

# HIGHWAY RESEARCH RECORD

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## Foreword

Five papers are presented in this RECORD dealing with program budgeting and its application to transportation systems. Since the Hoover Commission's report slightly more than ten years ago, federal and state governments have been moving in the direction of program budgeting. The formalized program planning budgeting system instituted within the Department of Defense in 1961 has given additional attention to program budgeting. This RECORD looks at how program budgeting elements have been instituted in transportation departments and possible future developments.

In the first paper, Kenneth E. Cook describes the essential elements of program budgeting and how in many states elements of program budgeting are currently being utilized. He points out that program budgeting is directed toward planning and management control rather than fiscal control. One of its primary advantages is that it allows the administrator to consider a multitude of facets, alternatives, and constraints involved in the allocation of resources.

Martin McGuire further elaborates on the use of program budgeting as a technique for resource allocation. He points out that program budgeting is an attempt to interpret intangible, nebulous, and vague goals into tangible resources.

Carl S. Rappaport reviews the history of PPB and discusses some of the difficulties in applying the Defense model of PPB to civilian agencies. He describes the current status of PPB in federal establishments and speculates on future developments.

Lester Lamm describes in his paper the procedure of applying program budgeting to a highway activity. Included in the process are (a) identifying objectives; (b) measuring effectiveness; (c) determining the need for program activity; (d) setting short-range goals; (e) developing alternative programs; (f) evaluating cost-effectiveness alternatives; (g) selecting the most effective program; and (h) using the findings of the analyses. Lamm then describes the highlights of the current Bureau of Public Roads program budgeting activity.

The Minnesota Department of Highways is developing a program budget. M. E. Hermanson discusses the considerations that directly affect the degree of success that state governments or highway departments can expect from this management technique. He discusses the relationship of the present budgetary methods to program budgetary systems and points out the values and shortcomings of each. He indicates that program budgeting to be effective must relate more directly to organizational structure than previous fiscal budgetary processes. To develop a program effectively, it must be assigned to a single or limited number of units and not to a variety of dispersed operating sections. A check list is described that could be used in developing a program budgeting system. The author concludes that program budgeting will work only if there is a proper attitude toward it and willingness by management to utilize it.



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# Application of Program Budgeting to Transportation

KENNETH E. COOK, Highway Economist, Highway Research Board

•PROGRAM budgeting, program planning budgeting systems, performance budgeting, and the other budgetary techniques are not new to highway and transportation planning. Many of the elements advocated by these budgetary systems already exist, either formally or informally, within most state highway departments. They may be scattered among a number of activities within the department and may not be clearly articulated or formalized. Some may be done unconsciously as part of the management decision-making process.

Professionals in budgeting, like many other professional groups, are prone to develop special jargon to describe their activities and to put greater emphasis on the novelty of their systems rather than on the similarities with current activities. In their enthusiasm to see accomplishments they may advocate an approach to instituting new budgetary techniques that is more revolutionary than evolutionary.

Discussion of program budgeting for transportation is not new. The Highway Research Board has had a committee on program budgeting for more than a decade. Papers on program budgeting, capital construction budgeting, and performance budgeting appear in the literature. As usual the theory is more sophisticated than actual practice. While no highway department has a fully developed program budgeting system, almost all are moving slowly toward it.

The real difference between current practice and the procedures advocated by program budget enthusiasts is the degree of formalization of the process. The program budget process seeks to clearly define and consciously evaluate in logical sequence the budgetary decision-making process by:

1. Clearly stating the goals and objectives of transportation;
2. Determining the desired level of service and the resources necessary to achieve this level of service, including decisions regarding what kind of a transportation system is needed and how much in money, manpower, and materials should be allocated to achieve these goals;
3. Setting the priority of the transportation programs in comparison with other social and economic needs;
4. Selecting from a number of alternatives that may accomplish the desired objectives, including considering the constraints and trade-off involved in each alternative;
5. Measuring rate of accomplishment and the consequences to the public and the environment; and
6. Ensuring scheduling of activities to achieve the desired objectives and controlling operations to achieve the most efficient use of time and resources.

What program budgeting does is to candidly set forth the step-by-step decision-making process in a logical sequence so that the goals, programs, and criteria of the decision-making process are clearly evident and not blurred by budgetary and fiscal procedures. Program budgeting requires a clear delineation of continuing and new activities and a demonstration of why each is needed. It indicates who is receiving benefits and who is paying the costs.

Program budgeting helps administrators and legislators to look at the purposes of expenditure rather than the objects of expenditure, and to base decisions on anticipated program achievement rather than on an extension of past levels of expenditure. It lays the transportation program open to close scrutiny by the public at large. The logical consequence of program budgeting means reduced reliance on earmarked and special-purpose funds, since the justification of funds is on the basis of goals and programs that may not be proportionate to the sources of revenue.

For these reasons, there may be some reluctance on the part of many transportation administrators to initiate program budgeting. They feel that by so doing they may run a great risk of losing direction of the highway program. Nevertheless the trend toward more formal application of the available techniques is strong in many transportation agencies and departments.

Recent trends toward implementing program budgeting for transportation programs have been based on several factors. Highway and other transportation programs in some states have grown too big and too complex to be managed and controlled solely by a single administrator or by a small group of managers. Public demands and expectations have outstripped transportation resources, and political control is becoming more and more sensitive to the general public's expressed needs. The public through Congress and state legislatures is increasingly reluctant to provide increased taxes without knowing how, and for what, new moneys will be spent.

Let us look at the state and federal highway programs and see what elements of program budgeting now exist and what additions we can anticipate in the future.

Highway departments are being required to provide more comprehensive justification for budgetary increases to the governor, the legislature, and to the federal government. Historically, highway user taxes have been defended as being special-interest taxes. This technique has undoubtedly made possible the tremendous advances in the American highway system that we have seen in the few decades of its life. Today, however, many legislatures view highway taxes as being in competition with other state taxes levied against the general taxpayers.

In some states, legislatures and governors, rightly or wrongly dissatisfied with the responsiveness of the highway program to the political electorate, have taken over the designation of highway programs and the allocation of highway resources.

When highway construction primarily involved improvements to established rural routes, relatively few people were damaged or dislocated by new construction. As transportation needs have become greater in urban areas, new construction may cost 100 times as much and displace many hundreds of people. In addition, the construction of new systems will have a substantial effect on the development of the environment for a considerable distance around the corridor. The greater the cost and impact of new transportation systems, the more directly involved become the legislature and the public.

The federal-aid highway program and many state programs already have in them elements of program budgeting. Authorized funds are divided according to Interstate, primary, secondary, and urban programs. Each federal-aid system has criteria for designation of route and design standards. Special funds are provided for other highway-related programs such as highway beautification, highway safety, access to federal lands, and economic development roads to relieve economically depressed areas.

There is a periodic estimate of highway needs by the states that the U. S. Department of Transportation reports to Congress. Although moneys for each mode and for mass transit are provided from separate funds, estimates of travel demands and federal program planning are gradually becoming multimodal.

There has been growing concern that the current criteria for allocating federal highway improvement funds among the systems may not truly reflect the public's demands, and may also result in less than optimal allocation of available funds to urban highway facilities. Therefore, the Bureau of Public Roads and the states are cooperating in the conduct of a nationwide evaluation of the classification of highways by function and of the costs and benefits of providing needed highway improvements. Any major change such as this must be very carefully considered by all involved agencies before implementation, but nevertheless these are essential steps in the development of program budgeting.

While there is concern whether the current federal-aid apportionments give the appropriate weighting to needs and whether the systems should be reclassified and design and traffic service standards reevaluated, it is clear that a form of program budgeting already exists at the federal highway level.

It has been difficult to define transportation goals and objectives in meaningful terms. The U. S. Department of Transportation has identified four primary goals (economic efficiency in transportation, optimal use of environmental resources, safety, and support of other national interests). They are of necessity broad and hard to deal with in concrete terms. In any budget process the basic issues are:

1. With given resources, what programs do we desire to continue?
2. What new problems have arisen that we must do something about?
3. What priority in the allocation of men and money should we give each?

