

by David Elam

David L. Elam, Jr., CIH, CMQ/OE, PMP, is principal consultant with Summa Consultants Inc. E-mail: delam@summaconsultants.com. For electronic files of this column and his other writings, please visit his Web site at www.summaconsultants.com.

We need to understand budget development techniques when we are evaluating project options and value.

ESTIMATING

The Basis for Demonstrating Value

At some point, project cost matters. Compliance is essential, but is there a less expensive yet equally effective option? We want it as soon as possible, but what is the net difference in cost if we wait a little longer? We want a fail-safe system, but can we cover the range of reasonably foreseeable failures at a reduced cost? We want security, timeliness, and quality. But we also want value. One way to evaluate value is to understand the tools and assumptions that undergird budget development.

The development of a solid project budget is an iterative process that involves an analysis of the project scope, schedule, human resources requirements, project expenses and support needs, business factors, risks, and organizational assets and constraints. The quality, depth, and accuracy of the budget development process vary depending on project status, importance, and relative value.

For example, we are less concerned about exact project costs when we are evaluating a selection of possible projects or making initial comparisons of technical proposals. Likewise, cost is probably not the deciding factor when an organization must choose between two similarly priced projects and one is discretionary and the other is required for compliance. In short, budget development techniques need to reflect the importance, timing, and value of our projects. Furthermore, we need to understand budget development techniques when we are evaluating project options and value.

Developing Cost Data

The Project Management Body of Knowledge (Project Management Institute, Fourth Edition, Section 7.1.2) describes several options for estimating project costs: expert judgment, analogous estimating, parametric estimating, and bottom-up estimating.

Expert Judgment. Expert judgment can be quick and effective when the scope of the project is defined and is similar to work that experts have performed

before. In its simplest form, we query someone with relevant experience, describe our project, and he or she tells us what it costs to complete a similar project. Expert judgment is always useful, but may require less qualification in the early stages of project budget development. On the other hand, expert judgment can provide the clarity and qualification we need when evaluating a final set of options.

Analogous Estimating. Analogous estimating can be useful when we have project experience in one area that is applicable to another area. For example, we may know that it takes approximately 120 hours to prepare Tier II reports for a single facility with 20 reportable compounds. With this general knowledge, we would be able to estimate the cost of preparing a Tier II report for a similar facility with a similar mix of reportable compounds. Analogous estimating can be quick and inexpensive, but can also be less accurate. Going back to our simple Tier II example, there could be significant difference in actual effort if one of the facilities used a sophisticated chemical inventory system while the other did not.

Parametric Estimating. Parametric estimating can be both efficient and accurate when estimating costs for projects for which we have a history of experience. For example, we may know that we can obtain continuous emission monitoring system (CEMS) performance specification testing for approximately \$3,000 per parameter, with only slight variations in cost due to the process on which

the CEMS is installed. We understand that there could be variation in the actual cost per parameter at a given location, but the \$3,000 per parameter value would enable us to prepare an annual budget for testing of three parameters at each of 20 monitors installed on different processes.

Bottom-Up Estimating. Bottom-up estimating likely provides the most accurate cost data because it is based on an evaluation of effort for each task by subject matter experts. The individual task estimates are then compiled to yield a cost estimate for the project. Bottom-up estimating is usually more expensive and time-consuming, but can provide added certainty and important project planning inputs.

Clearly, we have several options for developing cost data for project budgets. Furthermore, these project cost estimating tools can be combined to yield a range of qualified project cost estimates. Our challenge as project managers is to select and use project cost estimating techniques that are appropriate for the project stage, priority, or value.

So far we have discussed only planned and anticipated costs. A properly prepared project budget will also address the uncertainties associated with unplanned and unanticipated costs. For this reason, the project budget needs to include contingency reserves and management reserves.

Contingency reserves are estimated—using the same type of tools described above—based on risk analysis and reflect potential, but unplanned changes that affect project costs. Management reserves are budgets reserved for unforeseen changes in project scope and cost. Reserves may be used, reduced, or eliminated as more information is developed or as the project progresses.

As project managers, we're likely to have the freedom to choose the cost estimating tools for our assignments. Our challenge is matching cost estimating techniques with the project requirements and then pairing cost estimates with appropriate contingency reserves. Cost estimating knowledge and discipline allow us to define and communicate project value while at the same time demonstrating our value as project managers. **em**

Are you an A&WMA student member who will be graduating this year?

If so, we have a graduation gift for you!



To help you stay connected to your colleagues around the world, we are offering all graduates (undergraduates, masters, or doctoral candidates) a **FREE** one-year A&WMA membership!

This membership comes with all of the benefits of your student membership.

Contact a member services representative at 412-232-3444 to take advantage of this offer.

In Next Month's Issue...



Transportation and Air Quality

An overview of the latest transportation and air quality-related topics, including roadway emission monitoring, the MOVES 2010 model, diesel fuels, advanced diesel technologies, and greenhouse gas emissions.

Also look for:

- Inside the Industry
- IT Insight
- EPA Research Highlights