Power System Engineering, Inc.

Technology Planning to Maximize Your Investment

By Power System Engineering, Inc. (PSE)

With a Technology Work Plan in place, utilities can rest assured that their decisions are based on a conscientiously developed strategy.

Introduction

It doesn't take much of a miscue on a technology project—a less than optional design, the wrong choice of technology or vendor, or ineffective contracting—to quickly waste substantial dollars, time, and resources that can impact the project's overall success for years after the initial deployment. Without a comprehensive plan developed early in the project, it can be challenging to get the most value from your technology investments down the road. PSE's technology planning process evaluates the most viable technology opportunities for now and into the future and identifies a specific integration approach to ensure that new technologies complement and enhance the value of existing technologies.

PSE's strategic planning solution was built over a decade of technology and application planning experience. PSE's solution is a blueprint from the successes of the past, current industry trends, and our knowledge of the best practices for maximizing the value of the technology investments. We aim to uncover the technology's broad potentials while identifying ways to leverage its interdepartmental contributions across the organization as a whole. Each utility's future technology needs are the building blocks layered onto the solid foundation of PSE's Technology Work Plan (TWP). The TWP supports the utility's architecture to align costs, scheduled performance and the quality assurance of the technology's success with their strategic goals.

Benefits of Developing a TWP

Mitigate Risk and Gain Substantial Savings

PSE's TWP assessments are based on comprehensive industry experience in the areas of past technology procurement and implementation to avoid costly mistakes while increasing the probability for substantial savings. A good technology plan often costs around 0.25% to 0.50% of the capital costs in the technology roadmap, so the benefit far outweighs the cost.

Identify Your Budget

A budget is presented for each application and may include cost justifications or feasibility-level business cases that forecast the financial outcome of each program. These financial projections are intended to clarify year-end budgeting estimates and support budget approval.

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A TWP is a five-year roadmap that defines the best mix of technologies and integrations to deploy each year.

TWP Benefits continued

Foster Staff and Management Consensus

PSE has found that the successful deployment of technology is often more about people than the technology itself. Success is tied directly to the level of ownership each user has to drive the utility's overall core values and principles throughout the project. Our process encourages collaborative employee engagement in final decisions, thereby reducing conflict and bias.

Set Priorities

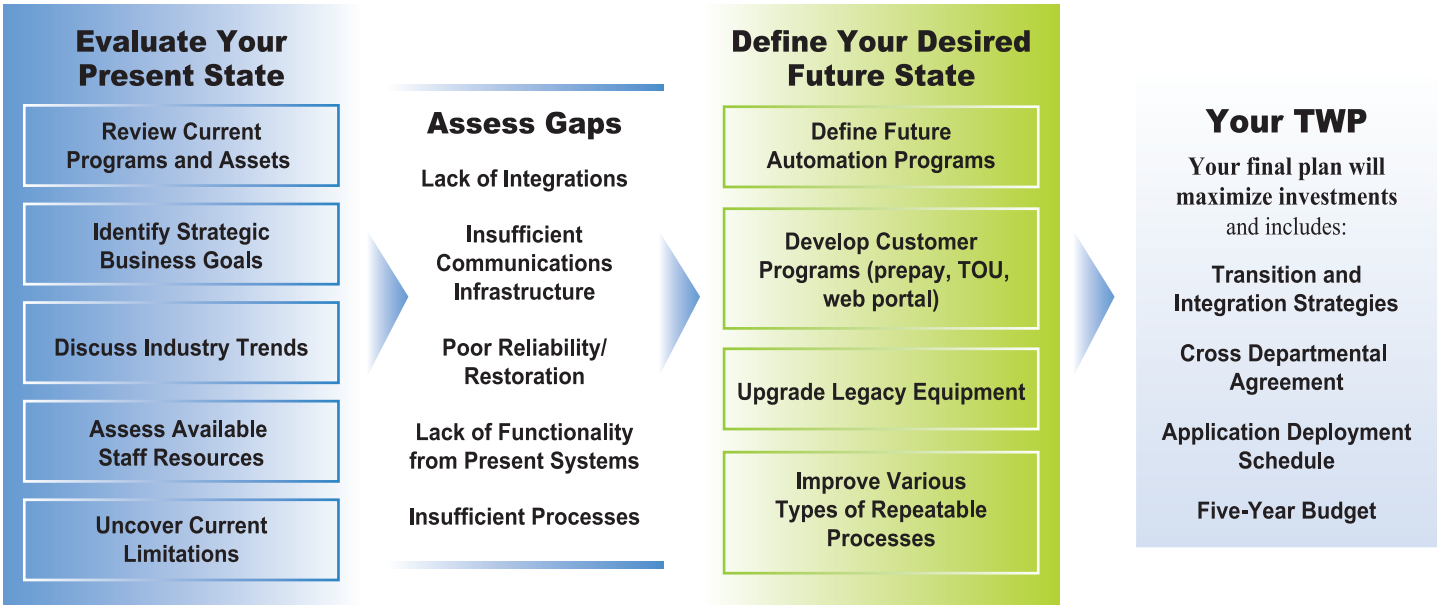
The TWP identifies a specific order of implementation for each technology. Purposeful order prevents redundant costs across multiple system areas. For example, if an outage management system (OMS) is deployed before a geographic information system (GIS) is deployed, the TWP would identify future OMS integration to the GIS as a key driver for GIS selection. This ensures that future capabilities are not overlooked due to the order in which technology is procured and deployed, and ultimately, full functional benefits can be realized across both systems.