These issues have been put in concrete terms in appropriations for federal aid to transportation. User funds paid into the Highway Trust Fund are used for completion of the Interstate system, and for upgrading federal-aid primary, secondary, and urban roads. Additional general fund revenues have been provided for mass transportation, high-speed ground transportation, transportation safety, and environmental effects of transportation facilities.

To develop a true program budget system in the future, management, fiscal, and post-audit control of transportation programs should be reoriented to provide information to federal and state administrators by both object of expenditure and by program. Also, programs and administrative structure will have to be more congruent, and the level of detail into subprograms or activities more developed. The concept of decentralized management with central financial control using the "management by exception" principle is already becoming evident with the Bureau of Public Roads current billing program for the reimbursement of federal-aid funds for state construction projects.

The theory of performance budgeting may find application in some activities that are measurable and may be budgeted on a unit-cost basis. Performance budgeting is based on the development of standards of performance for allocating resources and scheduling activities. The concept is much narrower than program budgeting, or program planning and budgeting systems, and has application primarily to routinized, repetitive, and measurable activities. Performance budgeting has the limitations of unit cost control. In an environment where greater emphasis is put on human values and individual worth, we will probably see only limited application of performance budgeting.

Currently, the Bureau of Public Roads and the states are investigating the use of performance budgeting as a means of controlling and scheduling highway maintenance programs. To date the manpower development gained from such studies has been more important than application to scheduling or management control. While performance budgeting is not a complete answer for state fiscal administrative needs, the management information systems being developed as part of these systems may prove very useful to the program budget process.

In the future, a number of developments can be expected. Transportation planning will become multimodal. Although funding may still remain earmarked by mode for quite some time, the evaluation of needs, especially in urban areas, is becoming multimodal. As intermodal planning becomes a more important factor, intermodal needs, costs, financing, and problems will receive more attention. Long- and short-range national programs for transportation systems and programs will be more formally considered. In order to determine the best allocation of resources, improved measures of performance and cost effectiveness measures of return on investment will be developed. When all these parts are put together, the U.S. Department of Transportation will essentially be operating under a program budget.

To assure that the states are scheduling their programs in response to established needs and priorities and within manpower resources, we can expect greater federal concern in the programming and scheduling of federally assisted state transportation improvement and perhaps maintenance projects.

Like the federal government, the states have made considerable progress in the development of program budgeting. Some states, such as New York, Wisconsin, and



Minnesota, are developing a program budget for transportation. Other states still have not taken the first steps toward a formal program planning process. In between these two extremes the majority of the states still look to the budgetary process as being primarily a fiduciary responsibility. They have developed a number of activities under the auspices of planning, personnel, construction control, and maintenance scheduling. These activities have not yet been integrated into a formal program budgeting system.

Many states already have some of the following elements that are necessary in instituting a formal program budgeting system:

1. Highway classification system with design standards and traffic forecasts for each system and road segment;
2. Milepost or other system for locating road segments on the state system;
3. Sufficiency rating system giving an evaluation of the adequacy of each road segment in terms of design, maintenance, and level of traffic usage;
4. Traffic counts and accident analysis for the state system;
5. Continuing highway needs studies and sources of funds;
6. Long-term construction program;
7. Cost-benefit and cost-effectiveness techniques for project evaluation;
8. Project programming and scheduling using PERT, CPM, or other schedule control techniques;
9. Project cost controls;
10. Manpower planning, training, and scheduling;
11. Maintenance performance budgeting;
12. Allocation of non-construction funds by functional units; and
13. Revenue forecasting.

These elements are essential ingredients to program budgeting. They provide the basic informational inputs to determine needs and availability of resources and to control the use of funds once they are allocated. With these elements in hand, New York and Wisconsin are developing a statewide transportation program for all modes. They have laid out the procedures for formalizing the program budgeting process.

It is probable that program budgeting in most states will develop out of the planning rather than fiscal process. As the need arises to coordinate these activities more closely, the formal program budgeting process conceived by theorists will evolve. The procedure will be evolutionary, not revolutionary, and will gradually integrate the total management decision-making and controlling process. It will include not only needs and financial resources but also manpower planning and material resources.

In systems design and analysis, we are often prone to think of the system in terms of a well-integrated automated mechanical system. The true program budgeting system is not; it is seeking to best achieve the goals of both the total populace and the individual employee. It is not a black box that relieves us of the responsibility of decision-making. Administrators will still have to make the final decision. Instead, it is a technique that allows administrators to consider the multitude of facets, alternatives, and constraints involved in any allocation of resources, and helps them to select the best combination that will provide the maximum human benefit and satisfaction.

# Notes on Program Budgeting Concepts And Methodologies

MARTIN C. McGUIRE, Department of Economics, University of Maryland

•IT HAS been said (1) that all budgets serve three purposes in the organizations they belong to—namely,

1. Strategic planning,
2. Management control, and
3. Operational control.

This paper will cover only the first of these purposes, since if anything is new about PPBS it is in its emphasis on strategic planning for resource allocation. And as an economist, I will concentrate on a few key features in economic analysis for such strategic planning.

Everyone would agree that there is a large gap between our ideals of a good society and the resources available to us for striving after those ideals. Resources are hard, tangible, and measurable things—like men, equipment, land, natural resources, and a great array of goods and services available to the economy. Ideals are vague, nebulous, intangible, not measurable—like national security, equal opportunity, environmental quality, law, and order. In practice, to get a grasp on resource allocation decisions, some intermediaries are necessary to relate resources to ideals. The PPB system attempts to span that gap by classifying, organizing, and analyzing government activities as shown schematically in Figure 1 with an example from the nuclear defense programs. Resources lead to programs, which in turn lead to outputs, which in turn lead to objectives, which themselves are surrogates for larger social ideals. The guiding principle of organization in this way is to relate specific resources uniquely to specific results.

Within a program structure or organization like this, analysis leading to resource allocation recommendations and decisions should be carried out at all stages. A few examples of the types of questions for analysis at each stage are listed in Figure 1.

What is the point of such analysis? To the economist there are four overall questions to be answered in any resource allocation problem:

1. Should a program be undertaken?
2. How much should be allocated to it?
3. What should be the composition of the program?
4. When should the allocation be made?

The very asking of these questions—not to say answering them—suggests the "global" viewpoint of strategic resource planning, in contrast to the incremental approach of traditional incremental budgeting (which asks how much a particular program should be increased or decreased).

Let us turn now to an attempt to use the foregoing classification on transportation programs. Figure 2 shows a simplified format for transportation programs on the assumption that the sole objective is to meet consumer demand (estimated from consumer surveys, for example).

The format is simple—like the defense format in Figure 1—and the same sorts of questions arise for analysis. Now suppose you make this representation more realistic

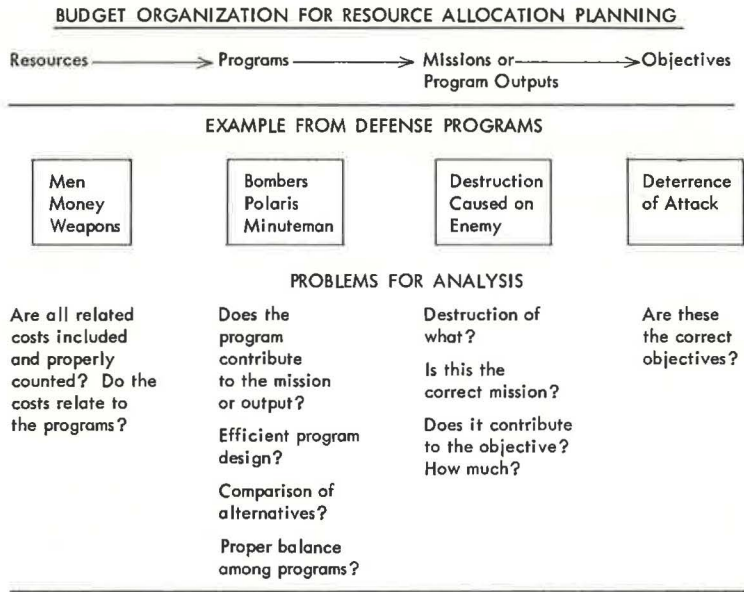


Figure 1.

