

CASE STUDY

Innovative Software Solution Streamlines Cost Estimating for Entergy

As distribution system upgrades surge, utilities need a more accurate efficient, and transparent way to scope and estimate these projects. A digital cost estimating and project scoping application built for Entergy transformed a cumbersome and inefficient process into a streamlined, data-driven methodology that provides critical insights needed for developing and monitoring billion-dollar-plus capital programs.



Challenge

Thanks to decades of regulatory requirements and lessons learned, utilities have developed highly refined procedures for accurately scoping and estimating large capital projects like high-voltage transmission lines, substations and related power infrastructure. But accurately scoping and estimating distribution system projects is another story. Because each distribution upgrade was typically small and targeted to fix a specific issue, rough estimates of project costs and scope were considered acceptable, mostly because budgetary impacts from individual projects were negligible.

Project Stats

Client

Entergy

Location

New Orleans, Louisiana

SPANS ACROSS ALL

250M+

PROJECT COST ESTIMATES

5

OPERATING COMPANIES
(TX, AR, MS, LA AND
NEW ORLEANS)

50+%

EFFICIENCY GAIN USING
THE APPLICATION

However, as distribution systems reach the end of their design lives and new demands emerge, a larger volume of projects is now needed to effect broader and more complex system upgrades. Like most large utilities, Entergy is facing a need for massive reinvestment to upgrade its distribution system. Managing these capital investments now rivals the scale and complexity of transmission system initiatives.

Previously, estimating costs and scope of distribution upgrades had typically been managed with commonly used spreadsheet programs. Even though these estimates were sometimes off target by 50% or more, these variations were still considered acceptable because of the relatively small project sizes. Now these projects are much more complex. The sheer quantity is creating a need to build investment road maps that create greater visibility into project costs and schedules during future budget cycles. Without this visibility, management would have difficulty knowing whether funds have been properly allocated and whether promised returns on investment and customer benefits will be achieved.

Solution

Given that projects were increasing in scale, complexity and financial impact, a standardized web application was the obvious solution for Entergy. This application could eliminate bespoke spreadsheets, capture more information through workflows and serve as a system of record, creating a digital representation of each project.

Developing the software that reflected the reality of utility industry project experience and directly integrated with Entergy's project cost data required programming to create a framework for metadata that describes and sets the capability to import other, more specific data, such as materials and equipment costs and labor rates.

The application needed to identify cost discrepancy drivers based on region and provide a platform to view financial health as the project moves through its life cycle. In addition, the application had to employ an intuitive user interface, giving anyone using it a logical, easy-to-understand sequence of well-defined steps to enter project data that interfaces and builds on information previously entered in the form field.

Beyond the administrative framework, the second phase of the project involved enabling users to create estimates based on information entered into the application.

Within the estimating application, base assemblies are built from component units. As more assemblies are built and used, the application leverages these assemblies to provide faster

Currently, the estimating application can accept financial data input from design and actuals to provide full visibility into each project's financial life cycle. These can be used to gain insights into cost comparisons at various stages, cost discrepancies, accuracy of estimates and other factors.

and easier access to project managers for cost estimation. Thus, the application becomes more accurate and efficient over time, saving substantial time in scoping and estimating future projects. As users pick the correct assemblies, they will see guidance on the respective components required, and as each project is entered, that experience continues to expand the knowledge base.

For example, a new project would start with preset metadata guiding the user through a series of fields. Each field prompts the user to enter a quantity for any number of items: standard equipment like poles, conductor and transformers, or even nonstandard equipment such as sensors, reclosers to detect faults, and communications devices.

During initial entry of a project into the system, an estimated cost must be entered, though this figure could be adjusted later as the project progresses through subsequent scoping and preliminary engineering.

Class 5 Planning Stage: Once a proposed project is entered into the system by the project sponsor, it proceeds to a Class 5 review-and-approval process. Class 5 is the initial planning stage, when base assemblies of digital representations of components are selected. This is the point where rough estimates begin. The estimating application provides flexibility to add scopes of work, such as installation of additional components or upgrades on other nearby systems. The application makes cost calculations based on existing data, allowing the estimating team to deliver an estimate of direct and indirect costs, along with risk contingency based on defined criteria at the conclusion of this evaluation.

As part of the near future road map, this application will provide informed decisions based on realistic assessments of permitting requirements, potential environmental issues, and the ages and types of equipment installed on existing or new distribution circuits in the area. Thus, the application gets progressively smarter and selects components based on historical experience.

Class 4 Scoping Stage: Following the initial Class 5 estimate, based on reasonable assumptions of costs that have been identified, a Class 4 second stage of evaluation and assessment begins. This scoping phase continues the estimating process, examining all project elements in more granular detail. These further reviews and adjustments are based on detailed investigations into requirements of the project, resulting in more refined estimates. This more accurate estimate of total project costs is then ready for review by senior management for budget planning purposes.

Results

This application is providing a strategic organizational framework for more effective financial and resource management. The benefits are expected to grow over time as the number of distribution projects increase in scale and complexity throughout Energy's multistate service territory. The solution has dramatically improved the speed and accuracy of planning and scoping estimates because project managers are able to easily drill down into each element of project cost in minute detail.

A number of benefits are being realized, including:

- **Increased confidence** in estimate accuracy.
- **Improved ability to compare estimates** at various stages of the project life cycle.
- **Streamlined process** that continues to build efficiencies.
- **Centralized system of record**, providing visibility into status and financials.

- **Scalability and simplicity.**
- **Easily allocates or reallocates** capital budgets across a vast number of projects.
- **Improved transparency** for stakeholders, enabling easy comparisons of estimates to actuals over project life cycles.

Over the approximately yearlong duration in which we worked with Entergy to develop this web-based application, it has been put through the paces. The long-term vision is to move this application to an enterprise-level application for all distribution project estimations from start to end. Over time, Entergy expects that this application will help provide increasing confidence in the accuracy of estimates, allowing distribution projects to be approved and prioritized with less burden on engineering staff to fully scope each project.

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