

Improving Transmission Program Outcomes From the Start

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The steady increase in U.S. electric infrastructure investment is good news for the nation but can be a challenge for utilities to manage. Transmission improvement planning is complex, and the best program management processes start early to successfully achieve program goals.



Improving the reliability and resiliency of the electric transmission and distribution system is a leading priority for utilities across the U.S. According to the Edison Electric Institute (EEI), \$25 billion was spent on investor-owned utility transmission investment projects in 2020, with another \$109 billion projected to be spent on transmission construction between 2021 and 2024.

While this level of investment reflects a commitment to infrastructure improvements for the country, it also indicates added project management complexity for utilities.

Achieving Program Success

Many utilities faced with planning transmission projects are dealing with a variety of regulations, different energy portfolio goals, or working within a constrained resource environment, including a consistent shortage of skilled labor. Whether intended to meet a federal requirement, incorporate renewables or serve as part of a reliability improvement program, utilities are working hard to maximize efficiency in a range of areas.

Transmission improvement programs benefit from robust upfront planning to help tame complexity, maximize resources, alleviate craft shortages through consistent work, reduce construction risk and cost, and establish a path that leads to program success.

Assess Recovery Mechanisms

With so many demands on utilities to improve infrastructure and increase grid resiliency, it can be a challenge to understand what funding options exist for programs. Investment planning must investigate different compensation options, incentives and available regulatory mechanisms to support improvements.

Through broad exploration of aging assets, reliability improvement needs and identified equipment issues, plans can be grouped and integrated to solve a larger issue. This logical grouping helps steer planning and informs the justification for investment and subsequent financial recovery needs. Defining financial recovery options early and working with regulatory affairs teams to understand the reasoning helps smooth the way to identify program funding.

Define Programs and Goals

Instead of undertaking projects individually, utilities should consider which efforts can be aggregated to create larger portfolios of work. Depending on the root cause of upgrade needs and defining the available opportunities, regional portfolios of transmission line upgrade projects can be created that are logical to implement and have financial recovery mechanisms already considered.

Breaking up larger upgrade projects into sets of mini-portfolios with similar objectives can aid in prioritizing improvements and keeping teams focused on greater efficiency:

- **Required upgrade projects:** As part of the capital investment portfolio, some mini-portfolios will focus on supporting needed upgrades of obsolete equipment or serving as part of an effort for regionwide support. Utilities notified that power generation plants will be shut down might be required to develop targeted programs that will accommodate the altered transmission flows. These large projects will have many components but common drivers to associate projects within the upgrade effort.
- **Reliability improvement projects:** Regulatory requirements to improve underperforming systems require a focus on a wide range of improvements. Likewise, addressing and replacing aging equipment to improve reliability can be complex. Identifying commonalities helps parse efforts and resources and should examine the interconnection of projects, size of the effort, and geographical and logistical components.
- **Long-term projects:** Many transmission improvement projects are long term in nature, requiring enhancements and equipment upgrades to be implemented over time. Ongoing skilled craft labor shortages can hamper efforts, and plans must accommodate available resources and be timed accordingly. Many utilities may require additional staffing, whether for planning purposes or construction. These types of programs should be planned according to seasonality, geography, skill level or other variables to minimize the risk of disruption during execution.

Thoroughly exploring and identifying program objectives and analyzing large project requirements to organize interrelated efforts and reach portfolio goals at the start of any transmission improvement initiative is time well spent.

Project planning includes understanding the return on investment for the program. Many utilities are complex entities with multiple subsidiaries, which can factor into how decisions

will impact financial earnings. Defining mini-portfolios within larger programs can help utilities weight options and make decisions that balance meeting regulatory requirements, managing discretionary programs and achieving the highest rate of return.

Breaking big efforts into smaller portfolios helps utilities understand the regulatory drivers and financial impacts of each smaller portfolio. This grouping helps decision-makers know what is required, what is discretionary, and how decisions can create better outcomes for customers and the organization.

Establish Contracting Strategy

Using the program goals, the next step is to identify the contracting strategy and appropriate approach for execution. An engineer-procure-construct (EPC) or design-bid-build (DBB) strategy often depends on the level of available internal resources, type of program experience, and available planning and execution skills, coupled with the level of involvement and control that the utility desires.

Project staff should carefully examine several key elements in the context of program goals and requirements to determine the appropriate contracting strategy:

- **Performance:** Identify if capabilities exist to successfully complete a large program.
- **Schedule:** Determine if critical construction, operations and budget dates can be met.
- **Involvement:** Decide how much participation is possible from internal teams.
- **Quality:** Evaluate whether quality design, planning and execution exist to meet goals.
- **Budget:** Establish how well project costs, change orders and forecasting can be achieved.
- **Stakeholders:** Answer how community and landowner interaction and communication will be handled before, during and after construction.

Whereas DBB offers owners more control, it can put a strain on internal departments, such as the supply chain. An EPC approach relinquishes handling of details but can be attractive in light of limited staffing levels or technical capabilities. Regardless of the way forward, experienced program managers should have experience working with a wide array of approaches.