Learn How to Integrate Existing and Future Systems

Integration is critical in any technology plan to ensure the full functionality of your new and existing systems. If integrations are not transparent, the existing data will be overshadowed by the new data accumulating between the legacy system and the new source; as a result, the value-added opportunities identified in the TWP can be lost.

Creating the Technology Work Plan

The final TWP uncovers gaps between your utility's present and desired future states. Once the gaps are discovered, applications and technologies can be aligned to determine how best to fill each gap, including addressing poorly performing existing technologies, deployment priorities, integration strategies, and budgetary calculations. The chart illustrates this process:



Education on available technologies is key to establishing stakeholder buy-in.

Step 1 Evaluate Your Utility's Present State

The TWP begins by looking at the present state of the utility. As you look inward, consider some of the following questions: Are your current systems functioning properly, or do some systems lack the functionality or usefulness you expected? Do any systems need to be reviewed for replacement due to age or other reasons? Are current staffing resources adequate to support future demand?

Step 2 Define Your Desired Future State

After clearly identifying the present state, it is important to review your existing business goals and determine your utility's desired future state. The TWP outlines future variables to ensure forecasted technologies align with current technologies and are scalable to the desired future state. This step will help establish a technology or program wish list to consider for deployment in the future.

Step 3 Assess Gaps

Finally, after documenting the present and future state, PSE assesses the gaps. Gaps could include plans to deploy new technology or program, staffing needs, improved integrations between technologies, proper employee training, or resolving cumbersome business processes.

Throughout the TWP process, there are many important milestones and steps to consider, including due diligence in the following areas.

Evaluate Needs

It is typical for most utilities to implement independent technologies for each functional group (engineering, operations, customer service, etc.) to meet specific needs in each area. In concept, the approach seems to be the most simplified solution for meeting these specific needs. However, in reality, this approach creates silos of technology in each department, ultimately preventing the networking of utility-wide information sharing and the full utilization of assets across the organization. In these cases, utilities often discover that they have wasted significant time and money duplicating efforts from department to department.

To prevent this kind of isolation, it is important that all the utility's functional groups sit together to discuss needs. These discussions tend to yield a more unified understanding of which needs are the most critical.

Selecting applications and technologies that meet the needs of multiple departments at once gives your utility more bang for its buck. The cross-departmental needs-gathering process establishes greater appreciation for each department's needs and fosters buy-in from all groups, ensuring that the selected technology is ultimately better utilized across the utility.

Learn About New Technologies and Approaches for Improving Existing Programs

Non-biased education on new technologies and approaches is the first step toward narrowing down possibilities for the future. Each utility has different needs and may not see value in all the areas listed. However, in the early stages of the process, value is not as clear, so it is important to keep each technology or program on the table until visibility is established. Possible applications to investigate include:

- **Supervisory Control and Data Acquisition (SCADA)** and migration toward Distributed Management System (DMS) for the feeders
- **Substation Automation** and scalability benefits for feeder automation
- **Distributed Energy Resource (DER)**
- **Solar:** community, utility-grade, or rooftop PV positioning
- **Advanced Metering Infrastructure (AMI):** How viable is it to migrate from older AMI/AMR technologies to new wireless AMI?
- **Load Management and new Demand Response (DR)** opportunities. Is adding load management, smart thermostat, or new time-of-use pricing programs economically viable?
- **Geographic Information Systems (GIS):** Getting more from GIS and enhancing GIS integrations
- **Outage Management Systems (OMS):** Are your outage restoration processes optimal?
- **Customer Information System (CIS)** and Financial Information System (FIS)
- **Interactive Voice Response (IVR):** For outage, payment, and prepaid metering

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Utilities that create a Strategic Communications Plan upfront have a greater success in deploying planned (and unplanned) applications.

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- **Mobile Workforce Management (MWM):** What high-volume field processes can be enhanced with new technology and business processes?
- **Automatic Vehicle Location (AVL):** How to get more from your AVL
- **Meter Data Management (MDM):** How to migrate from standalone metering and web presentment areas to Engineering and Operations analytics
- **Asset Management:** What commercial software is viable? If not using new software, how can an existing GIS be enhanced to address many of the asset management needs?
- **Mobile Voice Improvement:** How to improve coverage and capacity
- **Fixed Data Communications** such as last-mile wireless solutions, microwave, and various fiber alternatives

It is valuable to educate your team on the various technology applications and their relevance to your utility. This can be accomplished by inviting vendors to complete product demonstrations, talking to neighboring utilities about their experiences, and bringing in an unbiased third party such as PSE who has worked with various vendors and utilities to share their lessons learned. The more information you have, the better prepared you will be to make the right decisions.

