

California's Infrastructure Policy for the 21st Century: Issues and Opportunities

• • •

David E. Dowall

2000

PUBLIC POLICY INSTITUTE OF CALIFORNIA

Library of Congress Cataloging-in-Publication Data

Dowall, David E.

California's infrastructure policy for the 21st century : issues and opportunities / David E. Dowall.

p. cm.

Includes bibliographical references.

ISBN: 1-58213-023-X

1. Infrastructure (Economics)—Government policy—California. 2. Infrastructure (Economics)—Finance—California.

I. Title.

HC107.C23 C335 2000

363'.09794—dc21

00-028326

Copyright © 2000 by Public Policy Institute of California
All rights reserved
San Francisco, CA

Short sections of text, not to exceed three paragraphs, may be quoted without written permission provided that full attribution is given to the source and the above copyright notice is included.

Research publications reflect the views of the authors and do not necessarily reflect the views of the staff, officers, or Board of Directors of the Public Policy Institute of California.

Foreword

Many Californians look with pride on the state's history of public works. The first large water systems, visionary and controversial, helped set the stage for a century of growth. Decades later, Governor Pat Brown initiated an ambitious State Water Plan, a massive building program for K–12 education, a vast network of highways, and a higher education system that remains the envy of states and nations throughout the world. These investments were funded largely through state and local budgets with federal assistance.

These works constitute an integral and famous part of the state's identity. Less well known are the private investments that also produced extraordinarily positive consequences. In the field of astronomy, for example, private money funded the Lick Observatory in 1888, the Mount Wilson Observatory in 1917, and the Palomar Observatory in 1948. Each facility helped the state's universities and space science programs achieve prominence. In each case, too, private capital fostered development that might not have occurred with public monies alone.

The role of private investment is once again at issue as California's infrastructure needs outpace its capacity to provide services through conventional means. The state's large population, rapid growth, and demands for more capacity have already challenged business-as-usual in Sacramento's capital planning process. At PPIC's request, Professor David Dowall has drawn upon his experience both in the United States and around the world to review this process and suggest alternative approaches to infrastructure provision for California's next century.

The result is *California's Infrastructure Policy for the 21st Century: Issues and Opportunities*, in which Professor Dowall recommends that the state focus on infrastructure policy and management rather than its direct provision. He also maintains that simple per capita projections of park, highway, or education needs overestimate the economic demand for infrastructure by failing to consider the public's willingness to pay for it. Most important, these projections do not consider options for managing the demand for public facilities over time and across regions. The author reviews a list of options being explored and used elsewhere, such as cost sharing arrangements, public enterprises, competitive procurement, leasing, concessions, partnerships, and privatization.

This is the first PPIC study to focus solely on the policy context for infrastructure decisionmaking. It is more a thoughtfully prepared menu of options for the years and decades ahead than it is a set of recommendations for action in specific cases. Some will no doubt take a dim view of private enterprises entering areas that have been dominated by the public sector. Others will not accept the notion of more and steeper user fees for public facilities such as highways and parks. Even so, this report—along with a companion volume called *Building California's Future: Current Conditions in Infrastructure Planning, Budgeting, and*

Financing, by Michael Neuman and Jan Whittington—should help define the state’s infrastructure options as new master plans are put into place. Just as there was a place for private investment in California’s scientific community at the turn of the last century, perhaps there will be a place yet again in the 21st century. Whatever the outcome, we can expect a certain amount of productive controversy on such points. In the meantime, our hope is that this document offers useful ideas for managing the provision of—and demand for—infrastructure services.

David W. Lyon
President and CEO
Public Policy Institute of California

Summary

California faces a daunting infrastructure challenge over the next 10 years. According to the California State Treasurer’s Office, the state needs to invest \$82 billion to repair and maintain current structures and to build new ones. Projected state and local revenue sources will meet only about 50 percent of this need. Urbanization, community development, and the expansion and formation of new businesses are fueling these huge infrastructure demands. A surge in student enrollment, or “Tidal Wave II,” also threatens to overwhelm the state’s highly regarded college and university systems.

Unfortunately, the state’s infrastructure is not keeping pace with these developments. Congestion, both on highways and in classrooms, is now commonplace. Urban and rural roads are in poor condition, water supply and sanitation standards are threatened, and many college and university facilities are in poor or unsafe condition. The infrastructure planning and financing process seems to be broken as well. According to the Legislative Analyst’s Office, the state government lacks a stable

funding source for infrastructure programs, reviews these programs on an ad hoc basis, and has no requirements for statewide administrative or legislative evaluation of infrastructure investments.

Over the past year, a flood of infrastructure policy assessments has washed up on policymakers' desks. Most of these reports, like the earlier ones of the 1980s, focus on inadequate funding and boosting the role of government. To be sure, California's infrastructure problem is partly the result of insufficient funding as well as piecemeal planning and budgeting. Yet other deep-seated issues have contributed to the problem as well. Before beginning a new round of capital spending, policymakers would do well to assess these other issues to determine how they affect infrastructure planning and implementation.

This report helps to begin such an assessment by exploring five policy questions:

- What role can demand-side analysis and management play in setting levels of infrastructure service provision?
- What role can the private sector and market competition play in providing efficient infrastructure service?
- What are the potential effects of users and beneficiaries financing more infrastructure investment and operations?
- What are the best ways to finance infrastructure investment?
- How can government institutions be redesigned to move the state away from direct infrastructure provision toward management and policymaking?

Demand Analysis and Management

Most policy assessments focus on the supply side of infrastructure planning. A common misstep is to prepare forecasts of need based on per capita estimates of consumption. These per capita indicative standards largely ignore price elasticity of demand, the effects of conservation, and technological change. In addition to estimating demand, state policymakers should consider how demand management strategies can be applied to infrastructure service areas, including highway construction and repair, water supply, higher education, corrections, solid waste treatment, and park and natural resource management. These strategies include using facilities more efficiently and raising prices to reduce demand for scarce infrastructure resources. If widely implemented, demand-management strategies can significantly reduce the cost of new infrastructure investment.

Public and Private Sector Contributions

Policymakers around the world now agree that the private sector can play an important role in providing infrastructure. This consensus stands in stark contrast to past conventional wisdom, which assumed that infrastructure goods should be provided exclusively by government. This view came under considerable attack by public finance economists in the 1980s. The attacks were prompted by breakthroughs in public utility regulation, technological advances, and fiscal pressures to increase efficiency. Since then, policymakers have begun designing and implementing new models of service delivery that blend the efforts of public, private, and nonprofit organizations.

There are many ways to increase private sector participation in the provision of infrastructure. They include

- Coordination and cost sharing cooperation,
- Public enterprises,
- Competitive procurement,
- Management contracting,
- Leasing and concessions,
- Public-private partnerships, and
- Privatization.

User and Beneficiary Financing

In California as elsewhere, local governments have been shifting infrastructure costs to user and beneficiary groups. User fees are levied on the consumption of infrastructure services. These fees can be varied according to the level of demand during peak and off-peak periods. User fees and charges can be structured in a variety of ways. Fees can be levied as a flat monthly rate (as with garbage collection) or can vary according to consumption (as with water and electricity). User fees are not considered “special taxes” if they do not exceed the reasonable cost of providing the regulatory service or activity for which they are charged, and if they are not levied for general revenue purposes. Beneficiary charges are based on the positive effects infrastructure services have on properties and businesses. An example of a beneficiary charge is a levy for street lighting or flood protection.

Financing Infrastructure Investment

In addition to user and beneficiary financing, there are two basic ways to finance infrastructure investment: pay-as-you-go and long-term financing. No borrowing takes place with pay-as-you-go; instead, the government procures infrastructure services by paying the full cost of the facility at the outset. Proponents favor this method because it is the least expensive in nominal terms. However, it limits infrastructure investment to cash on hand and does not exploit the benefits of financial leveraging. For example, if a gas tax generates \$100 million per year, the pay-as-you-go approach allows government to build \$100 million worth of highways. If the \$100 million is used to finance development (by borrowing at 6 percent over 30 years), the government can build over \$1.3 billion worth of highways. Another limitation of pay-as-you-go is that current taxpayers pay for facilities that will benefit future generations.

Long-term financing is based on government borrowing and can be carried out in various ways. The most common method is for the government to issue bonds. To the extent that the term of the bond matches the economic and physical life of the project, this approach effectively balances inter-generational equity. It also allows government to move rapidly to meet increasing demand. Another important advantage of bond financing is that it better matches user fees to infrastructure procurement; that is, the revenue streams from these fees can be used to make bond payments.

Infrastructure Management

If government moves from providing infrastructure to managing how infrastructure is provided, California's institutional and regulatory

environment will need to be restructured to foster demand-oriented service delivery, competition, and efficiency. Instead of relying on state agencies to provide or finance infrastructure services, the new approach assigns responsibilities for the production of infrastructure to local governments as well as private and nonprofit entities. Although the state government's direct provision of infrastructure services would diminish under the proposed model, the state would still be responsible for

- Setting the policy framework for infrastructure,
- Facilitating local government, private sector, or nonprofit provision of infrastructure,
- Regulating providers of infrastructure services to ensure that standards of service and quality are met, and
- Ensuring that prices and tariffs for infrastructure services are set fairly.

The state must also ensure that low-income households and rural residents and businesses have adequate access to infrastructure services.

These five policy options call for a dramatic shift in how California plans, executes, and finances its infrastructure projects. However, the potential financial effect of aggressively implementing these policies is enormous and may generate enough cost-savings to close the state's 10-year infrastructure gap of \$6.4 billion.

Contents

| | |
|--|------|
| Foreword | iii |
| Summary | vii |
| Boxes | xv |
| Tables | xvii |
| Acknowledgments | xix |
| | |
| 1. INTRODUCTION | 1 |
| 2. INFRASTRUCTURE POLICY: SUPPLY VERSUS DEMAND | 5 |
| 3. PUBLIC AND PRIVATE PROVISION OF INFRASTRUCTURE | 21 |
| Creating Markets for Infrastructure Services | 26 |
| Models for Dividing Infrastructure Responsibilities | 29 |
| Coordination and Cost Sharing Cooperation | 29 |
| Public Enterprises | 30 |
| Competitive Procurement | 31 |
| Management Contracting | 32 |
| Leasing and Concessions | 33 |
| Public-Private Partnerships | 38 |
| Privatization | 39 |
| 4. FINANCING INFRASTRUCTURE PROVISION | 49 |
| Basic Approaches to Financing Infrastructure | 51 |

| | |
|---|----|
| Pay-As-You-Go | 51 |
| Long-Term Financing | 52 |
| Private Provision | 53 |
| Sources of Infrastructure Financing | 56 |
| Federal Subventions and Transfers | 56 |
| General Taxes and Special Taxes | 56 |
| Special Assessments | 56 |
| Developer Exactions | 57 |
| User Fees | 57 |
| Beneficiary Charges | 58 |
| Planning and Budgeting for Infrastructure Investment | 59 |
| 5. CONCLUSION: MOVING FROM PROVISION TO MANAGEMENT | 61 |
| References | 63 |
| About the Author | 73 |

Boxes

| | |
|--|----|
| 1. Energy Savings from Statewide Efficiency Standards | 8 |
| 2. Congestion Pricing in Singapore | 14 |
| 3. Interstate 15 Congestion Pricing Project | 16 |
| 4. Outsourcing in Public Higher Education—The Case of North Carolina | 34 |
| 5. Virginia’s Commonwealth Competition Council Process | 36 |
| 6. Contracting Out Operations at the Indianapolis International Airport | 40 |
| 7. Public-Private Partnerships—The Fort Mason Project | 42 |
| 8. Water Privatization and Regulation in England and Wales | 46 |

Tables

- 1. Percentage of Activities Outsourced in State and Local
Government Services 31
- 2. Ten-Year Capital Requirements, 1999–2009 49

Acknowledgments

The author would like to thank Bunmi Folayan, former graduate student in the Department of City and Regional Planning, University of California at Berkeley, for his research assistance during preparation of this report. Michael Dardia, David Lyon, Larry Magid, Will Price, Fred Silva, Michael Teitz, and Jan Whittington provided highly constructive and helpful comments on earlier drafts of this paper.

Although all of these people improved the final product, the responsibility for any error of fact or interpretation rests with the author alone.

