

# EFFICIENCY IN PUBLIC WORKS ENGINEERING—ALTERNATIVE ARRANGEMENTS FOR THE DELIVERY OF MUNICIPAL SERVICES

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## INTRODUCTION

The traditional engineering understanding of efficiency is the optimization of output given a fixed input. The systems approach of engineering identifies three major components in any process of converting scarce resources into desirable goods and services: the input of the factors of production (manpower, capital, technology, information), the transfer function (procedures and organization of production), and the output. Traditionally, engineering has concentrated on that aspect of efficiency pertaining to the optimal allocation of the factors of production. In public management, efforts in this direction have included work measurement, resource allocation modeling, improved scheduling, routing and location techniques, inventory and materials control, and capital budgeting.

Efficiency also depends on the nature of the transfer function. Two important considerations here are the incentive structures for employees and organizational design both within and outside the production unit. Attempts to improve efficiency through personnel management reform include monetary incentives, personnel performance appraisal, use of management-by-objectives, profit sharing, job enrichment, and in-service training. With respect to organizational change, various institutional arrangements are being experimented with in local government which introduce competitive elements into public service delivery and/or incorporate higher levels of cooperation between

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governmental units; e.g., consolidation, decentralization, contracting out, issuing of vouchers.

It is this last approach to improving efficiency that will be the theme of this paper. The purpose of the paper is to briefly survey some trends in an area of efficiency improvement with which engineers have some influence, but in which they have had little formal training; viz., organizational design and intergovernmental relations.

## THE SIZE AND ECONOMIC ORGANIZATION OF MUNICIPAL SERVICES DELIVERY

In many cases the delivery area of a municipal service is restricted to the boundaries of a particular jurisdiction. The political boundaries that often constrain the delivery service area may not be consistent with the optimal delivery service area size. Economies of scale may be such that larger delivery units would be desirable. Furthermore, in the past, the favored economic organization for the production of municipal services has been the local governmental department. That is, it has been customary for the local government authority to be the sole or monopolistic producer of property-related municipal services.

In recent years a trend towards special districting, especially in relation to utilities, has become evident. Even more recently trends towards the use of other institutional arrangements can now be observed in some parts of the country. There appears to be a wider effort on the part of local elected officials, administrators, and municipal engineers to draw in the profit-making and not-for-profit community organizations as partners in the provision of municipal services. Noticeably, there is a breaking down of the definite demarcation between private and public sectors at the local level.

## THE FUNCTIONS OF A PUBLIC WORKS DEPARTMENT

The purpose of a public works department is to provide the community with certain property-related goods and services which for any of a variety of reasons are not efficiently provided through the free market. A common reason for the public works department having responsibility is that by nature the good or service closely approximates a pure public good; i.e., individuals cannot be excluded from the use or benefits of the good, e.g., streetlighting. Another common reason is that production or consumption of a good produces significant negative spillovers on the community, i.e., unaccounted for costs or harm such as garbage storage.

It is important to highlight that even if a public works department has a responsibility to provide a good or service, it does not necessarily have to produce it. In providing a service, the public works department may perform any one or more of the following functions:

- planning
- financing
- production

Planning involves estimating of supply and demand functions for the good including the forecasting of costs. Financing includes pricing and revenue policies, budgeting, and expenditure analysis. Production refers to the actual conversion of input resources to desirable outcomes. Logically, it is not necessary for the governmental unit to execute all three functions for each good or service. For example, contracting requires planning and financing, but production is achieved in the private sector. Regulation calls for planning only by the governmental unit.

#### THE ADVANTAGES AND DISADVANTAGES OF FULL SERVICE DELIVERY THROUGH CITY DEPARTMENTS

There are a variety of advantages and disadvantages associated with a city department being both provider and producer of the goods and services for which it is responsible. The advantages stem from the advantages of bureaucratic structure where the organization is highly mission-oriented. Despite the frequent criticisms of governmental bureaucracy, without it much of modern governmental administration would be impossible. Briefly, some advantages are:

- an effective system of coordination over the delivery of the good
- a high level of control
- experts are able to direct and decide
- permanency of operations
- stability even with mobility of personnel
- impartial and apolitical
- minimizes nepotism, favoritism, bribery, and corruption

On the other hand some major disadvantages are:

- sloth and inertia, resistance to change
- expert's insensitivity to citizen needs
- timidity
- depersonalized service
- dearth of incentives to improve efficiency
- limitations of the bureaucracy as a mechanism for signaling consumer demands and citizen needs

The central issue is not whether a centralized bureaucracy is good or bad, but to what extent does it provide an institutional environment for efficient service delivery? A systems analytic approach to such a question calls for an identification of what other alternatives exist.

## ALTERNATIVE INSTITUTIONAL ARRANGEMENTS

Apart from operating its own production unit within a governmental department, local government has open to it the following options:

- contracts with a private firm
- establish a franchise
- establish standards of service, certify private vendors, then leave it up to consumer choice
- issue vouchers to families, permitting them to purchase from any authorized supplier
- contract with another governmental unit
- consolidate service with adjoining governmental units
- establish special districts for areawide delivery
- purchase specialized technical and support services from other jurisdictions or private firms

It appears that the choice of an appropriate institutional arrangement depends on the specific characteristics of each good or service, the quantity and level of service, and the equity issues involved. It appears there is a trend towards matching specific goods and services with specific institutional arrangements for their provision and production.

