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# TURNKEY PROCUREMENT

## OPPORTUNITIES AND ISSUES



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OPPORTUNITIES AND ISSUES**

**June 1992**

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**U.S. DEPARTMENT OF TRANSPORTATION**  
Federal Transit Administration  
Office of Technical Assistance and Safety

Prepared by:

**EG&G DYNATREND INC.**  
and  
**JEFFREY A. PARKER AND ASSOCIATES**

**OFFICE OF TECHNICAL ASSISTANCE AND SAFETY**

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# TURNKEY PROCUREMENT OPPORTUNITIES AND ISSUES

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## LIST OF ACRONYMS

A&E	Architecture & Engineering
AGT	Automated Guideway Transit
APT	Area Personal Transit
BOO	Build-Own-Operate
BOT	Build-Operate-Transfer
BTO	Build-Transfer-Operate
DPM	Downtown People Mover
EHCC	Eastern Harbour Crossing Company
EPA	Environmental Protection Agency
FEIS	Final Environmental Impact Statement
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
GAO	General Accounting Office
GET	General Excise and Use Tax
GSA	General Services Administration
HART	Hillsborough Area Rapid Transit Authority
HMT	Houston Monorail Team
HPOWER	Honolulu Project of Waste Energy Recovery
ISTEA	Intermodal Surface Transportation Efficiency Act
ITE	Institute of Transportation Engineers
LDDC	London Docklands Development Corporation
LRT	Light Rail Transit
MTI	Maglev Transit, Inc.
NBA	National Basketball Association
NHKTC	New Hong Kong Tunnel Company
O&M	Operations and Maintenance
OMB	Office of Management and Budget
OTG	Oahu Transit Group
PE	Preliminary Engineer
PMO	Project Management Oversight
PMP	Project Management Plan
PRT	Personal Rapid Transit
RFP	Request for Proposal
SEP	Special Experimental Project
SEPTA	Southeastern Pennsylvania Transportation Authority
SHTC	Sydney Harbour Tunnel Company
TGI	The Transportation Group, Inc.
TRB	Transportation Research Board
UTDC	Urban Transit Development Corporation
UMTA	Urban Mass Transportation Administration (now FTA)

# **TURNKEY PROCUREMENT**

## **OPPORTUNITIES AND ISSUES**

### **1.0 INTRODUCTION**

To help meet increasing demands for transit capital investments and better allocate implementation risks, the Federal Transit Administration (FTA) is encouraging more direct private sector participation in the planning, engineering, implementation, financing, and operation of fixed guideway systems. Turnkey and other innovative procurement techniques may prove to be an effective means for encouraging cost and risk sharing arrangements with the private sector. Potential benefits from new project implementation strategies include:

- **Permit Federal cash flows to be managed more effectively**  
For example: extended payment terms, access to lease financing
- **Minimize project costs**  
For example: accelerate implementation, utilize private sector project management capabilities
- **Control project completion and cost overrun risks**  
For example: negotiate fixed-price contracts for capital and operating costs, develop system-level performance criteria
- **Attract new sources of funding**  
For example: vendor financing, joint development

Congress also has indicated interest in testing the potential for innovative procurements to improve upon current practices in building fixed guideway systems. Section 3019 of the Federal Transit Act Amendments of 1991, incorporated into the Intermodal Surface Transportation Efficiency Act (ISTEA), provides for FTA to approve no less than two projects which demonstrate turnkey procurement practices. The goals of this initiative are to, "advance new technologies and lower the cost of constructing new transit systems." A turnkey project is

defined in the Act as, "a project under which a recipient contracts with a consortium of firms, individual firms, or a vendor to build a transit system that meets specific performance criteria and which is operated by the vendor for a period of time."

*FTA is to sponsor at least two projects to demonstrate turnkey procurement practices.*

Conventionally-implemented fixed guideway investments are managed from planning to completion by the "owner" organization, usually a public agency. The project sponsor maintains responsibility for planning, design, financing, construction and eventual operations. The implementation process occurs in defined phases -- system planning, project planning, preliminary engineering, final design, construction, testing and start-up, and revenue service. Elements of the FTA major capital project development process are listed in Appendix A. The procurement and construction elements typically involve segmenting the project into components which are separately bid. The bids are based upon engineering designs that are prepared independently of civil and system contractors. Responsibility for fitting all the contracts together and final performance of the system rests with the project sponsor.

In recent years, potential advantages to performing some of these functions privately have been tested. These "public-private partnerships" have been utilized in such diverse areas of public works projects as water and sewage treatment, solid waste disposal, highways, tunnels, prisons, water supply, schools, resource recovery and power generation, as well as fixed guideway transit systems. FTA and the World Bank have initiated a working relationship to share information on programs and research related to innovative procurement and financing approaches. See Appendix B, Section B.5.1 for a summary of applicable World Bank research.

The potential benefits of private sector involvement in fixed guideway transit projects are anticipated to be reduced public sector risk and lower cost. For example, the private sector development cost for a light rail system from West Falls Church to Dulles Airport in Washington, DC was estimated in 1985 at \$119 million, compared to a public sector development cost of \$181 million.<sup>1</sup> In many cases, however, such comparisons assume relief from Federal mandates, which may not be possible if FTA funds are utilized, or under state and local procurement statutes. FTA also is seeking help from the private sector in managing its cash flows to support the maximum number of projects without unnecessarily increasing costs by prolonging implementation schedules.

Recent research on capital and operating cost overruns<sup>2</sup> has demonstrated the need for risk-sharing arrangements that can minimize public sector exposure for the complexities of fixed guideway acquisitions. Each project carries its own risk profile, and the extent to which these uncertainties can be allocated among the project participants will affect bid prices and final costs. For example, vendors asked to supply fixed prices for major tunnels will include smaller risk premiums if project sponsors can supply detailed geotechnical data. On the other hand, vendors can supply little risk protection on costs if projects are bid before critical alignment, technology and scoping decisions are reached.

Cities such as Honolulu, Houston, Chicago, Newark and Minneapolis are advancing major transit capital investments which anticipate Federal financial assistance and public-private partnerships. Project sponsors in these cases have grappled with a variety of issues in attempting to mesh turnkey procurements with FTA implementation and environmental requirements. Integration of innovative procurement techniques with Federal requirements for environmental impact assessment, project management control, selection of a locally-preferred alternative, development of a financing strategy, projection of costs and revenues, and linkages to land use planning and joint development have generated much discussion, and some experimentation to date. The objective of this report is to provide a summary of innovative public works procurement methods that will enable FTA to better evaluate the adequacy of these techniques

for developing major capital investments. Topics for further research also are identified.

In addition to offering information on experiences with innovative procurement methods in a variety of fields and in other nations to Federal decision makers, this overview is intended to provide technical assistance in planning the implementation of transit capital projects using non-traditional procurement methods. The report reviews implications for the transit project development process, discusses potential project risk factors, and presents examples of innovative procurement methods involving public-private partnerships. Approaches to the assessment and management of risks are suggested, and additional detail on a variety of projects involving innovative procurement methods is incorporated into Appendix B.

A sufficient body of experience now exists to identify elements of innovative procurement techniques that are applicable to fixed guideway projects, and to explore ideas for maximizing potential benefits in keeping with the FTA implementation process.

*In conventional procurements, the public sector is responsible for the integration of all design and construction activities of numerous consultants and contractors. For innovative procurements, a single contractor is responsible for design, construction, and possibly operations with the financial incentive to control risks.*

## **2.0 TYPES OF INNOVATIVE PROCUREMENT & TRANSIT EXPERIENCE**

Turnkey contracting, and other innovative procurement methods that more directly involve the private sector, are being utilized to an increasing degree for public works projects in the United States and abroad. Examples in public transit, in other Federal agencies, and in other countries are presented in Appendix B. The examples demonstrate techniques defined below for development of capital projects incorporating private participation in financing, risk allocation, and project management.

Most examples of innovative procurement methods occur in foreign countries and must be tempered to conditions in the United States. In many cases, normal business practices in other nations combine engineering and construction activities for transportation projects into a single contract, facilitating turnkey arrangements. Other countries generally do not have extensive municipal finance markets which can generate large sums of capital at preferential, tax-exempt rates. Sovereign and regional governments frequently can resolve environmental, alignment, and contracting issues by fiat or special legislation, which would be very difficult to envision in an American municipality.

Much attention has been given to the linkage between real estate development revenues and transit project finance abroad. However, the land development process in most countries also is quite different from the United States' model. Severe restrictions on development imposed by zoning and taxation policies, extremely high land costs, a chronic shortage of assembled sites, and appallingly low levels of public infrastructure (by American standards) -- particularly for transportation, result in foreign cases that bear little resemblance to conditions in American cities contemplating fixed guideway transit investments. The level of pent-up demand for commercial and residential development, as well as for mobility in urban areas, often exists at levels that would be socially and politically intolerable in major American cities. These market conditions often make joint development around rail facilities "the only game in town" for real estate ventures abroad. Transit agencies in the United States not only operate in very different real

estate markets than those in other countries, the institutional arrangements at the municipal government level tend to separate transportation and land use decision-making authority to a much greater extent. Recent case studies<sup>3</sup> of fixed guideway projects in Boston, Washington, D.C., and Orlando, confirm that the vagaries of market conditions and institutional structures tends to make coordination of real estate and new fixed guideway transit development problematic in the United States.

*Market conditions and institutional practices in foreign countries make direct transfer of their turnkey experience in the U.S. very difficult.*

Perhaps most significantly, overseas public investment policies have favored mass transportation and intercity rail for over 100 years, creating a pattern of urban development well-suited to transit. Urban fixed guideway networks can compete more effectively against relatively underdeveloped road systems than is likely in the United States, even with modest shifts in the relationships between land use and transportation. These factors combine to yield private sector financing opportunities, significant joint development potential, and the ability to accept a higher degree of revenue risks.

Development of fixed guideway transit systems in the U.S. traditionally relies on a process dominated by the public sector. Historically, private firms are contracted separately for preliminary engineering, final design, equipment manufacturing, system construction, and other activities, which must be integrated by the public sponsor. Typically, the public agency bears all design, revenue, and a high degree of performance risks, and generally operates and maintains the system upon completion. In a few instances, fixed guideway projects have utilized innovative procurement techniques for construction. These exceptions have occurred in the



implementation and operation of automated guideway transit (AGT) systems. Suppliers of a specific system technology are contracted for design, construction, and possibly operations and maintenance. The most common application can be found at airports, and other special-purpose environments, such as amusement parks (Disney and Busch Gardens) and new community development projects (Las Colinas, TX and Tampa, FL).

The Morgantown Personal Rapid Transit (PRT) System was the first urban deployment of AGT in the United States, followed by projects under FTA's Downtown People Mover (DPM) Program in Miami, Detroit, and Jacksonville. The implementation of urban AGT systems is much more complex than construction in a special-purpose environment, due to the constraints imposed by the existing urban landscape (streets, buildings, clearances, view corridors, and so forth); the inherent difficulties associated with land acquisition and utility relocations; accommodating the general public as neighbors, taxpayers, and patrons; and satisfying environmental requirements and other mandates associated with publicly-funded projects. As a result of these cross-currents, the public sector has tended to maintain strong control over the implementation of higher technology transit systems in built-out areas, despite giving increased responsibility to the system supplier in certain cases.

*Construction in an urban environment is extremely complex due to the existing physical infrastructure, environmental sensitivities, and institutional barriers.*

In other public works fields, major construction projects are being implemented with greater reliance on the private sector. Environmental projects, such as solid waste disposal and waste water treatment facilities, have successfully utilized private firms to achieve environmental policy goals, provide capital investment, and apply sophisticated technology.

## **2.1 Examples of Innovative Procurement Methods**

The principal methods of innovative procurement are briefly described below and are summarized in Table 1:

**Contract Service** - A private entity is contracted to provide a specific service, or to operate and maintain a facility that is owned by the public sector. This approach is used because the public sector is unable to provide the desired service, or the competitive process is viewed as a means to control escalating operating and maintenance costs.

**Turnkey Projects** - A public agency contracts with a private entity for delivery of a complete and operational project that will be publicly-owned. The contractor, or developer, is given overall responsibility for project implementation, including design and construction. Capital funding and future revenue risk generally is assumed by the public owner. Performance risk, on the other hand, is conveyed to the private entity. After certification of project completion, the developer "turns the keys" over to the agency staff, as an indication that the project is prepared for immediate use. Either the owner, the turnkey contractor, or a third party could have responsibility for operations and maintenance.

**Superturnkey Projects** - In addition to the provisions of turnkey projects, the private entity receives real estate development rights along the project right-of-way, at station areas, and potentially at off-corridor locations. In exchange for these rights, the superturnkey contractor is expected to provide partial project funding, reducing the need for public investment.

