

Chapter VI

Calculation of Total Cost: A Case Study

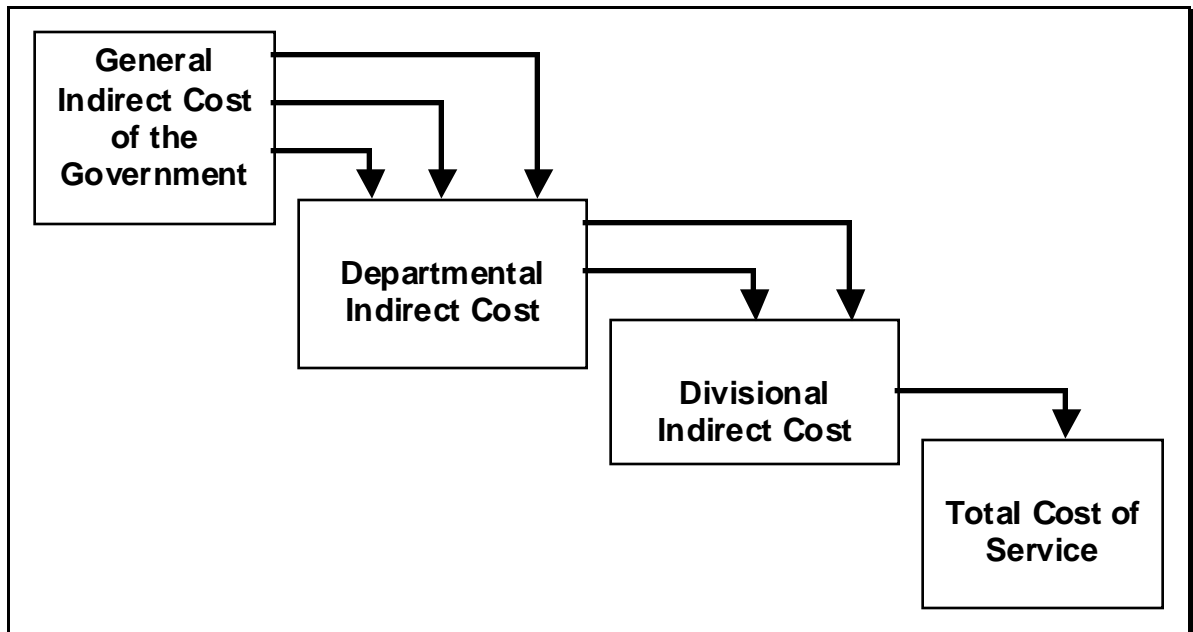
A widely used application of cost analysis — using the allocation of indirect costs to determine total cost — is presented and the relationship of cost analysis to federal indirect cost allocation procedures is discussed.

Much of the previous discussion has focused on direct costs because they are the costs most frequently discussed in a local government environment. Budgets are prepared by identifying the direct costs necessary to deliver the service; most accounting systems report on departmental direct costs, and most departmental personnel are held accountable only for their direct costs. Indirect costs tend to be treated as someone else's problem.

By their very definition, indirect costs are not directly associated with the delivery of a specific service. They are general rather than specific, and it can be hard to determine an appropriate way to apportion a pool of indirect costs among several very different services.

Exhibit 10¹ presents a schematic of the cost flow pattern used in the technique. Put at its simplest, the approach is “top down,” with each successive layer of indirect costs (organizational, departmental, divisional, etc.) allocated to the layer below until a service level is reached.

Exhibit 10 “Cost Flow Pattern”



¹ Based on “The Cost-Burden Study: A Method for Recovering Costs from Nonresidents” by Robert D. McRae, published in the March 1982 issue of *Governmental Finance*.

This is a rough cut at an allocation process for a hypothetical government. It is specifically aimed at those new to cost allocation and, as such, it is designed to exemplify the concepts involved as much by what it does wrong as by what it does right. For this reason, it is followed by a critique that points out the salient weaknesses. Readers will find a more technically correct — and more intricate — case study in a later chapter.

Background

A city with a population of about 100,000 has been experiencing increasing financial problems. Voters have shown themselves to be very resistant to tax increases, while spiraling prices for goods as well as commitments for salary increases have increased the demand for scarce resources.

To alleviate the situation a study of police services was conducted with the intent of identifying services that directly benefited small and distinguishable groups of people and then, if appropriate, instituting service charges that would recapture as much of the total cost of providing the service as was reasonable.

