WHITE PAPER

How the Program Management Model Is Evolving to Address Fresh Challenges

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The confluence of aging infrastructure replacement, clean energy goals and electrification is putting tremendous strain on electric utilities. Program management is helping scale their efforts efficiently by leveraging three essential components: people, processes and tools.

The electrical infrastructure in the United States is undergoing generational changes as electric utilities confront several monumental shifts in the power industry. These major influences are driving an extraordinarily high volume of work for utilities, which are increasingly turning to a program management model for efficiently managing numerous related projects to cope with the challenges.

Program management itself has changed and evolved over the last couple decades, taking advantage of advancements that were not available in the past. It is a way to maximize project efficiency through its approach to three essential resources: people, processes and tools. While processes and tools have historically been integral to program management, a fresh focus on people has been critical to its evolution and to maximizing the efficiency gains. But to understand how these keys are being leveraged, it is important first to understand the challenges of the evolving industry.

An Industry in Transition

A lot of the country's electrical infrastructure was built in the 1960s and '70s, and its typically 50-year life span is past its expiration. Much of this aging, decaying infrastructure needs to be replaced in order to maintain reliable, resilient service. Many utilities recognize that they have insufficient resources to complete the high volume of work represented in this replacement cycle. Historically, they do not ramp up personnel for work that is temporary in nature; rather, they lean on consultants and contractors to address their scale-based challenges.

Another factor affecting the scale of coping with aging infrastructure is internal migration. Certain geographic areas are experiencing substantial strain. For example, the state of Florida is seeing more than 1,000 people move there per day. Florida, Texas and North Carolina have been the three biggest states for growth in the U.S. over the last two years, placing huge new demands on infrastructure. Being able to build out sufficient supply in an emergent fashion has been a big challenge.

The rise of clean energy policies and carbon-reduction goals is another source of strain for utilities. There are a variety of incentives and federal funds for carbon reduction improvements in the Infrastructure Investment and Jobs Act passed in late 2021. More specifically, under the proposed Clean Electricity Performance Program (CEPP), the U.S. Department of Energy would issue grants to electric utilities that achieve designated annual clean electricity targets and collect payments from those that underachieve. Each utility would be expected to increase its carbon-free component by 4 percentage points annually between calendar years 2023 and 2030. (For context, the nationwide increase has averaged 1 percentage point annually over the last 10 years.)

Utilities are also being challenged to accommodate microgeneration of green energy. This impacts some areas more than others, with local or regional legislation sometimes setting targets much higher than federal expectations. Utilities are facing aggressive schedules and striving to tie in generation from private developers who are selling carbon-free power back to the grid. Utilities are building new infrastructure to support both the added load of shifting populations and connecting the microgeneration of renewable energy into the system.

The explosive growth of transportation electrification is an enormous challenge that adds another layer of complexity. Associety moves away from internal combustion engine vehicles and toward electric vehicles (EVs), utilities face huge surges in demand. The grid as built cannot support existing communities if every house plugged an EV into a 240-volt Level 2 charging outlet. Utilities are setting up distribution networks to support higher demand from EVs in new communities, but existing communities will require lots of retrofitting to support residential applications. Commercial applications —such as charging stations replacing gas stations — will tax the grid even more, with utilities facing massive demand to support everything from personal vehicles to fleets to mass transit. As electrification scales up and traditional combustion engine vehicles phase out, an incredible amount of infrastructure will need to be built or rebuilt to support the new paradigm.

How will electric utilities manage these large-scale, high-volume challenges? They are increasingly turning to program management. Programs take several projects that are similar in nature and place them under the umbrella of a portfolio to achieve more efficient execution. Whether a program contains 10 projects, hundreds or thousands, the projects are completed to obtain similar objectives within a given amount of time, gaining efficiencies through people, processes and tools.

Processes: Accommodating the Scope

Processes are essential to effective programs because of their sheer size. Scaling up can be detrimental to the execution of a project or program. There are plenty of competent project managers who can do well running one project, maybe two or three, but will start to struggle when scale takes over. The foundation and framework of a program allows for scale — and its variability — from the earliest stages through the way processes are set up.

Processes determine how work is aligned in a program to enable it to flow. Whether the program manager is restricting the flow or the extent to which it flows freely, control over how it moves through its life cycle is essential. Consider three projects under a program umbrella. Individually, they might not impact each other, but the influences and interactions of projects, people and other interested parties will affect a program significantly.