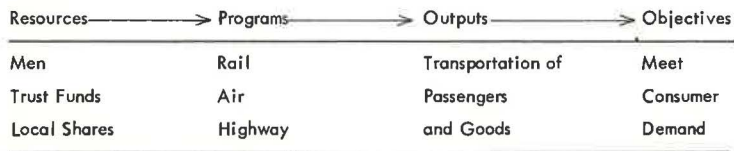


Figure 2.

by including the facts that transportation affects more than one general objective. Other plausible objectives are:

1. Investment for economic development,
2. Labor mobility for poor,
3. Access to inner city, and
4. Equalization of services to poor.

Each new objective added expands the problem of analysis for resource allocation by another dimension. The addition of more objectives means that each and every stage in the analysis, all the way back to the transportation system design, must be re-analyzed and probably changed. And the damage this allowance for multiple objectives causes does not end here. Since transportation objectives extend to non-transportation areas, other agencies' actions will influence the payoffs to transportation expenditure; hence it will prove impossible to relate specific resources uniquely to specific objectives. This is a problem typical of domestic (contrasted to defense) programs—how to organize for resource allocation planning, when widely diverse programs interact.

#### REFERENCE

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# Program Budgeting and PPBS in the Federal Government

CARL S. RAPPAPORT, Resources Planning Staff, Bureau of the Budget

•THIS paper discusses the planning-programming-budgeting system (PPBS) at the federal level from a government-wide point of view. In so doing, it (a) briefly traces the history of PPB, first in the Department of Defense and then in the civilian agencies; (b) comments on some of the difficulties of applying the Defense model of PPB to the civilian agencies; (c) describes the current status of PPB, including both its problems and its accomplishments; and (d) speculates about the future of PPB.

## HISTORY OF PPB

PPB was formally introduced in the Department of Defense in 1961. Previously, Defense had carried on independent planning and budgeting processes, and thus its plans tended to be unrealistic and to overemphasize short-run costs.

President Johnson clearly had the Defense model of PPB in mind when, on August 25, 1965, he directed the civilian agencies to adopt the innovation. In his Cabinet statement on that date, the President indicated that PPB would permit the civilian agencies (a) to identify national goals, (b) to choose the most urgent of those goals, (c) to search for alternative means of reaching those goals most effectively at the least cost, (d) to take account of future-year consequences of decisions, and (e) to measure program performance.

There were several important differences between the Defense Department and the civilian agencies which led to difficulties in applying the Defense model of PPB on the northern bank of the Potomac River.

First, there had been a tradition of long-range planning in the military before 1961, unlike the situation in many of the civilian agencies in 1965.

Second, there had been a history of analysis of defense issues at places like the Rand Corporation prior to 1961. Similar analyses of civilian issues were rare in 1965.

Third, in 1961 the Defense Department had a research base and literature from which to draw. Notable in this literature is "The Economics of Defense in the Nuclear Age," by Charles J. Hitch and Roland N. McKean. Such a literature is just now beginning to develop on the civilian side.

Fourth, prior activities had, as a by-product, resulted in the training of a large number of people in the application of modern analytical techniques to the resolution of current issues.

Fifth, Defense enjoyed greater data availability in 1961 than most of the civilian agencies in 1965.

Sixth, the Defense Department in general has a single objective, whereas most of the civilian agencies have multiple objectives.

Seventh, there are no autonomous actors in its field other than the Department of Defense. In the case of many civilian agencies, state and local governments and the private sector strongly influence the activities of federal agencies.

Finally, many of Defense's problems are hardware-oriented. Therefore, actions and reactions are much more predictable than are those of the socially-oriented civilian agencies.



## CURRENT STATUS OF PPB

In general, most of the civilian agencies have made progress toward all five goals identified by President Johnson. However, the federal government has not yet reached the end of the road on any one of them. A number of problems have emerged.

First, there are inherent limitations in systematic planning and analysis; they seldom give unambiguous answers.

Second, the data base in many civilian agencies is inadequate for PPB.

Third, in the effort to apply PPB in a comprehensive manner, it has not yet been possible to tailor its development to specific programs and agencies.

Fourth, there has been inadequate communication between analysts and decision-makers in many of the civilian agencies. As a result of different backgrounds, jargons, and views of the world, analysts and decision-makers have frequently been unable to develop supportive relationships. Thus, decision-makers have been unable to make full use of analytic talent and, correspondingly, analysts have frequently failed to have useful analyses available when decisions had to be made.

Fifth, legislation has frequently been excluded from the process of systematic planning and analysis.

Sixth, there has been a general scarcity of analytic talent, owing in part to the attempt to be comprehensive.

Seventh, because the period since 1965 has evidenced substantial budgetary restraint on the civilian side, administrative and political feasibility have greatly influenced resource allocation decisions.

Eighth, a number of agency heads have failed to support PPB, have failed to involve themselves in it, and/or have failed to obtain an analytic capability of sufficient quantity and quality.

Despite the foregoing problems, PPB has already produced a number of benefits.

First, as a result of PPB, more issues have been identified sooner, have been specified more clearly, and have been considered more carefully than otherwise would have been the case.

Second, PPB has begun to produce better and more complete program information for the President, the Budget Bureau, the department head, the bureau chief, and other levels of management.

Third, PPB has resulted in more and better analysis of issues.

Fourth, PPB has led to greater consideration of long-term consequences, both benefits and costs.

Fifth, PPB has resulted in the development of more analytic people.

Sixth, PPB has laid the groundwork for more progress in the near future toward systematic planning and analysis for decision-making.

Finally, and most important, PPB has led to some better and/or more confident decisions. Examples of such decisions are the HEW child and maternal health programs, the affirmative action program of the Equal Employment Opportunity Commission, and the Interior oil shale program.

## FUTURE OF PPB

PPB is now about 3½ years old. I suspect that it will evolve in the following ways during the next few years.

First, there will be an increase in the demand for and supply of analysis as studies become more responsive to the problems facing top management and as they display results so they are useful to top management.

Second, now that virtually all agencies have acquired some competence in PPB, there will be more tailoring of planning and analysis to particular programs and agencies. In the transportation field, I believe that such tailoring will include intermodal comparisons, better comparisons of alternative transportation systems, better data on multi-modal trips, better forecasts of demand at alternative levels of service, better cost data, better data on the relationships among federal, state, and local funds and in particular on the extent to which federal grants stimulate or substitute for state and local funds, and better information on benefits, such as the impact of transportation facilities

on regional economic development, on access to recreational and cultural attractions, and on social, political, and economic development of their environments.

Third, there will be more emphasis on the substance of PPB and less on the process.

Fourth, there will be reemphasis on the benefits of PPB to the agency as compared with those to the Budget Bureau and to the President. There will be wider appreciation of the fact that the benefits to the agency accrue to virtually all levels of management and not merely to the agency head.

Fifth, there will be more flexibility in issue identification.

Sixth, there will be greater integration between PPB and budgeting.

Seventh, there will develop aids to interagency comparisons. In particular, a government-wide program structure will be very useful in this regard.

Eighth, there will be more emphasis on long-range planning.

Ninth, there will be greater realization that PPB is not an all-or-nothing technique. Issues—many of which are susceptible to less sophisticated techniques—will be successfully resolved, thus demonstrating the usefulness of systematic analysis to those who still have doubts.

Finally, the Congress will be more and more involved in PPB. This will result in part from congressional interest in the method by which the executive branch arrives at its recommendations.

