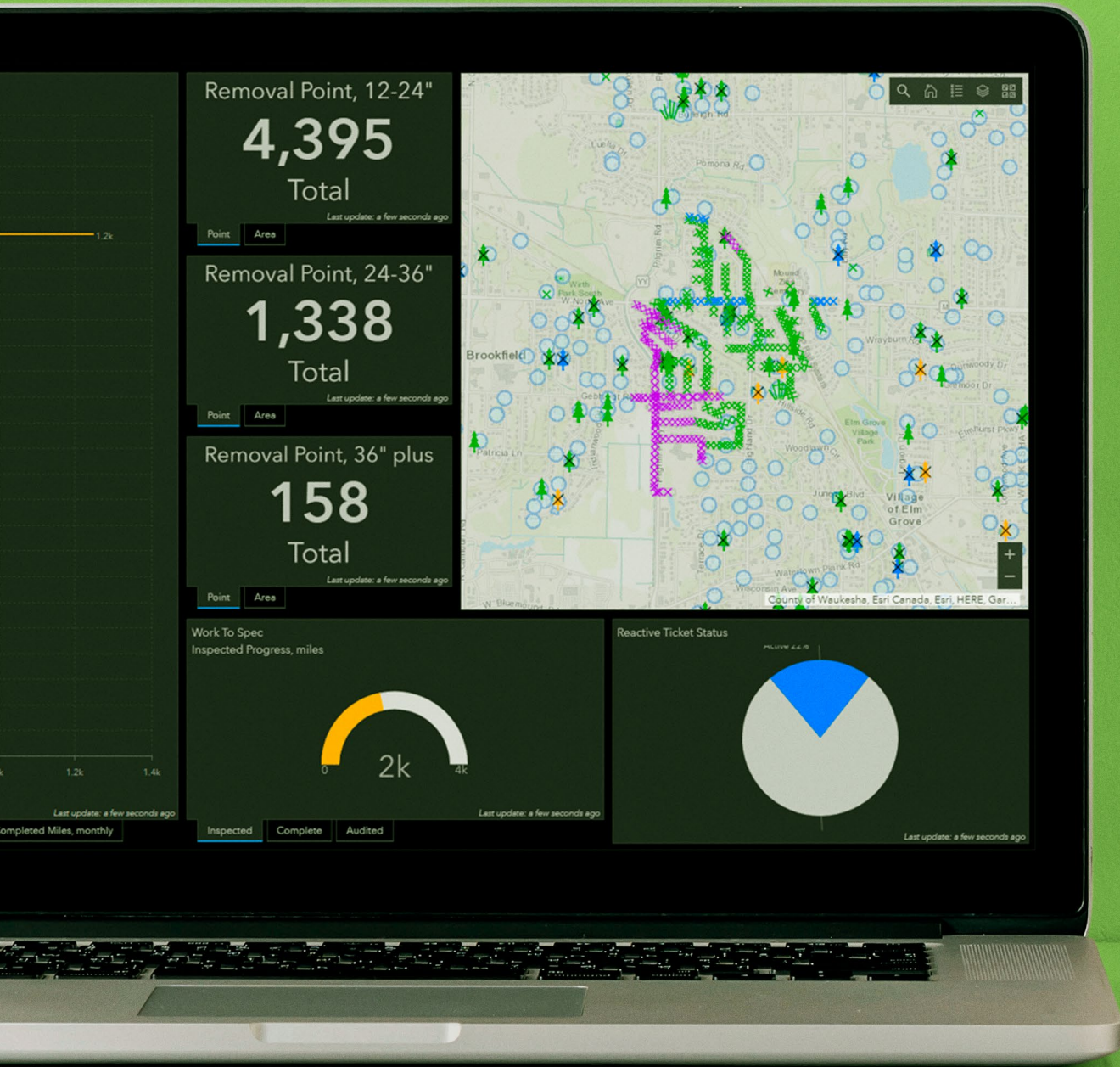


Digital Transformation at Energy Queensland

Queensland Energy serves 5.2 million customers with 130,000 miles of power lines across Queensland, Australia. It operates the largest area network in the region, covering energy generation, transmission, and distribution. The company faced the challenge of transitioning from two geographic information systems—a legacy GIS and an Esri geometric network—to the modern ArcGIS Utility Network as part of a digital transformation. The solution involved accurately modeling all electric and communication networks. This upgrade enabled grid visualization at any scale, incorporated 3D data capabilities, and significantly improved the ability to locate and edit assets quickly, enhancing overall operational efficiency. ■

**“ArcGIS Utility Network is underpinning
our ability to achieve a sustainable
and resilient future.”**

—Shannon Connolly, GIS Delivery Executive, Queensland Energy



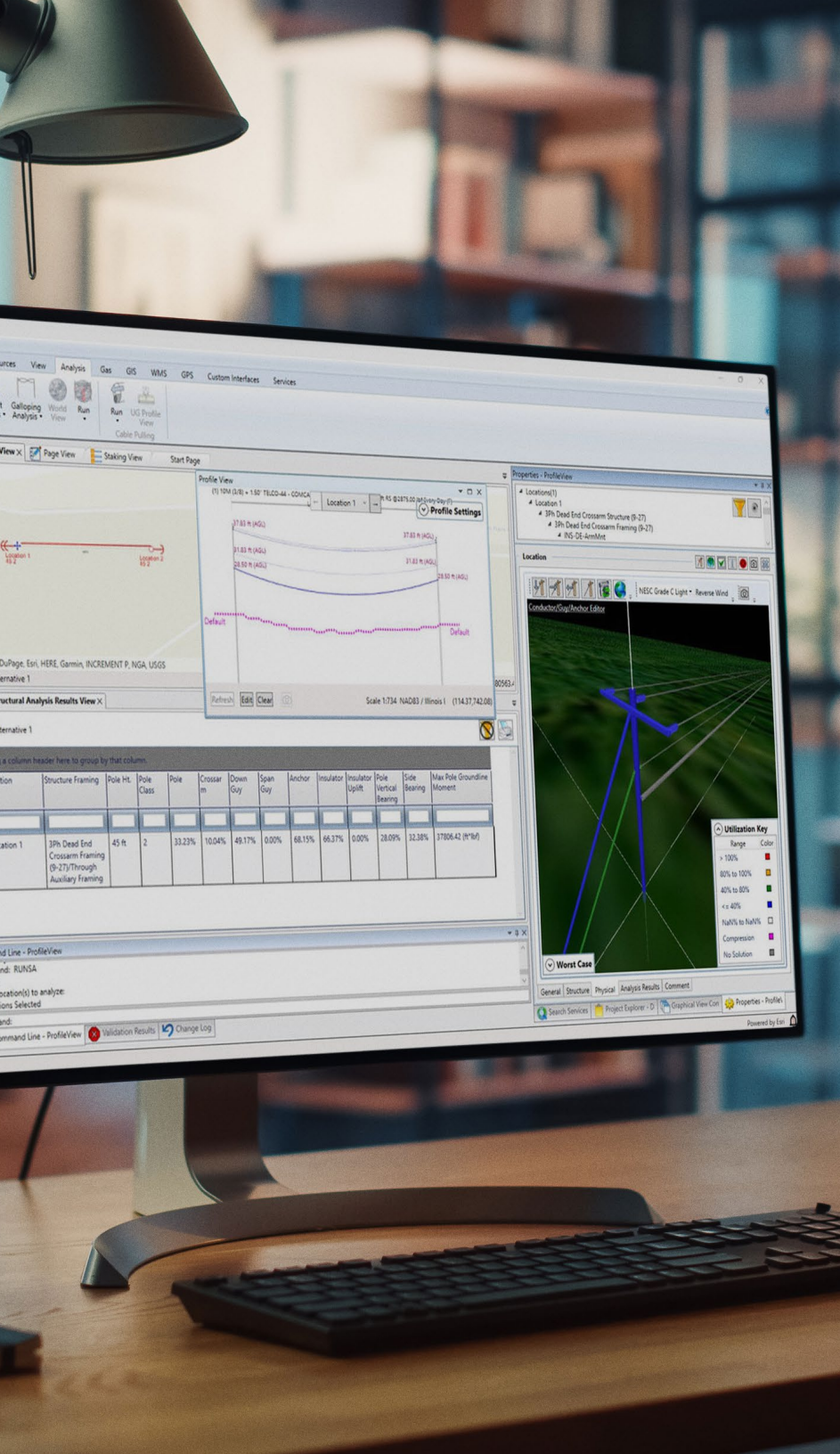
Interoperability

Establishing a shared services platform across Enterprise Resource Planning (ERP), GIS, Customer Information System (CIS), and Advanced Distribution Management System (ADMS) technologies can simplify asset management, streamline design, improve customer engagements, and offer a holistic view of operations. This modern transparency of enterprise-wide data and intuitive dashboards enables improved asset performance. It provides coordinated operations and monitoring, design, and planning supported by real-time office and field decision-making. Interoperability streamlines the process by reducing the number of steps required. It enhances decision-making by reducing the time it takes for data to move from one system to another. This is critical in emergencies. Interoperability gives utilities a better ability to perform the three C's: collaboration, communication, and coordination. This is particularly critical with field forces and dispatching personnel.