1. Introduction

Over the next 10 years, California faces a daunting infrastructure challenge. According to the California State Treasurer's Office, the state needs to invest \$82 billion to repair and maintain current structures and build new ones (Angelides, 1999). Projected state and local revenue sources will meet only about 50 percent of this need (Legislative Analyst's Office (LAO), 1998b). Urbanization, community development, and the expansion and formation of new businesses are fueling these huge infrastructure demands. A predicted surge in student enrollment, or "Tidal Wave II," also threatens to overwhelm the state's highly regarded college and university systems.

Unfortunately, the state's infrastructure is not keeping pace with these developments. Congestion, both on highways and in classrooms, is now commonplace. Urban and rural roads are in poor condition, water supply and sanitation standards are threatened, and many college and university facilities are in poor and unsafe condition. The infrastructure planning and financing process seems to be broken as well. According to

the Legislative Analyst's Office, the state government lacks a stable funding source for infrastructure investment programs, reviews these programs on an ad hoc basis, and has no requirements for statewide administrative or legislative evaluation of infrastructure investments (LAO, 1998b).

In response to these and other issues, the Governor's Budget established a Commission on Building for the 21st Century. This commission commenced operation in February 1999 and will work through December 2000 (Commission on Building for the 21st Century, 1999). In the course of its work, the commission will

- Formulate a balanced program of building activity to address the entire range of needs of Californians,
- Identify ways to expedite project management and administration,
- Review the policy of requiring majority votes for school and other local government bond financing,
- Consider alternative matching formulas for state-local infrastructure funding,
- Reconsider the division of infrastructure responsibilities between state and local government,
- Identify new resources for infrastructure debt service,
- Consider reforming the manner and method of infrastructure,
- Link infrastructure funding awards to performance criteria,
- Use the State Infrastructure Bank to assist in project financing,
- Consider dedicating state and local revenues for pay-as-you-go financing,
- Determine a prudent level of bond debt service for the state, and

- Consider how to rationally prioritize infrastructure project proposals.

The purpose of the report is to identify key policy issues and opportunities for California's infrastructure policymakers and to provide examples of innovative forecasting, provision, financing, and management. These examples are drawn from other states, countries in the Organization for Economic Cooperation and Development (OECD), and the developing world. (Paradoxically, many OECD and developing countries are far more innovative managers of infrastructure than is California.) The remainder of the report is divided into four chapters. Chapter 2 discusses the role of demand-side forecasts and management in infrastructure planning. Chapter 3 looks at opportunities for expanding private sector provision of infrastructure. Chapter 4 examines the financing and procurement of infrastructure services, and Chapter 5 considers reforms of the state institutions responsible for infrastructure.

2. Infrastructure Policy: Supply Versus Demand

Whether it is for public infrastructure or private facilities, investment planning is based on demand, which includes both the willingness and the ability to pay for services. The demand for infrastructure services is dynamic and sensitive to economic, social, and technological changes. Failure to assess these changes accurately often leads to disastrous results, such as toll roads in Mexico, where demand was overestimated by 300 to 400 percent (Ruster, 1997), or the transit systems in Los Angeles and Dallas.

The future demand for infrastructure in California will be determined by eight key factors:

Population Growth and Age Composition: The demand for infrastructure services—including schools, parks, and correctional facilities—expands as the population increases. The age profile of the population also affects the demand for certain infrastructure, such as

schools. The demand for corrections and higher education are both sensitive to age and may vary across ethnic categories.

Level of Economic Activity: Economic activity will affect the demand for infrastructure services. For example, economic expansion will generate increased demand for infrastructure services such as energy, transportation services, and water supply.

Income: Rising income frequently increases the demand for infrastructure services. One study estimates that urban water demand in California increases 2.5 percent for each 10 percent increase in income (Renwick et al., 1998). Similar trends are found for electrical power, recreation, higher education, and vehicle miles traveled.

Infrastructure Tariffs: As with most goods and services, higher prices for infrastructure services reduce the quantity demanded. In Singapore, the government has adopted a system of pricing to control congestion in the central business area of the city. A toll of S\$3.00 (about US\$1.70) reduced inbound traffic volume by 38 percent. Forecasting methods that ignore the potential effects of pricing and tariff setting routinely overestimate capacity requirements.

Tastes and Preferences: Consumer demand for services can change as social groups develop new preferences. For example, the demand for higher education among Hispanics is lower than that for whites or Asians. The overall demand for higher education therefore depends greatly on the extent to which Hispanic preferences reach the same levels as those of whites and Asians. If Hispanic participation rates rise to match white and Asian rates over the next 10 years, enrollment forecasts for the University of California, the California State University, and community colleges will increase by 270,000 (Park and Lempert, 1998).

Availability of Alternative Services: Although many infrastructure services are regarded as monopolies, consumers are increasingly seeking alternatives to low-quality public services. Over the past ten years, for example, California has seen a proliferation of private educational institutions at all levels. The rise of Business Improvement Districts and gated communities with exclusive private services also reflects a trend in the development of alternative service delivery institutions across the state and the nation (Blakely and Snyder, 1997, and Reason Public Policy Institute, 1999). New public-private partnerships are also forming between park districts and local community-based organizations to improve park management and operations (Walker, 1999).

Technology: Changes in technology are likely to affect both the demand for and supply of infrastructure systems. On the demand side, global production and distribution is altering the demand for transportation services (National Council on Public Works Improvement, 1988). Electronic commerce will also alter patterns of retail trade, distribution, and shopping. Projections of infrastructure service requirements frequently do not take account of technological improvements. For example, advances in appliances, lighting, and energy efficiency in buildings have brought about impressive improvements in energy conservation (see Box 1).

Similar advances and innovations could apply to higher education. If the California State University and University of California systems adopted year-round education, for example, the capacity of their existing facilities may shift upward by 33 percent. If the LAO is correct, the UC system may be able to increase its enrollment capacity by nearly 31,000 full-time-equivalent students, and the CSU system might be able to

Box 1

Energy Savings from Statewide Efficiency Standards

Between 1975, when the first statewide energy efficiency standards went into effect, and 1999, California's energy utility customers have saved more than \$22 billion on their utility bills. According to the California Energy Commission (CEC), by 2013, energy efficiency standards will have reduced customers' bills by more than \$89 billion, resulting in net savings to customers of more than \$65 billion. The graph below shows projected cumulative net savings from 1975 to 2013.

The energy savings are derived from models that compare the electricity and natural gas use in buildings under the prevailing standards with building electricity and gas use under prior standards. For example, the effects of the 1984 standards are calculated by comparing the difference in energy use between the 1984 standards and the prior standards—in this case, the 1978 standards.

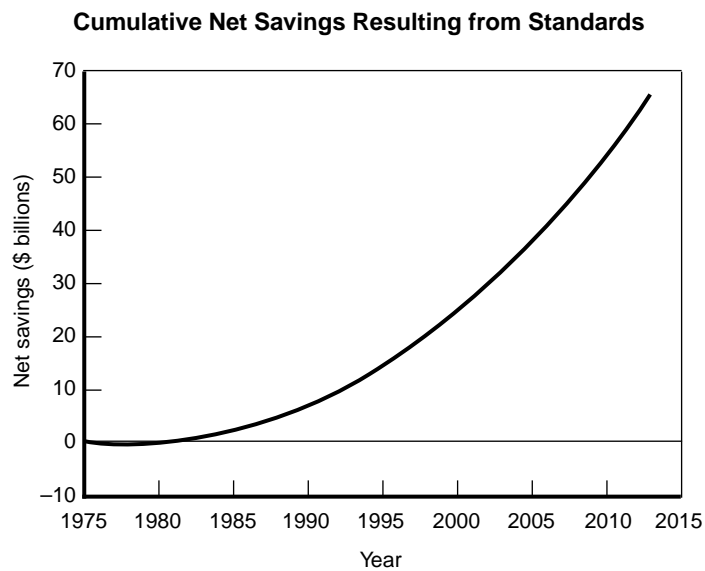
These savings are the result of eight statewide building standards and seven groups of appliance and equipment standards. The building standards address necessary improvements in space heating and cooling and water heating in both residential and commercial buildings. The equipment standards affect refrigerators, freezers, air conditioners, lighting fixtures, and gas appliances for both residential and commercial buildings.

The models developed by the CEC recognize the costs of meeting the efficiency standards. The cost to meet the residential

increase enrollments by approximately 36,000. If feasible, this boost in capacity would enable both UC and CSU to accommodate enrollment growth well beyond 2008 (LAO, 1999b). Distance learning technologies also promise to increase the productivity of higher education (Park and Lempert, 1998).

Box 1 (continued)

building standards are differentiated on the basis of the period of construction of the housing stock, whereas the cost to meet the appliance standards is based on the incremental costs of upgrading three appliances—refrigerators, central air conditioners, and central gas furnaces. Appropriate adjustments for nonresidential building and equipment standards are also included in the CEC savings and costs models.



SOURCE: CEC (1995c).

Conservation: Utilities have implemented a range of energy conservation programs over the past several decades. These programs have sponsored energy efficient appliances and lighting and more efficient building codes. More recently, urban water districts have attempted to reduce water consumption by offering incentives, including

rebates for low-flush toilets, drip irrigation systems, and drought-tolerant landscaping. These programs have produced significant reductions in water consumption. Several experiments are under way in California to create markets for water and to facilitate transfers between rural and urban users (Easter et al., 1998, and Brinkerhoff, 1999b).

Although some of these eight factors are beyond the control of policymakers, the demand for infrastructure services can be managed in various ways. The remainder of this chapter describes how demand management can make better use of existing facilities and guide future infrastructure investment.

As noted above, infrastructure planning is usually based on estimates of future requirements.¹ For example, infrastructure supply managers commonly estimate water and energy consumption, future applicants to post-secondary educational institutions, state park visitations, and prison populations. These estimates are based on underlying demographic trends or historical patterns of per capita usage rather than demand. Since the late 1970s, however, traditional supply-side planning has come under attack for being unreliable and unresponsive to political and environmental concerns.² In response to these and other criticisms, many public utility commissions began focusing on demand management rather than expanding supply to meet infrastructure requirements. As a result, many utility companies now use demand-management and cost-avoidance strategies in their least-cost planning exercises. These efforts have led to significant reductions in infrastructure investments in several key sectors. The application of

¹See, for example, Finzi (1994) and Grover (1983).

²See, for example, Reisner (1986) and Safina (1997).

demand management techniques to the state's capital planning process could save taxpayers billions of dollars in unnecessary costs.

Energy: California's Energy Commission is a world leader in demand management and conservation. In 1994 alone, statewide energy savings reached \$4 billion (Levine and Sonnenblick, 1994). The state relied on a wide range of programs to reduce demand, including upgraded efficiency standards for buildings, equipment, and appliances; utility programs to reduce energy consumption; and pricing policies to reduce consumer demand. The estimated savings associated with California's statewide efficiency standards between 1975 and 1999 is \$22 billion (CEC, 1995c). Success in the power sector quickly spread to urban water supply planning as well. Demand management is now common in solid waste management, telecommunications, and transportation.

Solid Waste: The disposal of solid wastes is a serious and continuing problem. Estimates of the full social costs of solid waste disposal in the United States are estimated at \$33 per ton. In California, policy is directed to reducing the waste stream going into landfills by 50 percent by 2000. The state is concentrating on programs to cut government and industry waste generation. For example, the California Integrated Waste Management Board (CIWMB) works with industry and local government to develop programs to reduce the waste stream, promote recycling, and manage hazardous wastes. Residential solid waste generation, which accounts for 40 percent of the waste stream, has declined in per capita terms from 3.1 to 2.4 pounds per day between 1990 and 1997. Commercial waste, which accounts for the other 60 percent, has declined from 9.7 to 7.8 pounds per employee per day. Between 1990 and 1997, the estimated statewide diversion and recycling

increased from 17 to 32 percent, and a total of 100 million tons of waste was kept out of landfills. This amounts to about three years of landfill activity (CIWMB, 1999).

Transportation: A recent study by the U.S. General Accounting Office suggests that congestion on the nation's roads results in \$100 billion a year in lost productivity. Congestion and slow traffic also generate more air pollution. The California Air Resources Board estimates that traveling 10 miles in 30 minutes produces 2.5 times more emissions than traveling the same distance in 11 minutes.

The idea of using tolls or charges to control congestion was first proposed by the Nobel-Prize-winning economist William Vickery in 1959. Spurred by growing problems with congestion and declining air quality, congestion pricing for highways has emerged as a policy mechanism for improving transportation efficiency and enhancing the urban environment. Its proponents argue that congestion pricing allocates road space more efficiently, produces additional revenues to support transportation improvements, and is more effective than other efforts to control emissions and reduce congestion (Brown et al., 1998, and Litman et al., 1998). Furthermore, congestion pricing reduces demand to levels reflecting full social and environmental costs. Demand reductions also take the form of increased vehicle occupancy and greater transit patronage (Association of Commuter Transportation, 1997).