**Build-Operate-Transfer (BOT)** - The private entity is given authority to design, build, own, and operate a facility for a period of time, after which the title reverts to the public sector. During the period of private ownership and operation, the contractor is able to generate profits from the service provided. Financing for construction and operations is supplied privately, on a non-recourse basis using projections of future net revenues. Revenue forecasts

include limited public sector guarantees (contingent liabilities or "off-balance sheet" mechanisms, not general obligation commitments), such as "take-or-pay" contracts, or the temporary transfer of existing, publicly-owned, income-generating assets to the BOT contractor.

**Build-Transfer-Operate (BTO)** - A variation of BOT has been suggested in California to allow private entities to reduce their liability exposure related to new highway development. After design, financing, and construction, ownership of the highway will be transferred to Caltrans. The road would become part of the state highway system, but the builders would have an exclusive contract to operate it for 35 years.

**Developer Financing or Proffer** - A private entity finances the construction, or expansion of a public facility in exchange for real estate development entitlements. Increasing infrastructure capacity to accommodate growth is being viewed more frequently as a private sector responsibility. In most instances, however, private entities pay impact fees or assessments to a public, or quasi-public agency which undertakes the actual construction.

**Privatization** - A private party owns, builds, and operates a facility normally controlled by the public sector and run by public employees. The private operator also partially, or totally finances operations. However, many of the incentives to undertake privatization projects were eliminated by passage of the Tax Reform Act of 1986. Where privatization continues to be pursued, government is motivated either by the goal of sharing the risk of technological innovation (solid waste management), or the opportunity to spin-off facilities capable of internally-generating net project revenues through aggressive management and economies of scale (sports facilities, convention centers and prisons).

**Merchant (Franchise) Facilities** - Not only does the private sector (usually the supplier of a particular technology) own and operate the facility, it also makes the decision to provide a service in anticipation of future profits. Facilities are usually completely financed with

private sector funds. An example might be a privately-developed landfill. It is interesting to note that the original transit systems developed in the United States were built under franchises to local governments. The economic viability of these companies was undermined over the years by public regulation, which required maintenance of low fares, as well as investment in competing transportation modes, such as buses and highways for passenger automobiles.

**TABLE 1. TRADITIONAL VERSUS PUBLIC-PRIVATE PARTNERSHIPS – COMPARISON OF RESPONSIBILITIES**

Project Procurement Method	Project Development Activity						
	Service Decision	Financing	Design	Construction	Joint Development	Ownership	Operations & Maintenance
Traditional	Public	Public	Public	Public	Public	Public	Public
Public-Private Partnership Technique							
Contract Services	Public	Public	Public	Public	Public	Public	Private
Turnkey Projects	Public	Public	Private	Private	Public	Public	Either
Superturnkey	Public	Either	Private	Private	Private	Public	Either
Build-Operate-Transfer (BOT)	Public	Either	Private	Private	Either	Private	Private
Build-Transfer-Operate (BTO)	Public	Either	Private	Private	Either	Public	Private
Developer Financing	Public	Private	Either	Either	Private	Either	Either
Privatization	Public	Private	Private	Private	Private	Private	Private
Franchise	Private	Private	Private	Private	Private	Private	Private

## **2.2 Procurement Approaches**

Three primary approaches have been utilized to procure contractors to implement major capital projects using public-private partnerships:

**Advertised Procurement** - consisting of an invitation for bid, receipt of competitive sealed bids, evaluation to eliminate unacceptable bids (not considered able to meet the performance requirements), and award of a contract to the qualified bidder offering the lowest-price.

**Competitive Negotiation** - process involves a request for proposal, receipt of offers, evaluation of proposals, negotiation with offerors, and award of a contract.

**Two-Step Procurement** - begins with a request for technical proposals only, evaluation to eliminate unacceptable technical proposals, issuance of a request for proposals to competitors who submit acceptable technical proposals, and award of a contract based upon cost and other factors.

### **2.3 Benefits of Innovative Procurement Methods**

Research for this overview included a review of literature documenting experiences of various Federal agencies regarding innovative procurement methods. The U.S. Environmental Protection Agency (EPA) has been promoting public-private partnerships for projects such as solid waste management, waste water treatment, drinking water supply, and so forth. EPA public-private partnership case studies<sup>4,5</sup> portray benefits from lower capital and operating costs, more rapid project completion, more comprehensive performance guarantees, access to more sophisticated technology, flexible financing, risk sharing and fixed-price contracting. Investments of private equity reported in the case studies are largely linked to tax incentives which are no longer available.

In a paper on privatization entitled, *Privatization: A Financing Alternative for State and Local Governments*, Patricia H. Newman of Dean Witter Reynolds,<sup>6</sup> suggests the range of potential cost savings accruing to state and local governments as a result of privatizing a municipal service and/or facility as follows:

- 10%-25% through the design/construct function being performed and guaranteed by a private company
- 10%-40% through the operate/maintain function being performed and guaranteed by a private company

Newman anticipates that the cumulative cost savings for a properly-structured privatization program can be expected to fall within the range of 10% - 25%, when compared to conventional state and local government funding alternatives.

In assessing the transferability of these benefits, the differences between environmental projects and fixed guideway investments are noteworthy:

- Environmental facilities often are built to meet legally-mandated standards, while transit projects must emerge from a community consensus on urban form and how to address future mobility needs.
- Environmental projects are often an exclusive public utility with a predictable level of usage based upon past history; transit patronage must be won through competition with other, well-established and well-subsidized travel alternatives.
- User fees paid for a monopoly environmental service can defray both capital and operating outlays; transit revenues seldom come close to offsetting operating expenses.
- Site locations for environmental projects are usually seldom-seen, isolated from populated areas, and under the control of the public sector; transit projects affect densely-populated corridors, interface with the public continuously, and are subject to a host of political, economic, social, and environmental impacts from construction and operations.
- Privately-furnished environmental facilities may not be bound by the mandates that accompany publicly-funded projects; fixed guideway transit systems in urban areas have yet to be built without heavy public sector investment and the cost burdens imposed by Federal, state and local mandates.
- Environmental projects tend to involve primarily "systems" whose design may be proprietary. This factor has resulted in a more extensive history of design-build, turnkey relationships among engineering and construction firms than exists in fixed guideway construction, where the design and construction functions have been separated under conventional procurement methods. The higher degree of "systems" content may increase

completion, performance and cost overrun risks, if an environmental facility is not procured by turnkey methods.

*Benefits attributed to private sector implementation of environmental projects may not be directly applicable to transit due to a variety of special circumstances.*

In November, 1990, a study was sponsored by the Hennepin County (Minneapolis, MN) Regional Railroad Authority that offers insights into the various approaches for implementing light rail transit (LRT). The study was conducted by Capital Partnerships, Inc. in association with Deloitte & Touche, L.S. Gallegos & Associates, and Hart, Bruner & O'Brien.<sup>7,8</sup> Its objective was to compare traditional and turnkey LRT implementation approaches with regard to the following factors:

- **Schedule** - the time required to implement projects once preliminary engineering has been completed.
- **Cost Control** - the ability to contain costs within an established budget.
- **Quality Assurance** - techniques for balancing project control and risks among public and private sector parties.

In addition, the study was designed to determine the approach most appropriate for implementing the region's initial LRT project, and to outline a project management framework that optimized the trade-off between project control and risk. Case studies were prepared for three traditional and three turnkey LRT projects that were deemed most comparable to the situation in Hennepin County:

### **Traditional**

- San Diego Trolley (South Line)
- Portland Banfield Transitway
- Los Angeles Metro Blue Line

### **Turnkey**

- Hong Kong (Tuen Mun)
- London Docklands
- Manchester Metrolink

The case studies found that the turnkey projects were implemented more quickly than traditional projects -- 40-43 months versus 67-73 months after completion of preliminary engineering. The greatest schedule risk factors were:

- Site access, particularly right-of-way acquisition and clearance
- Utility relocation
- Tunneling

Difficulties were found to occur in estimating and controlling "soft" costs, such as engineering, construction management services, and agency support, in traditional procurements. This finding is confirmed in a recent, FTA-sponsored study of comparative capital costs of constructing light rail transit systems in Portland, Sacramento, San Jose, Pittsburgh, and Los Angeles.<sup>9</sup> The turnkey projects were better able to control soft costs and other project expenses, as a result of incentives implicit in a guaranteed, maximum-price contract. On the other hand, turnkey projects were found to require improved quality assurance efforts in the areas of station finishes and the reliability of self-service fare collection systems.



*A study of light rail shows that a turnkey approach can be accomplished in about 40% less time after completion of PE than by a conventional approach.*

Hennepin County's *LRT Implementation Alternatives Study* concluded that traditional and turnkey projects have a number of common factors necessary for success:

- **Well defined project concept** - Clearly-defined project concept and mission -- what, why, when, and at what cost
- **Strong project champion and local public support** - Both public and private sector local support, especially by those most directly affected by the project during construction and operations; strong and effective leadership to develop and maintain project consensus
- **Timely implementation of a first line or initial segment** - A successful start-up that maintains public support and provides the basis for future financial commitments
- **Small project management team** - Cost-effective use of consultants to permit simple/direct lines of communication, timely/responsive decision-making, and minimize interference with contractors
- **Appropriate risk sharing** - Clearly identify and allocate risks through sponsor's procurement/contracting policies and procedures
- **Early right-of-way clearance** - The project sponsor, either directly or through separate contracts, should be responsible for right-of-way acquisition/clearance, including utility relocation prior to the beginning of construction

In the late 1970's, FTA initiated the Downtown People Mover (DPM) Program to demonstrate proven, automated guideway transit (AGT) technology in urban areas. Under this program, DPM systems were deployed in Detroit, Miami and Jacksonville over the following decade. The DPM projects utilized a turnkey concept in which system suppliers were responsible for final

design and construction. However, critical alignment and station location decisions normally fixed during preliminary engineering, were changed after the turnkey agreements were signed.

As a result, problems with schedule slippage and cost overruns, which affect traditionally-procured transit projects, also plagued the turnkey DPM projects. These experiences helped lead to the initiation of FTA's Project Management Oversight (PMO) Program. In an analysis sponsored by FTA<sup>2</sup>, it appears that the DPM projects violated lessons listed in the Hennepin County research, and other studies noted in the Appendices. In addition to the alignment and station shifts, inadequate utility investigations repeatedly yielded unanticipated field conditions. In Miami, the prime contractor was not delegated sufficient authority to approve the resulting change orders and delays mounted, as the paperwork made its way through the public approval process. A paper on the Miami DPM experience<sup>10</sup> confirmed the need for a fixed alignment, early assembly of right-of-way, clear definition of utility interfaces, detailed schedule, and process for managing change orders.

The following chapter reviews risk factors that innovative procurements permit public sector project sponsors to share with private partners. The experiences of innovative procurements in relation to the FTA planning and project implementation process, and opportunities to incorporate recent lessons, are addressed in Chapter 4.

### **3.0 RISK AND UNCERTAINTY FACTORS**

One of the primary benefits of innovative procurement techniques is the ability to allocate risks between public and private entities. The public sector bears most risks in traditional procurements relating to project implementation and future revenues. The nature of fixed guideway transit projects in the United States does not normally permit revenue risks to be shared with a private partner when an entire system acquisition is undertaken. However, there are income-generating elements of transit projects, such as parking garages, which can attract private equity and a willingness to share revenue risks. Despite this limitation, many different types of uncertainties can be allocated, and traditional procurement processes can be adjusted to permit greater optimization of price, risk and control.

The following discussion outlines risks normally associated with innovative procurements, and special considerations pertaining to fixed guideway transit systems. The project examples in Appendix B, and the literature search cited in the reference sources provide the background for the observations below.

#### **3.1 General Procurement Risks**

The private sector operates in a for-profit environment and will seek higher returns as the certainty of future revenues declines. A corollary to this concept is the time value of money -- the longer the period between the outlay of funds and future revenue streams, the lower the "present value" of the anticipated benefits. Fixed guideway projects are high-risk undertakings for either public or private entities. The reasons for this characterization include:

- There is a high degree of uncertainty that a project will proceed to construction due to virtually uncontrollable factors involving project finance, economic conditions, political dynamics, environmental considerations, and institutional consensus on project leadership.
- Fixed guideway systems have very long "gestation" periods. Periods of delay extending for months, or years can occur at any point in the implementation process. Frequent

delaying factors have involved failure of a referendum, or adverse vote in a legislative body; inability to avoid condemnation proceedings; and disagreement among public financing partners over the transportation solutions proposed by the project sponsor.