The harmony of ERP and GIS serves as an example. The ERP system and the GIS have worked in parallel for many years. The ERP system manages the transactions of many essential utility workflows, including work execution, asset management plans, customer information, and financial reporting. The ERP system, however, does not manage all asset types and groups. The ERP system manages tracked assets throughout their maintenance life cycle. The GIS manages the relationships of the asset attributes to location. The GIS connects the asset data with other operational data and analytics to optimize capital expenditure (CapEx) and operating expense (OpEx) programs of work. It works with ERP systems to streamline engineering, design, and asset and workflow management.

The harmonization of ADMS and GIS is another example of how the GIS provides insight and context. The integration provides a detailed understanding and visualization of the relationship between dispatch operations, customers, and field mobility.

These utilities have leveraged the ArcGIS Utility Network interoperability capability to improve operations. ■



ArcGIS Utility Network Helps **FirstEnergy** Design an Efficient Electric Distribution System

FirstEnergy transformed significantly by implementing ArcGIS Utility Network to modernize the utility's grid management. Faced with aging infrastructure and the need for more accurate, efficient network operations, FirstEnergy recognized that traditional methods were inadequate for managing the complexities of a modern electric grid. The company aimed to enhance data accuracy, improve outage management, and optimize asset performance. FirstEnergy turned to GeoSpatial Innovations (GSI), which implemented its Distribution Design Studio (DDS), an end-to-end electric and gas line design and engineering platform that integrates with ArcGIS Utility Network.

ArcGIS Utility Network gave FirstEnergy advanced capabilities, allowing for a detailed, real-time representation of the utility's electric network. This new system enabled better decision-making through enhanced visibility into network operations and improved data quality. It facilitated more efficient outage response and asset management, reducing downtime and improving service reliability.

FirstEnergy's implementation of ArcGIS Utility Network also allowed for better integration of various data sources and systems, which was crucial for streamlining operations across the company's extensive service area. The utility was able to automate many processes, reducing manual data-entry errors and enhancing overall operational efficiency. By adopting this modern platform, FirstEnergy positioned itself to meet future challenges and continue providing reliable, high-quality service to its customers while supporting the transition to smarter grid technologies. [Read the complete story.](#)

“Distribution Design Studio and its seamless integration with Esri's ArcGIS Utility Network have transformed FirstEnergy's design and mapping processes. This synergy will save time, ensure data accuracy, and support a robust electric system.”

—Justin Sanchez, Senior Designer, GeoSpatial Innovations

“Everything starts with the designer. We can't ensure network reliance without providing advanced tools like DDS [Distribution Design Studio] and ArcGIS Utility Network for designers to use.”

—Jamie Chipps, Manager of Applications Support for Distribution, FirstEnergy

GeoSpatial Innovations (GSI)

GeoSpatial Innovations, Inc., delivers industry-leading software to improve productivity and safety for workers engaged in natural gas and electric design and optimization, vegetation management, and GIS implementation services. GSI specializes in providing utility companies, engineers, and field contractors the software solutions they need to get the job done right. Our productivity software tools help streamline workflow, manage available assets, and plan jobs effectively and efficiently. ■



How **ESO** Migrated Data from ArcGIS Utility Network for Successful CIM Interoperability

ESO, Lithuania's largest electricity and gas distribution operator, undertook a significant modernization project to improve its network management by implementing ArcGIS Utility Network. This initiative was driven by the need to enhance operations' accuracy, efficiency, and reliability across Lithuania's vast and complex utility infrastructure.

Before this upgrade, ESO faced challenges with outdated systems that limited the ability to manage assets effectively and respond swiftly to issues. The implementation of ArcGIS Utility Network transformed how ESO managed its distribution networks by providing a more detailed and real-time view of the utility's assets. This new system enabled ESO to improve data accuracy and streamline workflows, significantly reducing operational inefficiencies.

With ArcGIS Utility Network, ESO gained advanced capabilities such as real-time network visualization, enhanced spatial analysis, and better integration of various data sources. These improvements allowed ESO to optimize asset management, reduce outage response times, and support long-term infrastructure planning. The enhanced

network visibility and data integrity also facilitated better decision-making and compliance with regulatory standards.

The successful deployment of ArcGIS Utility Network positioned ESO to continue delivering reliable and efficient services while adapting to future technological advancements and the growing demands of modern utility management. [Read the complete story.](#)

ArcGIS Utility Network and Similix CIM (Common Information Model) Adaptor integration with ESO's Advanced Distribution Management System (ADMS) technology has given the utility an easy-to-use configured solution. This has made the utility more efficient, providing better data integrity and enabling future CIM-based integrations.

Similix

Similix is a global consultancy and software provider specializing in Utility Network management and implementation projects. ■

“ArcGIS Utility Network provided a network model more aligned with the principles of CIM and eased the integration between the GIS and ADMS.”

—Andrius Mackevičius, Head of Network Data Management, ESO

“Integrating GIS and ADMS using Similix CIM Adaptor is a best-in-class example of creating value from upgrading to ArcGIS Utility Network. With a product-based CIM integration, ESO has a robust platform to leverage network information to ADMS and other systems for the future.”

—Jesper Vinther Christensen, CEO, Similix



Kaukauna Utilities Transforms Design with AUD and ArcGIS Utility Network, and Superior Network Modeling Advances Key Workflows

Kaukauna Utilities faced two main challenges: manual processing for electric system analysis and outdated paper-based design methods. To address these, Kaukauna Utilities first transitioned to ArcGIS Utility Network, integrating key business systems to improve data quality for analysis of the electric system, the Outage Management System (OMS), and the Customer Information System (CIS) while laying the groundwork for water and fiber networks. Second, staff implemented Automated Utility Design (AUD) software, which adhered to Utility Network validation rules, significantly reducing manual corrections. These solutions dramatically improved information currency, design efficiency, and operational performance across the board.

Spatial Business Systems (SBS) provided its Automated Utility Design software for this project. [Read the complete story.](#)

The superior network model advanced key workflows. [Read the second complete story.](#)

“Utility Network has allowed clients to visualize, analyze, and report on their sophisticated GIS platform with more detail, providing efficiencies in their work.”

—Rachelle McGillivray, POWER Engineers

“ArcGIS Utility Network was a key requirement to the success of many other systems at Kaukauna Utilities.”

—David Pahl, Manager of Generation and Substations, Kaukauna Utilities

“The AUD design tool, integrated with ArcGIS, has already made a big impact on our design process, and we look forward to extending the tool to improve efficiencies further.”

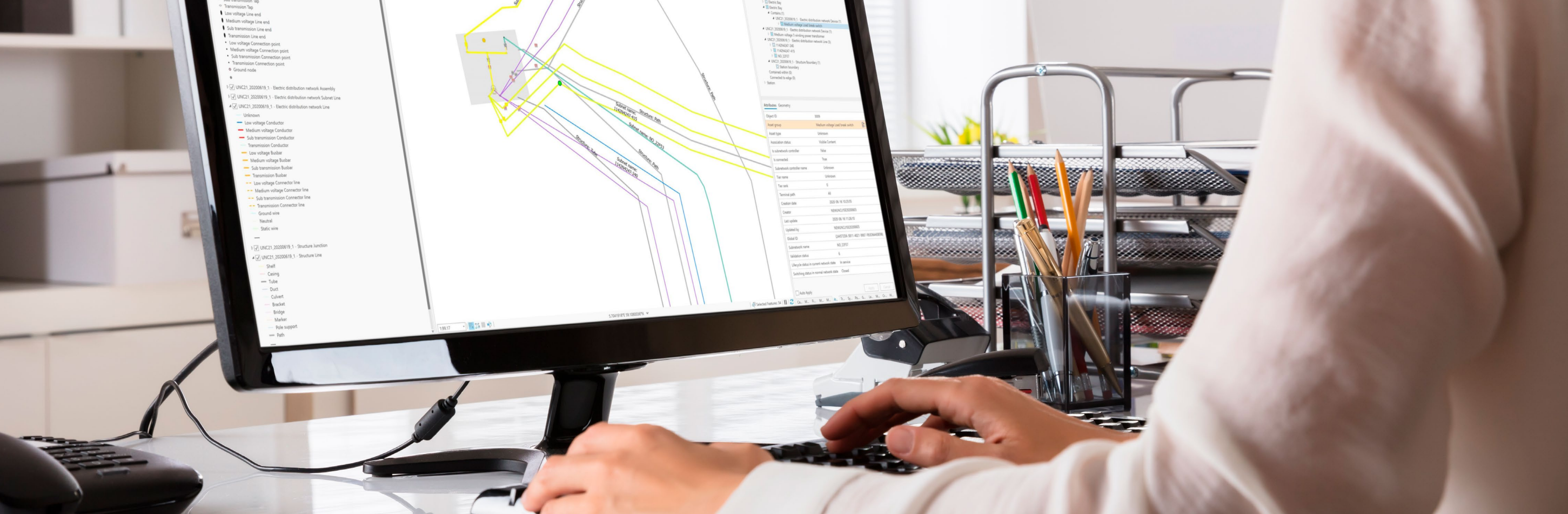
—Jeff Feldt, General Manager, Kaukauna Utilities