### CONCLUSION

In conclusion, I would like to quote Professor Frederick Mosher of the University of Virginia, who recently told a congressional subcommittee that President Nixon may "abolish the expression PPBS from the federal vernacular... but it is unlikely that he would or could fail to support a more systematic approach to the problems of planning, programming, and budgeting in the national government..."

# Applying Program Budgeting to Highways: An Illustrative Example

LESTER P. LAMM, JR., U.S. Department of Transportation, Federal Highway Administration, Bureau of Public Roads

•PROGRAM budgeting<sup>1</sup> may well be one of the least understood terms of our time. Because of its relatively brief history and the fact that the Chief Executive personally prescribed its extension to federal civilian programs, program budgeting has acquired a mystique. Its practitioners have contributed to the aura of mystery by quickly supplying a program budgeting jargon and have perhaps overemphasized the new features of the technique.

Yet, when the basic principles of program budgeting are uncovered and examined, it is found to be a powerful tool for planning and managing public programs. The technique appears to be especially adaptable to highway program analysis.

The purpose of this paper is to project a simplified, uncluttered view of how program budgeting fits into the highway program development process at the federal level. Possible extensions to state and local level investment decisions should be apparent.

## SUMMARY OF THE PROCESS

A short definition of program budgeting might be "A systematic process through which decisions on the scope or size of future public investments are made with reference to their impact on the goals or objectives of the particular public agency." This definition, while legible and fairly complete, hardly serves our purpose of simplifying the program budgeting process. A more suitable way to define program budgeting is to identify it as a logical 7-step process. Each individual step is briefly described in the following and will be illustrated in later sections of this paper, using a hypothetical but completely realistic example program area.

1. Identify objectives—By this we mean that the basic reason or reasons for the existence of the public program activity need to be clearly identified. This is by no means a simple process, especially when dealing with existing programs whose original objectives may well have changed over the years.
2. Develop measures—This step involves the establishment of quantifiable measurement units by which progress toward or away from program objectives can be gauged. Not all objectives, of course, lend themselves to easy quantification (reflect, for instance, on some of the newer social-oriented programs).
3. Identify needs—The next step is to forecast how the current situation would change if no program activity were undertaken. In other words, what undesirable future situation will the programs try to alleviate?
4. Set targets—Next, the agency must establish short-range (2 to 5 years) targets for the program activity. Should we try to cure 100 percent of the future ills, or 10 percent, or some intermediate figure?
5. Develop program structure—In this step the public agency identifies the alternative program activities (existing or new proposals) through which it may attack the identified problem. These program activities constitute the alternatives, which are then tested.

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<sup>1</sup>Throughout this paper "program budgeting" is used interchangeably with "planning-programming-budgeting system" (PPBS). Although not precisely correct, this is an acceptable simplification.



6. Make analyses—This is the program testing, evaluation, or analysis procedure. The analysis involves estimating for each proposed program the probable beneficial returns at various levels of annual program cost. If program costs and anticipated benefits are both expressed in dollar terms the analysis is known as a cost-benefit analysis. If, as is more often the case, benefits can be identified but not valued in dollars, the procedure is known as cost-effectiveness analysis.

7. Select program size and mix—In this final step the program budgeting analyst recommends to his administrator the group and level of program activities that will for the future year result in either (a) the desired short-range performance report being achieved at lowest combined program cost, or (b) the greatest beneficial results being returned for the known amount of available funds.

It is hoped the 7-step procedure outlined has more adequately defined the program budgeting process. Even so, to this point we have dealt in abstractions. For greater clarity, the step-by-step logic involved in the annual program budgeting cycle is further detailed in the following sections, using as a hypothetical (but completely realistic) illustration the group of safety-oriented highway improvement programs administered by the Federal Highway Administration, Bureau of Public Roads.

#### IDENTIFICATION OF PROGRAM OBJECTIVES

We are assuming that our area of concern is highway improvement for added safety. Here the establishment of program objectives is relatively easy. Obviously, our program objective is to increase safety on the nation's highways. We may express it in those terms or we may say that our objective is to reduce existing or future highway accident rates.

#### MEASURES OF PROGRAM EFFECTIVENESS

The selection of proper units of program measurement is an important step in the establishment of a workable and useful planning-programming-budgeting operation. The proper unit (or units) can have several identifiable features:

1. The unit will be a real descriptor of the objective being considered;
2. Agency program activity will have an influence on the magnitude of the unit;
3. The unit may be expressed as some physical element, or, if possible, may be stated in terms of dollar value; and
4. The unit may be a measure of agency program output or may be completely unrelated to output.

To illustrate the final point, which may be significant, the obvious measure of highway program output is the number of lane-miles of facilities opened to traffic in a year. Without knowing how much traffic is using the new facilities, or how safely and swiftly the traffic is being carried, however, we have no real idea of the impact of these new facilities on the objectives of the program.

Keeping these points in mind, we can quickly think of several potential measures of effectiveness of safety-oriented highway improvement programs. For instance, we may use the annual number of casualties (fatalities and injuries combined) resulting from highway accidents. Another possibility would be the annual dollar cost of highway accidents. These measures are shown in Figure 1. Other potential measurement units could be illustrated, such as annual fatalities; accident, casualty, or fatality rate per unit of exposure; and cost per accident.

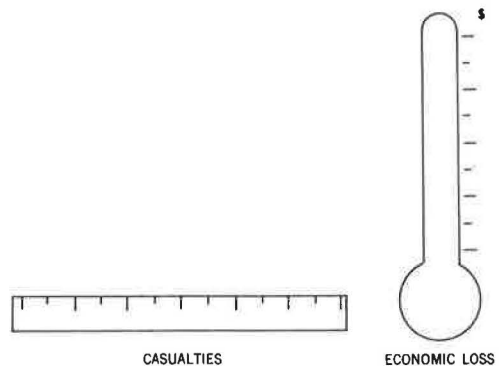


Figure 1. Highway safety quantitative measures.

NEED FOR PROGRAM ACTIVITY

The next step in preparing a program budget submission for an agency is to determine the warrants, if any, for future program activity. The word "future" is important. Program budgeting is for the most part a tool for program planning (as opposed to day-to-day program management or control operations). Therefore, the decisions made today will be translated into program activity taking place two to seven years in the future. We therefore need to identify not today's problem, but future problems. In many program areas this can be done by studying recent trends and predicting how certain features would change if no new program activity were proposed.

For instance, in our example, we know the number of annual casualties and the estimated annual dollar loss due to traffic accidents over a historical period. By assuming a continuation of current safety improvement program activity (or, as an alternate, by assuming no activity at all), we can predict what the future annual casualty and/or economic loss values will be. These figures, shown in Figure 2, represent "the need to do something."

SETTING SHORT-RANGE PROGRAM ACHIEVEMENT TARGETS

The next step in the program budgeting process involves an evaluation of the previously identified future situation. Let us suppose that the forecast is that by 1975 the projected growth of traffic and traffic accidents will result in an annual expectation of casualties (injuries and fatalities combined) on the nation's highways. We appraise this figure and find it completely intolerable. As a result, we would establish as the numerical desired result of our 5-year program activity the reduction of the estimated annual casualty total by, let us say, 100,000. This desired reduction is known as the short-range achievement target of the safety-oriented highway improvement programs. The establishment of numerical targets is shown in Figure 3.

DEVELOPMENT OF ALTERNATIVE PROGRAMS

We now know the type of return we desire from our programs and how much of an effect we want the program dollars to have over the next few years. Our next step is to itemize the various programs that may singly or jointly contribute to achieving the established short-range targets. In PPB jargon this step is known as developing the program structure.

Imagination is one of the principal ingredients in this step. Remember, we are considering a time period of several years, a period long enough to develop and apply new or completely modified program tools to the solution of our problem. There is no need to limit the program structure to existing activities.

