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Prioritizing Projects

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Many local governments are facing a difficult problem—too many projects, too few resources for conducting those projects. Population growth and aging infrastructure create demand for capital spending. But, because of revenue constraints, not every project can be conducted immediately. Projects must be prioritized. Is there a "right" way to prioritize projects?

According to the federal government, the answer to the above question is, "Yes." Beginning in the 1980's, government agencies, including the Department of Energy (DOE), sponsored research on formal methods for prioritizing projects. In one effort a team of experts from the Los Alamos National Laboratory, academics, and management consultants created a recommended prioritizing model called the Laboratory Integration and Priority System (LIPS). Numerous applications of LIPS and related methods have been conducted by the DOE, the Department of Defense (DOD), and other federal agencies. The DOE has even developed guidance for "risk-based prioritization" (see <http://risk.lsd.ornl.gov/CRE/DOEGuide.pdf>).

Learning from Uncle Sam

How does the federal government do it? The federal model for prioritizing projects is based on the assumption that the goal of government is to maximize the value that it delivers to its citizens. Proposed projects, such as extending a water line, expanding a hospital, or building a new school, create benefits that are, presumably, valued by citizens.

Suppose there was a way to quantify the value of the benefits created by projects. A reasonable rule for selecting projects would then be to choose those projects that, given the constraint on the budget, create the greatest possible value. If we rank projects based on the ratio of benefit-to-cost and fund from the top down, the projects we choose (assuming the projects are independent) will create the greatest possible value for the least possible cost.

Measuring Project Value

So, how do we measure project value? Remarkably, there is a way to logically quantify the value derived from a project. The basic theory was developed more than 50 years ago by the mathematicians John von Neumann and Oscar Morgenstern. This theory has since become known as "multi-attribute utility analysis (MUA)."

According to MUA, the value of an investment is determined by the degree to which it accomplishes objectives. Thus, an organization

that wishes to create a model for valuing projects must begin by identifying its fundamental objectives, and the fundamental objectives of those that it serves. The DOE, for example, stipulates that projects should be prioritized based on 8 high-level objectives, including public health and safety, protecting the environment, enhancing the socio-economics of impacted communities, and accomplishing its mission.

4 Basic Steps

Constructing a formal priority system requires 4 steps. The first step is to identify and structure objectives. Step 2 is to develop metrics, models, and scales for estimating the degree to which projects achieve objectives. Step 3 is to assign weights representing the relative value or importance of obtaining improvements on the objectives. The fourth step is to aggregate the various performance estimates and weights to obtain an overall measure of project value.

Needless to say, not all of these steps are easy. It is not hard to understand why very few local governments have tried developing formal project priority systems. However, by borrowing from models and techniques used successfully at the federal level, enterprising local governments now have the opportunity to create sophisticated tools for valuing and prioritizing projects

Catawba County's System for Prioritizing Water and Wastewater Projects

One of the first local governments to try using a formal, MUA-based method for prioritizing projects is Catawba County. Catawba County (pop. 150,000) is located in North Carolina in the foothills of the Blue Ridge Mountains. To say that Catawba has a reputation for innovative government is an understatement. The County's Web site lists over 200 awards it has won since 1986. Its County Manager, Tom Lundy, is serving as President of the International City/County Management Association, the 8,000-member organization with the mission of creating excellence in local government.

Catawba is a short, 20-minute commute from Charlotte, and rapid growth is placing considerable demands on government services. The need to prioritize is particularly acute for water/wastewater projects. While the County's water and sewer fund generates \$3 – 5 million annually, the backlog of proposed projects totals more than \$160 million.

Barry Edwards, Director of Catawba County Utilities, explains why a formal method for prioritizing projects was needed. "The County receives project proposals submitted by its 8 municipalities, and by others. We need to select the set of projects that create the greatest possible benefits for the citizens of the County. We need to explain and defend our choices to our commissioners and to the public."

Critical to the success of any formal priority system is gaining the understanding and support of elected officials. Although Utilities Department staff, working with consultants, designed the system, the County Commissioners reviewed and approved the 9 objectives used for prioritizing projects and participated in facilitated sessions

in which they set the system weights. Software makes it easy to collect and manage project data. Key outputs include an "optimal funding curve," which shows the set of projects estimated to produce the greatest benefits for any given funding level.

Like all analytic tools, Catawba's priority system is imperfect, and the County appropriately uses it as an aid for making decisions, not as a decision-making device. Nevertheless, County Commissioners appreciate the detailed information on the benefits provided by proposed projects. According to Barry Edwards, "The priority system gives us a logical way to prioritize projects. We're able to demonstrate to our Commissioners that investments in infrastructure produce benefits that far outweigh the costs."

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