POWER Engineers

POWER Engineers, guided Kaukauna Utilities at all project stages, including conceptual design, data migration, rollout, training, and go-live operations. POWER Engineers provides a full suite of geospatial and asset management solutions for electric and gas utilities. POWER Engineers specializes in implementing Esri’s ArcGIS Utility Network and has developed numerous tools to support utilities. POWER Engineers is also a business partner with SBS and can implement and support its AUD and Utility DataHub solutions.

Spatial Business Systems

SBS provided its Automated Utility Design software for this project. SBS products seamlessly blend the intelligence of Utility Network with the world of AutoCAD, allowing Utility Network to maintain a single source of geospatial truth and supporting a highly productive digital design workflow, enabling utilities to meet their increasingly difficult growth and operational objectives. ■



Building a Sustainable Future with ArcGIS Utility Network at Lyse Elnett

As an industry leader in Europe, Lyse Elnett recognized the potential of ArcGIS Utility Network, available only with an ArcGIS Enterprise license. In 2017, Lyse Elnett, alongside other European utilities, formed the Utility Network Community (UNC) to define an open-source data model aligned with the Common Information Model (CIM). Partnering with Similix, Lyse Elnett implemented ArcGIS Utility Network for its electric distribution grid, taking a phased approach. This technology enhances data quality and integration, supporting a sustainable future. The project aims to provide comprehensive asset information and advanced analytics, benefiting various energy sectors, including district heating and cooling. [Read the complete story.](#)

Similix

Similix is a global consultancy and software provider specializing in Utility Network management and implementation projects. ■

“The Utility Network technology with an open common data model will drive our business forward. It will be the central platform for designing and managing the life span of the electrical grid, including new distributed energy sources and smart devices.”

—Sigve Hamran, GIS Manager, Lyse Elnett

“The migration process can be complex when doing large data transformations to benefit from the new rich UNC model, but it is doable. This services-based architecture and subnetwork management provides improved opportunities for having one version of the truth inside and outside of GIS. You have stronger data quality and the ability to access or share it anywhere, which ultimately has a broader impact.”

—Signe Bramming Andersen, Director of Business Development, Similix



Modern Network Management Creates a Foundation for Increased Reliability for **LG&E** and **KU**

Louisville Gas and Electric Company (LG&E) and Kentucky Utilities Company (KU), part of the PPL Corporation family of companies, are large electric and gas utilities operating in Kentucky and Virginia. They faced challenges with isolated critical information and the lack of logical links between transmission and distribution, requiring manual data processing. To solve this problem, LG&E and KU implemented ArcGIS Utility Network, integrating it with Power Line Systems' PLS-CADD solution and a data warehouse. This solution created productive workflow apps and dashboards, improved data integration and analysis, and enhanced network management, leading to better-informed decision-making and operational efficiency. LG&E and KU partnered with SSP Innovations to lead an enterprise implementation of ArcGIS Utility Network. [Read the complete story.](#)

“The integration of ArcGIS Utility Network at Louisville Gas and Electric and Kentucky Utilities is a significant leap in enhancing grid reliability and operational efficiency. Moving to Utility Network and the Esri platform allowed us to combine information and data from multiple systems into one platform with everything we need to support modern grid operations. This advanced GIS system will improve asset management and operational analytics. As modernization progresses, the utility’s infrastructure will become more resilient, better equipped to handle future demands, and capable of delivering optimized service reliability to over 1.3 million customers.”

–Keith Yocum, Manager of Transmission Substation Engineering,
Construction and Maintenance, LG&E and KU

“Transitioning to [ArcGIS] Utility Network has laid the groundwork for a far more capable future.”

–Keith Yocum, Manager of Transmission Substation Engineering,
Construction and Maintenance, LG&E and KU

SSP Innovations

SSP is an Esri partner focused on utilities, and its forward-looking products span the geospatial technology landscape. SSP’s services help resolve energy companies’ consulting, technical, and data challenges. ■



Migration of **HK Electric's** Legacy GIS to ArcGIS Utility Network

HK Electric, responsible for electricity production, transmission, and distribution for nearly 600,000 customers in Hong Kong, recently transitioned to ArcGIS Utility Network as part of a major GIS modernization project. The company had previously relied on a heavily customized legacy geographic information system that had been developed over the course of 25 years. Age posed significant challenges in maintaining and adapting the GIS to modern smart grid requirements due to its complexity and unique functionalities.

To address these issues, HK Electric decided to migrate to a standard, sustainable GIS environment with minimal customization. ArcGIS Utility Network, and particularly its open data model from the Utility Network Community (UNC), provided the framework for this transition. This new model replaced many of the custom-built functionalities, simplifying the system while preserving the accuracy and detail required for Hong Kong Island's dense underground network.

The migration process involved over 100 preprocessing programs and extensive data validation, including creating over 1,000 verification reports. The project collaborated with Esri partners Similix and D&C Consulting, resulting in a state-of-the-art, service-oriented GIS architecture. The new system, launched in February 2024, now supports HK Electric's daily operations and will provide for future grid development needs.

“The degree of customization to implement the planning has drastically reduced [and] hence largely improved the long-term sustainability and reduced the total cost of ownership of the solution.”

—Chris Poon, Senior Manager, Data and Emerging Technology, HK Electric

“It has been very interesting working with HK Electric due to its innovative mindset and expertise within both the electric domain and IT. HK Electric and Similix share the same ambition: implementing a GIS with a services-based, open architecture, a data model reflecting best practices, and product-based and configurable integrations based on international standards. HK Electric now has a GIS that can grow along with future requirements.”

—Signe Bramming Andersen, Director of Business Development, Similix

Similix and **D&C Consulting**

The project was a collaborative effort between HK Electric and two Esri partners: Similix and D&C Consulting, a subsidiary of Kinetix. D&C was responsible for the overall project implementation, including migration, function, and system integrations. ■



Pioneering Grid Modernization with Esri's ArcGIS Utility Network at Duquesne Light Company

Duquesne Light Company (DLC) has been at the forefront of grid modernization, leveraging ArcGIS Utility Network to revolutionize the company's operations. This initiative aimed to enhance data quality, improve operational efficiency, and achieve high data accuracy, all while supporting the company's broader modernization goals. Integrating various technologies like the Outage Management System (OMS), Advanced Metering Infrastructure (AMI), and distribution planning applications drove DLC to select Esri's ArcGIS Utility Network and Schneider Electric's ArcFM.

The implementation of ArcGIS Utility Network provided a robust connectivity model, ensuring seamless communication and data flow across critical systems. ArcFM Feeder Services played a pivotal role in data exchange. ArcFM Editor and ArcFM Mobile empowered field personnel with on-the-go access to real-time data, significantly improving decision-making and field operations.

The results of this implementation have been transformative for DLC. Integrating critical systems has led to enhanced situational awareness and faster response times. These advancements have streamlined operations across departments, enabling real-time data access and better customer service. Collaborating with Schneider Electric was crucial in realizing these outcomes, solidifying DLC's position as a leader in grid modernization.

