



**GETTING THE MOST VALUE FROM YOUR  
METERING TECHNOLOGY INVESTMENTS:  
Economic Migration from AMR to Smart Grid**



## CONTENTS

Introduction	3
Maximizing Your ROI	4
Demonstrating the Value of Smart Grid Investments	6
TUNet® ERT Migration Solution - How it Works	8
ERT Migration Data Value Streams	9
Conclusion	11

**TAMMY ZUCCO**

Chief Marketing Officer, Tantalus

## INTRODUCTION – THE AMR TO SMART GRID UTILITY CHALLENGE

Over the past several decades, utilities have been integrating advanced metering technologies throughout their service areas. The implementation of this technology supports improved customer service and helps utilities to function more efficiently. Many utilities have adopted automatic meter reading (AMR) technology such as Itron drive-by or hand-held encoder receiver transmitter (ERT®) devices to gather consumption data used for periodic customer billing. While this technology is effective for that purpose, utilities are finding that one-way communication networks limit their ability to support more advanced customer and operational applications requiring two-way communications capability.

The TUNet multi-purpose utility platform enables Smart Grid applications for monitoring and control of electric, water and gas municipal and cooperative utilities. This two-way communications platform supports a variety of high-value utility applications including:

- Advanced Metering Infrastructure (AMI)
- Closed Loop Voltage Reduction (CLVR®)
- Outage management
- Remote connect/disconnect
- Prepay of electric power
- Power quality analysis
- Load management
- Revenue assurance
- Reliability analysis
- Asset management
- Capacitor bank and regulator control
- Streetlight control
- Net metering

**For a utility that has already made the decision to invest in ERT technology, there is a path to enabling advanced applications while continuing to leverage those assets. TUNet empowers utilities to build on existing AMR groundwork to take advantage of operationally efficient advanced applications at a fraction of the time and cost of a full system replacement. Unlike other solutions, TUNet is designed to be strategically deployed based on specific business drivers as determined by each utility.**

Tantalus and Itron have developed a joint solution that helps mitigate the costs associated with a full system replacement. Remotely reading electric, water and gas ERTs over TUNet extends the useful life and value of non-depreciated capital assets, does not interrupt existing ERT deployment plans, and provides a practical migration path to full two-way smart grid.

Rather than deferring the benefits of a two-way smart grid network, the TUNet ERT migration solution enables immediate AMI-functionality, at a measured and economical pace. The TUNet ERT migration solution incorporates Itron's industry-leading electric meters (CENTRON® & SENTINEL®) and water, electric and gas ERT modules (100W, 100G, R300, 60W) into a next-generation smart

grid communications and applications platform.

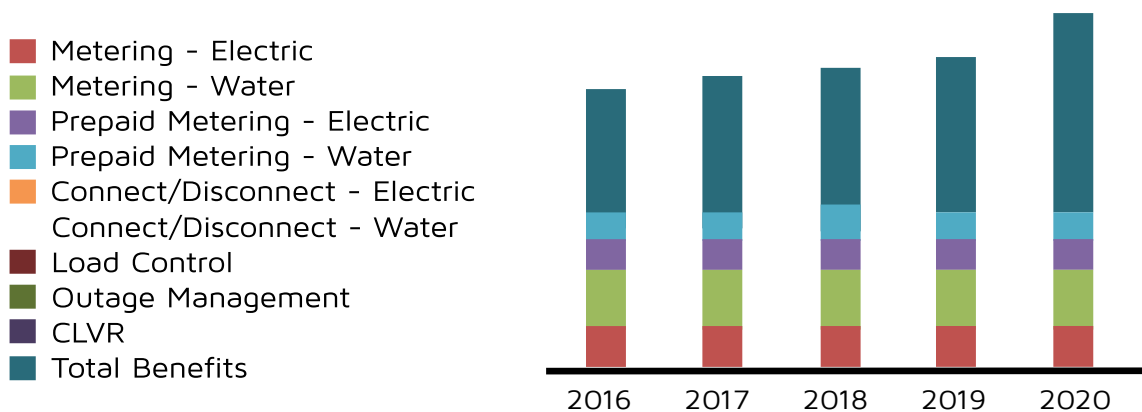
The result of the ERT migration solution is a flexible and powerful electric, water, and gas utility smart grid platform, tuned to meet the specific needs and challenges of the public power sector. The benefits of this solution extend far beyond meter reading by enabling the adoption of two-way smart grid functionality and applications that drive faster decision-making while providing access to near real-time data allowing utility departments to operate more efficiently and enhance customer satisfaction.