The study indicated that the crimes against property section of the investigations unit provided insurance companies with reports of certain property crimes on a request basis. The only fee being collected was a nominal charge for photocopying. While the total cost of providing the service was not known, it appeared that the cost of the service greatly exceeded the revenue received. Thus, it was decided to calculate the total cost of providing the service to determine the degree of subsidy the service recipients were receiving.

The first document examined was a summary of the city budget (Exhibit 11). The budget presented here is relatively clean; clearly titled items reflect accurate estimates of expenditures for the purpose listed. This is not always the case, however. In some systems, major capital purchases are included in the manager’s budget for control purposes. Using such a number without removing the capital component would lead to incorrect results. In general, it is important to discuss a budget with the people who prepared it, for only they know the facts behind the figures.

At first glance, the use of the term general government in the budget would suggest that indirect costs of the organization have already been grouped together and totaled (\$14,630,872). Examination of the details, however, suggests otherwise.

Exhibit 11 “The City Budget”

Summary

General Government	14 630 872
Public Safety	15 253 815
Community Maintenance & Development	22 650 340
Human Resource Development	26 548 215
Education	<u>25 609 783</u>
	104 693 025

General Government

City Council	175 545
Mayor	160 090
City Clerk	121 400
Elections	202 280
City Manager	228 675

Public Safety

Fire	6 050 665
Police	6 272 935
Building Inspection	281 235
Civil Defense	37 845
Licenses	41 125

Law	342 835	Weights & Measures	54 105
Finance	1 253 280	Traffic & Parking	1 025 610
Employee benefits	9 900 872	Electrical	1 402 380
County Tax	1 671 995	Criminal Justice	<u>87 915</u>
Public Celebrations	124 830		15 253 815
General Services	309 070		
Reserve	<u>140 000</u>		
	14 630 872		

**Community
Maintenance & Development**

Public Works	8 452 080
Community Development	1 678 330
Public Transit	4 180 875
Conservation Commission	8 635
Historical Commission	48 270
Rent Control	276 170
Debt Service	5 258 085
Water	<u>2 747 895</u>
	22 650 340

Education

Public Schools	25 609 783
----------------	------------

**Health
Human Services**

Health & Hospital	17 548 045
Senior Citizens	3 990
Library	1 144 955
Recreation	1 143 735
Youth Services	186 985
Community Schools	574 060
Veterans benefits	522 125
Civic Unity	32 870
Elderly Services	148 450
Manpower Program	530 000
Employment Program	<u>4 403 000</u>
	26 548 215

While most of the functions listed are self explanatory, some are not. For instance,

- What is the purpose of the county tax?
- Should public celebrations be included in the calculation of the indirect cost to be allocated to the police department?
- Is any major part of the general services budget devoted to police work?
- What is the function of the reserve account?
- What are the details of the employee benefits account?

Discussion with budget officials about these questions yielded the following information:

- The county tax was a direct pass-through to the county, whose principal functions were maintenance of certain roads and courts of justice.
- Public celebrations was included here because “we’ve always done it that way.”
- The general services budget was primarily dedicated to the municipal print shop, which did some printing for the police department as well as for most other city functions.
- The reserve account consisted of funds that were used for unanticipated needs that developed after the budget had been passed. It was not intended that any of this money would be transferred to the police department.
- The \$9.9 million for employee benefits was roughly divided into 2/3 pension costs and 1/3 health/life insurance. (Thus, for this city, benefits are an indirect cost.) In addition, as budget officials pointed out, pension costs are for retired employees

only. Further, the system is unfunded; so the sum shown is unrelated to the actual liability that the city will accrue in the budget year.

Adjustments

Expenditures for direct services must not be included if the estimate of indirect costs is to be accurate. In the case we are examining, county tax (\$1,671,995), public celebrations (\$124,850), and the reserve account (\$140,000) are not appropriate for inclusion in organizational overhead, since in the first two cases the public is a general beneficiary of the service in question (one could imagine each of them, perhaps retitled, as departments in another part of the budget) and in the third case, specific departments — but not police — will ultimately expend the funds.

General services is appropriate for inclusion in the organizational overhead because the government in general, and the police in particular, benefit from printing services.

Dealing with pension and insurance costs is much more of a problem. In an unfunded system, current pension payments are designed to be adequate to pay only those who are actually retired. Thus, there is no association between the pension payment made this year and the pension liability that is accrued this year. Under these circumstances, one of three choices is possible:

- either take the number as is, knowing that it is probably low;
- use a published study which provides estimates of what the proper contribution might be; or
- initiate actuarial valuations which will estimate costs for active and retired employees.