Recent analyses have confirmed an impressive 99 percent data accuracy concerning meter-to-transformer relationships, highlighting the reliability and precision of DLC's geospatial data infrastructure, with over 97 percent of the company's meters being connected. Additionally, the solutions for GIS editing, data sharing, and mobile devices have created more efficient operations—from digitizing field workflows to simplifying GIS processes and supporting data-sharing needs organization-wide.

“Utility Network and ArcFM have significantly enhanced our operational capabilities. The seamless connectivity and data accuracy provided by these solutions are instrumental in maintaining the reliability and efficiency of our electrical infrastructure. This is a crucial step forward in our commitment to providing safe, reliable, and affordable services to our customers.”

—Alan Hope, Manager of ADMS Program, Duquesne Light Company

“Schneider Electric's ArcFM is at the forefront of Utility Network deployments, providing innovative solutions that integrate seamlessly with critical systems like ADMS and Distributed Energy Resource Management System (DERMS). Our expertise ensures utilities can adapt to organizational changes, improve data quality, and enhance field operations through digital workflows.”

—Matt Crooks, Product Management Director, Schneider Electric

Schneider Electric

Schneider Electric is DLC's technology and implementation partner. The ArcFM Solution series is the most comprehensive set of utility-specific GIS applications built to fully digitize and automate GIS updating and maintenance. ArcFM bridges the gaps between siloed data, disconnected workflows, and isolated systems to ensure that network assets are accurately modeled to feed critical systems. ■



Advanced Planning and Construction with CIM Integration at Andel

Andel, a utility company in eastern Denmark serving 1.5 million customers, recently consolidated its legacy geographic information systems—ArcGIS with the geometric network and Intergraph G/Tech—with ArcGIS Utility Network. This move was supported by Esri UK’s web application UNE for ArcGIS, and by the Similix CIM [Common Information Model] Adaptor, enabling seamless integration with different Advanced Distribution Management System (ADMS) technologies. ArcGIS Utility Network has become a business-critical system at Andel, playing a key role in network planning, design, construction, operation, and maintenance.

To address challenges like aging assets and integrating distributed energy resources, Andel sought to leverage the high-fidelity data model in ArcGIS Utility Network. This strategy aimed to align the representation of real-world assets in GIS with operational systems, enhancing spatial analytics and ensuring that both GIS and ADMS reflected the grid’s actual state.

The implementation included advanced data transformation using the Similix Utility Network Migration Suite and Esri UK’s UNE for ArcGIS app for grid design—this integration streamlined grid extension and commissioning processes, improving efficiency and accuracy.

The results have been impressive, with ArcGIS Utility Network now serving as Andel’s primary data system.

The implementation has reduced training costs by 80 percent, increased productivity tenfold, and provided a future-proof solution that supports efficient workflows and strategic goals.

Similix

Similix delivered the software products and professional services for migration and CIM integration.

Esri UK

Esri UK delivered its UNE for ArcGIS application for planning, editing, and viewing. ■

“As part of a modern network management strategy, we are challenging ourselves to use a web-first approach and find smarter ways of working to optimize our processes and deliver improvements over the whole network management life cycle of design, plan, build, and operate. Working with Similix and Esri UK to address this challenge and maximize our investment in ArcGIS Utility Network has been extremely productive. We have enabled our GIS to serve as the [primary] data system for ADMS through CIM (Common Information Model)-based integration and rolled out an intuitive and focused user experience application to over 600 users. We have been impressed by the technology and the services that Similix and Esri UK have delivered and look forward to continuing our work with them to realize our strategic goals fully.”

—Jakob Møl Mortensen, Head of Energy Systems, Andel

“Andel has been a truly interesting customer to work with. As one of the founders of UNC [Utility Network Community], [Andel staff] were very clear on how they wanted to benefit from the high-fidelity data model in Utility Network by using Similix Utility Network Migration Suite for advanced data transformation during migration. Assets in the electrical grid are now modeled in more detail, providing a better representation of reality and aligning the representation between GIS and ADMS systems to support cross-department collaboration.”

—Signe Bramming Andersen, Director of Business Development, Similix

Enterprise Access and Collaboration

With ArcGIS, organizations can provide pervasive, secure user access to network information. ArcGIS allows sharing data across the organization and with all internal and external stakeholders. This breaks down siloes and facilitates information sharing so that everyone has the information they need to complete their work and make informed decisions.

ArcGIS adheres to a modern IT security model based on user identity. Each organizational account user has their own identity within the system, with permissions to access apps and manage data at the user level. This supports data quality checks by letting users see who has edited data, where the work was done, and when it occurred. It also means that users can be given access to the specific data and apps they need—along with the viewing or editing capabilities appropriate to their role—to further protect the organization’s data from unintended, inappropriate, or unauthorized use.

Self-service portals provide users with ready access to data and content based on their permissions and what has been shared with them. Shared data and content are available on any device—desktop, mobile, and web—without re-creating the content.

The seamless integration of ArcGIS Utility Network with web-based and mobility applications allows engineers, customer designers, and field crews to become more productive. They receive near real-time information as they work. Office employees discover new patterns and insights by visualizing and analyzing business and operational data on a map. Residents can more easily find information about their utility via open data portals and—using crowdsourcing apps that they can install on their smartphones—provide direct feedback to their service providers. Executives and officials get a deeper and more encompassing look at their businesses or common operating pictures, allowing for better situational awareness. ArcGIS Utility Network provides access and a deep engagement framework through the utility enterprise, from the boardroom to the utility vehicle dashboard.

ArcGIS Utility Network enhances outstanding collaboration. Learn how these utilities leverage this capability to improve their processes. ■





Upgrading Digital As-Builting Processes for Tracking and Traceability at **Apex Utilities**

Natural gas industry leaders published the ASTM F2897 standard, which specifies how pipe network attributes should be identified using a standard 16-digit barcode.

Apex Utilities, formerly AltaGas Utilities, decided that adhering to the ASTM F2897 standard was necessary for business and regulatory purposes. This required a change because, at the time, all contractor as-built drawings needed to be physically uploaded in the utility's office.

Mobile apps, ArcGIS Utility Network, and Eos™ Positioning Systems Arrow™ Gold Global Navigation Satellite System (GNSS) receiver enable the utility's new digital process for as-built drawings. The utility rolled out the barcode data collection system to 50 contractors and employees. This included data streams from the field to the office's implementation of ArcGIS Pro. The system automatically decodes the collected barcodes and feeds the data into the ArcGIS Utility Network database, which drives the utility's tracking and traceability system. The system saves 50 percent of the inspection field time required previously. [Read the complete story.](#)

“We wanted to move to Utility Network for our GIS because Esri made it directly compatible with the ASTM F2897.”

–Mathew Desbiens, GIS Manager, Apex Utilities

Eos Positioning Systems

Eos Positioning Systems is an Esri partner and a Canadian manufacturer of Esri-aligned GPS/GNSS receivers. The Eos Arrow Gold GNSS receiver provides centimeter accuracy with real-time kinematic (RTK) corrections for submeter accuracy via free SBAS (Space Based Augmentation Systems) corrections. AltaGas Utilities—now known as Apex Utilities—chose Arrow Gold because of its reliability in Canada's harsh environments. ■



Modernizing Utility Operations at **Austin Utilities** by Moving from CAD to ArcGIS

Austin Utilities is a community-owned, not-for-profit municipal utility that distributes natural gas to over 23,000 people in Austin, Minnesota. The utility implemented ArcGIS and ArcGIS Utility Network to address emerging business and regulatory requirements.

For years, Austin Utilities stored its data in CAD. The utility decided to move to ArcGIS to achieve improvements that could not be made in CAD. One of these was a tracking and traceability capability. Austin Utilities also distributes electricity and water. These business areas needed improvements that could be satisfied with ArcGIS as well.

Austin Utilities implemented ArcGIS Enterprise, which included many components including ArcGIS Utility Network. With ArcGIS Utility Network, Austin Utilities can perform asset tracking, traceability, and many other workflows requiring a real-world pipe network connectivity model. The many other capabilities of ArcGIS enable Austin Utilities' office and field staff to perform numerous other tasks.

With the implementation of ArcGIS Enterprise and Utility Network, Austin Utilities' office and field employees can better collect and work with higher-quality map data for current and future business and regulatory needs. [Read the complete story.](#)

ArcGIS enables users to see their assets and work with the data behind the visualization. ArcGIS Utility Network gives users working with data the capability needed for asset tracking and traceability. ■



How **Connexus Energy** Uses ArcGIS Utility Network to Drive Digital Transformation

Connexus Energy embarked on a journey to modernize its network management, focusing on laying a strong data foundation for critical systems across the company. As part of this effort, Connexus implemented Esri's ArcGIS Utility Network to support an immediate design-build system upgrade and a future Outage Management System (OMS) and Advanced Distribution Management System (ADMS). Recognizing the importance of high-quality data, Connexus took much of the data modeling and implementation in-house, ensuring that data requirements and project schedules were met.