Congestion pricing may take various forms. The French have used point pricing, or a congestion-sensitive system of tolls, to dampen travel peaks on an intercity highway linking Paris and Lille. This system has reduced peak period traffic between 4.4 and 8.2 percent (Gómez-Ibáñez and Small, 1994). Cordon pricing, or the collection of tolls to enter certain areas, is used in Singapore's central business district, where fees of

\$3.00 per day reduced traffic congestion by 20 percent (see Box 2). Congestion pricing on Interstate 15 in California varies with the level of congestion and the number of passengers in the vehicle. Demand for participation in the program is strong; the initial transponders, which are used to levy the tolls electronically, are allocated and there is a waiting list of over 600 persons (see Box 3).

Although the financial performance of State Route 91 in California has been problematic, its system of tolls suggests that congestion pricing may be acceptable to users.³ In 1989, Caltrans entered an agreement with a private developer to build and operate additional lanes at a cost of \$126 million. Drivers have the option of using existing free lanes or shifting to the privately constructed lanes, whose tolls vary according to congestion. According to a recent study, the toll lanes were attracting 30,000 vehicles per day, or about 15 percent of the total traffic. These lanes have added capacity and reduced overall travel times. Between 60 and 80 percent of the drivers surveyed in the corridor approve of the idea of extra toll-financed lanes, and 60 to 75 percent approve of variable tolling as well (Sullivan, 1998).

Implementation of congestion pricing has been limited, especially in the United States, and many policymakers still view it as political suicide. However, much of the polling on congestion pricing has neglected to ask drivers how tolls should be used. Recent research suggests that those polled would support increases if revenues were rebated to users or were used to finance new lanes (Harrington et al, 1998, and Frick et al., 1996).

³Toll revenues at this time are not sufficient to finance cost recovery, maintenance, and operations, and therefore the concessionaire is seeking to reorganize the project.

Box 2

Congestion Pricing in Singapore

In 1975, Singapore implemented the Area Licensing Scheme (ALS) as part of a comprehensive approach to reducing traffic congestion in the city's central business district (CBD). Under the ALS approach, a fee is charged to motorists entering the downtown district during peak hours. Before 1996, motorists were required to display a sticker on the windshield indicating that they had obtained a daily or monthly pass to enter the CBD. In late 1997, Singapore implemented an electronic road pricing scheme.

The ALS fee for private cars was initially set at S\$3 per day and enforcement hours were scheduled from 7:30 am to 10:15 am Monday to Saturday. To provide alternatives to motorists, bus service to the CBD was increased and parking lots were introduced on the fringe of the restricted zone. In conjunction with the ALS, parking rates in the core of the CBD were raised by one-third (private car parks were taxed the equivalent amount). Within a month of operation, the ALS had cut the volume of traffic entering the CBD by 47 percent and average speeds in the zone increased by 22 percent. The operation and enforcement of the scheme has required on average less than 10 percent of toll revenues.

The ALS is now enforced between 7:30 am and 6:30 pm on Monday to Friday and 7:30 am to 3:00 pm on Saturday. In 1989, fees for trucks (S\$3) and motorcycles (S\$1) were introduced. After years of increased congestion above the original reduced levels, the

Corrections: California's spending on prisons has increased from \$127 million in 1971–1972 to \$3.8 billion in 1997–1998. The state's prison system is larger than England's and Germany's combined, with an adult prison population exceeding 150,000 as well as 100,000 parolees (Bathen, 1997). Forecasters expect continued (though lower) growth

Box 2 (continued)

average speeds in 1989 returned to the speeds achieved immediately after the initial imposition of restraints in 1975. The table below shows the effects of the ALS on the inbound morning traffic volumes between 1975 and 1991.

As the table below shows, a properly designed congestion pricing scheme can substantially reduce traffic congestion, and, with appropriate and timely modifications, can be sustained. This is a remarkable achievement in light of Singapore's over 100 percent growth in number of vehicles since 1975. Furthermore, congestion pricing need not be costly to administer and can be achieved without significant adverse affect to land values and relocation of business activity outside the CBD. In the interim, the mode of transportation to the CBD has shifted from 56 percent by automobile before the ALS to only 23 percent by automobile in 1988.

The Effects of the ALS on Inbound Morning Traffic Volumes (1975–1991)

| Time of Day | March 1975 | May 1976 | May 1986 | May 1991 |
|-------------|------------|----------------|----------------|----------------|
| 7:00–7:30 | 9,800 | 10,332 (5.4) | 10,896 (11.2) | 8,684 (-11.4) |
| 7:30–10:15 | 74,014 | 35,787 (-49.2) | 53,944 (-27.1) | 46,167 (-37.6) |
| 10:15–10:45 | 15,159 | 13,441 (-11.3) | 16,266 (7.0) | 14,241 (-6.1) |

Figures in parentheses indicate percentage increases over 1975 figures.

SOURCES: Gómez-Ibáñez and Small (1994), and Seik (1997).

over the next 10 years. Prisoners are housed in 32 prisons and 38 camps around the state at an average annual cost of \$21,000 per inmate. The Legislative Analyst's Office projects that the state will need to provide an additional 30,000 beds over the next five years to meet growing demand

Box 3

Interstate 15 Congestion Pricing Project

The Interstate 15 (I-15) Value Pricing Project is a three-year, federally funded demonstration project that allows single occupancy vehicles (SOVs) to use existing high occupancy vehicle (HOV) lanes on the interstate for a fee. The interstate connects inland residential areas to the north of San Diego with major employment centers in and around San Diego. Interstate 15 has four to five lanes in each direction and two reversible HOV lanes in the median. The HOV lanes are separated from the main lanes by barrier and are accessible only from the two end points. Use of the HOV lanes (express lanes) is limited to carpools, vanpools, buses, motorcycles, and authorized SOVs.

The option of an SOV buy-in on HOV lanes on I-15 required special legislation that was passed in October 1994 (Assembly Bill 713). The law requires that level of service “B” or the pre-existing level of service (in this case “C”) be maintained on the express lanes at all times.

The I-15 Value Pricing Project consists of two phases. Phase I (interim operations), which started in December 1996 and ended in March 1998, was advertised as the ExpressPass program. At the time the program was initiated, the mixed-flow lanes were routinely experiencing severe congestion (level of service “F”) during peak morning and evening periods. The number of permits issued to SOV ExpressPass program participants allowed to use the express

and to ease acute overcrowding (Brinkerhoff, 1999a). Capital costs alone total \$1.6 billion, or over \$50,000 per bed.

Demand management may cut spending by reducing California’s high rate of recidivism. Approximately 56 percent of those released from California’s prisons return to prison within three years. Although 80

Box 3 (continued)

lanes increased incrementally from 500 in December 1996 to 1,000 in March 1998. The cost of the pass at the end of phase I was \$70. An important modification to the program occurred in June 1997, when project participants transitioned from windshield permits to electronic transponders.

Phase II (full implementation) started in March 1998 with the introduction of the I-15 FasTrak program. In this phase, customers pay a per-trip fee, which varies depending on the time of day and the level of traffic in the express lanes. FasTrak program participants pre-pay into their toll account and each time they travel on the express lane as a solo driver, a per-trip fee is deducted from their account. Per-trip fees are determined in six-minute intervals and are based on the traffic volume that will maintain level of service "C." The fee to use the express lanes generally ranges from \$0.50 to \$4.00 and is usually between \$3.00 and \$4.00 during the morning and evening peak hours.

According to preliminary findings from phase II, the average number of vehicles per day using the FasTrak lane has increased by 35 percent over pre-project levels (half of this increase is due to an increase in the use of the lanes by HOVs). The demand for the program has been strong. As of September 1998, 5,000 transponders have been issued and there were 600 people on the waiting list.

SOURCE: Kawada (1998).

percent of adult inmates have substance abuse problems, the Department of Corrections has only 3,000 slots in treatment programs (Brinkerhoff, 1999a). Surveys show that recidivism rates fall 12 percent for those receiving substance abuse treatment. When this treatment is combined with aftercare and counseling during parole, recidivism falls 48 percent. Given the fact that treatment and aftercare counseling costs

approximately \$12,000 per person, it may be possible to design cost-effective programs to reduce recidivism.

Another way to reduce demand for correctional facilities is to focus on young pre-offenders. A recent RAND study examined a range of interventions to divert children from crime (Greenwood et al., 1998). Using field trials, the RAND researchers concluded that early age interventions may result in significant reductions in criminal activity and therefore warrant consideration as a policy tool.

Other opportunities for demand management abound. For example, year-round operation of educational facilities could reduce infrastructure costs significantly. For the UC and CSU systems alone, year-round operation would avoid approximately \$3 billion in construction costs over the next 10 years (LAO, 1999b). Pricing and demand management could be effective in meeting budgetary requirements for many of the California Resources Agency and Environmental Protection Agency departments as well. CALFED's⁴ scenario planning process has identified new models of cooperative water resource management that also lower capital costs (CALFED, 1999). Local urban water districts have also achieved remarkable reductions in water use through a variety of programs and pricing systems to promote conservation (Baumann et al., 1998). The Department of Parks and Recreation might follow the U.S. National Parks Service and the U.S. Forest Service in implementing demand management systems to maintain high-quality recreational facilities.

It is important to recognize that demand management is not the only tool that infrastructure planners should use to guide decisions about

⁴A cooperative federal, state, and local government initiative to develop a water resource management plan for California.

infrastructure planning, development, and operation. Infrastructure managers should also address questions about whether the public or the private sector should provide infrastructure.

3. Public and Private Provision of Infrastructure

The idea that only the government can and should provide critical infrastructure is giving way to the view that both the public and private sectors should be involved in infrastructure provision. This shift reflects a number of changes, including the growing awareness that competition among providers fosters higher-quality and lower-cost services. This chapter examines two fundamental questions. First, who should provide specific infrastructure services? Second, if government is best suited to provide certain services, which level of government should assume that responsibility?

Such questions are not new. Adam's Smith idea of the invisible hand, which acts through market mechanisms to ensure self-balancing allocation in the economy, has long been understood to have limits, particularly in matters concerning the allocation of "public goods" (Kapp, 1950). Economists accept the notion that government should intervene to correct market failures, and for much of the past two

centuries, most have argued that government is best positioned to provide these public goods. They offer four basic arguments for this position.

Natural Monopolies: The natural monopoly argument holds that some goods and services require large initial investments that cannot be converted to some other use. Once these investments are in place, the average costs of production decline with output. The high initial costs and the low average costs of production form barriers to market entry and give rise to natural monopolies. Because these monopolies may engage in predatory pricing, the government or a closely regulated private entity should provide these goods and services. In some cases, the initial investment is so high that no private entity will offer the service.

Examples include the Interstate Highway system, the Hoover Dam, and the California Aqueduct. But counter-examples can be cited as well, including AT&T, the Channel Tunnel in Europe, and Italy's Autostrada.

Excludability: A second argument for government provision has to do with the ability of a service provider to exclude nonpayers from using a service. If it is impossible to block free-riders, or those who benefit from services without paying for them, then private entities will not be interested in providing the service. In such cases, the government needs to intervene and offer that service. Infrastructure services for which it is difficult to block nonpayers include lighthouses and navigational aids, parks, flood protection, public safety, and national defense.

Nonrivalry: A third argument for government's exclusive role in providing infrastructure is that some goods are nonrivalrous; that is, additional consumers can enjoy the benefits of a public good without detracting from the benefits received by other incumbent users. National defense is a classic case of a nonrivalrous public good, as its benefits do

not decline with increases in population. In many cases, consumers are unwilling to pay for services that they regard as nonrivalrous because they assume that they can enjoy these services for free without adversely affecting others.

Benefit Spillovers: A fourth argument for the government provision of public goods and services is that they generate substantial benefits beyond those captured by the consumer. If such goods and services are provided by the private sector, production will be geared to meet only the demands of consumers willing to pay for the service. As a result, production and consumption will fall below socially optimal levels. For example, society is better off if all children are immunized for polio, regardless of whether all parents are willing and able to pay. This type of good or service is referred to as a “merit good.”