At the time of this costing analysis, no study was available and there was inadequate time to complete an actuarial valuation, so the pension number was accepted as is and the presumed inaccuracy was noted in the narrative that accompanied the costing report.

Calculation of General Indirect Cost	
Total General Government	\$ 14 630 872
<i>Less:</i>	
County Tax	1 671 995
Public Celebrations	124 830
Reserve	<u>140 000</u>
General Indirect Cost	\$ 12 694 047

Estimates and Cost Analysis

Rarely will a cost analysis that deals with a service of any complexity be able to determine precisely and definitively each number used. Rather, the opposite is true; most of the important numbers will be estimated. Does this mean that the conclusion of the analysis is wrong, and that the analysis should be rejected?

Everyone understands that information is not always available in a convenient form and that estimates must be made. Estimates must be labeled as such, however, and a reasonable ground for making the estimate must be provided. Scholarly reports, statewide averages,

the experiences of similarly situated local governments, and the opinions of knowledgeable public officials can be the basis for reasonable estimates, provided that the source chosen is the best reasonably available and that the use of an estimate is disclosed (and justified) in whatever report summarizes the results of the analysis.

Reasonableness, necessity, and disclosure are the watchwords of estimation. One must always choose the best, reasonably available source. If there happens to be more than one source for the same information (a rare occurrence), use both. The results should be very much the same, and that fact will lend credibility to your report.

Whenever an estimate is used, be sure to indicate whether it is assumed to be on the high side or on the low side. In general, one needs to be conservative with estimation (that is, cost estimates below actual likely costs are superior for fee-setting purposes because it is apparent that users will not be overcharged), but one should never be afraid to be precise if the figures support it.

A final comment on estimation and accuracy — in general, forget the pennies, the dollars, even the tens of dollars. If a number is actually an estimate it should not pretend to an accuracy that it does not possess.

Allocate Organizational Overhead

Based on the information supplied by the budget officials, organizational overhead for the city works out to be \$12,694,047 (\$14,630,872 less \$1,671,995, \$124,830, and \$140,000). Now this sum must be allocated in some appropriate way to the various city functions.

The general answer to the allocation problem is that benefit should determine the amount of overhead that is allocated to a particular function; the greater the benefit, the greater the amount of overhead that should be allocated.

While the philosophy is clear, its application can be difficult; it is not easy to quantify benefit. There are two basic approaches that are widely used. The first method involves examination of the various pieces of overhead and the allocation of each using a measure of the particular benefit that it confers. Payroll expenses, for example, are frequently allocated based on number of employees, since the number of checks issued is often regarded as a reasonable measure of the benefit a payroll system provides. Similarly, janitorial services are often allocated on the square footage of office space.

The second technique for the allocation of overhead is the quick and dirty method of allocation based on the relationship of the department's budget to the total budget. Since the police budget in our example is \$6,272,935 and the total budget is \$104,693,025, the portion of general organizational overhead allocated to the police department is

$$\frac{\$6,272,935}{(\$104,693,025 - \$12,694,047)} \times 100 = 6.82\%$$

The allocated amount is \$ 865,541.48 (6.82 percent times \$12,694,047). Note that in the determination of the allocation percentage, the denominator is the total budget less the overhead amount. This is necessary to get a correct allocation percentage.

The allocation of overhead based on budget size has the advantage of simplicity; however, to maintain reasonable accuracy, it must be assured that

- overhead activities that principally benefit one or a few departments must be hand allocated to those departments and removed from general overhead, and
- 2) the budget numbers for each department must not contain large and atypical expenditures. The latter might occur if a community did not have a separate capital budget and occasionally included capital items in departmental operating budgets.

In situations where a community maintains a sophisticated multifund accounting structure with expenditures recorded in a number of funds, the above allocation technique can be used provided that the effect of interfund transfers is removed.

The Police Budget-Summary	
Leadership	\$ 255 950
Uniform Division	3 566 000
Crime Prevention	297 475
Investigation	452 085
Services	<u>1 701 425</u>
Total	\$ 6 272 935

Estimating Department Overhead

The above table presents relevant portions of the police budget. An examination of the summary section suggests that overhead expenditures have been grouped in the leadership cost center. However, it is important to remember that in municipal budgets things rarely are as they appear to be. An investigation of the expenditures that constitute the leadership function (below) shows three activities that are of general benefit to the police department and one — detail — that is of specific benefit to those police who accept private duty details. Thus, overall police departmental overhead is \$232,945 (\$255,950 less \$23,005).