Connexus decided to transition to ArcGIS Utility Network, anticipating that it would meet the company's current needs while supporting future ADMS opportunities. The project began with a phased approach, involving extensive collaboration between technical teams to align systems with end-user practices. Schneider Electric helped Connexus Energy realize this vision.

The GIS team at Connexus played a central role in handling data migration. Benefits are already being realized, including a more robust data model, optimized processes, and improved designer efficiency. Automated feeder services and simplified troubleshooting have further enhanced operational effectiveness, positioning Connexus for future success.

“Schneider Electric's ArcFM is at the forefront of Utility Network deployments, providing innovative solutions that integrate seamlessly with critical systems like ADMS and Distributed Energy Resource Management System (DERMS). Our expertise ensures that utilities can adapt to organizational changes, improve data quality, and enhance field operations through digital workflows.”

—Matt Crooks, Product Management Director, Schneider Electric

“The successful implementation of Utility Network has revitalized our long-standing systems. Over the past decade, staff changes and retirements prompted us to reevaluate our processes, which had become stagnant. This project catalyzed fresh thinking, encouraging us to move away from existing practices. We embraced native functionality, scrutinized our workflows, and streamlined our business operations. Importantly, this initiative fostered collaboration, engaging stakeholders and ensuring robust support, ultimately leading to an improved product.”

—Jared Newton, Director of Engineering & System Operations, Connexus Energy

Schneider Electric

Schneider Electric served as the technology provider and implementation partner to Connexus Energy. In addition to providing ArcFM Solution XI Series, including ArcFM Designer XI, ArcFM Feeder Services, and EcoStruxure ADMS, Schneider Electric is currently implementing the software solutions to go live in the fall of 2024. The ArcFM Solution XI Series is the most comprehensive set of utility-specific GIS applications on the market, built to fully digitize and automate the updating and maintenance of clients' Esri ArcGIS system of record. Schneider Electric's solution bridges the gaps between siloed data, disconnected workflows, and isolated systems to ensure that network assets are accurately modeled and updated to reflect their as-built or real-world state as they feed critical downstream systems such as ADMS. ■

Improved Data Quality and Governance

ArcGIS Utility Network uses network rules, attribute rules, and validation to ensure data quality by preventing invalid data and associations from entering the network. For example, suppose a model specifies that a certain type of pipe can only connect to another type of pipe in combination with a reducer. In that case, only those configurations will be allowed. These rules are enforced at the class level for specific asset types and groups.

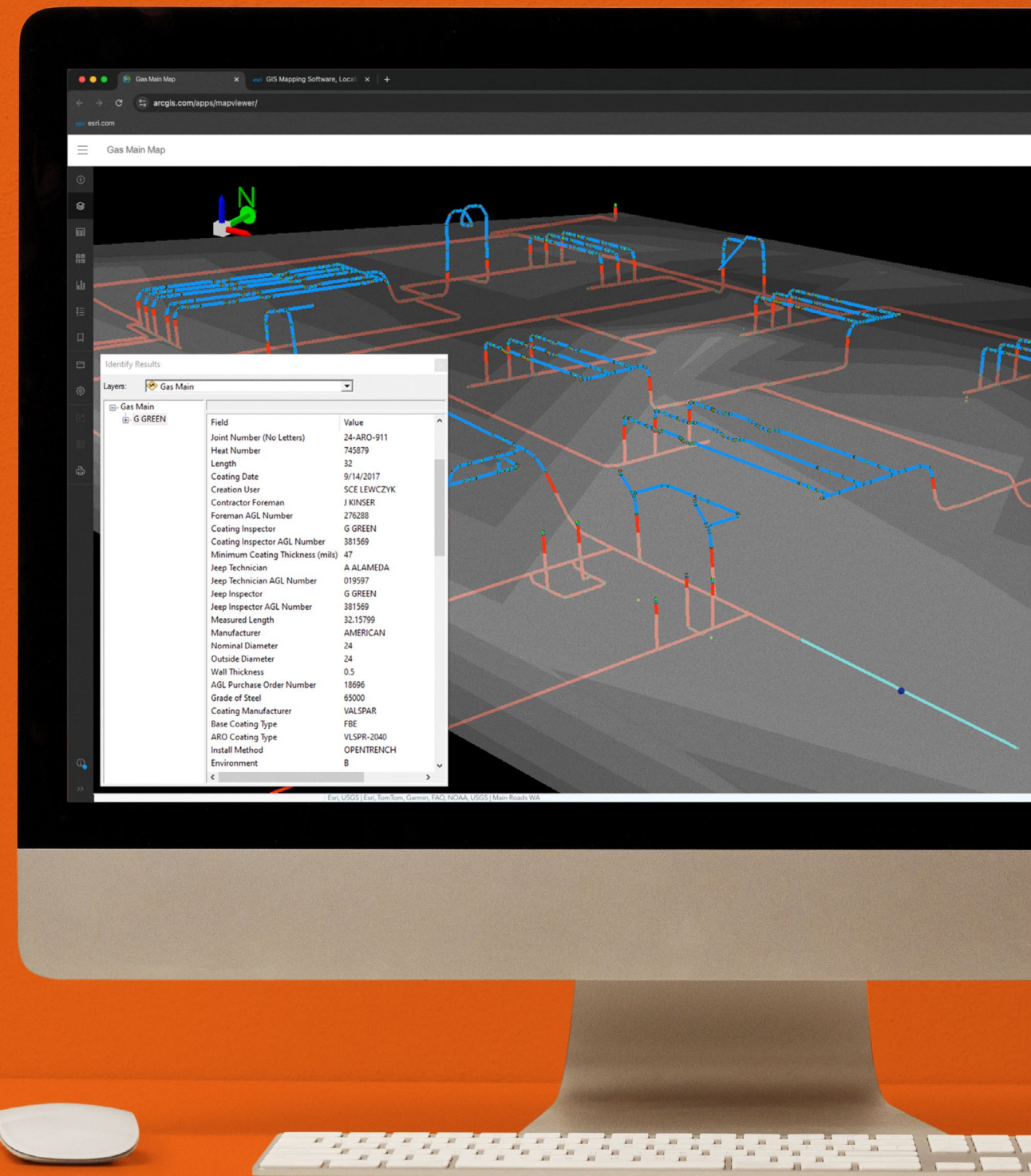
ArcGIS Utility Network also includes advanced topology rules that can provide quality control on the fly by modeling how system components connect to terminal devices, such as transformers.

Rules Uncover Hidden Data Issues

Editing rules and validation in the network ensure data quality by preventing the entry of logically invalid data and associations. For example, a reducer must be connected to pipes of the correct diameter on either end.

ArcGIS Utility Network has a built-in mechanism to detect logically inconsistent feature associations. This is done by a user-defined network rule base specifying which feature type can be connected and associated with another. For example, a medium-voltage transformer cannot be connected to a high-voltage line. The network rule base for ArcGIS Utility Network is integrated into the editing environment to prevent the creation of incorrect connectivity and associations between features. New features and associations are also tracked with dirty areas to mark the area that needs to be updated in the network topology. If attribute values are modified for existing features that impact the network topology, these features are flagged by dirty areas. During validation of the network topology, ArcGIS Utility Network updates the network topology in the dirty areas and checks for invalid features. These features are highlighted in the map display with point, line, and polygon error features.

Learn how these utilities improved their data quality with ArcGIS Utility Network. ■





GIS + Smart Design = Best-in-Class Customer Service for **LG&E** and **KU**

Louisville Gas and Electric Company (LG&E) and Kentucky Utilities Company (KU), part of the PPL Corporation family of companies, serve over 1.3 million customers in Kentucky. LG&E and KU have successfully integrated Esri's ArcGIS Utility Network to enhance their electric and gas operations. Facing the challenge of managing a vast and complex network, LG&E and KU sought a solution that could provide a more detailed, real-time view of their infrastructure, allowing for better decision-making and operational efficiency.

“The product we delivered will enhance our ability to integrate and analyze data [and] manage certain work processes, and it will offer benefits for years to come.”