## MAXIMIZING YOUR ROI

Once a utility recognizes the need to adopt advanced applications to reduce operational costs and enhance customer service, the decision to implement a two-way smart grid network does not necessarily have to be an “all or nothing” choice. The TUNet ERT migration solution is designed to allow the utility to reap the benefits of an automated network without an up-front investment in a full meter replacement deployment, but rather an incremental investment over time and as it makes financial sense. Tantalus’ intuitive and customizable financial model helps utilities evaluate and identify the benefits and costs of various smart grid applications in order to determine the most advantageous next step from traditional one-way AMR. Depending on the applications being considered and the characteristics of the utility, the business case and return on investment (ROI) can vary dramatically, so it is important for utilities to prioritize actions in a manner that best supports their operational objectives. The Benefits chart below (Figure 1) is excerpted from the financial model, and depicts a sample profile of the monetary value associated with specific application-based revenue streams and how they combine to form a quantified picture of compounding AMI payback. Total Benefits also includes additional fractional value streams gained from other applications.

Sample Financial Benefits of Smart Grid Applications

Figure 1



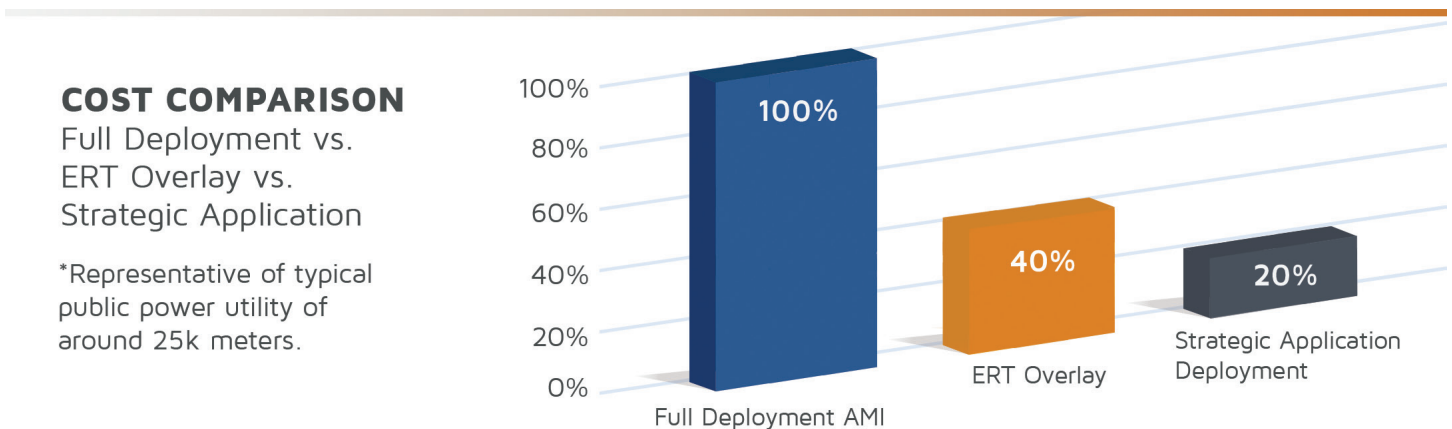
There are two basic approaches to maximizing the ROI of adopting the Tantalus-Itron ERT solution. In the first approach, a utility may elect to overlay a two-way AMI network across their entire service territory – effectively encompassing an existing base of gas, electric and water ERTs – in order to gain the benefits of two-way automation system-wide. By utilizing an **ERT overlay migration solution, this utility will effectively spend less than half the cost of a full deployment to gain a full-coverage TUNet AMI network while replacing approximately just one in seven electric meters.** For a utility who wants to automate **only** water or gas, no meter replacements are required. An example of this incremental approach to AMI through ERT migration has been demonstrated at Marietta Power and Water, a real-world example that will be outlined in further detail later.