The Police Budget - Leadership	
Chief's Office	\$ 52 580
Planning and Inspection	86 755
Inspectional Services	93 610
Detail	23 005
Total	\$ 255 950

Or is it? In general, no cost analysis is complete until the entire budget has been examined. Exhibit 12 presents some additional information on the services budget.

Exhibit 12 The Police Budget - Services	
Administration	\$ 71 985
Training and Personnel	79 895
Communications	249 245
Prosecution	49 955
Property Management	80 215
Records	55 160
Identification	34 880

Animal Control	25 150
Vehicle Operation	221 040
Supporting Services	833 900
	\$ 1 701 425

ADMINISTRATION. This section coordinates the support and staff services provided by the various sections of this division to all the other divisions of the department. Included in the responsibilities of this section are the preparation of the payroll and the purchasing of the necessary materials, equipment, supplies and services for the operation of the department.

TRAINING AND PERSONNEL. Upgrading the skills of sworn police personnel through in-service training is the major responsibility of this section. When necessary, the police academy also conducts police recruit training programs.

COMMUNICATIONS. Police communications utilize a number of different systems including telephone teletype, emergency call boxes and radio. These various forms of communication enable the department to obtain information from other law enforcement agencies, maintain contact with the community and deploy its personnel throughout the city in response to emergencies and calls for service. See summary page for information on new radio system proposal.

PROSECUTION. Once charged with a crime, the police must bring the person before the district court for arraignment or hearing. Officers assigned to this section act as the department's representative to the court assisting the arresting officers in the preparation of their cases and assisting the district attorney in prosecuting the lesser offenses.

PROPERTY MANAGEMENT. In addition to procuring and maintaining property for its own operations, the department is also responsible for the temporary safekeeping of property which it acquires as either evidence or as lost and found property. This section tags and stores this property until such time as it can be returned to the owner.

RECORDS. In addition to the officers' written reports concerning incidents of crime, the department is also involved in processing several other types of records such as firearm permits, bicycle registrations, arrest records, and other administrative matters. It is the responsibility of this section to oversee the storage and retrieval of these records.

IDENTIFICATION. An important aspect of investigating a crime is the identification and analysis of physical evidence. This section is responsible for taking photographs, lifting fingerprints, and taking footwear or tire impressions as well as sending evidence to state and federal laboratories for further analysis.

VEHICLE OPERATION MAINTENANCE. Departmental costs for the operation and maintenance of police vehicles — gasoline, oil, repairs and tires are taken care of in this cost center.

SUPPORTING SERVICES. This cost center supports miscellaneous personnel costs — incentive pay, overtime, court time and uniform allowances.

Clearly, quite a bit of the services budget is of general benefit to various police functions and should be included in departmental overhead. Assuming that communications and vehicle operation should be assigned to some combination of the uniform division and crime prevention cost centers, and that prosecution, property management, records,

identification, and animal control are basically unrelated to the preparation of property damage reports, we are left with \$913,795 (training/personnel and supporting services) which should be included in departmental overhead. Discussion with police officials indicated that very little of the administration overhead (\$71,985) was devoted to training/personnel and supporting services, so no fraction of the expenditures for this cost center is included here.

Total Police Indirect Cost	
Government Indirect Cost	
(from percent of budget allocation)	\$ 865 541
Leadership (\$255,950 less \$23,005) =	232 945
Services (\$79,895 plus \$833,900) =	<u>913 795</u>
	\$ 2 012 281

Total Departmental Indirect Cost

The total overhead (organizational and departmental) that needs to be allocated to component units is \$2,012,281, which is the sum of \$ 865,541 (organizational overhead), \$232,945 (from leadership), and \$913,795 (from services).

Again the allocation procedure is based on the percentage of the investigations budget to the total police budget, 10.61 percent ($\$452,085 / (\$6,272,935 - \$2,012,281)$) where we have again reduced the total budget by the amount to be allocated. Applying this percent to our estimate of total overhead, we get \$202,344 (10.61 percent times \$1,907,110), which is the amount of overhead to be borne by investigations.