## TRENDS IN THE USE OF ALTERNATIVES TO CITY DEPARTMENTS

Information on trends in institutional arrangements for delivering municipal services is limited. "A 1973 survey for the International City Management Association (ICMA) found that 61 percent of responding municipalities have formal or informal agreements for the provision of services to their citizens by other governmental units or private firms."<sup>1</sup> This study and a later one conducted in California by the Institute of Government and Public Affairs, UCLA, in 1975 suggests that more extensive use is made of alternatives to city departments in

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<sup>1</sup> E. S. Savas (ed.), *Alternatives for Delivering Public Services*, Westview Press, Boulder, Co., 1977, p. 116.

the West than in the East and South. The implications for public works engineers in Indiana are that experiences in the West may be worth evaluation. The California study interviewed 26 city managers regarding their currently preferred arrangements and expected shifts. The findings presented in Table 1 show that where city departments are the currently preferred arrangement, shifts in the future are generally expected. Also expected is a general shift toward more private sector involvement in property-related engineering services, e.g., tree trimming, street cleaning, refuse collection.

TABLE 1. TRENDS IN THE USE OF ALTERNATIVES TO CITY DEPARTMENTS

<i>Service</i>	<i>Current Preferred Choice</i>	<i>Expected Shift to</i>
General Law Enforcement	City Department	Joint Powers with other Jurisdictions
Fire Protection	County Contract	Joint Powers with other Jurisdictions
Tree Trimming	City Department	Private Contract
Street Cleaning and Patching	City Department	Private Contract
Traffic Signal Maintenance	Private Contract	Private Contract
Residential Refuse Collection	Private Franchise	Private Contract Private Franchise
Public Transportation	Special District	Special District
Water Pollution Abatement	Regional Government	Regional Government
Planning, Zoning, Subdivision	City Department	Regional Government
Business Refuse Collection	Private Franchise	na
Solid Waste Disposal	County Contract	na
Libraries	County Contract	na
Animal Control and Shelter	County Contract	na
Ambulance Services	Private Contract	na

Source: E. S. Savas (ed.), *Alternatives for Delivering Public Services: Toward Improved Performance*, Westview Press, Boulder, Co., 1977, p. 123.

## REASONS FOR THE USE OF ALTERNATIVES TO CITY DEPARTMENTS

The reasons for this trend can be categorized as theoretical and practical:

*Theoretical Reasons*

In recent years there has been a more systematic examination of public economy by economists and political scientists. Economists have attempted to use the classical microeconomic framework, used so successfully to model the free market, to conceptualize efficiency considerations in the public sector. A significant branch of economic study now concentrates on the theory of public goods, toll goods, and common pool resources, on the nature of externalities, and on public pricing. By clearly defining the nature of each specific good or service and disaggregating the production process of each good, opportunities for competitive bidding and direct pricing become more evident.

*Practical Reasons*

Practical reasons stem from a variety of fiscal, personnel, entrepreneurial, and urbanization consideration:

- avoiding the growth of city employment in which it may be difficult to cut back at some later date
- encourage the growth of the local private sector
- high capital start-up costs
- severe hiring restrictions for public employment
- internal labor problems such as unionization and collective bargaining
- supplemental forces needed to cope with an emergency or high demand, e.g., supplemental snow removal
- need for increased quality control; department becomes independent quality control agent
- lower cost of production by private firm or consolidation with other governmental units
- multinucleation of urban settlements in counties surrounding cities
- federal grant programs with uncertain futures increase the appropriateness of contractin gout services to private and not-for-profit organization

## PROBLEMS IN THE SELECTION AND IMPLEMENTATION OF ALTERNATIVES TO CITY DEPARTMENTS

The following can be identified as the major constraints in implementing institutional change in the delivery of urban services:

- threat of reorganization to city employees; this remains probably the major constraint, especially where the local government authority is unionized

- lack of information about alternative arrangements and their successes and failures
- the degree to which performance measures can be specified; programs with clearly defined outcomes are the simplest to contract out
- the department of public works needs personnel and procedures appropriate to monitoring performance and contract administration
- procurement process and bidding procedure; problems relate to single suppliers in small communities, favoritism, graft, and corruption
- citizen response may be negative or mixed
- the desirability of devising an incentive system for private providers

## CONCLUSION

An important function of local government is to create appropriate institutional arrangements for the delivery of municipal services. Increasingly, due to the pressure of the local fiscal crisis, new approaches are being explored for the efficient utilization of scarce local public revenues. Conventional wisdom has been that the governmental department of public works is best able to provide property-related services through its own planning, financing, and production operations. Logically, it is not necessary that governmental provision necessitates governmental production. There is an observable trend towards the use of alternative institutional arrangements including consolidation, special districting, contracting, franchising, issuing of vouchers, and regulating the private market. In one direction these shifts indicate a trend towards increased cooperation between governmental units. In another direction, they indicate a trend to include more competitive elements and to draw more directly on the marketing, production, and managerial expertise of the private sector.

Most interestingly the trends discussed in this paper highlight that public service industries are a complex interdependence of governmental, private enterprise and not-for-profit community organizations. The demarcation between private and public sector engineering is becoming increasingly fuzzy.