Standardization is the key to making processes more efficient. This does not mean they must be identical — the project and project manager on one project might be very different than the project and project manager on another within a program — but a minimum level of consistency is vital to make apple-to-apple project comparisons. That enables teams to better identify best practices, efficiencies and inefficiencies.
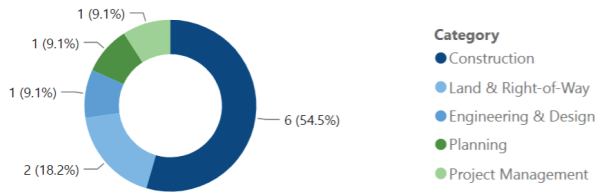
Tools: Managing the Data

As technology improves, so do tools. They are constantly evolving, as is the data that they are able to collect. What was represented by 1,000 data points in the not-distant past could now easily be 500,000 or even millions of data points.

The evolution of data is likely to dramatically increase the capabilities of project tools. If artificial intelligence (AI) and machine learning can be utilized effectively, that will let project teams focus more on making good decisions quickly and executing. As scale occurs, no one can afford to spend time trying to track down or generate data; it must already be accessible to support quick decisions.
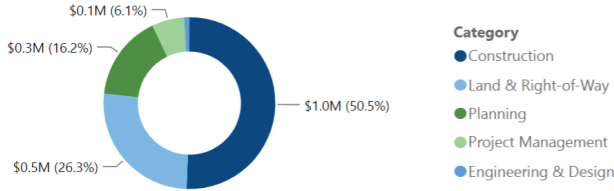
Big data can be characterized by three V's: volume, velocity and variety:

- **Volume:** How much relevant data is available, and is it stored in a data lake (raw) or a data warehouse (turned into information ready to be consumed)?
- **Velocity:** How fast is the data coming in: daily, hourly, instantly, annually? The speed at which it is coming in, along with the volume, will dictate some tools and how they are set up for the program.

Risk By Category

- 1 (9.1%)
- 1 (9.1%)
- 1 (9.1%)
- 2 (18.2%)
- 6 (54.5%)

Category
- Construction
- Land & Right-of-Way
- Engineering & Design
- Planning
- Project Management

EMV By Category

- $0.1M (6.1%)
- $0.3M (16.2%)
- $1.0M (50.5%)
- $0.5M (26.3%)

Category
- Construction
- Land & Right-of-Way
- Planning
- Project Management
- Engineering & Design

ProjectManager	Category	ProjectType
All	All	All

$7M	$1.98M	10	1
Cost Impact	EMV	# Risk Open	# Risk Closed

Cost Impact Probability	Negligible 3% to 5%	Marginal 5% to 10%	Significant 10% to 15%	Major 15% to 20%	Critical Over 20%
Very High - Almost Certain Above 80%	0	0	0	0	0
High - Likely 60% to 80%	0	0	0	0	1
Moderate - Possible 40% to 60%	0	1	0	0	0
Low - Unlikely 20% to 40%	1	0	1	0	0
Very Low - Rare Below 20%	3	3	0	1	0

Project	EMV	P90	P75	P50	P10	Schl. Impact Week
	$1,980,000	$1,920,000	$1,880,000	$1,680,0...	$800,000	94
	$1,180,000	$1,920,000	$1,880,000	$1,680,000	$800,000	74
	$800,000	$1,920,000	$1,880,000	$1,680,000	$800,000	20
Total	$1,980,000	$1,920,000	$1,880,000	$1,680,000	$800,000	94

Category	EMV	P90	P75	P50	P10	Schl. Impact Week
Construction	$1,000,000	$940,000	$920,000	$880,000	$800,000	32
Land & Right-of-Way	$520,000	$520,000	$520,000	$480,000	$0	22
Planning	$320,000	$320,000	$320,000	$320,000	$0	4
Project Management	$120,000	$120,000	$120,000	$0	$0	26
Engineering & Design	$20,000	$20,000	$0	$0	$0	10
Total	$1,980,000	$1,920,000	$1,880,000	$1,680,000	$800,000	94

Figure 1: An example of a data visualization showing risk management.

- **Variety:** What kind of data is being collected? Engineering drawings, geographical, financial, schedule or risk data? It can come in all shapes and forms.

Once raw data has been collected, made sense of and brought into a data warehouse, it can be served up to the program's interested parties, who consume it through visualizations. These could be simple or highly complex — anything from a basic graph to a Power BI visualization **(see Figure 1)**. These tools enable users to start making strong, quick decisions without having to second-guess whether they are based on erroneous data. The data is sound, vetted and consistent, which is made possible through standardized processes. Tools are how programs cope with big data to improve efficiency and enable the smart, fast decisions that are critical to effective performance.