- Bidding for major projects can be a highly-politicized undertaking, with unpredictable outcomes and large front-end expenditures for marketing and proposal preparation.
- The underlying technology risks are great due to the frequent deployment of advanced technologies; specifications resulting in "one-of-a-kind" systems; the interface of many project components; requirements for high reliability and safety during long hours of operation in exposed weather conditions; the frequent interest of localities in systems that are innovative (such as magnetic levitation) in order to create positive community image and attract usage; and the need for design compromises in order to achieve political consensus, address environmental or alignment constraints, and meet budget limitations.
- Construction risks for fixed guideway transit projects are extensive because of the scale of the projects, the variety of alignment conditions (a single system can include tunnels, bridges, at-grade operations, and traverse many different construction "sites" which have their own unique environments), the interface of many system components, the need to perform precise construction in adverse conditions (in the middle of busy streets, in residential environments, during off-hours, and so forth), and the reliance on numerous subcontractors, each of whom must perform well and on-time in order for the overall project to remain on-schedule and on-budget.
- The likelihood of modifications to plans by the project sponsor in response to field conditions, budget changes, political decisions, mandates, and other factors is high. Modifications often result in claims which can take years of costly litigation to resolve.
- Warranty, acceptance and performance requirements may be difficult to meet due to problems with initial specifications, the impacts of changes during construction, or unforeseen problems in integrating numerous technologies. The frequent inability to pinpoint the cause of problems, and allocate responsibility, extends the risks of future liability until well after the project is completed.
- Although most contracts provide for inflation adjustments, surges in interest rates, fringe benefits, cost-of-living payments, and foreign currencies can jump ahead of index calculations, or may be outside the scope of the procurement contract.
- In addition to project-specific risks, there are also general industry risks that affect individual procurements. For example, if a procurement occurs during a period when one or more large orders have been placed, it is possible that bid prices will be higher than when projects are built during slack times. The risk issues noted above result in heavy, industry-wide performance bonding requirements that can affect costs and may restrict the amount of work certain firms can undertake at any point in time.

Turnkey vendors will tend to increase fixed-price proposals to compensate for the greater uncertainties inherent to transit projects enumerated above. The risk premiums should be offset, in many cases, by savings arising from accelerated completion, ability to negotiate (and leverage) subcontracts and material acquisitions, greater control over the implementation process (contracting sequence), and stronger project management capabilities. The net benefit to the public sponsor should be a fixed-price, date-certain delivery that, at a minimum, costs no more than a conventional procurement.

*Fixed guideway transit projects are high risk undertakings which turnkey contractors can successfully accomplish through strong project management motivated by the profit incentive.*

At the same time, in order to realize these benefits, the public sponsor must be prepared to accept the terms of the new relationship. For example, changes in a design or specification which has been fixed within the agreed scope, can be expected to yield cost adjustments in a turnkey environment that are as great, if not greater, than in a conventional procurement. If the change requested results in an overall project delay, or the inability to meet an agreed performance criteria without other modifications, there is a "snowball" effect that can impact the entire program.

### **3.2 General Financing Risks**

The factors identified above do not address project-related financing risks. The most serious concern to a private sector partner is the inability of the public sponsor to meet its financial obligations. Project financing risks are noted below and affect procurements even when the public sector sponsor absorbs the risks of farebox revenues:

- Decline in the anticipated yield of a dedicated revenue source due to economic conditions, or optimistic growth forecasts
- Failure to appropriate funds conditionally pledged
- Pre-emption or discontinuation of dedicated funding for other purposes by a higher level of government, legal challenge, or by popular referendum
- Expiration of legal authority to levy a dedicated tax
- Inadequacy of funding to build and operate the project due to rising costs, poor financial planning, or inadequate contingency reserves

Examples of these phenomena are not hard to find in the transportation industry in conventional, as well as innovative procurements:

- The current decline in sales tax revenues has triggered cutbacks in transit services in numerous jurisdictions across the country. A drop in Portland's employment tax ten years ago resulted in difficulties maintaining core transit services and funding planned, future extensions. Los Angeles' decline in sales tax revenues is resulting in service cuts, as well as revisions to the scope and pace of fixed guideway transit construction.
- Over-building, lack of demand, and falling property values have resulted in a 25 percent decline in property values within the Route 28 special assessment district in Fairfax County, VA, and a shortfall in revenues from private property owners to amortize the district's debt, creating a potential future liability for state and local government project sponsors. Shifting market conditions have slowed major transportation initiatives along the Hudson River Waterfront and at Allied Junction in New Jersey.
- The demise of the savings and loan industry has resulted in the Resolution Trust Corporation voiding many letters of credit used to support proffered infrastructure commitments.
- Houston has confronted repeated efforts by the State Legislature to reduce, or limit the dedicated transit tax. In its last referendum, Metro dedicated a substantial share of its revenues to highway projects. Houston's initial procurement of heavy rail cars was overturned by popular referendum, and its most recent selection of a turnkey vendor was voided by a Board vote to drop the project.
- The Second Avenue Subway in Manhattan shut-down construction two decades ago and has been used as a storage facility after running out of funds.

- Los Angeles' attempts to impose special assessment districts around its heavy rail stations have been thwarted in the courts by property owners for years. Proposition C sales tax levies are under strong legal challenge throughout California.
- The Downtown Las Vegas' Maglev system abandoned support columns it began to build and canceled the project because the completion and revenue risks of the privatization procurement proved untenable.
- Denver's Rail Construction Authority was abolished by the State Legislature after inability to achieve a consensus on the project, and an outcry from employers and property owners along the corridor regarding imposition of a dedicated tax.
- The ten-year life of many California sales tax measures makes long term financing for fixed guideway projects virtually impossible.

*Tools are available to assess and control the financial risks inherent in fixed guideway transit projects.*

These risks are present in any fixed guideway project and can be addressed through well-recognized techniques, such as, Full Funding Grant Agreements, Letters of Credit, Board Resolutions from the sponsoring agencies regarding the flow of funds, pledges to maintain dedicated tax levels, limitations on the use of certain public revenues, the establishment of reserve funds, and adequate contingency budgets. In addition, more sophisticated risk assessment methodologies can be applied to forecasts of dedicated tax revenues and project costs. The possibility of wide swings in future sales tax revenue, for example, can be mitigated by creating large coverage factors, establishing a contingency reserve to meet project completion responsibilities, and creating a priority on the use of funds to meet financial commitments ahead of other agency obligations. The risks from variations in project costs can be addressed by entering fixed-price contracts, agreeing to share over-runs caused by specified factors (inflation, work stoppages, new Federal mandates, and so forth), capping contractor liabilities, securing

insurance and performance bond coverage, and calculating independent contingencies for specific project elements (land acquisition, utilities, at-grade construction, tunnels, and other segments).

### **3.3 Opportunities and Limitations of Innovative Procurements in Risk Mitigation**

Public sector sponsors of fixed guideway transit systems have tended to insulate vendors from many of the implementation and financing risks noted above, as well as others, by assuming responsibility for preliminary and final design, system integration (the possibility that each component may work as specified, but the overall system fails to perform adequately), project finance and revenues, inflation adjustments, and many forms of delay and liability. Despite this protection, the cases noted in Chapter 2 still yielded concerns over final, delivered cost and, in some cases, performance. The failure of many systems delivered in the 1970's and 1980's to achieve ridership estimates, as well as cost projections, contributed to unexpectedly high costs-per-boarding.

In recent years, FTA has explored methods for sharing acquisition and revenue risks with private entities. If fixed guideway systems can be tied to future growth, secure the financial support of private interests, and involve credible business entities in project implementation, the comfort level of Federal decision makers with cost and benefit estimates might be enhanced. Experience in foreign countries, as well as at other Federal agencies, principally the EPA, has suggested that risk sharing with private entities could help in achieving these aims. The following sections explore how conventional and innovative procurements tend to address different areas of risk and the general applicability of the findings to fixed guideway transit systems.

#### **3.3.1 Risks of Changes and Delay**

Based upon the analysis conducted by Hennepin County, and the experiences of projects in the environmental field, it appears that the key factors contributing to the run-up in costs in conventional procurements involved delay, and downstream changes in project definition. In



many instances, schedule problems and scope changes go hand-in-hand, arising from unforeseen circumstances, inadequate planning, problems with right-of-way assembly, and lack of consensus at the time critical contracts are let.

A principal area of savings identified in the case studies consistently relates to the ability of the private sector to perform on an accelerated basis, reducing outlays for overhead, accrued interest and inflation. In addition, the use of contract project managers minimizes the need for extensive public sector staffing, and permits more meaningful performance evaluation through system-level standards. It should be noted that public sector-sponsored procurements also have utilized contracted project management structures to implement fixed guideway transit systems, however, the contractor still bears no risk for the project. One example is the Port Authority Transit Light Rail Modernization Program in Pittsburgh, which used its engineering consultants to perform construction management and other project management functions.

However, the DPM experiences also show that the benefits of "turnkey" implementation can be lost by failure of the public project sponsor to cede adequate control to the contractor, to fix critical design considerations at the time contracts are signed, and to perform sufficient preliminary work with utilities and right-of-way. Therefore, private sector acceptance of risks for fixed-price, date-certain delivery imposes fundamental responsibilities on the public sector sponsor, if the anticipated benefits are to be achieved.

*To achieve the potential benefits of turnkey procurements, the public project sponsor must be willing to fix the project definition at the time of contract initiation and to permit the contractor to exercise strong control.*

### 3.3.2 New Risks Arising from Innovative Procurements

As illustrated in the preceding discussion, innovative procurements do not eliminate all risks for the public sector sponsor, and in some instances, public-private partnerships can create new risk categories which must be recognized in system planning efforts. Catastrophic losses are likely to continue to be public sector concerns, as it is unlikely to be cost-effective (or, in some cases, even possible) for a private party to guarantee against a loss such as the destruction of an almost-completed system by earthquake, or other natural disaster. As a readily identifiable, "deep pocket," public sponsors also are likely to retain exposure for general liability risks, even if private sector operations and maintenance agreements are incorporated into the acquisition.

Aside from these conventional considerations, reliance on a turnkey vendor for system completion, final performance, fixed-price delivery, and perhaps even project financing, also presents risks to the public sponsor arising from the potential for bankruptcy of the prime contractor, abandonment, or failure to perform by one or more major subcontractors. These risks can be mitigated through a contractor selection process that assures the prime contractor possesses adequate technical, managerial, and organizational capabilities. Performance bonds can protect against losses from contractor failure, and the use of third-party insurance to defray project risks for both the vendor and the contracting agency is a necessary practice in innovative procurements. However, the protection is generally less-than-complete, as recent experience with the Eurotunnel turnkey project suggest.

After a successful initial financing that incorporated sovereign and public equity, and a complex debt structure, Eurotunnel P.L.C., a private entity building the Channel Tunnel, soon encountered substantial cost overruns and was forced to negotiate additional funding and guarantees from the sponsoring governments. These overruns were outside the protection offered by the fixed-price, date-certain construction agreement signed with Transmanche Link, the consortium of five French and five British contractors implementing the project. Overrun problems and delays have continued since the re-negotiation occurred.

France and Britain transferred the "Chunnel's" multi-billion dollar completion and cost overrun risks to Eurotunnel P.L.C. However, Eurotunnel P.L.C., lacking the extraordinary financial resources required to meet the obligations it assumed, sought to transfer these risks "downstream" to its construction contractors. Transmanche Link also is unable to absorb the enormous risks at stake, and now seeks to pass the inevitable problems back to the "upstream" participants.

At this time, Transmanche Link has presented a \$2.6 billion claim for cost overruns and have stopped work on elements of the project in order to force another re-negotiation of the terms and conditions. In February, 1992, Eurotunnel P.L.C. announced the possibility of a three to four-month delay in opening the system, due to the dispute. Analysts have calculated that each month of delay will cost the private sector owners between \$110 and \$128 million, and that accrued interest costs will mount at the rate of about \$54 million per month (*New York Times*, 2/11/92, p. D19). It is not unlikely that as the dispute unfolds, the sponsoring governments will once again be asked for additional consideration. Should Eurotunnel P.L.C., default on its \$6.5 billion of existing debt, the governments of France and Britain inevitably will have new responsibilities arising from the subsequent work-out.

One of the key lessons from this experience is that a turnkey vendor will never have either the financial capability, or the willingness to absorb all risks relating to completion and cost overruns for a major fixed guideway system. The risks will tend to be distributed among all contracting and financing participants. Vendor consortia are frequently joint ventures comprised of several firms. The joint venture entity may lack tangible assets and may not carry unlimited corporate guarantees from the partners. In turn, the partners may be committed to several major projects, each of which may have a claim to the firms' balance sheets for completion, liability, warranty, and other guarantees.

Public sponsors must investigate the ability of proposing vendors to stand by their commitments, and take a real-world view of their private sector partners. Basically, there is a need to match the liabilities and risks being shared with the financial capacity of the private sector entity. As the real estate industry experience underlines, the higher the stakes and the bigger the projects, the more difficult it is to collect when problems arise. Pledges by project developers generally

*The public can be protected against potential private sector risks of innovative procurements by careful contractor selection and the use of performance bonds and third party insurance.*

are "uncovered" by underlying assets, and insurance/performance bond coverage may not pay for all potential losses, regardless of the face value of the commitments.

As a result, the contracting agency must determine the point at which it becomes cost-effective to simply retain certain risks and pay the future claims which may result. Critical to the success of these risk assessments is the identification of measures which the public sponsor can take in advance of the turnkey bid process to minimize risk premiums, or "optimize" risk sharing arrangements.