Complete a Feasibility-Level Business Case

Completing a feasibility-level business case can be beneficial for the decision-making process, but it's typically not required for every type of technology. Our experience is that utilities typically evaluate the business case for AMI, demand-side management, CVR, Asset Management, and MWM. Whereas for other technologies, it is generally difficult to quantify benefits in financial terms or to determine the benefit of replacing or upgrading an aging technology with something newer. In those cases, the decision to procure other technologies such as SCADA and CIS, for example, is better served by a detailed cost justification.

Develop a Strategic Communications Plan

Communications infrastructure is an important part of any technology plan. Thus, while on your way to a TWP, it is also a good idea to create a Strategic Communications Plan (SCP). The SCP focuses on integrating communications to leverage the infrastructure for present and future applications. This step is crucial to implementing a Smart Grid; the communications infrastructure is in fact the very foundation of the Smart Grid.

Unfortunately, an SCP is often an afterthought once the application technology has been procured or even deployed. However, utilities that create an SCP upfront have greater success in deploying planned (and even unplanned) applications. These utilities have also been able to justify more dynamic communications infrastructure (and associated process improvements) because they are able to spread the capital expenditure for communications across multiple applications. Similarly, utilities may be able to reduce overall recurring communications costs by, for example, flowing multiple applications through the same communications pipe versus paying monthly telecommunications costs for separate AMI lines, SCADA lines, and LMR backbone lines. Overall, an SCP extends the life of new and existing investments.

A Note about the Smart Grid

TWPs integrate the concept of the Smart Grid to advance the level of intelligence in a utility's operation to include not only such programs as AMI, demand response, and feeder automation, but also enterprise systems and processes such as the customer information system (CIS), work management, rates, and other future applications.

The Smart Grid varies in its level of sophistication and intelligence, and is accordingly often referred to in terms of "smart," "smarter," and "smartest." Highly automated, integrated systems capable of self-healing are ideal; nonetheless, a more basic Smart Grid may be possible and within reach of some smaller utilities. ***How the Smart Grid applies to your utility is somewhat dependent on your present infrastructure, application needs, and vision.***

At the conclusion of the TWP, you will have an understanding of the order and timeframe for implementing different technologies.

Develop an Integration Plan

Some products may be more easily integrated with others, and the viability of integrating multiple systems can be a critical deciding factor in selecting a vendor's product. Developing an integration plan ensures that you are carefully considering which new applications must integrate with each existing applications and to what degree. This allows you to evaluate each vendor's capability of meeting your needs.

Integration decisions must also be considered at the appropriate time; thus, defining a deployment schedule is critical. For example, one has to have a plan for how an OMS would be integrated with the AMI prior to selecting the OMS, IVR, and GIS vendors.

There are several approaches for integrating various applications. While vendor selection and technology procurement are not part of the planning process, it is important to consider your integration approach. Some utilities elect to pursue a best-in-class vendor that focuses on a technology for an application or two while others choose to pursue one primary vendor for many applications. The choice depends on each utility's unique situation.

Finalize Your TWP

The final step is pulling all the information together into a comprehensive plan. This includes creating a five-year deployment schedule and budget. It is important to understand that this plan is a living document and may evolve based on any number of changes at a utility. To remain current, the TWP requires an update each year.

Once the technology roadmap is in place, procurement, deployment, and integration of the applications will be fairly straightforward. Creating a Smart Grid is not particularly mysterious and is simply built by deploying technologies that best leverage communications, data, and applications across all functional groups within the utility.

About the Author

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Rick leads PSE's automation and communications technology group with more than 35 years of professional experience. Rick and his staff provide consulting and engineering services to utilities, including: technology work plans, strategic communications plans, procurement, design and project management of SCADA, DA, substation automation and design, AMI, demand response, CIS, GIS, MWM, AVL, OMS, and asset management. Communication area services include land mobile radio, fiber and microwave backbones, and mobile data. Rick earned his MBA from Cardinal Stritch University, Milwaukee, WI.

Contact Rick at 608-268-3502 or schmidtr@powersystem.org with any questions you might have regarding PSE's TWP capabilities.

Power System Engineering, Inc.

Full-service consultants

Serving the utility industry since 1974

PSE is a full-service consulting firm. Our team has extensive experience in all facets of the utility industry, including communications, IT, and smart grid automation planning and design; economics, rates, and business planning; electrical engineering planning and design; and procurement, contracts, and deployment.

We are employee-owned and independent, which gives our clients confidence that we are motivated to satisfy their needs and represent their best interests.

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