Division Overhead

The budget for Investigation (below) shows that this division has its own overhead, administration (\$55,495). Discussions with police officials revealed that an estimated 20 percent of General Assignment was support for other cost centers within the division and, thus, was a legitimate indirect cost of the division: \$36,160 (20 percent times \$180,805). Divisional overhead, then, comes to \$293,999 (\$202,344 plus \$55,495 plus \$36,160) and allocation to Crimes Against Property gives \$286,483 (97.44 percent times \$293,999) where 97.44 percent is the fraction of the investigation budget devoted to crimes against property ($\$154,045 / (\$452,085 - \$293,999)$). The seemingly “high” 97.44% reflects the large size of Crimes Against Property in terms of services delivered.

The Police Budget -	
Investigation	
Administration	\$ 55 495
Crimes Against Persons	61 740
Crimes Against Property	154 045
General Assignment	<u>180 805</u>
	\$ 452,085

The \$286,483 of layered overhead applicable to crimes against property brings the total cost for this activity to \$440,528 (\$286,483 plus \$154,045). It is interesting to note that this estimate is more than twice the direct cost figure carried in the budget.

Total Cost Pricing

Having determined that the total cost (direct and indirect) of the crimes against property cost center is \$440,528, the next question is: “What portion of this effort is devoted to providing the insurance reports?” Since this information was not contained in the budget, it was provided by police officials who indicated that 20 percent of the effort was devoted to supplying insurance reports, estimated to number between 400 and 500 a year.

Under these assumptions, the unit cost of one report is \$195.79 (20 percent times \$440,528/450) if an estimate of 450 reports is used. The most correct cost estimate clearly depends on the actual number of reports produced, a number impossible to know in advance. Under the assumption that 400 to 500 reports will be produced each year, the applicable total cost would range from a low of \$176.21 (500 reports) to \$220.26 (400 reports), assuming there is no relationship between the number of reports and the percent of crimes against property effort devoted to the reports.

Refinements and Second Thoughts

Other approaches to the allocation process are possible. For instance, it is possible to classify the departments in the budget into three categories: general government, central services, and line departments. The general government category would then include all those overhead departments for which there is no possible benefit-based allocation process — indirect administrative costs — such as city manager and city council. The central services category would include those overhead activities for which a benefit-based allocation is possible — indirect service costs — such as data processing or accounting. Line departments are the direct service departments.

Another alternative allocation scheme is to allocate first the total expenditures of the general government departments to all other departments (including the central service departments) and then to allocate the augmented expenditures of the central service departments to the line departments based on the benefit that each line department received. Such a two-step allocation procedure reduces the degree of arbitrariness inherent in all allocation schemes, but does not eliminate it entirely.

Accuracy

Are all the allocations made in the case study equally accurate? Probably not, but which aspects of the report would merit closer examination? A close reading of the Police Services Budget reveals that all \$833,900 of supporting services is personnel cost, that is, payroll. Two facts stand out:

- this is a large sum of money to be allocated, and
- the information for payroll is usually the best kept data in a government.

The first point relates to importance and the second to the ability to develop a more refined allocation based on actual experience. The answers to the following questions can be used to improve the allocation:

- Who actually gets incentive pay?
- Where is most of the overtime actually worked?
- Which functions require most or all of court time pay?
- Would uniform allowances be allocated better by using the number of sworn officers in a division than by allocating a percent of budget?

Completeness

How complete is this analysis? Is the thoroughness shown appropriate to the need? From our previous examination of fixed and variable costs, we know that facilities have operating and capital costs. Where are these discussed in the analysis?

The answer is that they are not formally discussed at all. Perhaps they are buried in all the overhead, perhaps not. Whatever the case, the analysis either is incomplete or looks incomplete, which is just as bad. If maintenance costs and rent (or depreciation) are included in some level of overhead, that fact should be mentioned. If they are not included, they should be. It would appear, therefore, that this report needs more work.

A further question should be answered — do all the insurance reports require approximately the same effort to produce? If there are wide disparities in length, for example, is it appropriate to charge the same amount for a short report as for a long one?

Costing a service is one thing, pricing it is something else. Factors other than cost must be considered in pricing a service. One factor that should never be ignored in a pricing situation is the effect of price on demand (or as they say in economics courses: elasticity). What impact will a fee of \$100 per report have on the demand for such reports? If demand changed significantly, what would be the impact on the fee charged? If demand dropped significantly, what would occupy the time of the individuals who previously produced the reports?