Examples of such measures gleaned from the projects described in the Appendix B include:

- Scrutinizing the balance sheets and other outstanding commitments of vendors through a pre-qualification process and requiring full, corporate guarantees from all joint venture participants when necessary
- Analyzing how the vendor proposes to distribute completion, cost and performance risks between members of the joint venture entity, and also "downstream" subcontractor participants, to assure that exposure for key system elements is not being shifted to parties who may have problems fulfilling their financial obligations
- Offering up-front to share overall, or segment-specific risks (either capping the vendor's liability for overruns, or agreeing to split the additional costs on a pro rata basis once the losses exceed an agreed level)
- Limiting the ability of private partners to undertake additional projects that can stretch their financial and management capabilities

- Advancing preliminary engineering on complex segments in order to provide bidders with more complete information on which to base their pricing
- Shortening the time period between award of the contract and the actual start of construction
- Breaking projects into components which are scaled to match the financial capabilities of potential private sector partners, or to enable qualified, smaller firms to participate
- Having financial commitments in-place to complete the project under worst-case conditions
- Assembling the right-of-way and performing detailed investigation of utility relocations (or removing utilities from the vendor's scope entirely)
- Permitting inflation adjustments
- Meeting frequently with potential bidders prior to the procurement to identify specific areas of concern regarding construction or specifications

*A formal risk assessment process should be used to "optimize" risk sharing arrangements between the sponsor and the contractor.*

The impact of these observations on the Federal project development process is explored in the next chapter.

### **3.3.3 Innovative Financing Offers**

The risk profile of procurements utilizing public-private partnerships are magnified when the public sector attempts to shift risks which are not construction/acquisition-related to the private vendor, or broadens the project scope to encompass variables and contingencies that are not directly project-related.

It has become a well-established practice to include solicitations of private sector funding and joint development in public-private partnership procurements. However, project experience includes no notable successes to date, despite the emphasis accorded to these considerations in the planning process and in solicitation documents.

Financing offers under innovative procurements have run the gamut from cross-border leases (Baltimore), to contingent real estate offers (Honolulu), to cash flow financing (Houston), to public authority deal structures (Manhattan Light Rail and Orlando/Matra AGT), to entirely private sector sponsored construction and operations (Downtown Las Vegas Maglev, Florida and Texas High Speed Rail).

An overriding risk is the potential that a vendor will win a procurement based upon attractive financing offers which fail to materialize. Such an outcome inevitably undermines the credibility of the project. Failure to deliver on promised financial support jeopardizes the integrity of the procurement process itself by eliminating bidders whose cost proposals may be higher, but more feasible. Problems following-through on creative financing offers could result in a shutdown of the project if the proposed revenue mechanisms are not replaced from other sources. As a result, project sponsors must mitigate these risks through careful analysis and a discounting process.

One of the more dramatic examples of a project vendor becoming unable to deliver on promised financing is the Downtown Las Vegas Maglev Project. The system supplier promised to build and operate a circular system at no cost to the state and local government. The project was intended by its sponsors as a demonstration of an innovative technology and was to generate profits from operating revenues, advertising and other sources. Construction began, with several vertical support columns in place, before it became clear that the financial exposure of the undertaking was beyond original expectations, that the technology was not quite ready for a showcase demonstration, and that local support for future extensions at public expense was lacking. The result was termination of the project.

The experience is significant in that it embodied, in the extreme, many of the claims associated with privately-sponsored fixed guideway systems (new technology, implementation efficiency, marketing know-how, "deep-pockets" project sponsor, strong ridership from tourism and employees, unusual advertising revenue opportunities, innovative overseas financing, and so forth). The project also fit into that "dream category" of offering a Las Vegas showcase for new technology by an aggressive foreign vendor.

It should be noted that two projects referenced in Appendix B, Manhattan Light Rail and Orlando/Matra AGT, also conclusively demonstrated the inability of a mass transit project to absorb revenue risks. For a period, the FTA's Privatization Policy actively encouraged the development of fixed guideway implementation strategies which required no Federal funding. These projects, as well as proposals for a monorail to the Denver Tech Center, the Dulles Light Rail Project, the West Side Transitway, and others emerged from this period. Based upon the positive experiences at the EPA, there was interest at FTA in the 1980's in testing the premise that the potential cost savings from avoiding Federal mandates and red tape, the applicability of favorable tax treatment of depreciation and operating losses, the marketing know-how of the private sector, and the ability to use turnkey implementation methods, could offset the needs for Federal participation and attract private equity to public transit investments.

Based upon factors noted earlier, environmental projects are monopolies providing a public service that everyone must utilize, and therefore are capable of pricing user fees at a level which can offset capital and operating costs, as well as provide a reasonable return on investment. Coupled with excellent tax benefits, the primary revenue risks of these projects related to the attainment of usage levels necessary to generate anticipated fee income, and the intrusion of public utility regulators into rate-setting. Even estimates of future usage risks for utility projects are mitigated by guarantees supplied by the public sponsor. Foreign highway and mass transit experience also tends to resemble public utility financing in the United States, due to enormous pent-up travel demands, historic under-investment in highways relative to transit, compact

development patterns, and the willingness of sovereign entities to supply private partners with usage guarantees, access to existing revenue sources, or extremely valuable assets that can be converted into capital and operating revenues.

In the U.S., transit ventures were viewed initially as offering the opportunity of being able to tap the profits of adjacent real estate ventures, collect impact fee revenues and special assessments, and use other, indirect methods developed by the private sector to finance infrastructure for major land improvement projects (Municipal Utility Districts, Mello-Roos Districts, Community Development Districts, proffers, and so forth) to supply the subsidies necessary to make desired investments financially feasible.

In each case studied, it came to be recognized that public transit revenue forecasts in the United States were simply too speculative for financial institutions to make commitments. The build-up of project revenues always required many years of operating losses, even under the most optimistic projections. Vendors were able to absorb cost-related risks affecting capital construction and operations, but could not guarantee the revenue-generating potential of their transit products. Invariably, the comparisons with cogeneration and environmental projects dissipated when firm commitments were necessary. "Take-or-pay" contracts for transit services

*Turnkey contractors have the ability to control cost related risks, but require public agency commitments to offset revenue risks.*

required off-balance sheet obligations that state, county and municipal governments refused to provide. In the Orlando Matra/AGT instance, a Federal standby commitment to mitigate revenue risks was aggressively pursued by Orange County, FL, and was not realized. Guaranteed purchase arrangements, tipping fees, and regulatory rate-setting mechanisms all seemed inappropriate to apply to a transportation system that might have difficulty attracting



large volumes of ridership in some markets, even if the service was free. Eventually, attempts to provide "standby" credit enhancements failed and the projects were abandoned.

The projects proposed as public-private partnerships were incapable of demonstrating revenue-generating potential to cover their capital costs. This was a particularly noteworthy outcome on the Manhattan projects, where one third of the nation's transit trips are taken; over 90 percent of peak-hour travel into the Central Business District may involve a transit or shared-ride mode, and auto trip generation rates of less than one fifteenth of Institute of Transportation Engineers (ITE) standards have been observed. The issue in the New York City project was less the ability of the market to bear a fare structure that could attract private financing, than the willingness of the Metropolitan Transportation Authority to permit fares in excess of those charged for regular public transit services. Regulatory, as well as market, conditions must be assessed in evaluating the potential for sharing revenue risks. Asking the private sector to absorb downside risks, without accompanying opportunities to realize upside potential has proven to be an unrealistic expectation in some cases.

In other cases, like the Denver Tech Center Project, which actually succeeded in creating an authority that imposed a dedicated tax on business to fund the program, a narrowly-based revenue source linked to the beneficiaries of a specific project proved inadequate to meet capital and operating needs. The benefits derived were too small in relation to project capital cost and too distant in the future to warrant significant, up-front commitments. The resulting requirement for general fund subsidies and Federal grants undermined the credibility of the "private sector" approach, caused the projects to compete with other public priorities for limited funding, and eliminated the potential cost savings from avoiding mandates and red tape.

*U. S. experience in contractor-supplied financing for transit projects has not been promising. At best, it should be considered only as a supplement to full public sector commitments.*

Based upon the experiences thus far, in what areas can financing be considered a reasonable element of a procurement?

The most realistic applications of vendor financing in innovative procurement strategies are in the area of construction financing. In effect, the project sponsor may need assistance in smoothing-out the "lumpiness" of cash flow requirements during construction, or in spreading payments over a somewhat extended time frame. In these instances, the project sponsor will have a viable revenue source, however, there may be problems with limitations on issuing bonds (such as Houston), or in matching revenues from Federal grants and other, outside sources to the optimum construction schedule. The Federal Advance Construction Program and conventional vendor financing packages can be tailored to meet these requirements. Similarly, lease packages can be devised to accomplish similar aims for rolling stock, as well as for entire systems.

In most cases, the implementation period for transit projects is so extended that mechanisms such as cross-border leases have little value when proposed at the time projects are bid. Many innovative financing proposals are highly sensitive to national and international tax laws that are subject to constant change. Therefore, these offers are constrained by their inability to guarantee specific terms and conditions until the project is virtually completed.

The ultimate evaluation criteria public sector sponsors can apply to innovative financing offers involve both the certainty of the proposal (is the offer firm or contingent on certain events, is the interest rate fixed or to be determined?), and a rigorous comparison between the terms supplied by the vendor and those which could be obtained by the public sector sponsor on its own. If the offer is firm, the terms are advantageous, and/or credit is supplied when none might otherwise be available to the public entity, then a true opportunity exists for consideration.

The application of experiences in sports arenas, government office buildings and military housing, is explored in Appendix B and is limited in applicability because of the unique Federal

lease financing structures utilized, or the ability of the projects to generate net project income.

### **3.3.4 Joint Development**

As current conditions in the real estate industry vividly demonstrate, more sophisticated risk and valuation measures are required when the proceeds from real estate ventures are incorporated into the pricing and financing of fixed guideway transit projects. Special factors that must be considered in assessing financing proposals contingent upon joint development revenues include:

- Differentiating between firm offers and options
- Differentiating between cash flows offered immediately, compared to those offered in the future
- Determining how joint development revenues should be applied toward transit costs
- Appraising land, right-of-way and facility donations
- Placing a cash value on entitlement variances and density bonuses that proposers may seek in exchange for contributions toward the fixed guideway program
- Impact of linking real estate projects to the fixed guideway system on the scope of environmental studies, and extension of Federal mandates to the private development
- Using a discounted cash flow analysis to compare a "buy and hold" strategy to the up-front cash consideration (if any) offered for real property assets by a superturnkey proposer
- Valuing the net present value of participatory lease arrangements, where future cash flows may be linked to a share of net profits from rents, and the sale or refinancing of future development (certain vs. less certain cash flows, minimum payments vs. contingent payments, and so forth)
- Impacts of anti-speculation limitations ("flipping" and non-assignment clauses)
- Ability to negotiate developer performance requirements (schedule for bringing proposed development on-line, quality and mix of uses, and waiver conditions)
- Willingness to accept non-subordination of publicly-owned land and eventual reversion of improvements

- Competitive implications (third party procurement) of exclusive agreements between vendors and property owners involving rights-of-way, station sites, parking facilities, and so forth

Fundamental to the "superturnkey" strategy, or fixed guideway financing offers contingent upon real estate revenues, is the certainty of the proposal. For example, an option may never be exercised, even though its face price may be very attractive. Funds delivered later in the implementation process are certainly less valuable than those provided up-front. Commitments to proceed with development within a particular time frame are more valuable (particularly when participating leases are involved) than open-ended arrangements. Contingencies based upon market conditions, interest rates, development entitlements, tenant commitments, suitable financing, and so forth, are common in the real estate industry and represent risks that anticipated returns may not be realized. As a result, joint development proposals must be subjected to discounted cash flow analysis to determine their true value and attractiveness.

*Differentiating between options and firm offers and proper valuation of land, density bonuses, and entitlements are critical to making joint development a realistic source of funding.*

Few transit agencies can control the real estate development entitlement process and are not in position to "sell" development rights in exchange for contributions to fixed guideway projects. Indeed, the sale of the New York Coliseum to Boston Properties that, at one point, was anticipated to yield \$450 million, was voided in court, partially on the grounds that the City of New York was offering "zoning for sale" in order to offset its requirements to fund the Metropolitan Transportation Authority's capital program.

More recently, Honolulu has received an extensive joint development offer as part of the successful turnkey proposal submitted by Oahu Transit Group (OTG). However, the offer

involves a participation in net profits of future development, and includes conditions that relate to condemnation, zoning adjustments, accelerated permitting, furnishing of street improvements, air rights above streets, and extensive scheduling requirements. The market value of public actions to meet these conditions is very great, and it remains to be determined if the City of Honolulu will conclude that the consideration offered in exchange from the developer is reasonable, or consistent with current plans and public policies. OTG also proposed to use joint development revenues obtained during the construction period as an offset to Net Project Costs, while income received once revenue service is initiated would subsidize operating deficits.