These four arguments have led many economists and policymakers to claim that infrastructure services—which exhibit characteristics of natural monopolies, free-riding, nonrivalry, and merit goods—are best provided by government. This view prevailed through the 1970s, when deregulation in the telecommunications and airlines industries began to generate significant consumer benefits through lower tariffs and greater innovation. Later, the fall of communist regimes in Eastern Europe and the sustained weaknesses of mixed socialist economies in Spain and France provided further impetus to the questioning of public sector provision of goods and services.

In fact, governments often fail in the provision of infrastructure services. On the efficiency side, government failures include:

- Providing too little or too much infrastructure,
- Unresponsiveness to consumer demand,

- Ineffective spending,
- High unit costs,
- Soft budget constraints, and
- Financial inefficiency.

Governments often do not gauge the real demand or market for services. The development of the Concorde by both the British and French governments offers a vivid example of the overprovision of public air transport (Hall, 1981). An example of underprovision is the lack of drug counseling and rehabilitation by the California Department of Corrections (Brinkerhoff, 1999a).

Because government agencies operate monopolies, they have little reason to worry about consumer demand or the quality of service. Without competition and choice, consumers have few options other than to stop consumption, provide the service themselves, or move to different jurisdictions.¹

Ineffectiveness in government spending is the result of institutional failures, the most important of which is that decisionmakers have little incentive to improve the efficiency of public service delivery (Leibenstein, 1978). Moreover, most government departments do not conduct rigorous cost accounting (Goldsmith, 1999). The lack of accountability and efficiency leads to high public sector output costs. Government agencies routinely enjoy “soft” budget restraints; that is, they often receive additional budget support from municipal or state governments.

¹In Lagos, Nigeria, infrastructure services are so poor that manufacturing establishments frequently provide the services themselves by digging water wells, transporting workers, and delivering mail. Lee and Anas (1992) estimate that these investments add 30 percent to the cost of setting up factories in Lagos. Similar patterns have been identified in Thailand and Indonesia. In the United States, families cite poor inner-city schools as a primary reason for moving to the suburbs.

A vivid example of this is the case of Argentina Railways. Before reforms, Argentina Railways' total annual subsidy from the government equaled 1 percent of Argentina's gross domestic product (GDP) (World Bank, 1994).

Soft budget constraints, poor or inadequate cost information, and unfocused management goals frequently lead to financial inefficiencies. During the 1980s, for example, most developing countries charged electrical power tariffs that covered only 50 percent of the actual costs of service provision. In the transportation sector, countries routinely underpriced services.² Unless there are valid reasons for subsidizing services—such as promoting equity through the transfer of income, generating significant positive externalities, or promoting economic development in lagging regions—infrastructure services should recover full capital, operating, and maintenance costs.

Government failures have sparked lively debates about how to divide responsibilities for infrastructure provision (Kessides, 1993). It is important to recognize that there is no single correct approach to this question. What is appropriate in one country or state may not be appropriate in others. It is also important to recognize that the debate in California is not about privatizing public services or shutting down government. Rather, it is about improving the quality and cost-effectiveness of infrastructure provision while fostering social and economic development, providing services to all consumers at affordable prices, and doing the least harm to the environment.

²During its 1991 fiscal year, the government of Zambia shifted 12 percent of its GDP to subsidize the country's transportation sector (World Bank, 1994).

Creating Markets for Infrastructure Services

To eliminate government failures and improve the overall quality of infrastructure service delivery, policymakers must frequently introduce competition and accountability. This can be done in a variety of ways: by promoting coordination and cost sharing, making procurement and service delivery competitive, forming partnerships with the private sector, and introducing private and nonprofit provision of services.

In thinking about how to improve the quality and cost-effectiveness of infrastructure, it is important to return to the role that competition plays in the allocation of resources. Whether competition is between two or more private firms or two public entities, it creates incentives to provide services at the lowest possible cost and highest possible quality. Work on contestable markets shows that the threat of entry creates powerful incentives for incumbent monopolists to be more efficient (Baumol et al., 1982). Competitive pressures will propel incumbents to innovate and adopt new technologies. Competition can also reduce the need for regulation, as predatory pricing and poor service will create opportunities for new firms to enter the market.

Examples of the benefits of allowing entry to the market abound worldwide. In the United States, deregulation of the airline industry is estimated to generate nearly \$20 billion a year in savings to consumers. Deregulation of the trucking industry in the United States has led to a 28 percent reduction in fares and substantial efficiency gains. In New Zealand, deregulation of the telecommunications sector has brought about cost reductions of nearly 6 percent per year since the start of competition (Ehrhardt and Burdon, 1999).

Too much competition can also create problems. There may be an inefficient duplication of facilities: too many hospitals, too many

universities, or too many parks. This problem can be handled through the use of franchising and permitting regulations that can limit the number of operators in a district or region. Competition can also make it more difficult to guarantee universal services. Again, government regulation (as opposed to provision) can be used to ensure universal access. If government wants services to be provided below cost, it can enter into service contracts with providers that cover capital and operating losses. Finally, intense competition can induce private companies to violate environmental and safety standards. Again, government regulation and monitoring play a critical role in maintaining acceptable levels of private sector performance.

Several strategies for promoting competition in the infrastructure sector have proven effective. First, infrastructure services can be broken up into smaller elements to promote competition and reduce sunk capital cost requirements. Two common approaches are vertical and horizontal unbundling. Vertical unbundling takes place when an infrastructure industry or sector is divided into various components that reflect stages in the process of service provision. The U.S. Public Utilities Regulatory Act of 1978 required that electric utilities purchase power from independent power producers. This measure divides the industry into distinct elements and fosters competition within them. In the United Kingdom, the government divided British Rail into several transportation service companies, leaving Railtrack as the operator of the rail network system (Galenson and Thompson, 1994).

Horizontal unbundling refers to the geographic division of large utility providers. For example, Japan divided its national railroad company into six regional operators, each of which rents track time from the railroad operator (World Bank, 1994). Perhaps the most dramatic

example of horizontal unbundling took place in 1984, when a U.S. Federal Court ordered the breakup of AT&T into seven “Baby Bells.”

Once infrastructure sectors have been unbundled, competition can promote efficiency and new investment. These efficiencies can be fostered by encouraging consumers to use substitutes, allowing new infrastructure service providers to compete with government and other private entities, and creating market competition in government procurement of services (Irwin, 1997). Consumers are often willing to substitute one form of service for another based on price and service differences. When the United States deregulated the rail and trucking sectors in the 1970s, competition in freight transportation spawned tremendous productivity gains. Private infrastructure service providers in electricity, water supply, transportation, education, corrections, and recreational services are providing effective competition to publicly provided services. The Edison Project, a spin-off of Whittle Communications, now operates 71 private schools nationally and is about to launch a stock offering to raise capital to expand its scope. Several other educational service firms are also approaching the presumed critical breakeven level of 100 schools.

Competition can be introduced into government activity by creating competition for the provision of services. Governments have a wide range of options for creating competitive procurement: service contracting, management contracting, leasing, and concessions. Government entities responsible for providing infrastructure can be corporatized and privatized and forced to compete in the marketplace. Privatization helps to create incentives for the efficient use of resources by linking performance and compensation.

Models for Dividing Infrastructure Responsibilities

This section outlines a range of examples being used to enhance the quality and cost-effectiveness of infrastructure services. The discussion starts with limited operating and capital efficiencies before moving to more fundamental transformations of public and private sector responsibilities. No single approach is recommended, as policymakers need to assess conditions carefully and proceed with reforms that are most likely to succeed in improving the quality and efficacy of infrastructure services.

Coordination and Cost Sharing Cooperation

Higher education in California and elsewhere is under extreme cost escalation pressure. RAND recently assessed cost control activities and found that three approaches warrant attention by policymakers and managers: collaboration, technology, and outsourcing (Kaganoff, 1998).

An example of collaboration is the Southeast Pennsylvania Consortium for Higher Education, in which eight schools collaborate on planning, purchasing, technology, and use of network facilities. The consortium is also looking at sharing faculty. In another case, Five Colleges, Inc. (Amherst, Hampshire, Mount Holyoke, Smith, and the University of Massachusetts at Amherst) pooled faculty to create two joint departments. They also link libraries, theater productions, and course registration. One of the oldest consortia of higher educational institutions is the Claremont Schools, which share costs for student services, management, libraries, and real estate management. Forming consortia is difficult and takes considerable time to build understanding and trust.

Technology initiatives focus on information processing, teleconferencing, distance learning, and other applications. Barriers to application include high initial costs and concerns about the use of technology in core teaching areas, where student-instructor contact is highly valued.

Outsourcing initiatives involve contracting with outside vendors to provide specific services. For example, the University of Pennsylvania has outsourced the management of its facilities and hopes to save 15 percent of its \$100 million annual real estate management budget. Most outsourcing is applied to support services, but there is interest in applying it to core teaching and learning activities.

Public Enterprises

One common form of restructuring is to corporatize public companies so that they can be held more accountable for performance. This process can proceed along several paths, but the most common method is to separate the entity from the government and form a stock company. This company can be wholly owned by the government but operate like a private stock company with a board of directors, shareholders, and management. A municipal water department, for example, can be spun off and established as a stock or independent entity. This independence allows the company to develop highly focused service delivery goals and to be accountable to its stockholders rather than to a local council. Corporatization does not guarantee that poorly run government departments will become efficient companies, but the legal transformation allows owners to change management and to tie their compensation and contracts to clear performance goals. It also

eliminates soft budget constraints and focuses attention on the need to achieve fiscal self-sufficiency (OECD, 1997b).

Competitive Procurement

Many governments around the world have developed competitive procurement methods. The most common approach taken is to outsource them, but another viable option is to create competitive markets for procurement and allow existing government departments the right to compete to provide services. Table 1 presents trend data for state and local government contracting out by type of activity. As it illustrates, contracting out has been expanding across the country over the past 12 years. Considerable evidence suggests that contracting out lowers costs through the reduction of overhead, fixed costs, and direct production costs. It can also help to vitalize public sector efficiency by allowing comparisons between in-house and outsourced costs (U.S. GAO, 1997). According to OECD's Public Management Advisory Group, successful

Table 1
Percentage of Activities Outsourced in State and Local Government Services

| Function | 1987 | 1990 | 1995 |
|-------------------------------|------|------|------|
| Major construction projects | 100 | 100 | 100 |
| Janitorial services | 52 | 62 | 70 |
| Solid waste collection | 30 | 38 | 50 |
| Building maintenance | 32 | 37 | 42 |
| Security services | 27 | 33 | 40 |
| Parking garages | 20 | 26 | 35 |
| Park maintenance | 18 | 25 | 32 |
| Tree trimming | 17 | 23 | 31 |
| Street maintenance and repair | 19 | 21 | 37 |
| Ambulance services | 11 | 13 | 20 |
| Bill collection | 10 | 12 | 20 |
| Street sweeping | 9 | 11 | 18 |

SOURCE: Mercer Management Consulting (1995).

contracting out is one of the principal market-type mechanisms applied in member countries. It can lead to efficiency gains while maintaining or increasing service quality (OECD, 1997a).

In general, successful outsourcing requires

- Top management involvement and commitment to re-engineering,
- Focus on staff concerns and issues,
- Specific service requirements in terms of outputs or outcomes,
- Monitoring performance and fostering cooperative relationships,
- Ensuring valid comparisons between in-house and outside proposals,
- Fostering competitive markets, and
- Developing and maintaining the necessary skills for contracting out.

Examples of successful outsourcing can be found in North Carolina's system of higher education (Box 4) and in the State of Virginia's Commonwealth Competition Council, which identifies opportunities for competitive service provision (Box 5). New Zealand contracts out functions of its Audit Office, and the government of Iceland contracts out residential treatment homes for children (OECD, 1997a). Not all outsourcing is successful, however, especially when oversight is poor. Noncompetitive and loosely controlled contracting can lead to inefficiencies, cost overruns, and corruption (Bloomfield et al., 1998).

Management Contracting

Whereas outsourcing and competitive procurement are used to acquire specific services, management contracting is the wholesale

(though temporary) transfer of management responsibility from incumbent public managers to outside private or nonprofit entities. Management contracting is increasingly popular in municipal wastewater collection and treatment and water supply and distribution. In 1998, the City of Milwaukee entered into a 10-year operations and maintenance contract with United Water. The \$350 million management contract is the largest wastewater O&M agreement reached to date in the United States. It guarantees 30 percent annual savings, or about \$145 million, to ratepayers. The City of Atlanta also recently took steps to contract out the operation of its water supply and wastewater treatment system. Facing 100 percent rate increases to fund improvements, the City of Atlanta negotiated a 20-year agreement with Lyonnaise des Eaux and United Water to operate and maintain its system and to bring it into compliance with federal and state water quality standards. The city retains ownership of the system and will continue to control rates and finance capital expenditures. In both cases, the cities structured competitive tendering procedures to attract firms and bid for contracts. The use of competitive bidding enabled both to procure lower-cost alternatives for managing and operating their utility systems. Both winning bidders agreed to keep all public water and wastewater employees on the payroll (Reason Public Policy Institute, 1999).