The second approach a utility may choose is a **strategic application deployment** where TUNet network infrastructure is deployed to a strategic location of their service territory to address a specific need or pain point such as a high-cost-to-serve area with frequent move-ins and move-outs such as a university apartment complex. In this example, the utility would greatly benefit from a strategic deployment of TUNet infrastructure and integrated smart meters equipped with remote disconnect/connect functionality.

Figure 2 below outlines the approximate relevant costs of a full deployment of two-way AMI as compared to an ERT Overlay and a Strategic Application deployment.

**Case Study Highlight:**

**Figure 2**



**Garland Power & Light – Strategic Application Deployment**

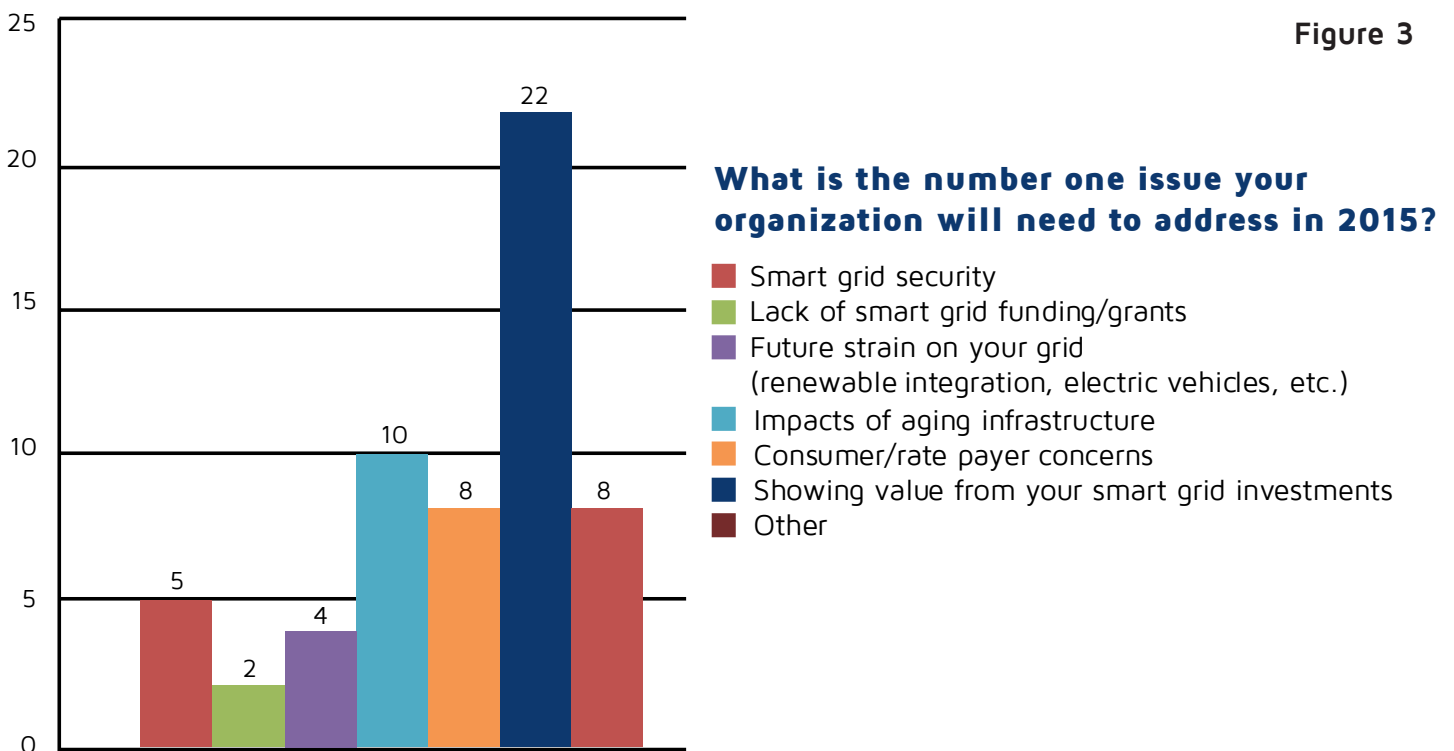
Garland serves 70,000 customers as Texas’ fourth largest municipal utility. Initially, Garland was considering a full AMI deployment as they recognized the benefits that a completely automated two-way system would provide. With ERT technology already in place, Garland determined that by utilizing its existing AMR infrastructure during a transition to AMI, it would adequately recover existing investments while creating a way to capture meaningful savings through advanced applications immediately rather than delay a move to smart grid technology for several more years.