The opportunity for superturnkey vendors to secure development rights without going through a separate procurement process can raise issues relating to project definition. By incorporating a major real estate development into the fixed guideway transit capital financing structure, there may be a requirement to include the land use impacts in the environmental analysis. Superturnkey procurements can help minimize the risk that a future developer will not be found if the joint development process is separated from the initial procurement, and allow the possibility to be exploited that the vendor may be prepared to pay either a premium, or more certain consideration for the property rights in order to secure the system contract. Unfortunately, few, if any, joint development procurements result in immediate cash to meet capital funding requirements. Most offers involve a participation in revenue streams from future developments that are contingent upon many market variables and governmental actions which are outside the span of control of the transit agency.

*Project sponsors must compare the benefits of combining system acquisition and joint development with separating the procurements. Is the risk of project delay increased by linking construction and land development decisions?*

In superturnkey procurements, where the Locally Preferred Alternative alignment is fixed and a station site or right-of-way is held privately, the landowner has the potential to influence the outcome of the bid process. For example, a system vendor may approach a property owner in the path of a fixed guideway system and enter into an "exclusive" relationship under which the landowner agrees to contribute the necessary property rights. However, any other system vendor competing for the turnkey designation would have to acquire the necessary land through purchase or condemnation. If the real property assets are sufficiently valuable, these types of arrangements could exert a material influence on the overall bid price for the system. On the one hand, such relationships can result in potential cost savings to the public sponsor, but on the other hand, they may introduce external factors to the procurement process that in actuality, or appearance are unwelcome complications.

A highly visible example of how joint development can be oversold as a source of private "equity" contributions, is High Speed Rail Corporation of Florida. This private entity was sponsored by a foreign equipment vendor, and was awarded a franchise designation after being the only bidder to maintain that no public funds would be needed to construct a high speed rail line from Tampa/Orlando to Miami. Financing was to be based upon passenger revenues and a vast real estate development program sanctioned by special state legislation. The development opportunities affected properties along the rail corridor, as well as loosely-defined "ancillary" corridors. Developments implemented in conjunction with the rail program were to be exempted from the state's adequate facilities ordinances, and, according to some interpretations, from land use controls exerted by local governments. The financial analysis supporting these claims was reviewed and accepted by the State's oversight commission.

By the time a project financing plan was presented, the original claims of totally private financing were abandoned, and the Corporation's requirements for funding from the local jurisdictions ranged into the *billions* of dollars. Put in its most favorable light, the downturn in the real estate market necessitated reassessment of the original financing projections. In response to the request for billions of dollars in public debt, the State Legislature ended the negotiation process, abolished the oversight commission implementing the program, and transferred all rail system planning to the Florida Department of Transportation.

The demise of the private sector approach to financing the Florida rail line conclusively demonstrates the risks incurred by public sponsors in basing implementation plans on ideas, options, or conditional offers from private entities. Fixed guideway projects are sufficiently complex that it is unsustainable to add a completely independent set of risk variables and contingencies to the implementation process -- particularly in light of current market conditions. The Florida model also demonstrates that real estate projects have similar cash flow cycles to fixed guideway transit projects, with heavy early demands for capital outlays and the likelihood of annual losses for several years. As a result, developers are least able to provide front-end capital to fixed guideway projects when cash requirements are greatest.

Other significant factors affecting inclusion of joint development revenues as an integral part of project financing relate to the valuation and discounting methods employed by both the proposer and the bidders. For example, experience along many fixed guideway corridors tends to confirm that the value of development rights on, or adjacent to, rail facilities increases over time, as ridership and system credibility grow. This raises the issue for a sponsoring agency of, is it advantageous to hold ancillary real estate assets until the system proves itself operationally, or is it better to sell (or not buy at all) early in the implementation process in order to minimize Net Project Costs? For example, financing the Hong Kong subway was partially based upon realization of revenues from major residential developments above station and yard facilities. In order to avoid the risks of delay and uncertainty, the development rights were sold largely for cash, with a small interest carried in future revenue streams, and implementation of the project's financing was separated from the real estate development approval process.

A discount rate can be used to make these calculations, however, the need for project revenues can place extreme pressures on an agency to dispose of valuable assets early in the implementation cycle. In reality, the Hong Kong model of a simple sale or long-term lease of development rights or other real property assets at the initiation of a project may be the optimum approach to generating needed project revenue, rather than a sophisticated joint development program, with its attendant opportunity costs of holding vacant land, and requiring costly,

operating outlays for staff, planning consultants, and property management.

The time delays and uncertainties inherent in planning for real estate development are a critical factor in the risk/return and discounting equation of joint development. If land acquired for transit use and eventual redevelopment is properly planned and completes the entitlement process during the engineering phase so that it is "ready to go," the public sector's value at the time of a turnkey vendor procurement, or separate joint development solicitation, will be enhanced significantly. From a discounted cash flow perspective, is the public sector best served by placing "raw land" out for joint development consideration, and how should the value of master planning and entitlements be calculated?

*In many cases, a simple sale of public real property assets may be more advantageous than a long-term participation in private development.*

One scenario for how the public sector can maximize value, minimize Net Project Costs, and realize the ridership and passenger amenity benefits of joint development can be observed in the Seattle Union Station Project. The innovative land acquisition strategy utilized in this case also illustrates the potential benefits to a public sponsor of avoiding the risks of joint development and adding them to the transit undertaking.

Seattle Union Station is the southern terminal of the Downtown Transit Project, and includes the International District Station, right-of-way for the bus tunnel and guideway, and a marshalling area for the dual-mode buses to convert from diesel to electric operation. However, METRO did not acquire the land for these facilities.



METRO was required to build a lid across the site in order to mitigate noise and diesel fume impacts on the adjacent community. The property owner, Union Pacific Realty, exchanged a permanent easement for all of METRO's operations, and retained development rights over the site on the lid METRO was required to build. An award-winning, 1.0-million square foot development for the site was privately master-planned by Union Pacific Realty and approved by the City of Seattle. METRO was able to receive its necessary easements by agreeing to upgrade the lid to a structural platform and to place the supporting columns in locations that were mutually agreeable to Union Pacific Realty, based upon its master plan design.

Although METRO will not have a participation in revenues from the future development, it avoided substantial land acquisition costs through the transaction. Union Pacific Realty has incurred significant expenses in designing the project and securing development entitlements from the City of Seattle. Due to market conditions, no development has not gone forward as yet. In addition to its avoided land acquisition costs, METRO did not have to fund planning outlays, property management, and maintenance expenses. Property management cost have proven considerable due to the presence of the historic railroad station and the need for costly street reconstruction that the owner of the property was required to bear. It is doubtful that a future joint development would have yielded METRO a return great enough to offset these out-of-expenses and opportunity costs. METRO not only avoided large cash outlays and exposure for these non-fixed-guideway-related risks, it is positioned to enjoy the benefits of enhanced ridership and passenger amenities from any future development above the International District Station.

It is interesting to note that a turnkey element was involved in the Seattle Union Station Project. Since Union Pacific Realty's architects and engineers had studied the project intensively and specified the location of the support columns as part of the master planning efforts, METRO entered into a fixed-price, date-certain contract with Union Pacific Realty to design and build the platform.

*The best joint development approach is often to minimize outlays for land acquisition.*

### 3.4 Federal Risk Exposure

The Federal interest in the outcome of a local, fixed guideway transit procurement is indirect. The Federal role is limited to financial participation and oversight, to assure that the funds are appropriately expended and all legal requirements are fulfilled. Local agencies are the owners, and "project managers" of fixed guideway transit systems. The sponsoring public body is at risk for cost overruns beyond those which can be justified under the narrow definitions of the Full Funding Grant Agreement, as well as for future operations and maintenance liabilities. There is a clear Federal interest in seeing good projects built at fair prices and on schedule. In addition, the Federal oversight role in system implementation has been extended into the areas of project and financial management. The further risk mitigation benefits of public-private partnerships and innovative procurements to the FTA, beyond those embodied in the Full Funding Grant Agreement, primarily relate to the opportunity to base funding decisions on more accurate cost and performance estimates.

*FTA is interested in seeing good projects built at fair prices and on schedule. They need to base funding decisions on more accurate cost and performance estimates.*

However, unless the implementation process is adjusted to reflect the opportunities and limitations of innovative procurements, the data for making build, no-build decisions and project selections can remain speculative. For example, it has been suggested that turnkey vendors will advance the preliminary engineering, (PE) process through the preparation of their bids. Experience indicates it is unlikely that this expectation will be realized, triggering downstream implications for estimating the costs of build alternatives and the Locally Preferred Alternative.

The premise that turnkey vendors will undertake their own PE studies in order to make realistic, fixed-price bids, and propose the "best" route in relation to their system's operating and construction requirements, runs counter to the risk-avoidance behavior natural to private sector project proposers. Bid preparation is costly and constitutes the capital which must be invested in a project that is most speculative. As a result, there are extreme pressures to limit expenditures until after the job is won and to maximize returns on the outlays required.

From a practical perspective, the preliminary nature of the bid documents used in the case study examples underscores the risks to the fixed-price vendor that changes are inevitable, and plenty of margin for error must be built into the pricing process. With little assurance as to when the initial engineering phases will lead to construction and rolling stock acquisition, the private vendor has every incentive to craft a bid price guided by budget figures disclosed in the newspapers and other public documents, rather than by exhaustive PE. The proposal process may be perceived as the cost of "buying" a future, sole source procurement if a particular project is built.

*Current turnkey practices may be resulting in the perception that proposers are simply "buying" a sole source procurement, if a project actually gets built.*

Actual profits will be based upon the negotiations which will follow more detailed engineering studies that define the system according to the project sponsor's preferences. As a result, project cost estimates based upon initial fixed-price bids from vendors may be as unrelated to final, delivered capital costs as under conventional project implementation processes. Due to the requirement that bidders incorporate significant risk premiums into their offers, the prices used for decision-making may be high, and can cause the project scope to be narrowed prematurely

to exclude high-risk elements. In so doing, the local consensus to make the investment may become unstable.

The following chapter examines the Federal project planning and implementation process in order to identify areas where flexibility in the adaptation of innovative procurement methodologies to fixed guideway transit projects has yielded success, and how the downside risks noted above can be minimized.

#### **4.0 INNOVATIVE PROCUREMENTS AND THE FTA PROJECT IMPLEMENTATION PROCESS**

As a major financing partner in fixed guideway projects, FTA seeks to promote an effective project development process which also satisfies Congressional requirements. In recent years, FTA has been proactive in project planning through the Alternatives Analysis process, and in PE, final design and construction through the provision of Project Management, oversight and more recently, Financial Management Oversight Contractors. Public-private partnerships must be implemented within the context of FTA's mandates and legislative requirements.

FTA's project management philosophy is contained in the *Project and Construction Management Guidelines*<sup>11</sup>, which also describe the transit capital project development and environmental review process. The distinct phases of this process are listed in Appendix A. FTA, through the Full Funding Grant Agreement, limits Federal liability for the risks of project completion and cost overruns. Capping Federal exposure provides clear incentives for the grantee to manage projects to completion according to agreed time, cost, and performance specifications. As noted in the previous chapter, greater participation of the private sector in the transit capital project development process presents an opportunity to tighten management and control mechanisms, as well as to allocate risks more precisely.

In order to facilitate the application of innovative procurement methods, variations possible within FTA's project management processes are summarized below, along with ideas for experimentation.

##### **4.1 Project Planning (Alternatives Analysis) and Preliminary Engineering**

A basic question Federal, state and local policy-makers must resolve in embarking upon a public/private partnership to implement a fixed guideway investment is the point at which critical project decisions are transferred or shared with the selected system vendor. For example, in

Houston, the selected vendor was to help define the Locally Preferred Alternative. In Honolulu, the Locally Preferred Alternative was selected prior to initiating the turnkey bid process; however, many project definition changes unfolded during bid preparation in response to cost and technical issues. In Minneapolis, it was originally believed that bringing the vendor into the process as early as possible could help to maximize joint development opportunities and minimize duplication of effort between public sector and private engineering requirements. Finally, in almost all cases, the prospect of "private sector financing" has been considered a critical factor in the turnkey procurement process, with implications for evolution of the overall, project finance plan.

*A question in innovative procurements:  
What is the best time in the project  
development process to procure the  
contractor?*

The FTA planning process requires that the System Planning Phase be carried forward in sufficient detail to justify a fixed guideway alternative prior to advancing into Alternatives Analysis. The decision to build a fixed guideway system raises profound choices regarding a community's future growth patterns and its financial obligations. Any involvement of the private sector in this process must be carefully managed to avoid obvious conflicts of interest. For example, it would appear to be inappropriate for a vendor to manage a planning process which results in ridership estimates, land use plans, alignment characteristics, cost projections, and revenue forecasts, which justify selection of the vendor's own system technology.