Leasing and Concessions

Leasing and concessions offer another way to create competition and improve the efficiency of infrastructure operations. The government offers to lease an infrastructure facility to a private operator for a fixed period of time. During the lease period, the operator is responsible for

Box 4
**Outsourcing in Public Higher Education—The Case of
North Carolina**

Responding to a mandate by the North Carolina General Assembly, the University of North Carolina Office of General Administration commissioned a study on the potential of outsourcing to improve the efficiency and effectiveness of the operations of the University of North Carolina.

The Office of General Administration conducted a baseline survey of outsourced contracts throughout all of its campuses and affiliated organizations. All institutions and affiliated organizations responded, and a total of 316 of the 345 surveys returned met the criteria for an outsourced service. The survey instrument consisted of four components: respondent information, function outsourced, current contract terms, and contract evaluation. Each completed survey represents a separate contract for an activity. According to the baseline survey, which was conducted in 1995, the annual expenditure on outsourced contracts totaled over \$84 million and resulted in annual savings of \$7.8 million.

The University of North Carolina General Administration outsourcing survey shows that over 250 private vendors were involved in outsourced activities. Contracts ranged from \$500 to over \$1,000,000 with over 60% of the contracts between \$500 and \$60,000. The predominant terms of the outsourcing arrangements were fixed-cost contracts (64.4%), followed by commission-based contracts (11.7%). Furthermore, one-fifth of the contracts included a renewal clause, and close to 10% included specific cancellation provisions. Over 85% of the reported savings per contract ranged from \$500 to \$120,000. The two largest functions with savings due to outsourcing were repair and maintenance and housekeeping.

Overall, the evaluation of outsourcing as an effective and efficient means of accomplishing work in the areas identified was extremely positive. Only eight cases of “unsatisfactory” experiences

Box 4 (continued)

(2.5%) were reported, whereas 46% reported “very satisfactory” experiences. Areas with high “very satisfactory” ratios were printing (64%), financial services (61%), housekeeping (54%), and laundry (53%).

Cost savings, where reported, were derived from a wide range of sources including

- Reduced staffing levels,
- Reduced equipment/use more efficient equipment,
- Ability to move staff among jobs to efficiently handle workload peaks and valleys,
- Ability to use pay incentives for creativity and productivity,
- More work scheduled for off-peak hours,
- Increased staff productivity through more effective training, and
- Economies of scale through larger operations.

The detailed study estimated that the potential saving from outsourcing by institutions could reach \$16.9 million. The method by which we have estimated contracting costs was predicated upon a combination of actual costs at similar institutions, including some of the same tasks currently outsourced by the University of North Carolina. The project team identified the following three major components of outsourcing costs: direct charges by the contractor, institutional costs for monitoring contractor performance, and costs of transition from in-house to outsourced performance.

According to the report, the areas with the most potential for cost savings are housekeeping; heating, ventilation, and air conditioning systems; and grounds maintenance. The study indicated that lower salaries and benefits accounted for as much as 30 to 35% of the estimated savings in lower-wage service areas (e.g., housekeeping and grounds maintenance).

SOURCE: University of North Carolina (n.d.).

Box 5

Virginia's Commonwealth Competition Council Process

The Virginia Government Competition Act of 1995 created the Commonwealth Competition Council in the executive branch. The council is to provide a strategic and institutional framework for competitive government and privatization in Virginia. According to the competition act, the council is charged with responsibilities that include determining which government services present opportunities for competition and privatization. The council's mandate is not to privatize government, but rather to create a level of competition that provides long-term benefits for the state's citizens. The council is composed of 15 members. The members are appointed by the governor (7), speaker of the house (4), and senate committee on privileges and elections (4). The members of the committee are drawn from executive branch agencies (4), House of Delegates (2), Senate (2), and the private sector (7).

A five-step competition process as outlined below was approved by the council in 1996.

1. **Input:** Input is gathered from public hearings, business interests and government agencies.
2. **Selection:** Public versus private performance analysis is conducted.
3. **Competition:** Using the Virginia Public Performance Act, requests for proposals and invitations for bid are issued, and proposals and bids are independently evaluated.
4. **Award:** After cost comparison, in-house provision is continued

operating and maintaining the facility. Leasing offers the opportunity to temporarily transfer the responsibility for operating a facility to a private operator. Examples of leasing facilities include Argentina's railroads and

Box 5 (continued)

or a contract is awarded to a nongovernment entity. The award is subject to an independent audit and appeal process.

5. Monitor: Ongoing quality assurance and post-performance reviews are ensured.

The council has developed a fully automated cost comparison program—COMPETE—which provides the fully allocated unit cost of state functions and activities, thereby providing a level playing field for comparing in-house costs with private sector costs. The council includes the cost of monitoring and oversight in the cost comparison. The provisions of the act authorize the Governor or the General Assembly to direct state agencies to perform a public/private cost comparison if the council receives an unsolicited proposal from a private entity. Workforce transition strategies are core tenets of the privatization and competition blueprint for the success in Virginia. The state supports employee stock ownership plans, career planning and job placements, and early retirement.

To date, successful competitive initiatives in Virginia include

- Sale of Virginia Education Loan Authority to a private loan servicing firm,
- Private management of the state's rest areas,
- Private construction and management of prisons, and
- Privatization of child support enforcement.

SOURCE: Commonwealth Competition Council (1998a, 1998b).

highways and the U.S. National Park Service's tourist facilities (Fishbein and Babbar, 1996).

Concessions and leases are used when the company or the infrastructure service requires significant capital investment. For

example, water supply and wastewater treatment systems, railroad networks, airport facilities (see Box 6), parking garages, sports facilities, and college dormitories could be targets of lease or concession agreements. The government leases the existing facility to the private operator, requiring that the facility be upgraded to a specified level of service and then operated for a fixed time period. At the end of the lease or concession period, the improved facility is returned to the government. Careful monitoring and oversight of concessions is needed to ensure that public interests are being served (Burns and Estache, 1998). In some cases, concessions do not reflect the full economic value of the assets being leased and therefore provide indirect subsidies to private entities (U.S. GAO, 1996b).

Public-Private Partnerships

A popular model for improving the quantity and quality of services is a partnership between the public and private sectors. Partnerships can also be forged between government and nonprofit groups. For example, the Lila Wallace-Reader's Digest Urban Parks Program has funded the formation of 11 parks partnerships between local governments and nonprofit community-based organizations (Walker, 1999). This model could be applied to larger regional and state park districts.

Public-private partnerships have been formed at all levels of government. At the federal level, partnerships have been implemented to finance projects with the National Park Service, Veterans Administration, and the U.S. Postal Service. At the state level, projects have been carried out between Caltrans and private developers, transit districts, universities, and local governments around the state. Many partnerships revolve around the joint development of real estate, such as

the redevelopment of Fort Mason, the Thoreau Center at the Presidio, and Rincon Annex in San Francisco (see Box 7). They typically involve arrangements in which a private entity leases or purchases assets to develop and operate them. These partnerships provide significant benefits to government by providing revenue and bringing technical and entrepreneurial talent to a project.

Privatization

Privatization is the final step on the continuum of promoting competition and accountability in the infrastructure provision process. It involves the transfer of infrastructure service responsibility to a private or nonprofit entity. Some of the most common forms of privatization are concessions and lease-develop-operate (LDO), build-operate-transfer (BOT), build-transfer-operate (BTO), build-own-operate-transfer (BOOT), negotiated sale to a strategic partner, competitive sale to a strategic partner, or public stock offering (U.S. GAO, 1996a; Sheshinski and Lopez-Calva, 1999; and Kikeri et al., 1992, 1994). In the case of BOT, the government enters into an agreement where a private developer builds a new facility, operates it for a fixed period of time, and transfers the facility to the government at the end of the term of the agreement. A common example of BOT is the development of bridges by private developers, such as the Skye Bridge in Scotland. In the case of BTO, the developer builds the facility, transfers it to the government, and simultaneously enters into an agreement to operate the facility for a fixed time period. The transfer is effected to reduce tort liability exposure to

Box 6
**Contracting Out Operations at the Indianapolis
International Airport**

The Indianapolis International Airport is one of the largest examples of a management contract in the United States. In 1994, the Indianapolis Airport Authority (IAA) decided to bid out the management of its airport. Given the uniqueness of airport management contracts in the United States and the fact that the authority wanted to have a single entity with sole financial liability in case of a default, the authority chose to bid out the management of the airport as a single contract. In late 1994, five bids, including an in-house bid, were submitted. All the proposals were evaluated under the same criteria and in 1995, the airport authority signed a 10-year contract with BAA USA (the American subsidiary of British Airports Authority).

BAA identified cost savings and non-airline revenue increases totaling more than \$100 million over the length of the contract. The contract guarantees savings of \$32 million, and, according to the terms of the concession, once the yearly baseline savings of \$3.2 million has been achieved, BAA receives 40% of the savings in the first year, 35% in the second, and 30% thereafter. The rest of the savings go to the authority. However, if BAA fails to meet the baseline requirement it gets no compensation. The contract allows for a 5% bonus if BAA achieves predetermined quality targets.

The contract requires that BAA use its best efforts to employ interested and qualified staff of the IAA and to compensate them at the levels at which they were compensated when BAA took over management of the airport. BAA hired all of the existing airport

the private operator. A BOOT scheme is a variation of the BOT scheme with the ownership of the facility vesting with the private operator.

Box 6 (continued)

employees and also agreed in principle to reserve 10% and 2% of its contracts with vendors for services from minority- and women-owned businesses, respectively.

Projected savings by BAA are not the result of employee layoffs and salary cuts but are due rather to effective management. BAA plans to increase airport revenue by aggressively recruiting new retail shops and developing new and better services for airport customers. The company plans to bring down airport operating costs by drawing on its expertise and introducing the best technology and the best management practices.

Indianapolis has experienced reduced cost and increased non-airline revenues per passenger since the introduction of the management contract with BAA. According to the City of Indianapolis, BAA reduced the airport's cost per passenger from an average of \$6.70 in 1994 to \$3.87 in 1996. Concession and parking revenue per passenger increased by 50%, from \$2.14 in 1994 to \$3.32 in 1996. As a result, BAA has been able to reduced airline landing fees at Indianapolis International Airport by 70 percent, saving the airlines that operate at the airport \$7 million during BAA's first 15 months of management.

Indianapolis travelers also benefit from a provision requiring that BAA develop a Quality Service Monitor program to assess the attitude and helpfulness of the staff and other factors that affect travelers. Furthermore, BAA implemented "street pricing" to airport concessions, dictating that prices for goods sold within the airport be comparable to the prices in the metropolitan region.

SOURCES: OECD (1997a) and Goldsmith (1999).

Privatization of existing facilities typically begins by restructuring the entity. Steps are usually taken to streamline operations, cut costs, and focus management on commercial principles. Often the public

Box 7

Public-Private Partnerships—The Fort Mason Project

In an effort to improve services and to maximize returns on buildings and facilities, some federal agencies have turned to public-private partnerships. Public-private partnerships entail a government agency in partnership with a private entity (including nonprofits) to deliver a public good or service.

According to a report by the GAO, successful public-private partnerships are characterized by the following attributes

- There is a catalyst for change which leads to the formation of a partnership,
- There is a statutory basis for agencies to enter into partnerships, and the statute allows the agency to keep the revenues from the partnership,
- Appropriate institutional structures are incorporated to facilitate partnerships with the private sector,
- Business plans or similar documents are critical to the implementation of large-scale projects, and
- Project stakeholders support the partnership.

The Park Service employs public-private partnerships to develop and manage facilities. One such arrangement—the Fort Mason Project—is a partnership between the Golden Gate National Recreation Area (GGNRA)—a public entity—and the Fort Mason Foundation—a private, nonprofit organization. Fort

department is converted to a stock corporation, which, during the initial phase, is owned by the government. The objective is to focus the entity on commercial objectives and subject the company to commercial law.