For our current example, we can identify several existing and proposed types of capital improvements designed to increase highway safety. It is important to remember

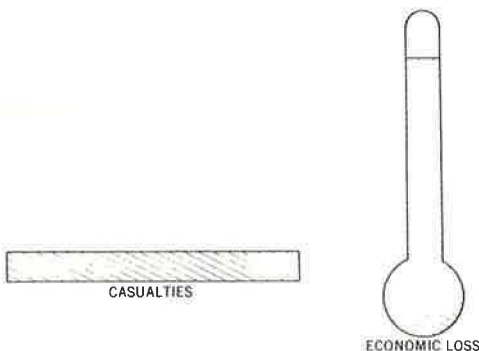


Figure 2. Needs if no action is taken.

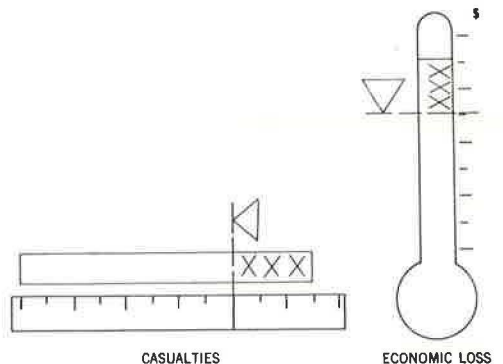


Figure 3. Highway safety targets.

that we are at this point restricted to considering only those activities that improve the highway; the driver-oriented and vehicle-oriented programs administered by the National Highway Safety Bureau are evaluated in a later step. Therefore, the safety-related program structure for the Bureau of Public Roads includes the following activities:

1. The Interstate Program—The end product of this activity is a nationwide network of highways which, in addition to increasing the efficiency of highway transportation, are also much safer than other highways. Therefore, we must for completeness estimate the safety gains attributable to the annual Interstate program activity, and evaluate these against the estimate of Interstate dollars that are buying added safety each year.

2. The Primary, Secondary, and Urban (ABC) Programs—These programs also contribute to highway safety and to other objectives. Costs and safety gains must also be estimated for these activities.

3. The Traffic Operations Program to Increase Capacity and Safety (TOPICS)—The title of this new program indicates that highway safety is one of its principal benefits.

4. The Spot Safety Improvement Program—Here again safety is a prime objective of this program activity.

5. The Railway-Highway Grade Crossing Improvement Program—A program designed to improve safety by causing reductions in the incidence of a specific class of accidents.

6. The Roadside Hazard Reduction Program—This program, involving conformance with the provisions of the AASHO "yellow-book", is another example of a special-purpose safety improvement program.

7. Conformance with the Manual of Uniform Traffic Control Devices (MUTCD)—Here the reason for wanting uniform traffic control devices is an estimated desirable impact on highway safety.

8. Research and Development Activities—In developing and comparing alternative future program activities it is most important that the comparison not be limited to existing or committed programs. For instance, if the analysis period runs through 1975, there may be some current research or development activities that would reach operational status in the near future. In the area of highway safety improvements, we may want to consider the estimated costs and benefits of the Passing Aid System, the Electronic Route Guidance System, and the Merging Control System, to name only a few efforts.

#### COST-EFFECTIVENESS ANALYSIS OF ALTERNATIVES

After the full group of programs having potential impact on stated goals has been identified there remains the task of evaluating the relative desirability of each program. The evaluation is accomplished through a process known as cost-effectiveness analysis. This process may be extremely complex or may be largely intuitive, depending on the extent to which the program objective can be quantified, the amount of historical program performance data available, and several other important determinants.

Cost-effectiveness, in an oversimplified view, is an estimate of the anticipated amount of returns at several assumed annual program cost levels. If enough information is known about a program, its cost-effectiveness characteristics may be expressed as a mathematical relationship, or alternately may be graphically displayed as in Figure 4.

Figure 7 purports to show the relative cost-effectiveness of three highway improvement programs identified as poten-

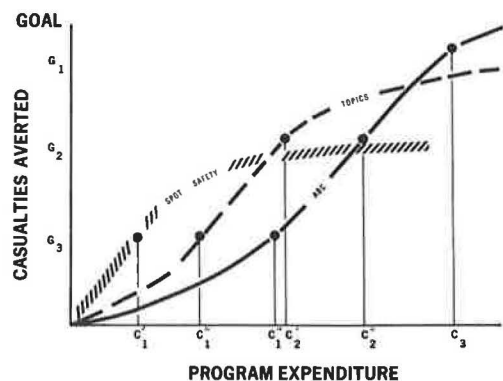


Figure 4. Example of cost-effectiveness analysis.



tial contributors to the goals of reducing the annual traffic accident toll. Annual program costs are measured along the abscissa, while the ordinate shows the estimated number of annual casualties reduced by each program. It should be noted that further analytic study will be needed before the actual points on each curve can be specified, although the general shape and relative position of the three program functions is probably quite realistic.

The figure implies that the Spot Safety program, being composed of relatively minor improvements, will have high payoff at low cost, but will quickly approach a maximum number of casualties that could possibly be averted without more extensive new or rebuilt facilities. Similarly, returns from the TOPICS program will be higher than ABC results at small annual costs, but tend to "peak out" at a level lower than the maximum ABC returns.

In similar fashion the cost-effectiveness of each individual program, including R & D expenditures, should be investigated and incorporated into a comparative framework.

#### SELECTION OF MOST EFFECTIVE PROGRAM MIX

The final analytical step involves the identification of the group of future programs and the proper size of each that will lead to the most desirable results. "Most desirable" means the mix of program activities that either (a) achieves the desired annual results at lowest total cost, or (b) maximizes the returns at the known amount of funds available.

To illustrate the "low-cost" solution, let us turn again to Figure 4. If we presume that our specified target is to reduce annual casualties by  $G_1$ , it is evident that we would recommend the Spot Safety program which gives  $G_1$  return at a cost lower than that of TOPICS or the ABC programs. It follows that with a target of  $G_2$ , we would select TOPICS, and at  $G_3$ , the ABC program would be selected.

This obviously oversimplifies the program selection process. The real problem is to select the mix of programs that yields the low-cost solution. For instance, to achieve  $G_2$  at low cost, we should obviously include some elements of the Spot Safety program. The actual process involves a simultaneous investigation of incremental costs and returns of all programs, a process that sounds formidable, but is less of a problem than the necessary prior step of identifying individual program effectiveness.

In many instances a government agency operates under conditions of budgetary constraint—that is, the amount of potential increase in future program size is limited. In other words, a known limited amount of money is available for the planning year. In this situation the solution of the cost-effectiveness analysis is the maximization of desired returns within the limits of known program funds. The solution principle is as discussed in the previous paragraph, namely, simultaneous investigation of marginal costs and returns.

One final clarification concerns the relationship between cost-effectiveness analysis and the more widely known cost-benefit analysis. Cost-benefit analysis normally presumes the ability to express benefits in terms of their dollar value so that the analysis is solved in terms of, say, the ratio of benefits to costs or the expression of net present value of benefits minus costs. Cost-effectiveness, however, can be carried out whenever the desirable returns can be quantified, and may be quite useful in program selection. For instance, if program A results in a reduction of one highway traffic fatality for each \$500 of cost it is obviously preferable to program B, wherein \$1200 is needed to reduce fatalities by one.

#### USE OF ANALYSIS FINDINGS

We now have traced the repetitive cycle of program budgeting analysis. For the sake of expositional ease no mention has been made of complicating factors such as periodic feedback throughout the process. The inventory of needs may lead to a re-appraisal of agency objectives. The target establishment step may uncover more meaningful measures of program effectiveness. So, too, results of the program analysis undertaking can cause reexamination of any of the earlier stages.