No evidence has been found in reviewing project experiences that the private sector can resolve environmental, community, and political concerns regarding a project's feasibility or desirability more readily than the public sector. To the contrary, the DPM experience and the Hennepin

County investigations suggest that the evolution of a consensus regarding technology, vertical and horizontal alignment, station siting, and a practical financing plan, prior to an innovative procurement may be a critical determinant of whether or not the benefits of a public-private partnership will be realized.

Furthermore, placing projects out for turnkey bids prematurely can create new downside risks that an existing consensus will fall apart unnecessarily. For example, high risk segments, such as tunnels and long-span bridges, can yield fixed-price bids well above preliminary estimates, if vendors do not have access to detailed engineering studies. The large risk premiums that may be necessary for these segments, if fixed prices are solicited too early in the planning process, could cause them to be dropped from the project. The modified project scope may produce lower overall benefits and weaken political support. However, more informed bids with reduced risk premiums could enable difficult segments to be retained. As noted earlier, vendors have proven unable to afford making their own PE studies in support of the bidding process to minimize these uncertainties. One alternative FTA may wish to consider is providing financial support to a short list of bidders for completing detailed cost proposals.

*High risk premiums for complex construction elements can be reduced by performing more detailed engineering studies publicly.*

As a result of these observations, it is likely that an innovative procurement would proceed best after an Alternatives Analysis yields a firm consensus for a Locally Preferred Alternative and a workable financing structure. It also is recommended that the system supplier procurement package be derived from a detailed risk assessment, allocation, and reduction study. Section B.3.1 provides a reference for such a study, which was conducted for a resource recovery project in Honolulu.<sup>12</sup> One by-product of such an analysis could be an option for public

sponsors to advance more detailed engineering studies for high-risk segments prior to an innovative procurement solicitation, that is, as part of the alternatives analysis phase, or subsequent to initiation of PE which is outside the scope of a turnkey contract.

Several ideas may be worth exploring for future innovative procurements. One observation that arises from the cases reported in previous chapters and in Appendix B, is that the cumulative risks associated with fixed guideway transit systems may be too great for the private sector to assume until a stronger body of project history in the United States is built. It may be more feasible to consider dividing the system into segments, during the Systems Planning and Alternatives Analysis process, some of which can be bid using turnkey methods, and others of which can be built either all privately, all publicly, or in combination. For example, in Honolulu, it was considered that the tunnel section in downtown might be built using traditional methods and furnished to the turnkey vendor for system installation. Many fixed guideway systems incorporate segments involving modest construction risk, such as those utilizing existing rail rights-of-way, or traversing largely undeveloped areas, that could be contracted more easily on a turnkey basis.

Similarly, elements of fixed guideway system could be contracted independently to the private sector. One example might be contracting with a private group to design, build and operate parking facilities throughout a rail corridor. In SEPTA's Fraser Shops Project, a private consortium was contracted to design, build and operate a commuter rail system maintenance facility. Precedents also have been established for private firms to be contracted to build and operate electrical power distribution, telecommunications, and fare collection systems.

While potentially complicating systems integration, these "partial turnkey" approaches can help create a body of successful experience that leads to a full, system procurement. The same legal, financial, and institutional issues affect these smaller-scale packages. Financial risks are more manageable for both sponsors and bidders, and public and private sector managements could have the opportunity to establish precedents, as well as new business relationships, in a lower-



profile setting. In addition, contracting for discrete functions and system elements, some of which are capable of generating predictable project revenue streams (such as parking or cogeneration), could help establish precedents for limited private sector financing, and sharing of both cost and revenue risks.

*A greater body of knowledge of the benefits and risks of innovative procurements for U.S. transit projects is needed; partial turnkeys should be encouraged and evaluated.*

It is possible that the concept of contracting systems, components, and segments *at different stages in the implementation cycle* also could evolve into a workable structure for adapting turnkey procurement processes in the United States market, and implicitly minimize risk premiums. Rather than soliciting an entire system at a relatively early stage in the development cycle, the initial procurement could cover only long-lead, system elements and, perhaps, project management services. As the project advanced through the implementation process, bid packages for pre-qualified firms in civil construction, and other project components, can be prepared jointly by the project management contractor and the public sponsor. Systems integration responsibility would remain with the project management contractor, who would have the lead in preparing specifications and bid packages. By delaying issuance of bid packages, or initiating negotiated procurements for various elements until the appropriate point in the implementation cycle, the risk premiums for delay, changes, inflation, and other factors can be minimized.

While lacking the appeal of a single, fixed-price for the entire system, a segmented turnkey approach could result in multiple fixed-price contracts that still achieved the benefits of shifting the risks of performance and cost overruns away from the public sector, accelerating

implementation, and avoiding large public sector staffing requirements.

A segmented turnkey approach also holds the potential to attract a wider variety of firms to the role of overall, system vendor/project manager due to the modified functional responsibilities, reduced capital requirements, and lower front-end risk exposure. An inherent concern in the current practice is the potential for car builders, engineering, and construction firms to be attracted to the role of turnkey vendor in order to increase profit margins over conventionally-bid work. Narrowing the scope of the segmented turnkey vendor to a systems/project management function and retaining elements of the competitive process for defined project components can help to minimize conflicts of interest and disputes among members of consortia for a "fair share" of the overall project.

#### **4.2 Final Design**

Throughout PE and Final Design, all utility modifications must be identified and planned. Any utility relocations which can be accomplished in advance of system construction will permit future time and savings. Land acquisition and relocations should be completed by the public sector sponsor prior to initiating the Construction Phase. Joint development initiatives, if any, should be refined and financing agreements established according to the master schedule.

*Advanced land acquisition and utility relocations are critical to effective construction phase performance.*

Final Design usually concludes with the delivery of detailed plans and specifications for the construction contractors. Presumably, these documents can be more performance-oriented under an innovative procurement, minimizing delay and the need for future adjustments based upon

unanticipated conditions. The contract documents should anticipate the eventuality of disputes and claims, and attempt to streamline a process for rapid resolution. Financial incentives and penalties can be included to encourage contractor performance.

Since change orders may necessitate substantial penalties in a turnkey environment, maintaining discipline on scoping modifications is a critical success factor.

### **4.3 Construction**

To assure system integration and realization of joint development pledges, the vendor is responsible for management of construction contractors. Although vendor consortia typically include a civil construction firm, it is possible that prequalification of a limited number of contractors with good records of performance, safety, management, and financial capability might be considered to encourage competition. Public assembly of rights-of-way and completion of some, or all major utility work could lower the risks of delays, termination, changes, and field conditions and attract interest among more firms, resulting in favorable bid prices.

Once construction begins, the public sector can expedite contractor progress and limit cost escalation by assuring that approvals, permits, facilities, and so forth, are available as defined by the master schedule.

Several of the important financial considerations pertaining to innovative procurement processes occur at this stage. First, the primary benefits of turnkey procurements in cost reduction are realized through acceleration of project construction. A smooth flow of project and construction management, as well as appropriate penalties and incentives within the vendor team, can assure that the optimum path to project completion is followed.

Second, it is possible that a vendor consortium could help a public project sponsor with construction financing that can smooth-out the "lumpiness" of implementation outlays. Although

in most cases, public agencies can secure short term financing on more favorable terms than vendor-supplied construction financing, testing the market could yield unanticipated benefits.

Finally, the project is likely to be far enough along at this stage that innovative financing methods, such as cross-border leases, can be explored in greater detail.

#### **4.4 Testing and Start-Up**

Requirements for testing and start-up activities must be included in the system supplier's contract, however, the burden for identifying and resolving problems rests with the vendor. It is at this stage that some of the greatest benefits of combining final system acquisition, design, and construction in a single procurement can be realized. Fixing responsibility and authority with the vendor minimizes the potential for finger-pointing between engineering teams, and the system and civil contractors, should "teething" problems arise.

#### **4.5 Revenue Service**

Based on the innovative procurement method employed, operation and maintenance of the transit system could be the responsibility of a public authority, the system supplier, or another private contractor. The system could transition from private to public operations after a certain period of time.

Thus far, no public-private partnership for a fixed guideway transit or high speed rail program has been willing, or able to accept revenue risks. Given the availability of attractive substitutes for mass transit services, the history of optimistic patronage forecasts in many planning studies, the difficulties of raising fares over time, and the extended "maturation" period for system utilization, it is unrealistic to expect that private parties will share revenue risks with public sector project sponsors. However, it is not unrealistic to expect that vendors will cap operating and maintenance costs. Protecting public agencies from rapidly-escalating operating costs, and

allowing the maximum exposure for future losses to be defined, are critical benefits of turnkey procurements which include operations and maintenance. Experience in this arena regarding airport people mover systems is extensive, and generally positive. In addition, linking the system acquisition and operations and maintenance functions causes system suppliers to take a "life-cycle" view in the specification of original equipment and design.

*Inclusion of system operations and maintenance responsibilities in the turnkey contract can affect life-cycle cost efficiencies.*

Critical to the success of the guaranteed operations and maintenance agreement is development of performance measures, and definition of the expenses covered in the maintenance agreement. For example, a maintenance agreement will need to address liability for major capital replacements as part of normal overhaul cycles, or for components which move beyond their warranty period.

Finally, it is necessary for a public sector project sponsor to be sensitive to the possibility that the maintenance agreement option does not result in a determination by the Internal Revenue Service that the project is a "private activity" and loses all, or part of its access to tax-exempt financing. Limiting the term of the initial agreement to five years, and conforming the conditions for payment of fees, renewals, and extension options to current guidelines are essential considerations in this regard.

## **4.6 FTA Implications**

### **4.6.1 Summary**

From the Federal perspective, the implications of innovative procurements in the project development process are several:

- Selection of a turnkey vendor is not a substitute for local consensus on system definition and financing. In fact, conducting a procurement before a Locally Preferred Alternative is defined in detail, appears to add to the controversies inherent in the fixed guideway planning process.
- Unlike toll roads and fixed guideway transit projects abroad, turnkey procurements for fixed guideway systems in the U.S. do not appear to yield private equity, when the return on that equity is secured by farebox revenue. Therefore, the identification of stable and reliable funding sources necessary for implementation and operation is unlikely to be affected by the system procurement method.
- Risk premiums can be minimized in fixed-price procurements by advancing engineering studies on complex system segments and advancing early right-of-way assembly and utility work.
- It may be advantageous to consider implementing major fixed guideway projects through partial turnkey procurements where multiple bid packages could be developed, e.g., for vehicles, guideway, control systems, or stations, some of which can be delivered through public-private partnerships, and others which can be supplied totally privately, totally publicly, or in combination.

### **4.6.2 Review of Federal Cash Flow Management Issues**

FTA's ability to commit funds for major, multi-year capital investment projects is constrained by the limits in authorizing legislation, competing demands from numerous investment opportunities and the "pipeline" of projects to which funds are committed, but remain unspent. A procurement method which permits Federal payments to be delayed, which minimizes cost and Federal share, and which attracts new sources of capital from the private sector clearly is attractive. Accomplishing these goals through public-private partnerships could allow Federal

participation to be spread-out over time, while transferring the risks for completion and cost overruns to the private sector. From a financing perspective, a lease-purchase arrangement would offer these benefits, however, the ability to commit funding over time periods extending across appropriation, as well as authorization periods is limited, even under the terms of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA).

*Innovative procurement approaches offer the opportunity to improve the flow of Federal funds to support the transit project.*

The experiences of other Federal agencies in utilizing innovative procurement methodologies to leverage cash flows were reviewed to determine how benefits and costs attributed to these techniques have been recognized. An extensive review of the General Services Administration (GSA) lease-purchase program, private sector initiatives in the environmental field, experiences in the electrical utility industry involving Build-Operate-Transfer (BOT) projects, and an extensive case study outlining the financial structure and turnkey implementation of a sports arena in Miami were studied (see Appendix B for selected examples).

The GSA initiative, as well as related leasing programs at the Defense Department involving base housing and certain depot facilities, was driven largely by budgetary constraints, and an exemption from the Anti-Deficiency Act which permitted long-term, full-faith-and-credit obligations of the United States to be recognized only as outlays in individual years.

The General Accounting Office (GAO) performed an extensive investigation of the GSA program (GAO/GGD-90-11, December 1989), and concluded that the program was more costly than other options available (direct appropriations and ownership, as well as borrowing directly through the Treasury) and recommended that the program be discontinued. GAO reviewed 43 potential projects and found that a net present value of \$1.3 billion in savings would be realized from

ownership of the projects. In addition, 72 leases were reviewed and found that in 25% of the cases, government ownership would have a \$116 million lower cost. In other cases, leasing was either less expensive or preferable for other reasons.

In October, 1990, the Office of Management and Budget (OMB) issued Bulletin No. 91-02, which sets forth instructions on the scoring of purchases, lease-purchases and leases of capital assets (Part B) and narrows the practices employed in the GSA program:

**"3. Scorekeeping rule.** When an agency is authorized to enter into a contract for the purchase, lease purchase, or lease of a capital asset, budget authority will be scored in the year in which the authority is first made available in the amount of the Government's total estimated legal obligations...