Box 7 (continued)

Mason is an old Army installation which is historically significant because it was a major point of embarkation for U.S. troops during WWII. Because of the historic significance and the extent of the restoration needed on the site, GGNRA recognized in 1975 that it lacked sufficient funds and expertise to restore the facilities to the standards required by the Historic Preservation Act of 1966. In 1976, GGNRA and the Fort Mason Foundation entered into 20-year develop/operate partnership (extended to 2004).

GGNRA (managed by the Park Service) provides the buildings at Fort Mason rent-free, and in return the foundation is required to renovate, maintain, and operate the property, which consists of three piers, five warehouses, and several smaller buildings. The contract between the Park Service and the foundation stipulates that the foundation must develop and administer the complex and allow public activities to be held at minimal or no charge to the public. The foundation achieves these requirements by leasing facilities for events, meeting exhibits, etc., at rates approved by the Park Service.

By all indications, the partnership appears to be meeting the objectives of both parties in the partnership. The Park Service is satisfied with the preservation of the site and the provision of low-cost leased space to nonprofit organizations. The foundation is meeting its aim of providing low-cost or free programs of wide and specialized appeal to the public.

SOURCE: U.S. GAO (1999b).

Corporatization is commonly used before the privatization of state enterprises in the United Kingdom, New Zealand, Mexico, and Argentina (OECD, 1997a).

Perhaps the ultimate form of privatization is divestiture, or the outright sale of the public service institution to a private sector entity. The few examples of divestiture at the federal level include Conrail and the Great Plains Coal Gasification Plant. However, divestiture has been actively pursued in Canada, France, Mexico, New Zealand, and the United Kingdom. The most aggressive program of divestiture has been in New Zealand, where the national government sold assets worth 14.1 percent of GDP between 1987 and 1991. The United Kingdom also sold assets worth 12 percent of GDP between 1979 and 1991. The divested entities included agricultural, mining, manufacturing, transportation, financial, and insurance services as well as hotels, housing, and water supply and wastewater treatment authorities (see Box 8). In Mexico, 1,008 out of 1,155 public enterprises were sold between 1982 and 1992.

Forms of divestiture vary according to the goals of the privatization and the size of the entity. It is often important to target the sale of the entity to a firm that can provide suitable technology, know-how, and capital. In such cases, privatization will focus on attracting a strategic investor. In other cases, sales can be tendered. Competitive tenders usually serve the public interest best, whereas negotiated sales should be avoided if at all possible. Public offerings are expensive and require a large and active financial marketplace. Private placement is less expensive, but care must be taken to ensure competitive bidding (Klein, 1998).

First and foremost, divestiture needs to be guided by clear goals and objectives. Most governments pursue divestiture for three reasons: to increase efficiency, to reduce the size of the public sector, and to reduce

government debt. There is also evidence that privatization fosters economic development and stability (Lopez-de-Silanes et al., 1995). In the United Kingdom, privatization was carried out to increase the efficiency of service provision. In New Zealand, policymakers were concerned with both increasing efficiency and reducing government debt. Using private sector financial advisors, these governments carefully assessed the market valuations of the entities to be privatized.

They also included “clawback” provisions in sales contracts to insure that the government participated in any windfall profits that occurred shortly after privatization.

Both New Zealand and Mexico included divestiture proceeds in their annual budget statements, presenting debt levels with and without privatization proceeds. In all of the surveyed countries (France, Mexico, Canada, New Zealand, and the United Kingdom), a centralized agency was used to carry out privatization. In most cases, the entity to be privatized was converted to a stock corporation. Entities that were corporatized before sale fetched higher prices. Firms to be privatized may also require restructuring to break up monopolies and to foster competition (OECD, 1997b).

Governments typically consider political as well as financial effects of privatization. An excellent GAO report lists six needs for effective state and local privatization:

- A political champion to push for privatization,
- Developed implementation structures,
- Legislative and resource changes,
- Reliable, complete cost and benefit information,

Box 8

Water Privatization and Regulation in England and Wales

Ten publicly owned water and sewerage authorities in England and Wales were privatized in 1989. The government privatized the authorities believing that privatization would lead to more efficient companies and spawn badly needed investments in water and sewerage infrastructure.

Privatization of water and sewerage was accompanied by the creation of a new regulatory agency—the Office of Water Services (Ofwat). Ofwat was given oversight, implementation, and licensing authority over the water sector. To limit monopolistic pricing, the regulatory structure imposed price caps set in five-year cycles and introduced the use of yardsticks based on sector-wide performance comparisons to limit information asymmetries. Less efficient water companies are given more demanding efficiency standards to bring performance in line with the best performers.

Private water companies invested nearly twice as much in the six years following privatization as had been invested in the six years before privatization, fulfilling the government's investment objective. However, there were signs that not all of the investments were as efficient as the government had intended.

During the first regulatory cycle (1989–1994), the operation of the price cap effectively resulted in a rate-of-return approach to

- Strategies for building support and managing the workforce transition, and
- Monitoring and oversight.

International as well as domestic experience suggests that restructuring government services is controversial. Public employees are

Box 8 (continued)

rewarding investors for gold-plating investments and consequently increasing the profitability of companies. The investment boom resulted in higher prices for consumers at the same time that the companies were reporting soaring profits.

The privatization of water and wastewater in England and Wales is best viewed as a partial success. Evidence gathered by the World Bank indicates that privatization has delivered the investments necessary to improve water quality standards, however, the regulatory framework in the first five-year cycle did not provide the necessary incentives to ensure improvements in efficiency.

The experience from England and Wales indicates that ample and reliable information is needed to deliver on the efficiency objective of privatization. Price caps rely on yardstick competition which assigns inputs, costs, and quality based on lowest cost and highest service standards. If price caps are set too high, utilities earn excess profits. On the other hand, if price caps are set too low, utilities will underinvest. However, utilities face different conditions (e.g., input prices) and bridging parameters across different conditions has proved challenging for Ofwat. That said, improvements in the second regulatory cycle (1995–2000) should be a better test of the price cap regulatory mechanism practice in England and Wales.

SOURCES: Van den Berg (1997) and Vass (1993).

concerned that privatization threatens their security, and consumers are concerned that it will reduce the quality or coverage of services. Moreover, privatization is not risk-free. Because actors do not always maintain the public's property diligently, privatization can create moral hazards. Consequently, the full costs of implementing privatization schemes are not factored into most programs (Sclar, 1997). All countries

engaged in privatization stress the importance of ongoing regulation to ensure fair prices and adequate service coverage and quality (U.S. GAO, 1997).

4. Financing Infrastructure Provision

California's infrastructure needs between 1999 and 2009 are estimated at \$82.2 billion. These requirements are shown in Table 2.

At the present time, the state can issue \$8.7 billion in bonds to meet this need. This leaves a gap of \$73.5 billion: \$53.3 billion for state capital outlay and \$20.2 for state-funded local infrastructure, which is

Table 2
Ten-Year Capital Requirements, 1999–2009

| Category | \$ billions | Percent |
|-----------------------------|-------------|---------|
| Business and transportation | 27.6 | 37.6 |
| Higher education | 15.4 | 21.0 |
| K–12 education | 8.9 | 12.1 |
| Corrections | 9.5 | 12.9 |
| Resources | 9.0 | 12.2 |
| Other | 3.1 | 4.2 |
| Total | 82.2 | 100.0 |

typically budgeted as local assistance. Funding comes from two basic sources—direct appropriations (pay-as-you-go) and long-term financing (bonds, lease-options or installment purchases, and capitalized leases). The Department of Finance (DOF) estimates that \$33.1 billion will be available from federal and other non-General Fund pay-as-you-go sources. The DOF also estimates that the state could issue \$32.5 billion in general obligation bonds, and that \$1.5 billion could be available from the General Fund to finance infrastructure projects on a pay-as-you-go basis. The state can therefore expect to cover all but \$6.4 billion in projected infrastructure needs (California DOF, 1999b).

The Department of Finance has suggested some alternatives to address the \$6.4 billion shortfall in funding capacity. These include

- Increasing local school districts' ability to raise construction funds through a simple majority voting requirement and requiring that districts match state funds for school construction,
- Reducing or eliminating state support for other primarily local responsibility infrastructure,
- Developing methods of program delivery (for example, year-round education) that reduce the need for capital and infrastructure outlay,
- Committing a higher level of General Fund resources to pay-as-you-go infrastructure,
- Expanding the use of long-term financing strategies for infrastructure,
- Expanding use of privatization, and
- Committing a fixed portion of revenue for infrastructure.

Several other strategies could be added to this list. The state might also use demand-management techniques to reduce infrastructure requirements, increase private sector participation in infrastructure provision, and levy user charges and fees to reduce congestion and increase revenues.

Basic Approaches to Financing Infrastructure

The three basic models for procuring infrastructure services are pay-as-you-go, financed-purchase, and leasing and private provision. In the first two options, the government or the community purchases the assets and facilities that provide the infrastructure service. In the third option, the government rents the facility providing the service or procures the service from a nongovernmental provider.

Pay-As-You-Go

Under pay-as-you-go, no borrowing takes place; rather, the government procures infrastructure services by paying the full cost for the facility up-front. Pay-as-you-go procurement is driven by federal funds (such as from the highway trust fund) or money from the General Fund account of the state budget. Proponents favor this method because it is the least expensive in nominal terms and because there is no interest expense or marked-up leasing charges. However, it limits infrastructure investment to cash on hand and does not capitalize on the benefits of financial leveraging. For example, if a gas tax generates \$100 million per year, the pay-as-you-go approach allows government to build \$100 million worth of highways. If these funds are used to finance development (by borrowing at 6 percent over 30 years), the \$100 million per year cash flow would allow the government to build over \$1.3 billion

worth of highways. Another limitation of pay-as-you-go is that current taxpayers pay for facilities that will benefit future generations (Auerbach, 1999).

Long-Term Financing

Financing infrastructure is based on government borrowing and can be carried out in a variety of ways. The most common way is for the government to issue bonds (LAO, 1998a). Buyers are paid interest while the bonds are outstanding and are repaid the original amount when the bonds reach maturity. Most bonds have terms of 20 to 30 years. The government can also finance purchases by leasing a facility and taking on ownership of the facility at the end of the lease. The long-term financing of infrastructure facilities, whether accomplished through bond financing or lease-purchase options, gives the government the ability to procure durable, long-lasting infrastructure and to pay for it over time. If the term of the borrowing matches the economic and physical life of the project, this approach effectively balances inter-generational equity. It also allows government to move rapidly to meet increasing demand. Another important advantage of revenue bond financing is that it better matches user and beneficiary fees, charges, and assessments with infrastructure procurement; that is, the cash flow from fees, charges, and assessments can be used to make bond or lease payments.

There are two basic types of bonds: general obligation and revenue bonds. These reflect different methods of securing cash flow payments to bondholders. In the case of general obligation bonds, the government promises to use its general revenues to pay interest and principal. Accordingly, the general obligation bonds are backed by the full faith and credit of the issuing government, and the yields are determined by the

overall fiscal and economic health of the government issuing the bonds. Governments with too much borrowing or indebtedness will receive a lower credit rating because they have less capacity to service debt. The DOF has estimated that California can maintain a debt service to General Fund account ratio of 6 percent without adversely affecting the state's credit rating. Approximately 90 percent of all jurisdictions use general obligation bonds to finance projects (International City/County Managers Association, 1999).

Lease-purchase agreements allow state and local governments to procure infrastructure facilities by issuing certificates of participation, which are secured by the stream of lease payments. This mechanism allows governments to finance infrastructure acquisition without going into debt or obtaining voter approval. Certificates of participation are riskier than bonds and therefore carry higher rates of interest.

Private Provision

A third model for procuring infrastructure shifts responsibility to a private provider to deliver the service to consumers. For example, the Department of Corrections could contract with private companies to provide and manage facilities. Instead of paying the capital and operating costs of such facilities, the state would pay a fee to the private provider.

Commonly referred to as privatization, this third approach provides a wide array of alternative methods for procuring infrastructure services. For example, a government can avoid having to finance the major upgrading of old or inadequate facilities by executing a lease-develop-operate agreement. In an LDO, the government leases the facility to a developer who in turn modernizes and operates the facility and leases it

back to the government. At the end of the lease period, the property (with all improvements) reverts to the government. This method of financing was used to upgrade the parking terminal at Toronto International Airport and to refurbish and expand highways in Argentina, Chile, China, Columbia, Hungary, Malaysia, Mexico, and the United Kingdom (Fishbein and Babbar, 1996).

