

Zpryme Smart Grid Insights Presents:

# IT Systems & the Smart Grid:

An industry brief that zeros-in on the integration of IT systems and the Smart Grid from 2010 – 2015.

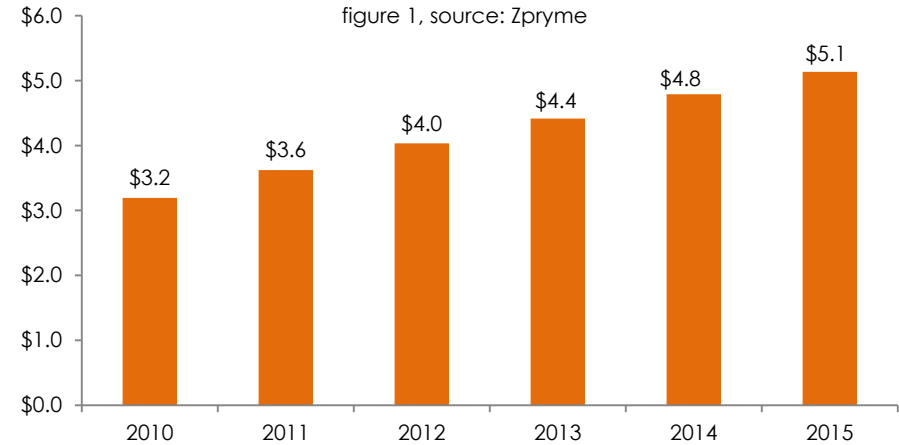
## IT Systems & the Smart Grid

As of December 2011, the top 10 SGIG projects had installed over 5 million smart meters. These advanced utility distribution devices aim at accelerating the transmission and distribution systems of utilities as well as modernizing the utility company. Their increased functionality also produces massive amounts of data that can lead to greater efficiencies in energy production and distribution, such as outage detection and automatic rerouting when needed. However, the antiquated nature of the Information Technology systems prevents the complete benefits of the Smart Grid from being fully realized. To experience the full effects of the Smart Grid, not only do the Information Technology (IT) systems have to be updated, but also Information Technology and Operational Technology systems must be integrated to provide maximum efficiency for the utility company.

At the end of 2011, the market value for Information Technology Enterprise systems was projected to be \$3.6 billion with a projected growth rate of 10%. It is projected to grow to \$5.1 billion by 2015. Two main markets exist in the IT enterprise system market. First, network security software and systems has a projected CAGR of 15.2% and is currently experiencing a \$700 million market. It is projected to reach \$1.1 billion in 2015. Data storage infrastructure is the second main market for enterprise systems. It is experiencing a CAGR of 18.8% and a market of \$800 million. Data storage is projected to reach \$1.7 billion by 2015.

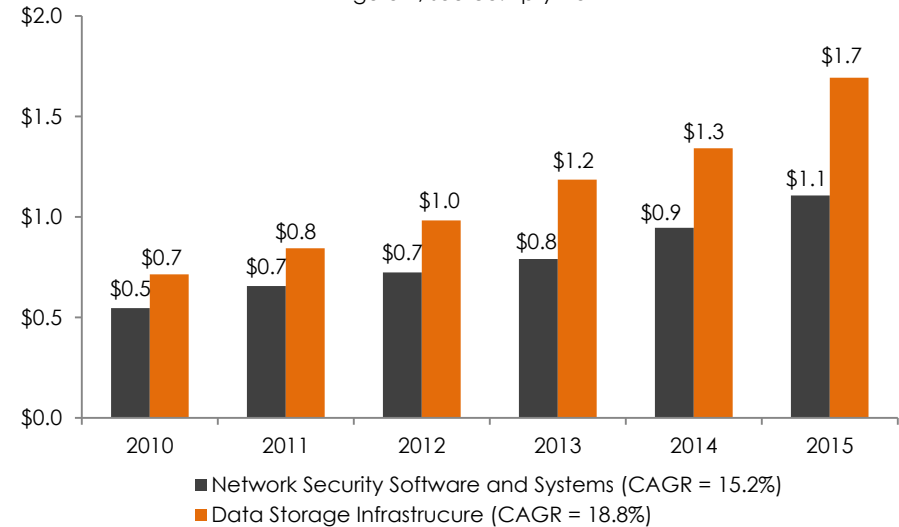
**U.S. Utility Enterprise System Market Value Forecast**  
2010 to 2015 | in U.S. billions | CAGR = 10%

figure 1, source: Zpryme



**U.S. Utility Network Security and Data Storage Market Value Forecast**  
2010 to 2015 | in U.S. billions

figure 2, source: Zpryme



## History of Utility IT Systems

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Historically, utility companies collected little information automatically. Employees visited each business or residential addresses to manually record the energy amount used, and to address maintenance issues. Additionally, customers called a hotline number to report outages, maintenance schedules were maintained by hand, and customer information databases were updated manually. This system was not only very inefficient but also expensive, as extensive labor was necessary to implement it. In addition, problems were not immediately detected and repaired, and areas of energy loss often went undetected.

Utility companies identified the enterprise system as an area for improvement and have begun updating these processes as well as automating smart meters and other equipment. This has caused substantial problems in some cases as the massive amounts of data generated have overwhelmed the existing IT systems. This problem has produced outages, system crashes, and blackouts in some areas.

## Key Issues

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For the full benefits of the Smart Grid to be experienced, many problems must also be addressed. Addressing these problems in the Smart Grid architecture before further expenses are incurred will minimize the future cost of Smart Grid deployment.