Outlays for a purchase (in which the Government is its own contractor) or a lease-purchase in which the Federal Government assumes substantial risk will be spread across the period during which the contractor constructs, manufactures, or purchases the asset. Outlays for a lease or a lease-purchase in which the private sector retains substantial risk will be spread across the lease period, consistent with existing practice."

On the positive side of the turnkey, lease/purchase decision, GSA has found it advantageous to purchase completed buildings in order to avoid the risks of cost overrun and delay. Similarly, the staff report recognized a certain amount of value added by the private sector in managing construction of the buildings on the Government's behalf. Finally, the comparison made by GAO is valid in recognizing that lease/purchase is more costly than direct Federal acquisition, however, the option of direct Federal acquisition was not available due to inadequate authorizations and appropriations from Congress. The lack of capital funding during a period of rapid expansion of Federal space requirements, resulted in agencies leasing space on the commercial market, which is the costliest option for the Government to exercise.

Thus, the lease-purchase program remains cost-effective when compared to the alternative of leasing space on the commercial market, which the government may now be forced to continue. The cost differences are attributable to the additional interest expense of financing initial construction and long term mortgages at commercial rates, as well as in certain cases having to



pay local property taxes.

### Application to the FTA Program

Unlike GSA, FTA is a grant agency that technically does not own the assets it funds. Transit projects are very different from office buildings in terms of the complexity of the construction, completion and financing risks involved. From the perspective of a grantee seeking FTA participation in a lease-purchase transaction for a turnkey fixed guideway system, the OMB scoring procedures would apply, and it is likely that the entire stream of lease payments would be counted in the year the commitment was made. The procedures set forth in OMB Circular A-104 would be used to determine if it was in the Federal interest to make the lease commitment.

From FTA's perspective, the current practice of spreading funding commitments over time in order to fit commitments within obligation ceilings may be increasing costs by extending the construction period for its projects. Added costs can come in the form of interest expenses for progress payment schedules that result in negative cash flows for vendors, breaking contracts into many small components that are inefficient, maintaining project overheads for extended periods, increasing the risk of inflation, and so forth. Two other approaches are available, in addition to leasing, to spread-out payments without forgoing the benefits of accelerated construction. These include vendor financing of acquisition costs through an extended progress payment schedule in a turnkey acquisition and Advance Construction Financing authority available to FTA grantees.

The Houston turnkey acquisition encountered few problems identifying mechanisms that could overcome "spikes" in cash outflows during the construction period using vendor-supplied credits in the form of an extended progress payment schedule. Local dedicated tax revenues, as well as priority access to future Section 3 grant funds were found to be reasonable sources of credit for vendors to tap in arranging construction financing.

Advance Construction Notes have permitted borrowing that allowed Federal payments under a Full Funding Grant Agreement to be extended without raising project costs excessively (Port

Authority of Allegheny County, June, 1984, \$37.6 million Advance Construction Note Issuance). This financing was completed prior to extension of the Advance Construction feature of the highway program to transit capital projects and resulted in Net Project Cost savings of approximately \$3 million. While adjusting progress payments capitalizes future payments at taxable rates, the Advance Construction approach is tax exempt.

Mechanisms permitting FTA to "smooth-out" its payments for new fixed guideway systems still do not address the simultaneous problem of a "pipeline" of unspent, but committed Federal funds. With consent from OMB, grantees could establish lending arrangements among themselves to advance funds "warehoused" for projects waiting to move into construction. These transactions could be structured either through clearinghouses established at the state level, bilateral agreements, or trustee arrangements instituted through private banks. "Swaps" of local tax and Section 9 funds have been made between jurisdictions, and freeing these "reserves" could increase the pace of transit construction activity. However, such actions would accelerate outlays which both Congress and OMB have been anxious to control during the current period of high deficits. Similar ideas for adjusting Federal cash flows were discussed at the Financing Session of FTA's Planning and Research Priorities Workshop held in December, 1991.

## **5.0 CONCLUSION**

### **5.1 Adapting Innovative Procurement Methods**

The experiences reviewed for this report suggest that flexibility in adapting innovative procurement methods to mass transit acquisitions, as well as adapting elements of the FTA project implementation process to public-private partnerships, will be critical to minimizing the risk premiums factored into vendor proposals and realizing the promised benefits of these mechanisms to fixed guideway investments. Neither the public-private partnership models applied abroad, nor those utilized for the delivery of environmental facilities, can be applied fully to fixed guideway acquisitions in the United States without substantial modifications.

### **5.2 Issues for Further Investigation**

Based upon the record in fixed guideway projects thus far, several issues bearing further investigation include:

- At what point in the project implementation process is it most appropriate to initiate a turnkey procurement?
- What is the role of the turnkey contractor in Preliminary Engineering?
- What is the most effective financing structure to include in the procurement?
- What is the most appropriate process for selecting a turnkey contractor?

### **5.3 Topics for Additional Research/Development**

In concert with the National Transportation Policy, FTA has initiatives to encourage public-private partnerships in the planning, design, financing, construction, and operation of transit projects, including innovative procurement methods for fixed guideway systems. FTA should consider additional research, development, and technical assistance activities to foster greater understanding of relevant experiences and issues. The following list of topics is suggested as

desirable components of a comprehensive program plan for assessment of the turnkey concept in accordance with the demonstrations authorized by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. It should be recognized that these are supplementary to previous and current efforts, many sponsored by FTA, such as this report and others referred to in this document and cited in Appendices B and C.

**Turnkey Project Assessment** - Documentation and assessment of a completed U.S. fixed guideway transit project which was implemented using a turnkey approach. Items to be identified and compared to a traditional procurement would include: project description, responsibilities of public implementation and oversight agencies and private contractors for each implementation phase, chronology/schedule, total cost by category and the flow of funds, project management control systems, financial management control systems, project performance by project phase -- actual cost/time versus budget/schedule, significant risk factors and their management, actual ridership and O&M cost versus projections, major project issues and their resolution, and lessons learned.

**Turnkey Procurement Evaluation** - Documentation and evaluation of a contemporary fixed guideway transit procurement process for the selection of a turnkey contractor with responsibility for final design, construction, testing and start-up, and system operations for at least a several year period. The Honolulu Rapid Transit Development Project and the Houston Fixed Guideway Transit Component went through turnkey procurement processes during 1991. While both are worthy of a review, Honolulu should receive first priority as a basis for tracking the project through the implementation process. After selecting a system contractor to implement a monorail system, the Houston project lost critical public support and was terminated by the Metro Board of Directors. It would be advantageous to study both the Honolulu and Houston procurements, since for one (Houston), the turnkey process was initiated prior to selecting the Locally Preferred Alternative; and for Honolulu, the turnkey process began after selection of the Locally Preferred Alternative. In addition to the factors considered as part of the turnkey project evaluation, special attention should be devoted to

describing the process by which the turnkey approach was selected, risk analysis and allocation, contents of the procurement bid package (statement of work, system performance requirements, pricing structure, evaluation process and criteria), and the baseline projections against which future implementation performance can be measured.

**Documentation/Dissemination of Innovative Procurement Projects** - Conduct a literature review and possibly interviews to develop case studies on projects which have utilized innovative procurement methods to implement projects of interest to FTA or those considering such projects. The case studies would be significantly less detailed than the assessments and evaluations discuss previously. Examples include those projects discussed in Appendix B.

**Fixed Guideway Capital and O&M Cost Studies** To provide additional information to a database to assist FTA and those planning new systems to understand the cost experience of systems similar to those being considered for future implementation. They should permit more realistic estimates to guide the development of adequate project financial plans.

**Revenue and Cost Risk Assessment** - Perform a risk assessment to examine the deviation in projected costs and revenues from actual experience, as well as reviewing risk evaluation techniques that would be applied by the private sector in evaluating whether to bid on or finance proposed turnkey projects. Revenue factors would include direct revenues from fares, as well as indirect revenues from sales taxes and other sources that may serve as a credit enhancement. Cost factors would include all project related capital, O&M, and modernization costs. Capital costs include financing, project/construction management, design/engineering, land acquisition, utility and property relocation, systems and equipment acquisition/installation, civil construction, system integration, testing and start-up, and consideration for the impact of schedule and the time value of money.

**Assessment of Transit Industry Financial Control Systems and Risk** - Identification and assessment of available financial and cost accounting systems for project level financial control and the financial and cost risk for selected new start projects and firms involved in their construction.

**Update of the FTA Project Management Guidelines** - To address emerging project management issues, the guidelines should be updated to better address topics such as financial control systems, risk assessment and management, joint development, and turnkey procurement. It should describe needs in areas of financial and cost accounting, cash management, risk measurement and management, contractor control, and master scheduling.

**Follow-up Meeting with the World Bank** - An initial meeting was held recently between technical representatives of FTA and the World Bank to discuss areas of mutual interest related to innovative procurement and financing approaches to major transportation projects. At least one additional meeting is anticipated to focus on transit projects and to address issues such as the role of joint development, structuring of financial partnerships and opportunities for equity investment, and the timing of turnkey requests for proposals (RFPs) relative to the project definition process.

**APPENDIX A**  
**FTA MAJOR CAPITAL PROJECT DEVELOPMENT PROCESS**

**System Planning**

- Regional Transportation and Comprehensive Planning
- Transit Corridor Priorities

**Project Planning**

- Alternatives Analysis
  - System Description (Selected Alternative)
  - Performance Requirements
  - Preliminary Patronage
  - Preliminary Alignment
  - Cost Estimates
  - Finance Plan
  - Master Schedule
- Draft Environmental Impact Statement
- Project Budget
- Project Management Plan

**Preliminary Engineering (PE)**

- Revised Project Management Plan
- Project Budget
- Preliminary Implementation Plan
- Performance Specifications
- Design Criteria
- Interface Plans
- Configuration Control
- Final Environmental Impact Statement
- Master Utility Agreements
- Real Estate Acquisition/Relocation Plan
- System Safety and Security Plans
- Preliminary Procurement Plan
- Preliminary Architecture and Engineering Plans
- Preliminary Construction Plan
- Preliminary Operations and Maintenance (O&M) Plan
- Preliminary Organization Plan
- Preliminary Capital and O&M Cost Estimates
- Revised Finance Plan (if required)

- Preliminary Joint Development Plan

### **Final Design**

- Revised Project Management Plan
- Project Budget
- Implementation Plan
- Mitigation Plan
- Final Design Plans and Specifications
- Detailed Utility Agreements
- Real Estate Acquisition/Relocations
- System Safety and Security Plans
- Procurement Plan
- Bid Documents
- Construction Plan
- Quality Assurance/Quality Control Plan
- Test Plan
- Operations and Maintenance Plan
- Organization Plan
- Capital and O&M Cost Estimates
- Revised Finance Plan (if required)
- Joint Development Plan

### **Construction**

- Revised Project Management Plan
- Project Budget
- Contingency Management
- Revised Finance Plan (if required)
- Mitigation Measures
- Utility Relocations
- Equipment Fabrication and Installation
- Civil Construction
- Construction Management
- Quality Assurance/Quality Control
- Completion Documentation
- Joint Development Coordination

### **Testing and Start-up**

- Revised Project Management Plan
- Test Results
- Final Acceptance
- Management Reports



- Operating Reports
- Maintenance Reports
- Failure/Deficiencies Reports
- Final O&M Plan

### **Revenue Service**

- System Operations and Maintenance
- System Performance Analysis and Enhancement Planning
- Capital Replacement Planning



**APPENDIX B**  
**INNOVATIVE PROCUREMENT PROJECT/PROGRAM EXPERIENCE**

**B.1 CURRENTLY/RECENTLY ACTIVE PROGRAMS FOR FTA FUNDING**

**B.1.1 Honolulu Rapid Transit Development Project<sup>13,14,15,16</sup>**

The City and County of Honolulu are advancing a 16-mile fully automated, elevated, fixed-guideway rapid transit system estimated to cost \$1.76 billion (in 1991 \$) utilizing a turnkey procurement approach. A subway segment and a Waikiki leg have been eliminated from the final plan. Project development over two decades has resulted in the preparation of a comprehensive set of procurement documents for the design and construction of a transit system utilizing proven technology, and operation for a five year period after which it would be turned over to the City. In addition, "superturnkey" provisions allow the City to exercise turnkey developer proposals for the use of public-private partnerships to generate non-farebox operating revenue to support the transit project.

In October 1991, the Oahu Transit Group (OTG), headed by Morrison Knudsen Corporation, was selected to design, build, operate, and maintain a system using AEG Westinghouse technology. The Oahu joint development proposal consisted of a mixed-use residential/commercial complex on a 36 acre site, with 20% of the development profits contributed to the City. In addition, the developer proposed to construct two transit stations and a pedestrian bridge, landscape and widen Ward Avenue, provide a park-and-ride facility within the parking structure, and master plan development along the transit route. Numerous conditions were required of the City including use of condemnation powers, zoning adjustments, priority permit processing, provision of certain streets and air rights over streets, scheduling requirements, etc. Potential OTG-managed joint development revenues received during the six-year construction period would be used to help pay for the capital costs of the project; joint development proceeds received during revenue service would be used to offset O&M costs.