Determine Scope, Financial Analysis and Reporting

Having established the overarching goals and the contracting strategy, further deep-dive communication helps to flesh out the details. Good upfront program management starts to shape the year-to-year milestones, engineering requirements, cost estimating procedures, and short- and long-term staffing needs.

Planners and program managers should work together closely to define program parameters, explore options and evaluate alternatives. New transmission lines and greenfield projects can alter complexity as compared to brownfield or rebuild efforts. Comprehensive construction planning at an early stage results in more accurate project scope, timelines and cost estimates. All of these elements can influence how program partners agree to move forward for successful execution.

At this stage, utilities should focus on program planning that provides detailed estimates from the bottom up, including multiyear forecasts during construction. This data is vital and will be used to track efforts going forward. Financial planning should adhere to existing internal procedures, and it should be counted on to work within utility systems to tie in with the broader capital budgeting process. Skilled financial planning will support appropriate and expeditious accounting of assets and project closure in the long term.

Finally, it's important to identify reporting obligations early in project planning so that the right data is captured, monitored and available. Regulatory requirements and financial goals will help define many components, but making sure all necessary data and information to communicate with stakeholders is outlined at the outset will save time and expense.

Transmission Project Drivers and Tactics

- Increase power reliability.
- Alleviate congestion.
- Reduce overloading.
- Accommodate renewables.
- Upgrade substations.
- Install new transmission lines.
- Modernize the grid.
- Replace aging infrastructure.
- Support energy use changes.
- Harden for storms.

Communication Is Key

While the steps to effective program management are well defined, communication is an element essential to every success.

Each project, no matter the size, should include plans to proactively engage with stakeholders to avoid problems. While some public outreach is a regulatory requirement, it is vital that all projects incorporate communication efforts and interact with the wider community.

Understanding and seeing that the broad group of stakeholders — utilities, program managers, executives, business partners, vendors, suppliers, contractors and the wider community — are aware, involved and included appropriately during planning and execution will substantially increase program efficiency and impact.

From initial discussions about program concepts to landowner negotiations, program management should strive for a collaborative decision-making process that will, in turn, substantially increase overall program efficiency and impact.

Plan All Permitting

The complexities of permitting are different for every transmission project. Successful programs accommodate the additional time and knowledge required and incorporate having permitting specialists on the team. A successful project starts with making permitting a priority to see that it doesn't become an unexpected priority amid execution.

Effective program management brings forward the needed experience to deal with federal and local permitting requirements. With the potential to affect both schedule and cost, the permitting process should be well defined and either use the utility's typical permitting arrangements and systems or rely on program managers to develop robust permitting processes from the start.

A program management effort can define what will be permitted early and evaluate the specific requirements while conducting desktop and field constructability reviews. Some portfolios might span multiple states and thus require a geographically segmented approach.

The permitting personnel should assess all types of permits that will be required, what lead times will be needed, and develop contingencies for any schedule impacts that might arise.

They will identify land, corridors and vegetation the program might impact, as well as potential permitting dangers such as animals or aspects of the environment.

Execution and Data Integration

With planning, discussion, evaluation and critical thinking by the utility and program management teams completed upfront, complex transmission improvement programs are on course for smoother, more efficient execution. During the construction phase, when project personnel are more dispersed and unforeseen challenges could arise, it is the integrity of execution data that provides the insight needed to drive success home.

Robust program management relies on advanced systems, tools and technologies to not only estimate projects but also provide real-time tracking of progress during execution. From documentation management to financial forecasting, program management should use the right technologies to deliver easy-to-use information and real-time program insight and monitoring:

- **Project controls:** Using geographic information system (GIS) mapping — coupled with document control and real-time schedule information — all utility, contractor, partner and stakeholder personnel can see program progress and track commitments, milestones, deadlines and actuals.
- **Financial controls:** These intuitive and powerful financial tracking and interface tools help assess project financial performance, forecasts and earned value metrics, comparisons against the plan, and contractor billing.
- **Risk assessment:** Stay in front of problems with predictive modeling, forecasting and simulation to understand risk factors and make on-the-ground tactical decisions.

- **Project information management:** Essential for capital planning and project delivery, a robust project information management tool is used to track every dimension of a project or program, including any request for information (RFI), cost control, transmittals, submittals, meeting minutes, construction daily reports and more.
- **Real estate management:** GIS tools can be used to store landowner contact information, land conditions and communications, and they can flag potential owner issues or notify workers of special working conditions required by the owner or stakeholders.

Conclusion

Spending time assessing program goals, understanding the broader capital portfolio, identifying the scope and selecting the right contracting strategy are the right first steps for transmission program planning. This solid foundation is then used to help define the program scope, estimate schedules and finances, and plan permitting strategies. Execution using the right tools that track activity and leave nothing to chance drives home a successful transmission improvement program.

By embracing an upfront commitment to planning and leveraging program management experience, utilities can execute complex transmission improvement programs that meet goals within a predictable schedule and budget.

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