Concessions can also be used to finance facilities such as urban water supply and wastewater collection and treatment. Under this arrangement, the government contracts with a private operator to take over an existing utility. In return, the concessionaire agrees to maintain, upgrade, and expand water and wastewater services at its own expense. The concessionaire is entitled to charge service fees, subject to utility regulation. Most concessions run for 20 or more years and are common in the United Kingdom, France, and many developing countries.

Financing privatization projects is inherently riskier than conventional forms of financing for two reasons: The revenue streams are typically based on user fees and charges, and the developer must shoulder construction as well as market risk. Furthermore, the financial success of such projects is usually not guaranteed by the full faith and credit of governments. However, certain mechanisms can be used to reduce risk and enhance the creditworthiness of projects. Governments can enter into “take or pay contracts” where they promise to purchase a minimum level of service. Contractors can also purchase project-completion insurance and performance bonds (OECD, 1997b).

Several states have formed infrastructure banks to facilitate the financing of infrastructure. California’s bank started in 1994 as the California Economic Development Financing Authority and was reconstituted and renamed the California Infrastructure and Economic

Development Bank (CIEDB) in 1998. During fiscal year 1998–99, the bank received an appropriation of \$50 million; this year the appropriation is \$425 million. This appropriation is for public entities only.

The CIEDB is authorized to issue bonds; make direct loans; provide insurance, guarantees, and other forms of credit enhancements or liquidity facilities; make grants; create financing pools; and acquire or lease facilities. These activities can be used to enhance the financial feasibility of projects by lowering borrowing costs, pooling smaller projects to reduce issuance costs, or offering lines of credit to cover operating shortfalls. Bonds issued by the CIEDB are issued on a conduit basis, which means that the revenues of the underlying bond are used to pay interest and principal on the bonds. Credit ratings on the bonds reflect the use of credit enhancements or the rating of the underlying borrower. Neither the state nor the bank is obligated to pay back conduit bonds in the event of default. The bank is in the position to facilitate the financing of both private and public infrastructure projects.

Long-term financing along with user and beneficiary charges provides the most efficient means for procuring and financing infrastructure. In cases where federal government transfers are available, these funds should be used to finance developments on a pay-as-you-go basis. Private provision or public-private partnerships can leverage government resources to develop capital projects. As project financing becomes more complex, blending federal, state, local, and private funds, infrastructure banks can play an important role in facilitating financial arrangements.

Sources of Infrastructure Financing

California uses a variety of sources for financing infrastructure (State of California, Governor's Office of Planning and Research, 1997).

Federal Subventions and Transfers

The federal government transfers considerable monies to California on an earmarked and revenue-sharing basis. The bulk of the transfers are linked to transportation infrastructure development and maintenance. During 1996–97, for example, California received \$1.52 billion in federal highway trust funds (Brown et al., 1998).

General Taxes and Special Taxes

State and local governments can impose taxes on citizens for the purpose of financing services. Such taxes include income and sales taxes, property taxes, gas taxes, and real estate transfer taxes. According to Proposition 218, however, imposition of such taxes requires voter approval (LAO, 1996). Proposition 218 reduced all local taxes to either general or special taxes. General taxes pertain to general government services and special taxes pertain to taxes levied for specific purpose. General and special taxes can be used to finance infrastructure services when the distribution of benefits is disbursed across the public.

Special Assessments

Some infrastructure investments (such as such as flood control, streetlighting, and underground utility service) produce spillover benefits. Special assessment districts are designed to levy taxes on property owners directly benefiting from the infrastructure investment. Two-thirds of voters or a majority of property owners must approve these special

assessments. California's tax increment financing law provides a vehicle for financing infrastructure investments that enhance property values by capturing part of this gain and using it to pay debt service.

Developer Exactions

Developer exactions, also called impact fees, are levies on new development or redevelopment. They are one-time collections that are part of the building approval process. Impact fees are levied to cover the infrastructure costs associated with new development, such as school construction, sewer hook-up, and road construction. Such fees are not viewed as special taxes if they reasonably reflect the cost of providing service and if the revenue is not placed in the general fund. The proliferation of developer fees and exactions has led to legislation designed to limit further increases in fees (Dresch and Sheffrin, 1997).

User Fees

User fees and charges are levied on the consumption of infrastructure services. Revenues generated by user charges can be used to finance the construction, operation, and maintenance of facilities (OECD, 1998). User charges can also be used to control congestion by varying the prices according to the level of demand during peak and off-peak periods (Humphrey et al., 1997). User fees and charges can be structured in a variety of ways. Fees can vary according to consumption (as with water and electricity) or remain a flat monthly charge (as with garbage collection). User fees are not considered "special taxes" if they do not exceed the reasonable cost of providing the regulatory service or activity for which they are charged, and if they are not levied for general revenue purposes (Government Code Section 50076).

User fees can be levied by either a public or private entity. In the case of a government provider, fees need to reflect the costs of services to avoid voter approval. Also, the fees must be channeled into infrastructure service. If the service is privatized, the private provider is free to levy fees on users. If the provider is granted a utility franchise for which there are no alternative service providers, the government must regulate pricing and service provision to protect the public's interests.

Beneficiary Charges

Beneficiary charges are levies that are based on the beneficial effect that an infrastructure service has on properties and businesses. They are not associated with actual consumption but rather with the benefits generated by the infrastructure service. An example of a beneficiary charge would be a levy for street lighting or flood protection. Beneficiary charges may be deemed user charges if they meet the test of Government Code Section 50076, or they may be viewed as special taxes and therefore require voter approval.

Given the range of options for financing California's infrastructure services, policymakers must decide which of these methods are most appropriate. In California, as elsewhere, local governments have been shifting costs for infrastructure capital costs from general fund sources to user and beneficiary groups. According to a 1993 ICMA survey of 79 cities and 9 counties in California, 60 percent of the respondents indicated that they had shifted costs to users between 1987 and 1992. Of those stating that they had shifted costs, 62 percent indicated that they have implemented user fees and charges to finance services. Seventy-five percent of cost shifters said that they required developers to finance infrastructure projects (ICMA, 1993).

Planning and Budgeting for Infrastructure Investment

A critical step in infrastructure provision is the linking of planning with budgeting. The Government Performance and Results Act of 1993 seeks to strengthen federal decisionmaking and accountability by focusing on the results of federal activities and spending. Beginning in fiscal year 1999, agencies must prepare annual performance plans containing annual performance goals covering the program activities in agencies budget requests (U.S. GAO, 1999a).

California recently adopted a Strategic Planning Guideline, and according to the Department of Finance, nearly all agencies (98 percent) are complying with the new law. A new infrastructure planning requirement was enacted in 1999. Assembly Bill 1473 (Chapter 606, 1999) will require, beginning in 2001, that the Governor submit annually a proposed five-year infrastructure plan to the legislature along with the annual budget. This is certainly a step in the right direction, but there are important aspects that need attention to make the process more effective (U.S. GAO, 1998).

Performance budgeting is central to any initiative to improve the effectiveness and efficiency of infrastructure service provision. In essence, funding decisions are based on program results. Far too often, capital budget requests are based on wish lists and are not linked with mission statements about what the agency is trying to do or deliver. In particular, it is critical that projections give full weight to operating and maintenance costs. These cost items need to be fully incorporated into the financial and market analysis. Agencies often underbudget for maintenance, causing the infrastructure assets to rapidly deteriorate. Full

cost recovery tariffs needs to be estimated and integrated into project appraisal assessments of demand.

To sum up, long-term financing as well as user and beneficiary charges provide the most efficient means of procuring infrastructure.

Other important financial elements include:

- Making the most efficient use of federal transfers,
- Developing partnerships with the private sector to build, finance, and operate infrastructure projects,
- Devolving responsibility for infrastructure projects that primarily benefit local jurisdictions to those jurisdictions; co-financing could be developed for local projects (such as school construction) that generate spillovers to the state at large,
- Using technology, pricing, and demand management to increase capacity of infrastructure facilities, and
- Assessing and prioritizing projects using modern methods of capital budgeting and investment planning.

5. Conclusion: Moving from Provision to Management

Previous chapters have outlined how California's infrastructure could be made more efficient, cost-effective, and dynamic. In keeping with the idea of moving from infrastructure provision to infrastructure management, policymakers might consider ways to

- Make infrastructure planning and capital budgeting more demand-driven,
- Apply demand management tools to attenuate the growth in demand for infrastructure capital and better use existing infrastructure facilities,
- Shift infrastructure responsibilities from the public to private sector and stimulate competition for infrastructure services,
- Use long-term financing and credit enhancements to leverage appropriations and revenue streams to procure infrastructure investments, and

- Finance infrastructure through user and beneficiary charges and rely on private provision and financing where possible.

These policy initiatives call for a dramatic change in the institutional environment surrounding state infrastructure provision. Instead of relying on state agencies to provide or finance infrastructure services, the new approach suggests devolving responsibilities for the production of infrastructure to local governments and to private and nonprofit entities. Although government provision of infrastructure would diminish under the proposed model, the state would still be responsible for setting infrastructure policy, managing its provision, ensuring that standards of service coverage and quality are met, and overseeing prices and tariffs.

References

- Angelides, Philip, *Smart Investing*, California State Treasurer's Office, Sacramento, California, 1999.
- Assembly Office of Research, *California's Infrastructure: Rusty Hinges on the Golden Gate*, Sacramento, California, 1984.
- Association of Commuter Transportation, *TDM Case Studies and Commuter Testimonials*, Transportation Demand Management Institute, Washington, D.C., 1997
- Auerbach, Alan J., *Generational Accounting Around the World*, Working Paper No. 3598, National Bureau of Economic Research, Cambridge, Massachusetts, 1999.
- Bathen, Sigrid, "Prison Construction," *California Journal*, Vol. 28, No. 3, 1997, pp. 6–13.
- Baumol, William J., John C. Panzar, and Robert D. Willig, *Contestable Markets and the Theory of Industrial Structure*, Harcourt Brace Jovanovich, New York, 1982.
- Baumann, D. D., J. J. Boland, and W. Michael Hanemann, eds., *Urban Water Demand Management and Planning*, McGraw-Hill, New York, 1998.

- Blakeley, Edward J., and Mary Gail Snyder, *Fortress America: Gated Communities in the United States*, Brookings Institute, New York, 1997.
- Bloomfield, Pamela, David Westerling, and Robert Carey, "Innovations and Risk in a Public-Private Partnership: Financing and Construction of a Capital Project in Massachusetts," *Public Productivity & Management Review*, Vol. 21, No. 4, 1998, pp. 460–471.
- Brinkerhoff, Noel, "Lock 'em Up," *California Journal*, Vol. 30, No. 2, 1999a, pp. 8–16.
- Brinkerhoff, Noel, "Water Marketing," *California Journal*, Vol. 30, No. 8, 1998b, pp. 12–17.
- Brown, Jeffrey, et al., *The Future of California Highway Finance*, The California Policy Research Center, Berkeley, California, 1998.
- Burns, Phil, and Antonio Estache, *Information, Accounting and the Regulation of Concessioned Infrastructure Monopolies*, World Bank Discussion Paper 2034, Washington, D.C., 1998.
- CALFED, "Economic Evaluation of Water Management Alternatives: Screening Analysis and Scenario Development" (Draft), 1999, available at <http://calfed.ca.gov>.
- California Assembly, Assembly Bill 1473 Capital Outlay: State Planning and Funding, 1999.
- California Business Roundtable, *Building a Legacy for the Next Generation*, Sacramento, California, 1998.
- California Department of Finance, *Governor's Budget Summary*, Sacramento, California, 1999a.
- California Department of Finance, *Capital Outlay and Infrastructure Report*, Sacramento, California, 1999b.
- California Energy Commission, "Volume II: Electricity Demand Forecasting Methods," *California Energy Demand: 1995–2015*, Sacramento, California, 1995a.