By performing a detailed analysis of Garland’s business drivers for AMI while considering the utility’s need to adopt a phased approach to maximize the value of current investments, Garland was able to successfully justify an initial strategic application approach to smart grid by deploying TUNet in a commercial park to daily read several hundred electric ERTs and gather near real-time data from their water ERTs.

### Performance and Results

Garland’s initial strategic deployment approach decision allowed them to capture the full value of non-depreciated ERT assets while moving to a smart grid ready platform. With TUNet delivering hourly interval water consumption readings, tampers, and alerts, Garland is proactively able to identify problems such as water leaks and resolve them in a timely manner. By receiving daily electric consumption readings as well as tampers and alerts, Garland began to realize the benefits of improved operational efficiencies on the first day of deployment. The utility has also been able to use TUNet to isolate and phase out instances of underperforming electromechanical meters, some of which were later determined to be operating as low as 85% efficiency, translating to significant and previously unrecognized lost revenue over years – in some cases, over decades. Now, with the success of a strategic application deployment in a commercial park as well as a strategic deployment of remote disconnect/reconnect in a multi-dwelling apartment building, Garland is reaping the measurable benefits of two-way smart grid. They plan to continue to phase in strategic application deployments across their service territory over time that will address specific operational needs and provide immediate returns.

### DEMONSTRATING THE VALUE OF SMART GRID INVESTMENTS



Research conducted by Tantalus reveals that decision makers from more than 50 municipal and cooperative utilities indicated that **demonstrating measurable value from smart grid investments is a top priority for 2015** (See Figure 3). Other findings show that addressing the ‘impacts of aging infrastructure’ ranked second among utility concerns, which coincides with industry trends indicating a desire to leverage existing investments as part of the justification in a broader smart grid strategy. In line with these findings, many utilities are now looking beyond the direct operational benefits (such as reduced truck rolls) of upgrading from a one-way AMR system to a two-way AMI network. The benefits of adopting new technology to enable advanced smart grid applications can justify the costs over time, some with quicker paybacks than others, but there are many reasons a utility may not want to “rip and replace” a working AMR system that is performing well for its intended purpose.

The key benefit of implementing a TUNet ERT Migration solution is that AMR-only utilities are provided a cost-effective option to leverage and protect existing ERT investments as part of a strategic migration path toward more advanced capabilities as individual utility business drivers dictate. If the utility has identified several needs or pain points that could be addressed with a two-way network that would greatly improve its customer service or operational efficiencies, the business case for a TUNet Overlay for their entire service territory can be readily justified using Tantalus’ financial model.

In a simplified example, a utility with ERTs fully deployed may decide that it wants to implement remote disconnect/connect and a prepaid power program in a particularly high-cost-to-serve area to reduce truck rolls, increase its cash flow, and protect future revenue. In addition, the utility sees the value of the data coming back from ERTs and TUNet meters that allows them to troubleshoot specific areas while gaining access to more current and granular information for outage management, power quality analysis, as well as a host of other benefits. **In this case, the utility may achieve two-way system automation by replacing as little as 15 percent of its electric ERT meters with a TUNet network that gives access to near real-time meter data and allows them to implement many advanced applications throughout their service territory. If a utility wants to automate water and gas readings only, a deployment of TUNet infrastructure is required. No meter changeouts are required in this scenario.**

### Case Study Highlight:

#### Marietta Power & Water- ERT Overlay

Marietta Power & Water is Georgia’s largest municipal utility, serving more than 45,000 electric and 17,000 water and wastewater customers. Like other utilities with reliable Itron ERT technology already in place, Marietta began to look to future needs beyond basic monthly meter reading. Through careful analysis, it became apparent that the utility would need to adopt a real-time communication infrastructure in order to provide the energy data with enough granularity, frequency, and reliability necessary to support powerful advanced applications.