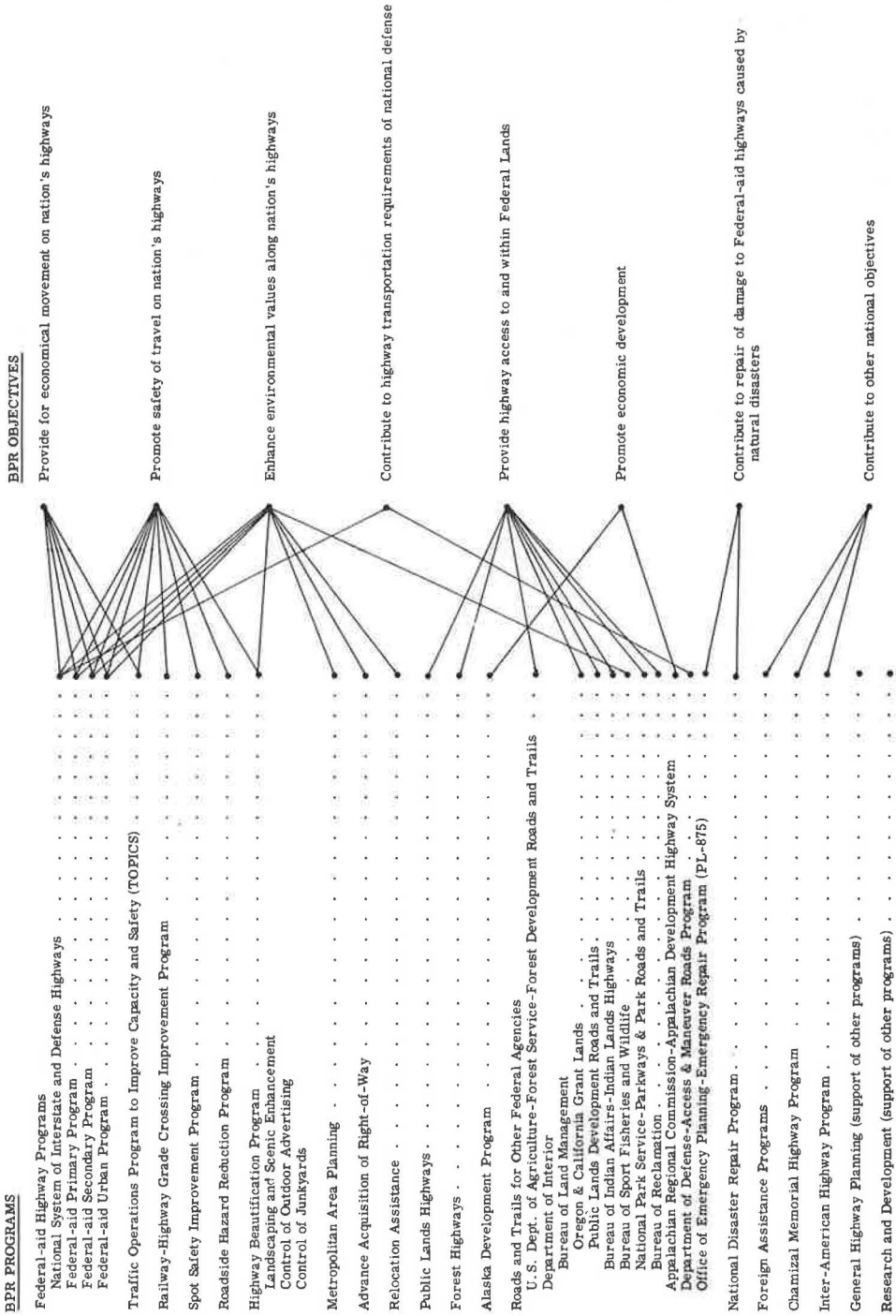


Figure 5. Relationship of programs and objectives.



To return to the results of the program budgeting process described, however, let us briefly trace the next series of tasks. We must remember that our end result has been a recommendation to the agency head of those programs that appear most justified from a cost-effectiveness standpoint. The agency head must also consider many other potentially competing influences, such as:

1. Legislative and political constraints;
2. Organizational capabilities—federal, state, and local;
3. Existing commitments; and
4. Advice from program managers.

When these factors have been evaluated, the annual Bureau of Public Roads program budget submission is ready for transmittal to the Federal Highway Administrator. At this next level the BPR safety-oriented program costs and accomplishments are considered jointly with National Highway Safety Bureau and Bureau of Motor Carrier Safety data and proposals. The FHWA material forwarded to the Department of Transportation sets forth the most desirable grouping of all highway safety programs.

At the Departmental level highway safety activities are evaluated with safety program recommendations covering other transportation modes. A coordinated recommendation is then sent to the Bureau of the Budget and, after review at this level, is incorporated eventually into the proposed budget for all federal activities advanced by the President in January of each year.

#### HIGHLIGHTS OF BPR PROGRAM BUDGETING ACTIVITY

This paper has described the makeup of the PPBS process in the Bureau of Public Roads by using as a hypothetical example the treatment of highway safety-oriented improvement programs. What of the full set of BPR program activities? Several highlights of the Bureau-wide process would seem to be applicable at the state or local level.

There appears to be substantial agreement on the best way to state the several objectives of highway improvement programs. The principal highway program objectives are as follows:

1. To provide efficient, economical, low-cost highway transportation, attempting to increase such user benefits as traffic service, convenience, capacity, and operating speed;
2. To provide safer highways, minimizing loss of life, human suffering, and property losses stemming from highway traffic accidents;
3. To preserve environmental values, enhancing the benefits of highway facilities accruing primarily to non-users;
4. To provide highway access to areas of federal interest, such as national parks and national forests;
5. To promote increased economic development in designated regions or areas.

Figure 5 illustrates how the most important programs of the Bureau of Public Roads contribute to the achievement of these objectives. Note how many programs (such as the Interstate) simultaneously impact upon two or more objective areas.

As a final illustration, the Appendix illustrates the way in which the various BPR programs are displayed within the program structure developed for fiscal year 1970 programs by the Department of Transportation.

## *Appendix*

### BPR PROGRAM STRUCTURE (1968)

#### Program Category I:

#### Urban Transportation (SMSA)

1. Interstate system
  - a. Efficiency features
  - b. Safety features
  - c. Aesthetic, environmental and social features
  - d. National defense features
2. Other primary
  - a. Efficiency features
  - b. Safety features
  - c. Aesthetic, environmental and social features
3. Secondary system
  - a. Efficiency features
  - b. Safety features
  - c. Aesthetic, environmental and social features
4. Urban extensions
  - a. Efficiency features
  - b. Safety features
  - c. Aesthetic, environmental and social features
5. TOPICS
  - a. Efficiency features
  - b. Safety features
6. Railway-highway grade crossings program
7. Spot safety program
8. Roadside hazard reduction program
9. Fringe area parking
10. Roadside beautification program
11. Billboard and junkyard regulation
12. Metropolitan area planning
13. Advance acquisition of right-of-way
14. Relocation assistance

Program Category II:Inter-Urban Transportation

1. Interstate system
  - a. Efficiency features
  - b. Safety features
  - c. Aesthetic, environmental and social features
  - d. National defense features
2. Other primary
  - a. Efficiency features
  - b. Safety features
  - c. Aesthetic, environmental and social features
3. Secondary system
  - a. Efficiency features
  - b. Safety features
  - c. Aesthetic, environmental and social features
4. Urban extensions (in areas 5,000-50,000 population)
  - a. Efficiency features
  - b. Safety features
  - c. Aesthetic, environmental and social features
5. TOPICS (in areas 5,000-50,000 population)
  - a. Efficiency features
  - b. Safety features
6. Spot improvement program
7. Railway-highway grade crossings program
8. Roadside hazard reduction program
9. Billboard and junkyard regulation
10. Roadside beautification program
11. Advance acquisition of right-of-way
12. Relocation assistance

Program Category III:

International Transportation

1. Inter-American highway

Program Category IV:

Other National Interest

1. Natural disaster repair
2. Access to Federal lands
  - a. Public lands highways
  - b. Forest highways
3. Alaska development
4. Chamizal Memorial Highway program

Program Category V:

General Support

1. Research and Development
  - a. Traffic operations
  - b. Social and economic impact
  - c. Structural
2. General highway planning
3. Administration

# State Level Program Budgeting Considerations

M. E. HERMANSON, Assistant Commissioner, Minnesota Department of Highways

•PROGRAM BUDGETING can be a valuable aid to management—but it also can be the cause of overoptimism by public administrators who see it as a panacea for their entire range of operating problems. It can also expose an organization's weaknesses and deficiencies and reveal whole new prerequisite tasks.