—Dean Snyder, Acting Director of IT Development and Support, LG&E and KU

ArcGIS Utility Network has enabled LG&E and KU to model their electric and gas networks with unprecedented accuracy. ArcGIS Utility Network offers advanced spatial analytics, enabling the companies to visualize and analyze their networks to the smallest details. With this level of insight, LG&E and KU can perform network tracing, manage outages more effectively, and optimize maintenance operations, significantly improving service reliability. Spatial Business Systems (SBS) provided its Automated Utility Design (AUD) software to strengthen the design process.

One of the key benefits of ArcGIS Utility Network is its ability to integrate data across various systems, creating a unified view of all network assets. This integration supports more informed decision-making and helps LG&E and KU respond swiftly to emergencies. By adopting this cutting-edge technology, LG&E and KU have improved their operational capabilities and ensured that their infrastructure is prepared to meet future demands efficiently and sustainably.

[Read the complete story.](#)

“With the support of Esri, a world leader in GIS technology, we were able to break this large-scale project into manageable pieces with a phased approach.”

—Dean Snyder, Acting Director of IT Development and Support, LG&E and KU

Spatial Business Systems

SBS provided its Automated Utility Design software for this project. SBS products seamlessly blend the intelligence of Utility Network with the world of AutoCAD, allowing Utility Network to maintain a single source of geospatial truth and supporting a highly productive digital design workflow, enabling utilities to meet their increasingly difficult growth and operational objectives. ■



Enterprise GIS Unites **Liberty Utilities** Processes

Liberty Utilities, a subsidiary of Algonquin Power & Utilities Corp., has grown significantly since its establishment in 1988 and now serves over a million customers across various regions. The company faced challenges in maintaining consistency and standardization in its operations due to its growth strategy being centered on mergers and acquisitions. These challenges became especially evident during the COVID-19 pandemic.

Liberty adopted Esri's ArcGIS for enterprise GIS solutions and ArcGIS Utility Network for network management, centralizing its operations in the Microsoft Azure cloud. This project facilitated a system of engagement with over 1,000 members, offering functionalities ranging from asset inspection to general mapping through various applications accessible on tablets. Partnering with Cyient, Liberty standardized the data migration process, enhancing data quality and validation, reducing errors, and improving service efficiency.

The new system has fostered improved communication and coordination, providing management with superior situational awareness, especially in crisis situations like wildfires and floods. The initiative has streamlined integration with other corporate systems and promises lower costs and increased productivity. [Read the complete story.](#)

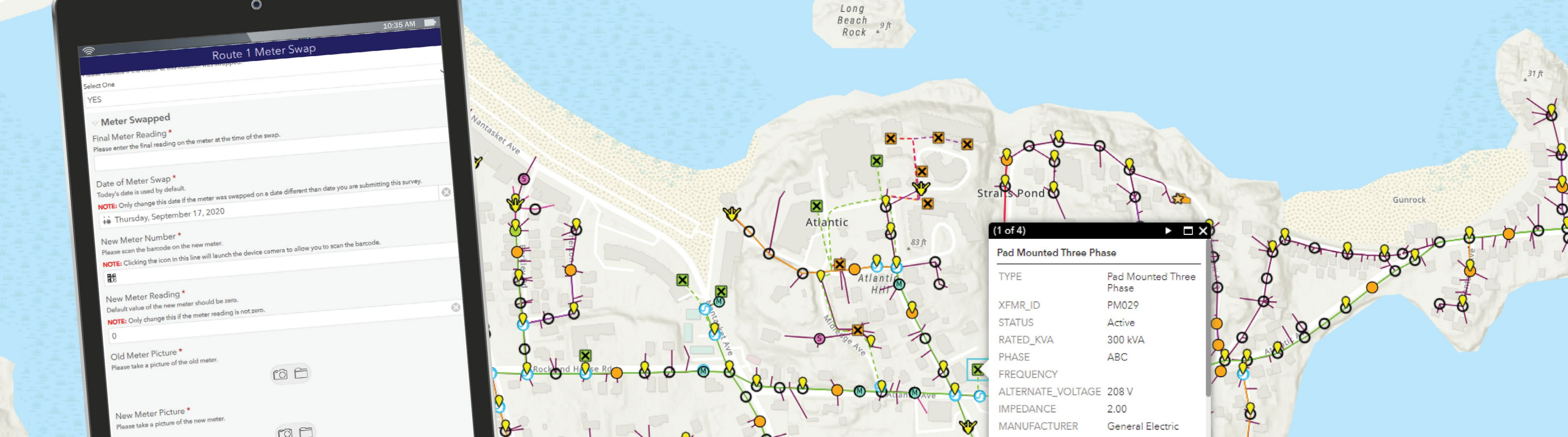
“The project was successful, and the team effectively crossed many hurdles. There were many technical and business challenges, let alone the situation that the COVID-19 pandemic presented, but the team handled them well. A big thank-you goes to the project, local, IT, regional, vendor, and implementer teams for achieving this massive feat!”

–Jitesh Parmar, Utility Business Transformation Leader, Liberty Utilities

High-quality data leads to fewer errors and less work repeated, thus lowering costs, improving service, and reducing restoration time. In addition, data errors can lead to confusion, which can cause accidents. Much improved communication and coordination at Liberty now occur with outstanding data quality.

Cyient

Cyient was selected to help Liberty fully migrate data, software, IT landscape, and security workflows and applications. Liberty also established an internal team of GIS professionals, IT architects, technicians, managers, and change management specialists to work alongside Cyient. ■



Unlocking the Power of GIS in a Utility Network Journey

Hull Municipal Light Plant, a Massachusetts electric utility serving 10,000 residents, faced manual data integrity challenges that impacted the small coastal community. The utility implemented ArcGIS Utility Network to address this, establishing a comprehensive solution for better data governance. Hull Light sought a modern solution to improve the efficiency and accuracy of its operations.

ArcGIS Utility Network has provided Hull Light with a powerful tool to manage its electric grid more effectively. By offering a detailed and accurate model of the utility's infrastructure, ArcGIS Utility Network enables Hull Light to visualize its entire network, perform complex spatial analyses, and manage assets with greater precision. One of the significant advantages of ArcGIS Utility Network is the ability to conduct real-time network tracing, which helps quickly identify issues, such as outages, and respond more effectively, minimizing customer downtime.

The integration of ArcGIS Utility Network has also streamlined Hull Light's processes by centralizing data from various sources into a single, unified system. This capability has enhanced decision-making and operational efficiency, allowing the utility to plan maintenance better, manage resources, and ensure service reliability. Patrick Engineering, now known as RINA, assisted in the implementation.

Through adopting Esri's ArcGIS Utility Network, Hull Light has significantly improved its ability to deliver reliable electric services, demonstrating a commitment to modernizing its infrastructure for the future.

[Read the complete story.](#)

This integration created a common operating picture and significantly shortened field data collection and billing update time by 80 percent. As a result, Hull Light supported decision-making and improved data quality by 25 percent, enhancing overall operational efficiency and reliability.

RINA

RINA, formerly known as Patrick Engineering, provides comprehensive engineering and consulting services to the utilities sector, including energy, water, and telecommunications. Their expertise spans design, construction management, and project implementation, supporting infrastructure development and maintenance. RINA is known for delivering innovative, sustainable solutions to enhance utility performance and efficiency. ■

“This streamlined survey will be very beneficial and add time savings to our AMI (advanced metering infrastructure) meter system deployment and future Utility Network needs.”

—Michael Schmitt, Assistant Operations Manager, Hull Municipal Light Plant



Accelerating Hope's ArcGIS Utility Network Implementation and Migration

Hope Gas provides natural gas to approximately 125,000 residential, industrial, and commercial customers in 35 West Virginia counties.

Hope acquired the gathering, transmission, and distribution assets of Dominion West Virginia and its supporting operations, which included the data in a legacy GIS. Hope Gas could not maintain the gas assets in this legacy data format and needed to implement the Esri platform in nine months to maintain the data, capture inspection data in the field, and generate compliance reports for the newly acquired gas distribution systems.

With the assistance of Esri partner RAMTeCH, Hope implemented ArcGIS technology, including the Utility and Pipeline Data Model, Portal for ArcGIS, ArcGIS Pro, ArcGIS Utility Network, and a GIS mobile application.

“RAMTeCH understands the importance of a modern network and how critical it is for utilities to be fully prepared when transitioning to the ArcGIS Utility Network. Leveraging a comprehensive strategy that provides a clear blueprint to the future state is key to ensuring a successful ArcGIS Utility Network system deployment.”

—Jeffrey Nash, Senior Vice President, RAMTeCH

RAMTeCH helped Hope successfully implement the new Esri GIS within the accelerated nine-month time frame and meet the agreed-upon expectations. This implementation included cleansing the data, configuring Utility Network rules, creating topology, and loading data into the Utility Network SAP HANA database.