Marietta found that the ability to leverage existing electric and water ERT technology, coupled with

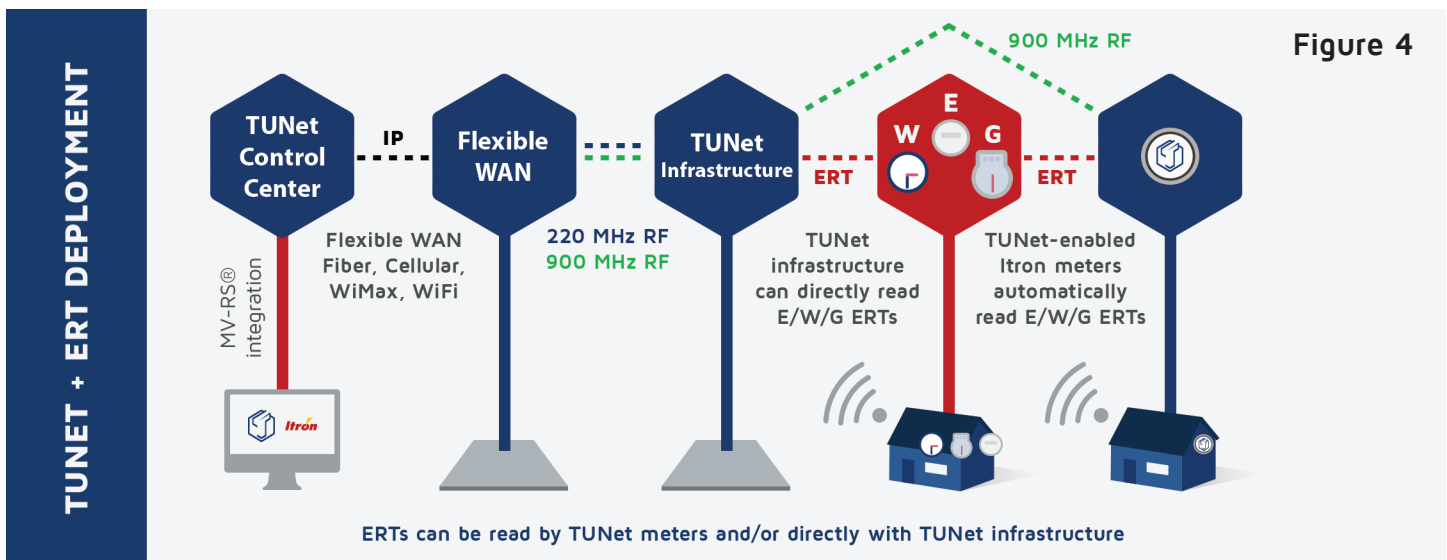
the flexible deployment pace afforded by TUNet provided enough financial justification to move forward with an AMI project.

### Performance and Results

Less than one year into a full ERT overlay deployment, Marietta is now remotely collecting daily meter readings from more than 36,000 electric and water ERT devices through TUNet, translating into thousands of dollars in economic benefit from avoided field visits and other operational costs. The utility anticipates that it will be able to fully automate the daily collection of electric and water meter readings by overlaying its service territory with a low-maintenance two-way wireless TUNet network while upgrading less than 15% of its meter population. The financial benefits that result from features such as improved metering, access to voltage data, outage notification and billing accuracy as well as quicker water leak detection will continue to grow as Marietta continues on the path to full smart grid automation. Marietta plans to continue to leverage the benefits of access to two-way AMI data and increased ROI to implement additional smart grid applications such as remote disconnect/connect and direct load control.

### TUNET ERT MIGRATION SOLUTION – HOW IT WORKS

The joint solution developed by Tantalus and Itron works by deploying TUNet network infrastructure over a utility’s complete service area or a specific strategic geographic area by replacing a percentage of electric meters. **Typical full ERT overlay deployments involve a replacement of around 15% of the electric meters. Full AMI coverage can be achieved without replacing any gas or water meters.** All TUNet enabled meters and network devices use embedded distributed computing (internet of things) at the endpoint which provides the parallel processing power to leverage multiple applications on a single network.