- California Energy Commission, "Volume XI: Committed Demand Side Management Program Savings," *California Energy Demand: 1995–2015*, Sacramento, California, 1995b.
- California Energy Commission, *Savings and Cost of Statewide Efficiency Standards*, Sacramento, California, 1995c.
- California Energy Commission, *1998 Baseline Energy Outlook*, Sacramento, California, 1998.
- California Integrated Waste Management Board, *Facts at a Glance*, Sacramento, California, 1999, available at <http://www.ciwmb.ca.gov>.
- California State Senate, Senate Bill 915, Capital Outlay: State Budgeting, 1999.
- Choate, P., and S. Walter, *America in Ruins: The Decaying Infrastructure*, Duke University Press, Durham, N.C., 1983.
- Commission on Building for the 21st Century, *Initial State Infrastructure Report to Governor Davis*, 1999, available at <http://www.ltg.ca.gov>.
- Commonwealth Competition Council, *Annual Report*, Commonwealth of Virginia, Richmond, Virginia, 1998a.
- Commonwealth Competition Council, *The Privatization/Competition Manual*, Commonwealth of Virginia, Richmond, Virginia, 1998b.
- Commonwealth of Virginia, *Virginia Government Competition Act*, Richmond, Virginia, 1995.
- Congressional Budget Office, *Innovative Financing of Highways: An Analysis of Proposals*, U.S. Government Printing Office, Washington, D.C., 1998.
- Dresch, M., and S. Sheffrin, *Who Pays for Development Fees and Exactions?* Public Policy Institute of California, San Francisco, California, 1997.

- Easter, William K., Mark W. Rosegrant, and Ariel Dinar, eds., *Markets for Water: Potential and Performance*, Kluwer Academic Publishers, Boston, Massachusetts, 1998.
- Ehrhardt, David, and Rebecca Burdon, *Free Entry in Infrastructure*, World Bank Discussion Paper 2093, Washington, D.C., 1999.
- Estache, Antonio, and David Marimort, *Politics, Transaction Costs, and the Design of Regulatory Institutions*, World Bank Discussion Paper 2073, Washington, D.C., 1999.
- Finzi, Ugo, *The World Bank and Project Analysis: An Introduction*, EDI Publication, World Bank, Washington, D.C., 1994.
- Fishbein, Gregory, and Suman Babbar, *Private Financing of Toll Roads*, The World Bank, Washington, D.C., 1996.
- Fox, William F., *Strategic Options for Urban Infrastructure Management*, The World Bank/Urban Management Program, Washington, D.C., 1994.
- Frick, Karen T., Steve Heminger, and Hank Dittmar, "Bay Bridge Congestion-Pricing Project: Lessons to Date," *Transportation Research Record*, No. 1558, 1996, pp. 29–38.
- Galenson, Alice, and Louis S. Thompson, *The Evolution of the World Bank's Railway Lending*, World Bank Discussion Paper 269, Washington, D.C., 1994.
- Gómez-Ibáñez, José A., and Kenneth Small, "Road Pricing for Congestion Management: A Survey of International Practice," *Synthesis of Highway Practice 210* (Transportation Research Board), National Academy Press, Washington, D.C., 1994.
- Goldsmith, Stephen, *The 21st Century City*, Rowan & Littlefield, New York, 1999.
- Gramlich, Edward M., "Infrastructure Investment: A Review Essay," *Journal of Economic Literature*, Vol. 32, No. 3, 1994, pp. 1176–1196.

- Greenwood, Peter W., Karyn E. Model, C. Peter Rydell, and James Chiesa, *Diverting Children from a Life of Crime: Measuring Costs and Benefits*, RAND, Santa Monica, California, 1998.
- Grover, Brian, *Water Supply and Sanitation Project Preparation Handbook*, World Bank, Washington, D.C., 1983.
- Guislain, Pierre, *The Privatization Challenge: A Strategic, Legal and Institutional Analysis of International Experience*, The World Bank, Washington, D.C., 1997.
- Hall, Peter Geoffrey, *Great Planning Disasters*, University of California Press, Berkeley, California, 1981.
- Harrington, Winston, Alan J. Krupnick, and Anna Albertini, *Overcoming Public Aversion to Congestion Pricing*, Discussion Paper 98-27, Resources for the Future, Washington, D.C., 1998, available at <http://www.rff.org>.
- Humphrey, David B., Robert Keppler, and Fernando Montes-Negret, *Cost Recovery and Pricing of Payment Services: Theory, Methods and Experience*, World Bank Discussion Paper 1833, Washington, D.C., 1997.
- International City/County Managers Association, *Special Data Issues: Local Government Infrastructure Finance*, Washington, D.C., 1993.
- International City/County Managers Association, "Introduction to Infrastructure Finance," *Inquiry Service Report*, Vol. 31, No. 3, Washington, D.C., 1999.
- Irwin, Timothy, *Price Structures, Cross-Subsidies, and Competition in Infrastructure*, Private Sector Viewpoint, World Bank, Finance, Private Sector, and Infrastructure Network, Washington, D.C., 1997.
- Kaganoff, Tessa, *Collaboration, Technology, and Outsourcing Initiatives in Higher Education: A Literature Review*, RAND, Santa Monica, California, 1998.
- Kapp, K. William, *The Social Costs of Private Enterprise*, Harvard University Press, Cambridge, Massachusetts, 1950.

- Kawada, Kim, *San Diego's Interstate 15 Value Pricing Project*, San Diego Association of Governments, San Diego, California, 1998.
- Kessides, Christine, *Institutional Options for Infrastructure Provision*, World Bank, Washington, D.C., 1993.
- Kikeri, Sunita, John Nellis, and Mary Shirley, *Privatization: The Lessons of Experience*, World Bank, Washington, D.C., 1992.
- Kikeri, Sunita, John Nellis, and Mary Shirley, "Privatization: Lessons from Market Economies," *World Bank Research Observer*, Vol. 9, No. 2, 1994, pp. 241–272.
- Klein, Michael, *Bidding for Concessions*, World Bank Discussion Paper 1957, Washington, D.C., 1998.
- Legislative Analyst's Office, *Understanding Proposition 218*, Sacramento, California, 1996, available at <http://www.lao.gov>.
- Legislative Analyst's Office, *A Primer on State Bonds*, Sacramento, California, 1998a, available at <http://www.lao.ca.gov>.
- Legislative Analyst's Office, *Overhauling the State's Infrastructure: Planning and Financing Process*, Sacramento, California, 1998b, available at <http://www.lao.ca.gov>.
- Legislative Analyst's Office, *A K–12 Master Plan*, Sacramento, California, 1999a, available at <http://www.lao.ca.gov>.
- Legislative Analyst's Office, *Year Round Operations in Higher Education*, Sacramento, California, 1999b, available at <http://www.lao.ca.gov>.
- Lee, Kyu Sik, and Alex Anas, "Costs of Deficient Infrastructure: The Case of Nigerian Manufacturing," *Urban Studies*, Vol. 29, No. 7, 1992, pp. 1071–1093.
- Leibenstein, Harvey, *General X-Efficiency Theory and Economic Development*, Oxford University Press, New York, 1978.
- Levine, Mark D., and Richard Sonnenblick, "On the Assessment of Utility Demand-Side Management Programs," *Energy Policy*, Vol. 22, No. 10, 1994, pp. 848–856.

- Litman, Todd, Charles Komanoff, and Douglas Howell, *Road Relief: Tax and Pricing Shifts for a Fairer, Cleaner, and Less Congested Transportation System in Washington State*, Energy Outreach Center, Olympia, Washington, 1998.
- Lopez-de-Silanes, Florencio, Andrei Shleifer, and Robert W. Vishny, *Privatization in the United States*, Working Paper No. 5113, National Bureau of Economic Research, Cambridge, Massachusetts, 1995.
- Mercer Management Consultants, *1995 Privatization Study*, Washington, D.C., 1995.
- Mercer Management Consultants, *Capital Budgeting in the States*, Washington, D.C., 1997, available at <http://nasbo.org>.
- National Council on Public Works Improvement, *Fragile Foundation: A Report on America's Public Works*, Washington, D.C., 1988.
- Organisation for Economic Co-operation and Development, *Contracting Out Government Services: Best Practice Guidelines and Case Studies*, Public Management Occasional Papers No. 20, Paris, 1997a.
- Organisation for Economic Co-operation and Development, *Privatization of Utilities and Infrastructure*, Paris, 1997b.
- Organisation for Economic Co-operation and Development, *User Charging for Government Services: Best Practice Guidelines and Case Studies*, Public Management Occasional Papers No. 22, Paris, 1998.
- Palmer, Karen, Hilary Sigman, and Margaret Wells, *The Cost of Reducing Municipal Solid Waste*, Discussion Paper 96-35, Resources for the Future, Washington, D.C., 1996.
- Park, Gregory S., and Robert Lempert, *The Class of 2014: Preserving Access to California Higher Education*, RAND, Santa Monica, California, 1998.
- Reason Public Policy Institute, *Privatization 1999: The 13th Annual Report on Privatization*, Los Angeles, California, 1999.

- Renwick, Mary, Richard Green, and Chester McCorkle, *Measuring the Price Responsiveness of Residential Water Demand in California's Areas: A Report*, Prepared for the California Department of Water Resources. Sacramento, California, 1998.
- Reisner, Marc, *Cadillac Desert: The American West and Its Disappearing Water*, Penguin Books, New York, 1986.
- Ruster, Jeff, *A Retrospective on the Mexican Toll Road Program (1989–1994)*, Private Sector Viewpoint, World Bank, Finance, Private Sector, and Infrastructure Network, Washington, D.C., 1997.
- Safina, Carl, *Song for the Blue Ocean: Encounters Along the World's Coasts and Beneath the Seas*, Henry Holt, New York, 1997.
- Sclar, Elliot, *The Privatization of Public Service: Lessons from Case Studies*, Economics Policy Institute, Washington, D.C., 1997.
- Seik, F. T., "An Effective Demand Management Instrument in Urban Transport: The Area Licensing Scheme in Singapore," *Cities*, Vol. 14, No. 3, 1997, pp. 155–164.
- Sheshinski, Eytan, and Luis Felipe Lopez-Calva, *Privatization and Its Benefits: Theory and Evidence*, Development Discussion Paper No. 698, Harvard Institute of International Development, Cambridge, Massachusetts, 1999.
- Smith, Warrick, "Utility Regulators—The Independence Debate," *World Bank Public Policy for the Private Sector*, Note 127, Washington, D.C., 1997.
- State of California, Governor's Office of Planning and Research, *A Planner's Guide to Financing Public Improvement*, Sacramento, California, 1997, available at <http://www.ceres.ca.gov>.
- Sullivan, Edward C., *Summary of Findings from the SR91 Impact Study*, Department of Civil and Environmental Engineering, California Polytechnic State University, San Luis Obispo, California, 1998.
- U.S. General Accounting Office, *Budget Issues: Privatization/Divestiture Practices in Other Nations*, Washington, D.C., 1996a.

- U.S. General Accounting Office, *Concession Contracting: Governmentwide Rates of Return*, Washington, D.C., 1996b.
- U.S. General Accounting Office, *Privatization: Lessons Learned by State and Local Governments*, Washington, D.C., 1997.
- U.S. General Accounting Office, *Executive Guide: Leading Practices in Capital Decision-Making*, Washington, D.C., 1998.
- U.S. General Accounting Office, *Performance Budgeting: Initial Experience Under the Results Act in Linking Plans with Budgets*, Washington, D.C., 1999a.
- U.S. General Accounting Office, *Public-Private Partnerships: Key Elements of Federal Building and Facility Partnerships*, Washington, D.C., 1999b.
- University of North Carolina, Office of General Administration, *Outsourcing/Privatization Study for the University of North Carolina System*, n.d., available at <http://www.fis.ncsu.edu>.
- Walker, Chris, *Partnerships for Parks: Lessons from the Lila Wallace-Reader's Digest Parks Program*, Washington, D.C., 1999.
- Van den Berg, Caroline, *Water Privatization and Regulation in England and Wales*, Private Sector Viewpoint, World Bank, Finance, Private Sector, and Infrastructure Network, Washington, D.C., 1997.
- Vass, Peter, "Water Privatization and the First Periodic Review," *Financial Accountability & Management*, Vol. 9, No. 3, 1993, pp. 209–224.
- Vickery, William, *Statement to the Joint Committee on Washington Metropolitan Problems*, U.S. Congress, Washington, D.C., 1959.
- World Bank, *World Bank Development Report*, Washington, D.C., 1994.

About the Author

DAVID E. DOWALL

David Dowall is Professor of City and Regional Planning at the University of California at Berkeley. He is a leading expert on urban economics and infrastructure policy and frequently consults for the World Bank, Asian Development Bank, United Nations Development Programme, and the U.S. Agency for International Development. He has served as a policy advisor to local and central governments and businesses in over 40 countries. His books include *The Suburban Squeeze*, *The Land Market Assessment*, and *The Warsaw Economy in Transition*. He holds a B.S. in economics from the University of Maryland and both a master's degree in urban and regional planning and a Ph.D. in economics from the University of Colorado.