RAMTeCH

RAMTeCH delivered the new Esri GIS to Hope Gas within the accelerated nine-month time frame and met agreed-upon expectations. RAMTeCH interfaced directly with Hope, and RAMTeCH utilized its offshore team to perform the data migration, working closely with Hope's business executives and IT and GIS operations teams. ■

“With no hesitation and [with] true confidence, RAMTeCH stepped in and provided the necessary solution and personnel to ensure Hope had its new GIS technology operating by the firm deadline set by the State of West Virginia. Our collaboration with RAMTeCH guaranteed all expectations were met and Hope's systems program was a success.”

—Nagy Nagiub, Vice President of Corporate Services, Hope Gas



City of Seguin Migrates to Utility Network with GPS Accuracy

The City of Seguin, Texas, serving over 30,000 residents, upgraded its utility services with ArcGIS Utility Network, enhancing GIS data accuracy for electric, water, and wastewater utilities. Faced with growing infrastructure demands, the city used high-precision Global Navigation Satellite System (GNSS) receivers from Eos Positioning Systems™ to accurately map assets, preventing construction mishaps and aiding future maintenance. The resultant data is integrated into the city's enterprise GIS, supporting technologies like Supervisory Control and Data Acquisition (SCADA) and Outage Management System (OMS) technology. The city plans to extend this precision to the water utility network, significantly improving asset management and operational efficiency.

Eos Positioning Systems

Eos Positioning Systems, Inc., is the Canadian designer and manufacturer of premier, high-accuracy GNSS receivers for the "Bring Your Own Device" (BYOD) market. Eos GNSS receivers, including the Skadi™ Series and Arrow Series products, provide real-time submeter, subfoot, and centimeter-level location accuracy to any device or app. All Eos GNSS receivers are completely device agnostic and support iOS, Android™, and Windows devices. Eos also offers advanced mapping solutions: tilt compensation, underground utility mapping, and much more. ■

“We’re ensuring the data is correct. Then we can do a full connection for our Utility Network to move to the next phase.”

—Felecia Helms, Utility Data Analyst, City of Seguin

“People must recognize that good asset management starts with collecting good data as step one. Data does not exist in a silo. It’s designed to be shared, expanded upon, integrated, and consumed upstream and downstream. We keep this in mind while building and capturing something as simple as a point.”