My objective here is to attempt to identify some of those factors that I believe could directly affect the degree of success that state governments or highway departments can expect from this management technique. Note that I have grouped state levels of government with highway departments for reasons that will be developed later. My orientation is from the considerations of an operating executive, rather than the budgeting or financial specialist.

I will express some pointed reservations. They are not intended to discourage, but to offer a more realistic assessment of the position that any governmental subdivision could find itself in when it chooses to entertain this concept. For then, having had the benefit of a thorough appraisal, the undertaking will be far more likely to command and receive top management's support, time, and resources. And these are essential not only from this level but down through at least middle-management echelons.

## WHY INTRODUCE PROGRAM BUDGETING AT THE STATE LEVEL?

PPBS is a system aimed at helping any management make better decisions on the allocation of its resources to the best qualified among alternative ways of reaching objectives. It is more a top-management tool than a detailed control technique. Its essence is development and presentation of relevant information as to the implications of major alternative courses of action. Call this an application of systems analysis, if you wish. At the very least we should agree that this explicit definition of alternatives would seem to be a vast improvement over most present state level budget procedures.

Not only is the typical (line item) budget request lacking in alternative choices, but also there is not even available from it that kind of information that would allow judgment of the effect on a program of either a decrease or an increase in financing. This often results in superimposition of judgment by certain review level budget staffs over the judgments of those at least presumably more knowledgeable about their programs. The result often is those very arbitrary actions that we all deplore, and that sometimes lead even further into the directing of deleted funds into other programs, again without judgment as to effects.

Super budget staffs—and even legislative committees—when considering a line item budget often use previous expenditures as the base figure and concentrate their reviews solely on proposed increases. Program budgeting is a definite step toward a better solution, because it focuses on the entire budget of the agency and forces consideration of all existing operations.

## RELATIONSHIP OF PRESENT METHODS TO PBS

Is planning-programming-budgeting revolutionary? No, probably more evolutionary. The planning part of this relationship would seem to be synonymous with systems anal-



ysis, and this certainly is not new. We know that program decisions resulting from application of systems analysis techniques more often than not result in better resource utilization. And here we must keep in mind that most highway department programs are not new, but rather are ongoing basic functional relationships that will require conversion to this new technique. The glamour of choice selection that goes with wholly new undertakings, such as a new federal program, is normally absent.

Systems analysis (defined as the identification and evaluation of the implications of alternative programs) serves to sharpen the judgment and intuition normally applied in the decision-making process, thus permitting less reliance on purely subjective methods. Pragmatically, PBS is not likely to replace those time-tested intuitive judgments that describe the political decision-making process. But I suggest that a budget that is presented with program values created by the systems approach will cause that political process to at least differently accomplish some of the dialogues between affected parties (definitely possible), perhaps result in some different actions (harder to prove), and render some better judgments (still more difficult to prove—a value judgment).

But what is the relationship between our present methods and the program budget? Despite a decade or so of discussing program budgeting, a large majority of state governments and highway departments have not been motivated to depart very far from their traditional line item or object budgets. While legislators have shown some receptivity to the PBS concept, it seems unlikely that they will move very rapidly to approve complete elimination of the line item budget in the immediate future. This means the old budget structure must co-exist with PBS, providing a dual look at an agency's needs.

This is probably a good procedure, for there is nothing incompatible between line item budgeting and program budgeting. A line item budget can be developed from a program budget and if the system is correctly designed the additional effort need not be excessive. A cautionary note, however: Budget planning must be in terms of objectives. Care must be exercised to ensure that managers do not revert to traditional methods—making projections on the basis of object class categories—and then structuring their programs to fit these predetermined "needs".

At this point one should ask himself if he really believes that those factors which in the past have not encouraged changes in public budgeting can be ignored by management now in considering program budgeting. Probably not, but one should also remember that familiar caution: "If we are now doing anything the way we always used to do it, we are probably employing an obsolete method."

Another frequently encountered state level condition is that work planning and programming frequently take place independently of the budget process. A common approach is to wait upon budget approval before deciding what will be done. In many organizations the concept that work planning and budgeting are related still may be foreign to their experience if not alien to their thinking.

A further limitation is that much of our forward planning today is relatively short-range. Professional administrators have long recognized the need for longer-range planning. But despite agreement on desirability it is slow in coming. Will PBS change this? Not very rapidly, I believe, although it is a step in the right direction.

#### RELATIONSHIP BETWEEN ORGANIZATION AND PROGRAM BUDGETING

Program budgets generally should be structured so program categories and sub-categories make sense from an operational viewpoint. It follows, for obvious reasons, that any program budgeting system could operate more efficiently to the extent that organizational structures relate to program structures.

At state levels and perhaps especially in highway departments there will always be those long-standing interrelationships that will continue to influence retention of some rather peculiar alignments between programs and organization. And when we decide to proceed with program budgeting some of those now-suppressed or ignored relationships will continue to pop up and have to be recognized.

But the main concern is that, if no thought is given to relating organization to program structures, a variety of dispersed operating units can be assigned implementation of a program (or subprograms that constitute a total program) and then coordination of these several units becomes the responsibility of a chief executive. This event, if it happens, has:

1. The potential for a highly centralized decision-making process during program execution. This is undesirable.
2. The requirement for sophisticated program management control systems that may be beyond the capabilities of the agency.
3. The probability of an excessive invasion of the time of the chief executive at the expense of his other managerial responsibilities. This would be unfortunate.
4. The capability of delaying the implementation process. This also would be undesirable.

These elements undoubtedly have been factors in our slow state level progress, both from the conceptual and the actual implementational viewpoints. But I must emphasize that this organizational relating is a secondary consideration that can come later.

The program budgeting effort in the Minnesota Department of Highways was preceded by (and linked to) an organizational study with PBS in mind. The goal was structuring of the department in such a way that it could then promote effective development and execution of its programs.

Does program budgeting imply or require centralization? Pre-PBS is really centralization at its worst. With little or inferior program-impact information, a review level budget staff is often compelled to involve itself in detailed decisions where it is inherently less capable of comprehending and deciding than the requestor.

Does this suggest perhaps that even legislative financial committees should add to their staff adequate supporting expertise to be able to look at program budgets from a "systems analysis" viewpoint? Would such a step embarrass or prod into greater effectiveness those review budget staffs who now peremptorily exercise such a highly centralized budgetary control? Some interesting possibilities could develop from this concept, for it is well known that at state levels there is little true "bargaining" on a budget request. The department is in the "asking" role, but a higher agency does the "deciding".

How do present information and control systems relate to program budgeting? Implicit in PBS is the idea that activities can be programmed, their results quantified, and progress toward goals measured. To do this an agency needs the capacity to collect, analyze, and report program information to its management. Traditional management reporting generally is late, incomplete, excessively voluminous, or totally nonexistent.

Thus, while we can accept the idea that program budgeting assumes the capacity to monitor and report on programs, in fact, the state of the art at state levels is not very far advanced. Development of an analytic capability is basic to support of the "planning" in PPBS, but this capability must be augmented by an information system that will provide both budget examiners and managers with information essential to decision-making. The development of the management information system thus becomes an integral element in the implementation of PBS and may prove to be its single greatest benefit. It follows then that any state or highway department undertaking program budgeting should be prepared to make a substantial investment in improving or at least revamping its reporting systems. This management information system need—plus the ability to automate it—will fully test management's attitude and likely be a difficult hurdle to jump. It could at least become a frustrating delay factor.