Another factor that should always be considered in pricing a service is whether there are any legal constraints on the government's right to establish charges and fees. Some states prohibit local governments from charging more than the direct cost of delivering a service, while others prohibit charges that exceed the cost of service delivery. Clearly, it is essential to establish the legal basis for a government's pricing decisions.

Strictly speaking, these questions and issues can only be addressed through knowledge of local conditions; however, it should be clear that a serious attempt to deal with them before the fee is established may avoid considerable embarrassment later on.

Indirect Cost Allocation Plans

We have seen that local governments provide a range of indirect support services to their programs and services that are not contained in the direct budgets for these programs and services. Jurisdictions also tend to provide the same types of indirect support to their federally funded programs (building space, equipment and vehicle use, financial and record keeping support, etc.), frequently without recovering the expense of these activities from the federal grants which finance the programs. When this happens, the local taxpayers are paying costs that are legitimately expenses of the grant program in question.

The federal government long has recognized that it is appropriate to charge certain indirect or overhead expenses to any program that benefits from support activities. It has promulgated principles and procedures to assist local government grant recipients in the proper recovery of allowable costs.

The principles for indirect cost recovery are published in Federal Management Circular (FMC) 74-4, "Cost Principles Applicable to Grants and Contracts With State and Local Governments" (sometimes referred to as Office of Management and Budget Circular A-87), with direct guidelines set forth in "OASC-10, Cost Principles and Procedures for Establishing Cost Allocation Plans and Indirect Cost Rates for Grants and Contracts with

the Federal Government,” issued by the U. S. Department of Health, Education and Welfare. FMC 74-4 provides principles and standards that “. . . are designed to provide that federally assisted programs bear their fair share of costs recognized under these principles, except where restricted or prohibited by law....”

While it is not the intent of this book to treat federal indirect cost allocation plans in detail, there are some points about these plans which can usefully be made here.² Before a jurisdiction can recover any expenses for grant related activities, the expenses must be identified, documented, and requested.

Said differently, an indirect cost allocation plan that identifies and documents allowable and allocatable costs must be prepared and submitted to one federal agency (known as the cognizant agency), which is generally the “federal department which has the greatest dollar involvement.” The plan usually is constructed to result in an indirect cost allocation rate. (While conceptually similar to the allocation rates developed in the preceding police costing example, the indirect cost allocation rate incorporates the three partial rates developed in the case study and is usually intended to be applied to direct salaries of grant programs rather than to its total expenditures.) Following approval of the plan and associated rate, the local government is allowed to bill its federal grants for direct costs plus an amount equal to the indirect cost allocation rate times the direct salaries (assuming direct salary is the base).

While the determination of a federal indirect cost allocation rate is an application of cost analysis, it is important to note that the resultant rate is not a direct substitute for a government’s own indirect cost rate, since under federal law certain costs that are perfectly legitimate local expenditures may not be included in the calculation of the federal rate. Generally, political expenditures such as the city council’s or the mayor’s expenses, and general government expenses such as the expenses of the tax collector’s office, are excluded. On the other hand, the expenses of most central services functions may be included in the calculation of the rate — even if they are incidentally budgeted in the mayor’s office; for example, the central telephone exchange would still be an eligible expense if, for reasons of tradition or physical proximity, it were budgeted in the mayor’s office.

Other Uses of Indirect Cost Rates

The determination of an indirect cost allocation rate that includes all overhead costs can be a valuable tool to local government managers by aiding in the allocation of indirect expenses to all (accounting) funds, not just general fund programs. Many governments maintain a significant number of accounting funds in order to isolate certain functional activities including sewer, redevelopment agency, water, sanitary treatment, housing agency, retirement, transit, and airport funds. A full indirect cost rate can be an effective tool in making each fund pay its fair share of governmental overhead. In addition, utilization of this indirect cost rate helps make the legislative body, the chief executive, line personnel, and the public more aware of the need to control overhead costs by encouraging a focus on total cost.

Controlling overhead is one of the most difficult aspects of managing local government budgets. By distributing the overhead costs to all of the benefiting functions and programs and presenting it as a part of the total service delivery costs, a constituency is created which will combine a demand for the services financed by overhead with a desire for the most

² For more detailed information, consult James E. Kirk, *Recovery of Local Overhead Incurred in Federal Grants* (New York: John Wiley & Sons. 1980) and the circulars cited in the text.

cost-effective delivery of those services. In such an environment, overhead activities are likely to be lean and efficient.