—John Saldana, Smart Grid Solutions Manager, City of Seguin

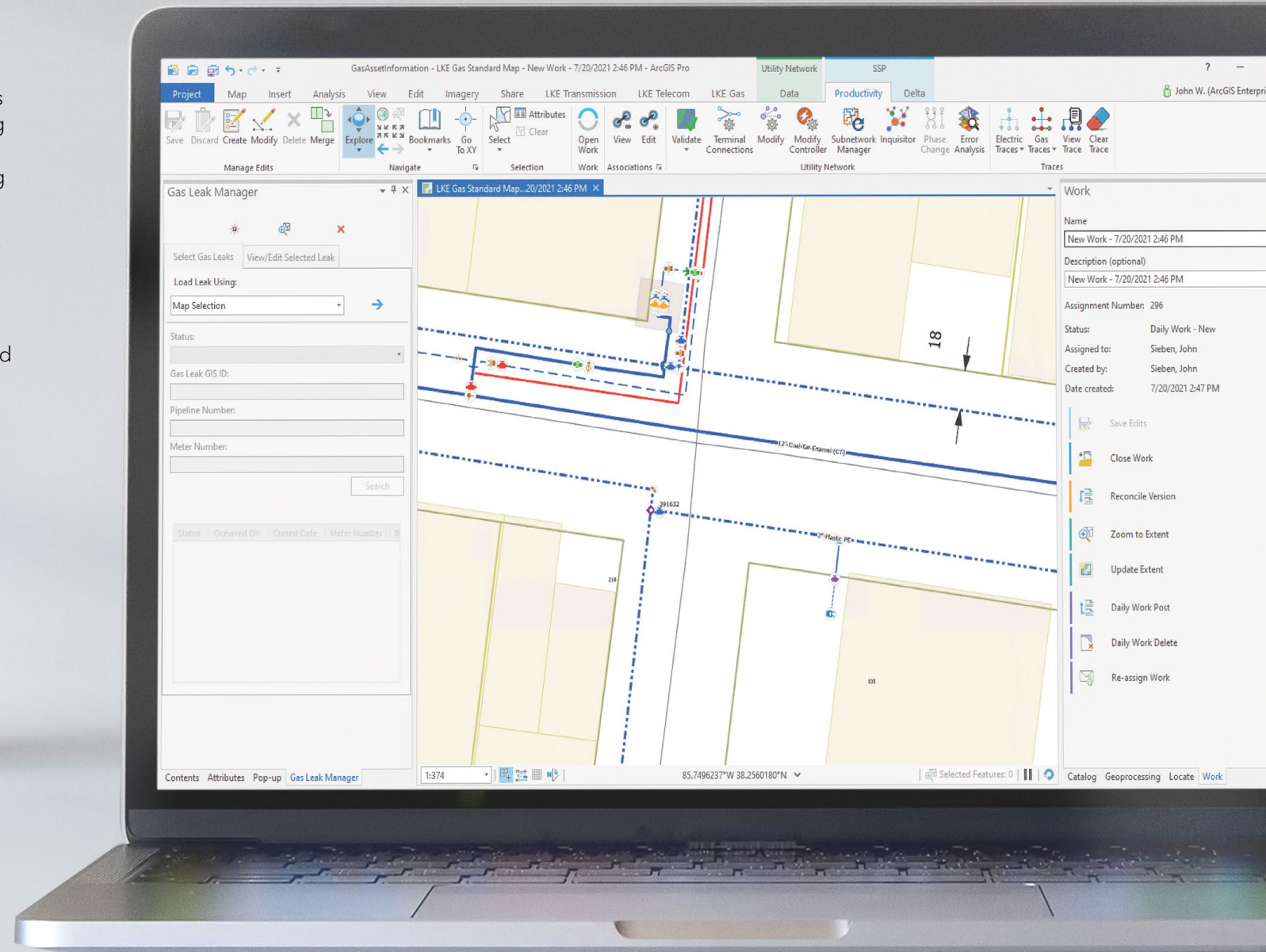
Spatially Enabling the Digital Utility

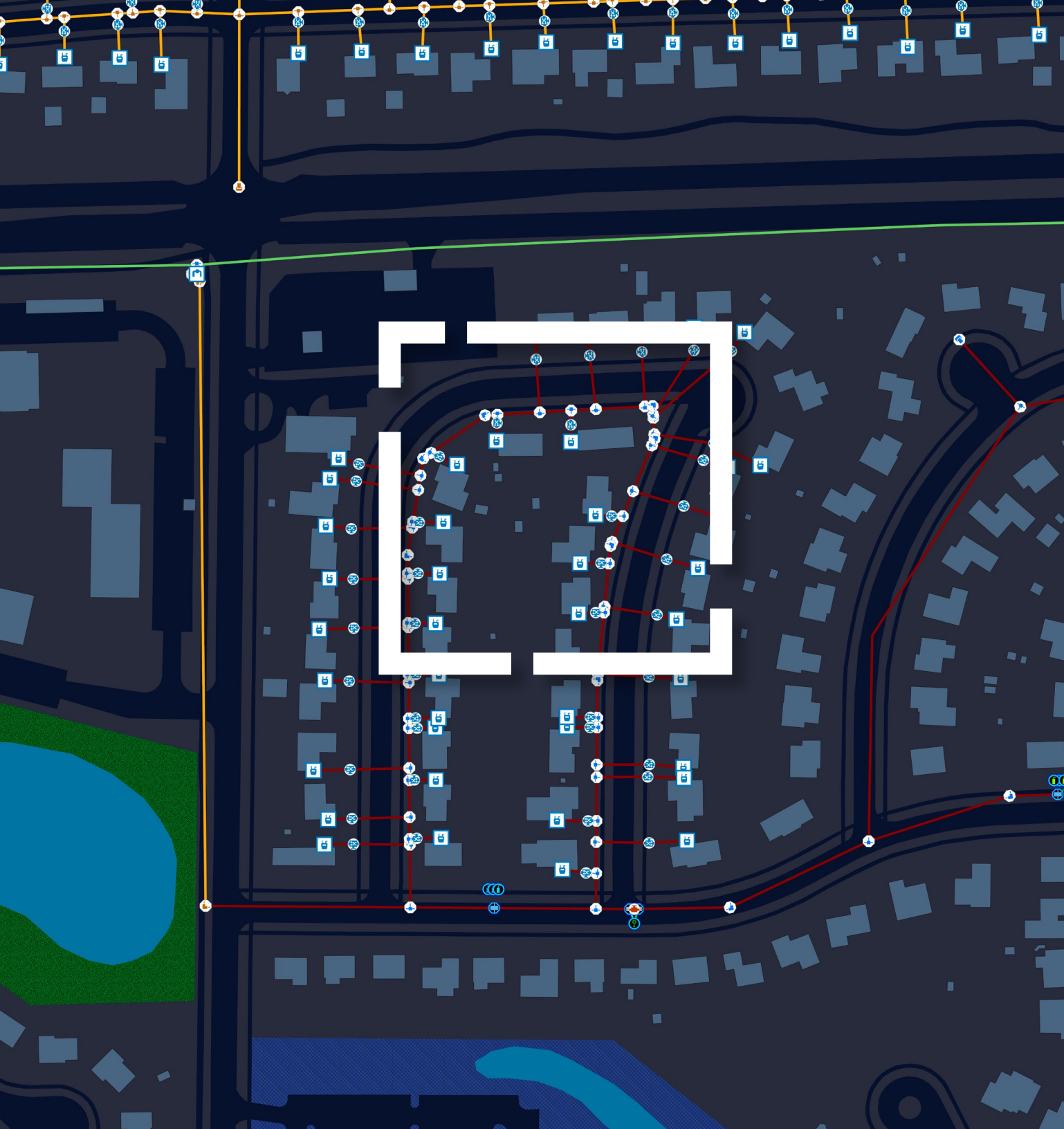
ArcGIS is designed to model, manage, visualize, and analyze modern networks in a changing landscape. It accommodates new kinds of network assets and connectivity rules. Hence, organizations are better positioned to overcome business challenges from emerging industry pressures and shifting consumer expectations. ArcGIS also supports modern technology patterns so that organizations can work and deliver information in ways that staff and external stakeholders expect. This means accessing and editing data in the office and the field and sharing key information internally and externally—all within a secure environment that allows organizations to safeguard their data.

ArcGIS lets organizations improve how they model modern utility networks and visualize and analyze those networks to support workflows across the enterprise. This makes it easier to understand what is happening within the network and apply that understanding to day-to-day operations and long-term planning. In turn, this allows the organization to improve reliability in the network, resulting in improved service delivery to customers. ■

[Learn how ArcGIS is digitally transforming energy utilities.](#)

[Learn more about ArcGIS Utility Network.](#)





About Esri

Esri, the global market leader in geographic information system (GIS) software, offers the most powerful mapping and spatial analytics technology available. Since 1969, Esri has helped customers unlock the full potential of data to improve operational and business results. Today, Esri software is deployed in more than 350,000 organizations, including the world's largest cities, most national governments, 75 percent of Fortune 500 companies, and more than 7,000 colleges and universities. Esri engineers the most advanced solutions for digital transformation, the Internet of Things (IoT), and location analytics to inform the most authoritative maps in the world. **Visit us at [esri.com](https://www.esri.com).**

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Acknowledgment of Our Valued Business Partners

Esri would like to extend our gratitude to our exceptional business partners, whose expertise and collaboration have been instrumental in the success of this eBook. Your contributions have helped shape the innovative solutions outlined in these pages, enabling the digital transformation of utilities across the globe.

This journey has been a collaborative effort, and we couldn't have reached these milestones without you. We look forward to continued growth and innovation together in the future.

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RAMTECH



What Partners Are Saying About ArcGIS Utility Network



Ultimately, utilities adopting ArcGIS Utility Network can achieve greater situational awareness and operational efficiency, positioning themselves at the forefront of industry innovation and service excellence. As Esri phases out the geometric network, transitioning to ArcGIS Utility Network becomes vital for utilities seeking to stay current with technological advances in GIS.

RAMTECH

ArcGIS Utility Network data models and tools add advanced network capabilities to the Esri platform and provide utilities with a reliable, flexible, and secure GIS that models networks as they exist in the field, which must be consumed by operational systems. This system of record enables uniform and consistent data to be consumed by many levels of users in an organization, as well as critical systems to support engineering, field, and operations. **ArcGIS Utility Network's advanced visualization and analysis capabilities modernize and expedite operational workflows so utilities can respond more quickly and efficiently during severe weather and other major events.**



ArcGIS Utility Network provides a platform to manage topology and complex relationships for critical infrastructure and powerful tools (and APIs) to share this data with stakeholders. Over the years, GIS has expanded to be the heart of a utility—driving everything from outage management to network analysis—but in many cases, the available capabilities lacked functionality and gated advancement. **A modern utility is a digital utility, and Utility Network is the upgrade that gives GIS the horsepower to overcome historical hurdles and support today's needs.**



GIS-based solutions leveraged to support reliability for electric distribution organizations will help reduce SAIDI and its related capital improvement expenditures. **Increased data fidelity and the ArcGIS Utility Network capability's real-world modeling constructs will enable volt-var-optimization and other optimizing ADMS apps, providing as much as 5 to 7 percent of yearly injected energy savings for utilities.** We have seen Utility Network migration and implementation serve as a springboard for digital utility modernization, process automation, and organizational transformation for our clients, who are universally focused on providing exceptional service and clean and safe energy.



GeoSpatial Innovations, Inc.

ArcGIS Utility Network is crucial for contemporary utilities as it provides a robust foundation to adapt to evolving conditions and strategically plan for the future. Customers are adopting ArcGIS Utility Network to ensure that asset modeling reflects their actual field layout, establishing a solid base for adapting to environmental shifts and laying out strategic plans.



We see utilities striving to enhance their operational efficiency and data accuracy. **ArcGIS Utility Network helps by providing a comprehensive, real-time view of their infrastructure and enabling smarter decision-making.** We help by offering expert guidance, ensuring a smooth transition to ArcGIS Utility Network.

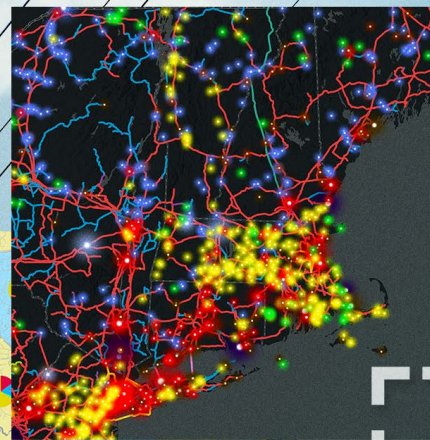
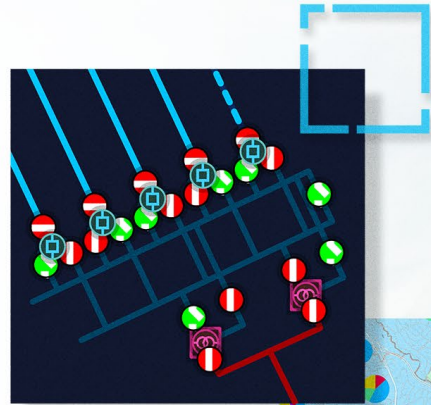
Life Is On



ArcGIS Utility Network, coupled with ArcFM Solution XI Series applications such as ArcFM Editor XI and ArcFM Feeder Services, ensures higher data quality, which is crucial for reliable operations and informed decision-making. ArcFM, in collaboration with ArcGIS Utility Network, enhances field integration and supports digital workflows, streamlining design and construction, enhancing operations, and improving efficiency. As utilities look to DERMS and ADMS as solutions to ensure reliable and efficient customer service, they require high-quality data and real-time updates that reflect the as-built and existing infrastructure. ArcFM and ArcGIS Utility Network support these needs by providing a flexible and scalable data model to create, manage, and share a digital twin of the built world.



Utilities are adopting ArcGIS Utility Network to improve resiliency in their operations and better serve their customers and communities. **Modern systems like ArcGIS Utility Network help future-proof operations and enhance connectivity with business systems.** Once adopted, utilities will find improved opportunities for collaboration. Once business systems are connected, our customers see the old, traditional silos breaking down between systems and departments. This adoption is becoming essential for modern utilities due to the comprehensive data model, immediate analysis capabilities, advanced tracing, scalability, and support for modern technologies like AI. In some cases, simply getting their systems into a digital format provides an immediate benefit, increasing the visibility of owned assets and shaping asset management goals. ■



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