**Figure 4: TUNet ERT Reading Solution:**

Tantalus can design the ERT migration solution to fully cover the service territory with a phased deployment to ensure the highest level of continuous performance with existing utility systems,

such as the Itron MV-RS® system that is used with ERT drive-by and handheld networks. Following a propagation study and system design, the basic TUNet infrastructure is deployed to provide connectivity in strategic locations for specialized applications such as prepay or load management or to provide full system coverage for a comprehensive AMI program. An optimized Wide Area Network (WAN) is established utilizing a flexible combination of wired and wireless, existing or new communication options (220/900 MHz RF, fiber, cellular carriers, Wi-Fi, WiMAX) best suited to each utility to establish coverage and connectivity over the service territory. All TUNet-enabled devices (meters, load control devices, collectors, repeaters, etc.) unite to form a 900 MHz RF Local Area Network (LAN) that optimizes coverage, connectivity, scalability, redundancy, and alternate data transmit path capabilities. TUNet LAN/WAN gateway devices collect data from multiple TUNet endpoints (meters, load control) and Itron Electric, Water and Gas ERTs for transmission to the TUNet Control Center (TCC). ERT readings are captured remotely via any TUNet-enabled device as they are transmitted. All readings are then sent from TUNet to MV-RS® and then to other utility systems (billing, CIS, etc.). All data is stored by TUNet and can be easily integrated with billing and other systems via MultiSpeak® interfaces.

Full two-way functionality is available for water and gas through a unified and integrated head end. TUNet transmits all logged hourly interval data, leak alarms, and tamper notification messages from 100-series water and gas ERTs.

TUNet can also be deployed strategically to meet specific business objectives or to serve isolated or hard-to-reach meter populations. Some examples are given in Figure 5 below:

**Figure 5**

<b>CHALLENGE</b>	<b>APPLICATION / SOLUTION</b>
Address non-pay while enabling customers to manage account	Remote Connect/Disconnect with Prepay
Manage load and power supply costs	Load Management application solution
Provide granular data to largest customers Develop customized rate plans based on usage	Commercial & Industrial strategic overlay
Automate ERT reading-reduce truck rolls and labor costs	ERT Overlay standard package