Do not overlook the necessity for individual departments and agencies at state levels to design their systems to be fully compatible with (and potentially a future part of) a particular state government's overall system. This is an essential factor and another potential limiting or delaying roadblock. Minnesota's State Planning Agency is setting guidelines for two- and six-year targets as well as a longer range 25- to 30-year set of goals. All state departments and agencies are (a) to inventory, and plan to contribute, information data into a State Information System (in category, sub-category for-

mat); (b) to prepare two- and six-year planning programs, based on goals; (c) to adopt a uniform state accounting system (this is being formulated now); (d) to move ahead on PBS as it can be kept compatible with overall state guidelines; and (e) to advance EDP efforts in these areas only as they can be kept compatible with statewide goals and objectives.

## A PRE-PBS CHECKLIST

### Objectives and Goals

All programs and sublevels of programs must fit into unit organizational goals at least to the extent that managers can measure whether program results are consistent with those intended. Despite opinions as to the merits of top-down vs down-up goal setting avenues, we find the forces involved tend to keep this process moving in a revolving pattern, with continuous refinement. And while specific identifications of goals usually are expected it is prudent to remember that at the higher governmental or agency levels more value sometimes results from not always being explicit in all objective descriptions.

### Personnel

A major limiter to installing a program budgeting system can be the availability of experienced analytical people to accomplish the planning role in PPBS. These systems analysts are as important as EDP programmers. In today's market these two employment areas may be among the most vexing problems.

### Data Processing

I have stressed the magnitude of the information and reporting requirements necessary to support a program budgeting effort. This suggests the next caution: Do not ignore the data processing capability of your agency. This point cannot be overemphasized.

Overall, state level agencies have not been leaders in embracing EDP nor have they established a particularly enviable record in the use of this technique. One can safely state that not many states or highway departments today are completely satisfied with their data processing capabilities nor could many of them readily undertake the development of a comprehensive automated reporting system that would be operative in a reasonable time span. Even with adequate hardware and resources, there is always that shortage of experienced and qualified personnel, plus salary structures usually not competitive with commercial enterprise.

### Internal Communications

You will discover a need for some two-way cooperation, or at least some improvements, where you thought you had all elements already smoothly functioning. Some examples are the following:

1. Accountants must learn to speak or at least understand the language of the systems analyst if they are to input the best data into a program budgeting system;
2. Systems analysts must understand data processing systems and programming needs; and
3. EDP systems specialists must broaden their spectrums to see and understand the generalist analyst viewpoints.

### Accounting Systems

Traditional governmental accounting procedures have been designed to check on the honesty or limit the discretionary power of agency administrators. It is unlikely that data obtained as a convenient by-product of such accounting systems will be adequate for the decision-oriented information requirements of program budgeting. Therefore, if your accounting and record keeping system needs modernizing—and it quite likely will



to accommodate program budgeting—then plan to do this first or at least concurrently with early stages of any PBS project. Again, any revision should be compatible with or made part of a statewide uniform accounting system.

### Splinter Efforts

The whole subject of program budgeting is so broad and has had so much attention from so many sources that you may find one or more of your agency functional units starting off on its own on what I call a "splinter effort". This is both good and bad. These positive thrusts should never be totally blunted because they in themselves represent a certain advance in the "art". But at the same time, what will be their effect on your total approach?

You might find that such a "splinter effort" could (a) diffuse your already overtaxed EDP resources; (b) attempt a level of detail that could confuse or even discourage the total effort; (c) lose sight of top management's goal-oriented needs, or (d) be out of step with state level comprehensive planning.

Remember, there are dangers as well as opportunities in moving ahead too rapidly in applying any new management techniques—including the risk of discrediting them.

### Management Environment

There is a very direct relationship between the management environment of an agency and the degree of implementation success possible. And introduction of new managing techniques such as program budgeting without a careful assessment of that environment could be unwise. Make certain that this examination is comprehensive at your top levels as well as at your financial control centers. And do not move into something as boat-rocking as PBS can be with key areas of management not only helping to rock your boat but also tampering with your seacocks.

### Consultants

Assume you wish assistance both in expertise and to expedite implementation. You want to get a program budgeting system installed and functioning. Here is where the consultant can fill a role and assist. He brings objectivity, experience, analytical skills, and the ability to devote full-time attention to your project. He has access to the best in brainpower, and a unique broadness of exposure to the many facets of a problem. And, in the case of program budgeting, he can probably be credited with some of the pioneering efforts—certainly with maintenance of the momentum.

We know from experience and personal observations that even the most qualified firms appear to have personnel problems and you may find yourselves devoting considerable time to indoctrinating apprentices as part of the package. Consultants, too, have to study your organization and break down functional categories to the degree necessary. In our case this was highly overdone and resulted in a much greater effort and in more units of data than necessary. The consultant identified 4100 units of effort vs some 1400 that were finally selected. In fact, this phase expended contract resources that possibly shorted more significant professional contributions in the latter stages of the study. If the consultant is not highly skilled in the data processing area you might get a theoretically possible design that you could not begin to afford to implement. Or it might be totally impossible to program his effort within a reasonable time framework.

### Progress in AASHO

AASHO is a prime example of an important management-level environment. PBS was recognized and assigned as a subject to the subcommittee on Uniform Accounting, which is 98 percent composed of financial managers. One could ask: Why was not this management-oriented subject placed, at least for first conceptual digestion, in a subcommittee such as Administrative Practices or Finance where more principal decision-making officials attend and confer? Revisors of the Uniform Acceptance Manual chapters proposed (quoting from a communication): "... at this time it is necessary only to

report that such a system is in existence and its primary use has been by the federal government." Or, quoting from a proposed manual paragraph addition: "Although PPBS has been installed as a term in the budgeting vocabulary, only time will tell, as the system is modified, whether it can or should take its place as a complete operating budgeting system."

At the 54th Annual Meeting in Minneapolis, a report on Project 19-1, "Budgeting for State Highway Departments," by Mr. Hinck of the firm of Ernst and Ernst, although scheduled for both the Uniform Accounting and Finance subcommittees, was given at the Finance committee session and drew a capacity audience. It revealed that the state of the art is just as most of us had anticipated, but it also quite confidently predicted that the principles of budgeting can be common to all highway departments with each department still choosing its own methods and procedures to be followed. The AASHO task force on program budgeting will be watching closely the progress of the Highway Research Board committee and the NCHRP research project 19-2.

### SOME SATELLITE BENEFITS

Program budgeting will force people to re-think their roles, and their agency's role. It can expose hidden relationships and subliminal power structures. It may cause the "ship of state" to ship a little water—but it will not swamp the boat. This can be good.

It will open some managers' eyes for the first time to the tremendous value in controlling functions with this new budget concept. For the first time the manager will be capable of evaluating one of his programs vs another. And it could be his first realization of the costs of some of his functions.

In Minnesota this is happening, and it is significantly rewarding to note the receptivity and a desire to advance the momentum into more and more areas. In our Department program budgeting efforts so far have resulted in a marked advance in dialogue between peoples; a recognition that work planning and budgeting are homogeneous; the probability that some decisions have been better; and the likelihood that, having gone this far, it will not, by itself, just fade away.

Will PBS work? I think so. But the proper attitude of all of the players in the game is essential. If there is not a wholehearted resolve, the benefits will be marginal. Resistance can be expected from all of those comfortable ones who most resist change, and all whom they can rally to their side.

At this stage I am pointing a finger more at complacency among our financial accounting and processing people than at top management, although this does not excuse top managers who create or condone this situation. And one has but to examine the Project 19-1 draft report on the state of the art among highway departments or a progress report on the 5-5-5 projects to recognize that state level responses are generally slow in development.

My advice to state level managers is to be alert—not passive—to the possibility that some day someone may want to inject this program budgeting approach into your agency. If this happens it might be wiser to join in the effort than to dream that it will by itself fade away. Remember, it will be quite difficult to resist the logic behind systematically planned approaches to delineating programs based on the goals and objectives of your own organization.

I believe in PBS—yes, in PPBS. I predict that it will eventually infiltrate most of our states and highway organizations to some degree. I also believe that it will have greater impacts at state levels than its skeptics now are ready to admit.