Ideally, programs are designed to be modular, making it possible to switch out tools — be they financial or scheduling or data visualizing — without interrupting communication between data sets. Programs should not be constrained to a specific tool because the data was structured in a way that was not dynamic. The best software from 10 years ago might not be the optimal choice today or 20 years from now. When the application of tools is modular in nature — enabling easy changes driven by clients or technologies — disruptions to the success of a program are minimized.

Effectively endless data is available today. These data points are vital to utilities and their partners as they analyze whether (or how well) a program is meeting its scope, schedule and budget. Projects and programs live and die by these metrics; if a budget is overrun, delaying energization of an asset, that could mark the difference between success and failure. Analysts must avoid being overwhelmed by the flood of data, but it is essential to collect. Time spent making good decisions is more valuable than time spent looking for fresh data.

One of the biggest differentiators between programs now versus 10 or 20 years ago is the amount and availability of data to support making near-real-time decisions. Fast decisions are the difference between meeting a capital budget or not. Fast decisions in June will be reflected in capital portfolio spend outcomes in December and whether those portfolio projects are in service as scheduled.

Utilities across North America have been challenged in trying to achieve in-service dates and maintain budget. Extraordinary challenges from supply chain issues to labor shortages and inflation have made it harder to meet schedule and budget targets. Having reliable data and applying principles from AI makes it easier to be more predictive. No forecast is perfectly accurate, but predictive models combined with historical context inform better decisions.

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People: Smoothing the Path

Individuals are the third major factor in how a program plays out. Who is involved and influencing decisions — whether on the utility side, the consultant side or externally — can make a difference in the success of a program and its projects. External stakeholders such as transmission operators, governmental bodies and residents have an interest in the projects and can influence their outcomes positively or negatively. Program managers must constantly consider the role of these interested parties while striving to make the client successful. Therefore, defining success upfront is crucial. Not all objectives will be SMART — specific, measurable, achievable, relevant and timebound — making it harder to define some aspects of program success for utilities.

Regarding capital spending, every utility wants its projects in service when planned and within budget, but that is just one component of what some interested parties consider success. The optics can be harder to pin down: how the community perceives the project, how utilities perceive their partners' support, or how utility employees regard consultants.

It's challenging for utilities to scale up or down quickly; there are countless moving parts when it comes to billions of dollars of capital spending within a year. One small influence here or there from key parties can impact how that year plays out, or how a five-year plan does. For this reason, stakeholder engagement is crucial to program management success.

A program can have top-of-the-line tools and optimal processes, but the people make the projects happen. From the utility personnel to the project managers, project control specialists, real estate coordinators, environmental scientists, procurement professionals, construction managers and more, many different resource groups ultimately play a major part in determining the success of a program. All must be in harmony; when one person is out of sync, it can be disruptive upstream and downstream within the program.

A good program is a fine-tuned machine. Its pieces must work together smoothly or it will generate chaos. If a program is missing its capital spend target by $500 million as October approaches, it will be extremely difficult to meet that target. When all the right people are party to good decision-making earlier, it will be far easier to ramp up or down to meet the goals and the definition of success without major disruptions.

One of the biggest wild cards in program management is external influences, such as the community, governmental bodies, environmental issues or procurement. These are largely out of the program's or utility's control. For instance, breakers that had lead time of 24 weeks a year ago and 52 weeks a month ago might suddenly have 96-week lead time due to supply chain challenges. Such exponential growth in lead times for fairly common materials is capable of bringing projects to a screeching halt, risking the in-service targets in the capital portfolio.

Strategic work with procurement professionals to establish reliable and robust options to source equipment is a vital step to help portfolio projects get in-service as speedily as possible and keep programs on track for success. When utilities and their partners can draw on a deep network of resources and relationships, they are better able to mitigate those risks and achieve creative solutions.

Processes and tools alone cannot solve every problem. It takes human brains to make smart decisions about how to utilize the tools and processes available to optimize the outcomes.

Conclusion

People, processes and and tools must work together cohesively for program management to deliver its efficiency benefits. Each of these factors has evolved over time and will continue to do so. Program management will continue changing along with them, reshaping itself to help its practitioners achieve their custom definitions of success.

The major challenges facing the electric utility industry — and other critical infrastructure industries — will continue evolving as well, but the complexities of replacing aging infrastructure, adapting to clean energy initiatives and enabling large-scale transportation electrification will remain at the forefront of planning for the next generation, at minimum. Coping with the scope is a monumental undertaking. The efficiencies unlocked through program management are a powerful tool set — and enticement — for utilities as they maintain reliable operations today and prepare for successful empowerment and streamlined implementation of a brighter future.

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