1. **Legacy Systems:** Over the last 100 years, utility companies have adopted software programs depending on their needs. Different departments adopted and installed different programs to meet their needs, and then updates were performed to maintain their functionality. This creates many linkages in the IT system. As new programs are installed or updated, any error in any program can cause a total system crash. Before a new IT system can be implemented, a complete audit of the current system must be performed to identify all software used and the goals of each department and functionality of each program. The benefits and problems experienced with each software program must also be identified, so the most specific software packages can be implemented in each department.

Legacy systems were developed to hold a limited amount of data from a limited number of sources. As the Smart Grid is further implemented, the new IT system must not only be robust enough to handle the current needs, but also the future needs of the utility organization. Because of the current status of the Legacy systems, black-outs and system crashes have been experienced as the Smart Meters began transmitting massive amounts of information back to the utility company. For that reason, controls and limitations to the data transmitted by the Smart Grids to the legacy system must be implemented before a new IT system is installed.

2. **Segmentation of Utility Departments:** A major problem in the establishment of an effective Smart

Grid is the operational segmentation of the utility company. IT is just one department of several, including customer service, residential, commercial, billing, etc. Each department has been able to adopt the best software package to meet their needs. In most cases, organizational protocols have never been developed and many different software packages are in operation on the same system. IT was consulted only when installing the programs or when a problem was experienced, not in the selection or integration of the software itself. New protocols must be established based on the new IT system to ensure that the entire system functions properly for each individual department and as a whole.

Another problem based on the segmentation of departments is that the software used by each department does not communicate with other departments or other software. Each department then stores some of the same information about each customer (name, address, service type, etc.) in their specific computer program, but it is not accessible in the other departments. From a customer service perspective, this reduces the service provided to customers and may require transfers to different departments to address customer issues. However, the ramifications for the company are more severe. Each entry of customer information requires additional storage space and creates redundancies. Information on a single customer may be stored 10 times or more depending on the size of the utility company and the number of its departments. These redundancies

mean there is less storage space for the information transmitted by the smart meters. Because the smart meters are able to provide functionalities that the utility company is not able to utilize, this presents a lost opportunity for the utility.

For the Smart Grid to be fully implemented, information technology and operations must be de-segmented. The goals of operations, and each individual department, must be integrated into the overall IT of the utility center. Through the de-segmentation process, the goals of all departments would be addressed while eliminating redundancies and maintaining efficiencies. Of primary importance to this process is the integration of different organizational departments through their collaboration to form company and departmental goals. To be successful in this integration, each department must be an active participant throughout the implementation process.

3. **Human Resources:** As the new IT system is implemented, it is essential that the personnel be retrained and developed to meet the changing needs of the organization. The existing IT staff possess many of the skills necessary to operate the new IT architecture. Other technical support personnel can also be developed to fulfill the technical needs of the organization. The key for the most cost effective implementation of an updated IT infrastructure is to perform a thorough skills assessment of current employees, then offer employee development to provide coverage for areas that are not currently covered. By performing

the retraining early in the implementation process, the utility company can reduce the effect of problems as the IT system is updated.

## Key Player Spotlight

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Two main Smart Grid Companies are teaming up with utility companies to meet the IT needs of the Smart Grid. Both companies are leading the way in which the Information Technology for the utility company is updated. However, these two industry leaders have vastly different ways of addressing the product, which translates into the product they deliver.

1. **ABB:** ABB has focused on creating a centralized control center for the utility company, which takes the information provided by the Smart Meters and translates it into automated processes for the utility firm. ABB has been recognized for developing ways in which the utility company can leverage the information derived from its advanced metering infrastructure for a company's operational objectives. It does this through its Network Manager Platform. The key component is the integrated distribution control system, which integrates all of the different IT systems/software packages into a centralized system to meet the company's operational needs. The goal is to provide situational awareness to the distribution management system (DMS), such as in detecting outages, areas of inefficiencies, or scheduling maintenance based on Smart Meter generated information automatically. Overall, ABB offers better control of the distribution

process from a centralized location, while maintaining the operational goals of the utility company.

2. **Accenture:** Accenture has worked with over 100 utility companies throughout the IT updating process. Accenture has found that roughly 80% of all utility companies lack the detailed planning necessary to achieve optimal results from updating the IT infrastructure. This lack of planning leads to missed opportunities in areas such as security, analytics, information management and privacy. These missed opportunities then lead to a longer implementation time and increased costs for the firm. For that reason, Accenture works with the utility company throughout the development and implementation process with particular focus on developing a unified system for the entire organization. Using milestones, Accenture not only focuses on implementation of the IT system, but also focuses on communication across departments, leading to a company-specific IT plan which meets the needs of the entire organization. As such, they deliver much more than a hardware and software package, and are very involved in non-IT related activities, such as business and operational planning, which results in a hardware/software package for the firm.

## Bottom-line

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As the Smart Grid continues to be developed and Smart Meters deployed, the IT infrastructure of the utility company must be updated to meet its increased and changing needs. Smart Meters are equipped to provide enormous amounts of data to the utility distribution center, and the IT system must be able to process this information. It is vitally important that the information transmitted to the legacy system be controlled to prevent problems from occurring as the smart meters are installed. As the new IT system is implemented, the goals of the entire organization, including the individual departments, must be integrated in the new system to prevent redundancies and increase system efficiency. ABB and Accenture have led the way in working with the utility companies to provide integrated IT systems to meet their needs. However, many other providers are likely to follow suit as more utility companies move to a Smart Grid framework. As these new options in IT systems become more readily available the utility company must look at the breadth of their offerings and insure that the IT system integrated meet the needs of the entire organization both in its present state and for its future growth.

## Zpryme Credits

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