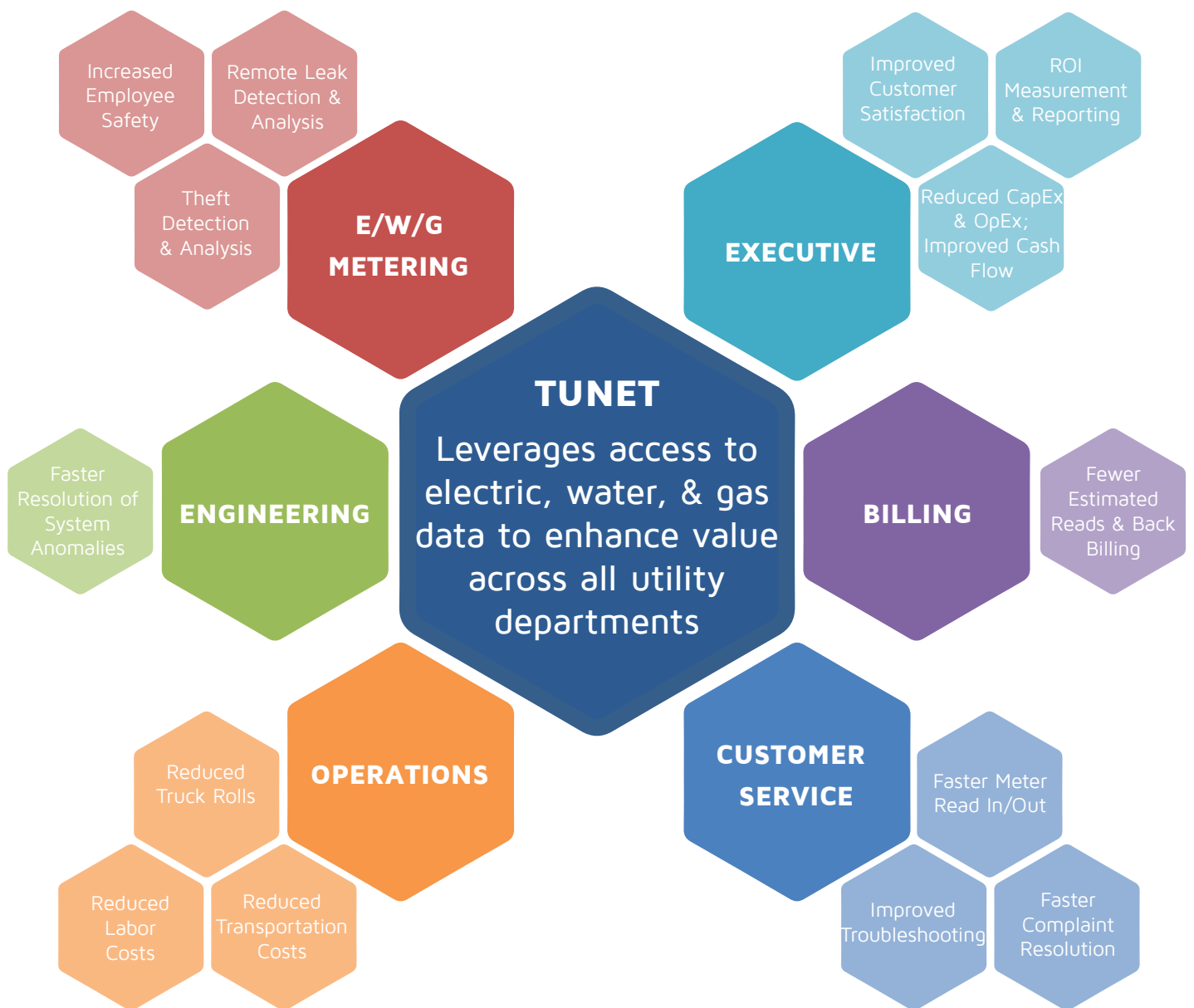
**ERT MIGRATION DATA VALUE STREAMS**

Access to daily or hourly data can make a significant impact across utility operations. Currently, hand-held and drive-by networks provide electric, water, and gas consumption data on a monthly basis for customer billing. In this typical scenario, it may take months or years to identify operational problems that exist at the meter level such as leaks, theft, as well as inaccuracies and

inefficiencies. As a result, utility revenue is compromised, operational costs increase, resources are wasted, and reliability and customer satisfaction may suffer.

Economically migrating from AMR to smart grid through a TUNet solution can quickly uncover and help resolve many of these problems by enabling near real-time access to more granular information. With more than 20 electric, water, and gas utilities utilizing the Tantalus-Itron ERT migration solution, utilities are now experiencing a high return on investment by virtually eliminating manual meter readings and truck rolls, therefore saving time, fuel, and money. These utilities can now **obtain key information in seconds rather than minutes or days**, allowing them to make more informed decisions while reaping significant savings and enhancing customer service (See Figure 6).

Figure 6



## CONCLUSION

The Tantalus-Itron solution for AMR to AMI ERT Overlay migration presents a practical next step for utilities who have invested in a reliable and proven ERT network. Rather than immediately replacing existing AMR investments, utilities now have an alternative path to adopt two-way smart grid functionality at a fraction of the cost. Tantalus is focused on offering utility choice – whether you opt to start with a strategic application deployment or a complete ERT Migration, with TUNet, your utility will be implementing a next generation multi-purpose platform that will enable many smart grid applications that will drive enhanced customer satisfaction and operational efficiencies for years to come.

Access to valuable data streams and information at the precise moment it is needed will prove invaluable across all departments in your utility organization. The Tantalus-Itron ERT Migration solution is an attractive, low-risk investment option designed to help utilities capture the financial and operational benefits of an intelligent electric, water, and gas distribution grid that effectively funds itself beginning on Day One.

Please contact Tantalus to learn more about this opportunity.

Tantalus provides a two-way, multi-purpose platform that enables access to data to power advanced Smart Grid applications for monitoring and control of electric, water and gas municipal and cooperative utilities. TUNet® – the Tantalus Utility Network – is an award winning end-to-end WAN/FAN/LAN/Grid Edge communications system that utilizes IP-based networks including Fiber, WiMAX and cellular as well as 220 & 900 MHz wireless RF. TUNet is purpose built for the Smart Grid and unites utility applications through distributed computing capability embedded at every endpoint. The result is enhanced value across all utility departments through solutions such as automated metering, outage management, power quality monitoring, load management, and distribution automation that are both cost-effective and practical to deploy throughout urban and rural service areas.

For more information, please visit [www.tantalus.com](http://www.tantalus.com).

### CONTACT TANTALUS

1121 Situs Ct.  
Suite 190  
Raleigh, NC 27606  
USA

Phone: 919.900-8970  
Web: [www.tantalus.com](http://www.tantalus.com)  
Email: [TantalusSales@tantalus.com](mailto:TantalusSales@tantalus.com)  
Twitter: [@TantalusCorp](https://twitter.com/TantalusCorp)