The project financing plan assumed 30% federal funding from FTA, with two options for the remainder dependent on the level of private sector support defined in 1990 legislation enacted by the state:

**Act 183:** If sufficient private sector and/or City funding is available:

35%: Transit Capital Development Fund, based on contributions of up to \$50 million per year from the state general fund from FY 1992-2008 (17 years).

35%: Private source and/or City funds to match the Transit Capital Development Fund dollar for dollar.

**Act 184:** If sufficient private sector and/or City funding is not available:

70%: 0.5% local general excise and use tax (GET) surcharge in addition to the current 4.0% GET during the period CY 1993 through CY 2002 (10 years).

The City and County of Honolulu and the State of Hawaii have mutually executed a Development Agreement which specifies the project that will be build and a financial plan for the capital cost of the project. The City Council must vote to enact the one-half percent GET increase no later than October 1, 1992 in order for the increase to take effect on January 1, 1993 for a period of 10 years.

As a first step in deciding which, if any, of the OTG joint development proposals to explore, the City has decided to proceed with a City financed master plan development effort.

#### **B.1.2 Houston Fixed Guideway Component<sup>17,18,19</sup>**

The Metropolitan Transit Authority of Harris County (Metro) recently advanced a project for design, construction, and operations of the fixed guideway component of its Phase 2 Regional Mobility Plan. The Initial Line consisted of 14 stations and 13.6 miles of revenue guideway extending from downtown Houston to the West Belt in the southwest quadrant of the metropolitan area. A team led by Kiewit Construction Group, Inc. and The Transportation

Group, Inc. (TGI) was selected by Metro as the preferred system supplier in March 1991. Known as the Houston Monorail Team (HMT), the selected supplier planned to utilize monorail vehicle technology and fully automated operations.

The project was intended to utilize a combination of turnkey and conventional contracting. HMT services was to involve three separate contracts for sequential phases, at Metro's option, as follows:

**Phase I - Preliminary Engineering Support Services** for systems components and fixed facilities under a cost-plus-fixed-fee contract with a ceiling.

**Phase II - Project management and systems integration; design, fabrication, installation, construction, and testing of systems components; design services for fixed facilities by A&E subcontractors; design management and support during construction; and an option for construction management services for fixed facilities by construction contractors selected by firm fixed-price bids.** The HMT services will be compensated on a lump sum, firm-fixed price basis.

**Phase III - Operations and Maintenance** for the initial five-year period of revenue service on a firm-fixed price basis.

According to Metro's Draft Project Management Plan, revenue service would commence in 1998, assuming FTA approval to begin the PE/FEIS and grant award. A recent change in the City of Houston's mayor from a proponent for the Houston Monorail Project affected public support for the project. In January 1992, Metro's Board officially killed the proposed monorail project.

## **B.2 U.S. URBAN PUBLIC TRANSPORTATION EXPERIENCE**

### **B.2.1 Miami Metromover<sup>10</sup>**

As part of the UMTA DPM Program, Westinghouse Transportation and System Support Division (now AEG Westinghouse Transportation Systems) was selected as the turnkey contractor with responsibility for final design and construction. Revenue service for this system, located in downtown Miami and connecting with its heavy rail transit system, commenced in April 1986. Extensions to the system are being planned.

### **B.2.2 Detroit People Mover<sup>20</sup>**

The second project under UMTA's DPM Program was implemented in Detroit and opened in July 1987. The Urban Transit Development Corporation (UTDC) was the turnkey contractor responsible for final design, construction, and operations. The system consists of a 2.9 mile one-way loop with 13 stations.

One of the major problems, which affects the ability of many transit projects to achieve early cost estimates, was that the system configuration was not fixed when the system supplier was selected. Instead of simply refining PE plans provided by the grantee, changes in the guideway and station locations had to be accommodated to satisfy the local attempts to maximize development initiatives. There were also quality problems with precast guideway beams. Conditions such as these led to numerous change orders which resulted in schedule slippage and cost increases.

### **B.2.3 Dulles Corridor Feasibility Study<sup>1</sup>**

A Congressionally-directed study of rail transit in Washington DC's Dulles Airport Corridor (Dulles Corridor Rapid Transit Feasibility Study, Rice University, October 1985) examined two development/financing alternatives: 1) private sector with local governments providing a

stipulated service fee; and 2) a strictly public sector approach funded only by dedicated tax revenues. The study proposed public-private cooperation in the planning, financing, building and operating of the rail line. The private sector approach was estimated to save 34% of the public sector cost, \$119.4 million versus \$181.3 million.

The private sector financing option assumed the creation of a transportation district comprised of corridor governmental jurisdictions. The district would pay a service fee to the system's private owner conditioned on the provision of service, and thus, would not constitute a debt obligation of the transportation district. The study also examined value capture of benefits generated by the proposed rapid transit service which accrue to non-transit users. Non-user beneficiaries include the airlines (at Dulles Airport), property owners, developers, employers and employees, and auto users in the corridor who would enjoy less traffic congestion.

#### **B.2.4 Harbour Island People Mover<sup>21</sup>**

In conjunction with Harbour Island, a \$1 billion private office, retail, and hotel development in Tampa Florida, a people mover shuttle was implemented in 1985. This was a private sector initiative with little or no role for the public sector in funding or controlling the project. It uses Otis Elevator Company air-floated, cable-drawn technology for the one-half-mile, single track, elevated link between the island and downtown Tampa.

The Harbour Island People Mover was developed and financed by Harbour Island, Inc., through its wholly-owner subsidiary, Tampa Island Transit Company, Inc., at a cost of \$7.3 million. The Hillsborough Area Rapid Transit Authority (HART) agreed to lease the right-of-way on one of the downtown streets to Harbor Island, Inc. for construction of the guideway. Fast track design and close cooperation among government officials permitted construction to be completed in eight months. There is an agreement between the developer and the transit authority that the developer will operate and maintain the system for 15 years and then sell it to HART for \$1.00.

Under its contract with Tampa Island Transit, HART is neither a joint owner nor partner in the

construction and has no financial liability. HART has statutory authority to regulate the fares charged and standards of service provide to the public by Tampa Island Transit which contracts to Otis for maintenance.

#### **B.2.5 Las Colinas People Mover<sup>22</sup>**

In Las Colinas, Irving, Texas, 12,500-acre master-planned, multi-use development, an automated people mover is an integral part of the plan conceived by the prime developer. Developers of individual commercial buildings must include guideway segments in their projects. Construction of linkages between segments, rolling stock acquisition, operations and maintenance are the responsibility of the Dallas County Utility and Reclamation District. This district is a special water district that is enabled by Texas legislation to levy an ad valorem tax subject to voter approval. A combination of this tax and farebox revenue is used to pay the operating cost of the transit system. The district in turn contracts with AEG Westinghouse, the system supplier.

The Las Colinas Area Personal Transit (APT) was procured in a manner which reduced the risk to suppliers, while providing certain assurances to the District. Several meetings were held with potential system suppliers to pre-negotiate the contract and all terms and conditions. Bidding occurred after the individual suppliers agreed to the terms and conditions. Over 30 meetings were conducted with each of the suppliers. Technical, special, and general provisions and the invitation for the bids were negotiated separately with all of the suppliers resulting in one set of contract documents that accommodated all participants.

As targeted in contract negotiations, the requirements on suppliers from the District's perspective included:

- Development of the 10,000-foot initial segment of guideway with a fixed price contract without an economic price adjustment.
- A five-year contract for O&M with 99% reliability required.
- Unit prices for expansion for ten years without escalation.



- Provision of shop drawings in the event of discontinuation of service.

### **B.2.6 Orlando AGT System**

In the mid-1980s, Matra (with SOFRETU, Combustion Engineering and The First Boston Corporation) was selected from among four transit system developers and was given a preliminary franchise agreement for a fixed guideway system in Orlando's Southwest Corridor. Matra was to have exclusive rights to finance, build, and operate a 12-mile, 14-station automated transit system based on the technology which was designed and developed by Matra and has been in operation for several years in Lille, France. The project was terminated after failure to receive permission from the Disney Company for a terminus within the Walt Disney World property. The following was taken from a case study which was sponsored by UMTA to document the project.<sup>23</sup>

The financial plan developed was based on three key issues:

- Public participation was limited to the fullest extent possible to preserve the private character of the project, as mandated by the Sponsors (Matra, SOFRETU, Combustion Engineering) and Orange County.
- To correlate the support/investments sought with the risks imposed upon and benefits attendant to the various participants.
- The plan was intended to be a "living document" and thus subject to modification with time.

The finance plan called for the Sponsors to form a special-purpose corporation to own, construct, and operate the system. The project Sponsors would guarantee to construct the system for a fixed price, within a pre-determined time frame (with penalties) and thus assume all of the technological, regulatory, and environmental risks associated with the construction of a major transportation projects. The sources of funds proposed during the construction period are as follows:

- Senior Debt (Tax-Exempt) 52 %
- Subordinated Loans 14 %
- Equity - UMTA Grant 11 %
  - State of Florida Grant 11 %
  - Developers 4 %
  - Sponsors 8 %

The finance plan anticipated substantial tax benefits due to the private ownership, which could have been affected by subsequent changes in the tax law.

Three areas of support were planned to augment farebox revenues during system operations:

**Orange County** - An annual fee of \$11 million per year over 30 years plus the revenue generated from a one-cent per gallon tax on all gasoline sold, estimated to be \$1.75 million per year.

**UMTA** - UMTA would be asked to provide standby loan commitments and credit support of up to \$5 million per year to assure adequate cash flow for the project.

**Sponsors** - Operating Corp. would be owned by the Sponsors and its obligations would be guaranteed by them. There would be a predetermined annual O&M fee with escalation provision. Operating Corp. would have appropriate insurance coverage and may be required to post an annual surety bond or letter-of-credit (in favor of Sponsor Corp.) callable only in the event that it cannot meet its financial obligations.

The Sponsor would also require the independent verification of ridership estimates to have confidence in the cash flow projections. Several legal issues related to project public and private participants were raised and are listed below:

- Privatization Authority (County)
- Service Contract Authority (County)
- General Obligation Authority (County)
- Local Option Tax Authority (County)

- Ad Valorem Tax on Corridor Property (County)
- Contractual Authority (County)
- Tax Exempt Revenue Bonds (County Industrial Development Auth.)
- Special Property Tax (County)
- Condemnation/Donation (County)
- Referendum (County)
- Incremental Tax Revenue Pledge (County)
- State Construction Contribution (State)
- State Appropriation (State)
- UMTA Grant Apportionment (County as designated grant recipient)
- Joint Venture Organization (per State requirements)
- Asset Financing (per State Uniform Commercial Code)
- Limited Partnership (per State requirements)
- Ground Lease (tax consequences or other liabilities)
- Environmental Impact (per State and Federal requirements)
- Labor and Employment (per State requirements)
- Occupational Safety (per State and Federal requirements)
- State Preference (State)
- Waste Storage and Disposal (State regulations)
- Public Project Criteria (State and County criteria)
- Antitrust Law (State must provide authority to County)
- Competitive Procurement (State and local requirements)
- Public Rate Making (per State or County procedures)
- Construction Claims (State law may establish liability)

### **B.2.7 Orlando Maglev System<sup>24,25</sup>**

Under the auspices of the Florida High Speed Rail Transportation Commission, a maglev demonstration project has been advanced in Orlando, Florida. The project would provide a direct, 13.5-mile link between the Orlando International Airport and a proposed hotel/shopping/office complex in the International Drive area. Interests associated with Maglev Transit, Inc. (MTI), the proposed Maglev system developer, are backing the real estate complex. A trip would take approximately 5.5 minutes at speeds up to 250 miles per hour.

The key aspects of MTI's financial plan include:

- The system will be funded by Japanese investors. Dai-Ichi Kangyo Bank, the largest bank in the world in terms of total assets, will arrange the financing.
- Fare revenues and other ridership-related revenues are sufficient to meet all obligations and yield a return to equity investors, estimated to be approximately 16.7% pretax.
- No public investment is required to make the system financially feasible.
- No inducements, such as real estate or value capture revenues, are required. Ridership estimates are not contingent on the construction of the real estate complex at the International Drive terminus.

The key characteristics of the Orlando Maglev project which enhance its financial feasibility include the heavy demand for the route, the strength of the Orlando economy, and the relative shortness of the route which keeps capital costs low.

#### **B.2.8 Houston Turnkey Park and Ride Lots<sup>26</sup>**

The Metropolitan Transit Authority of Harris County, Texas (Metro) utilized a turnkey process to develop (provide land, design, and construct) ten park and ride lots as of the mid 1980's for the purpose of rapidly acquiring the facilities. The time required for the turnkey approach was 5 to 12 month compared to 20 months for the conventional approach, for an average 60% time savings. An unexpected benefit was a 20% cost reduction due in part to minimized interest payments and cash flows since costs are paid upon completion.

Metro had prepared and published a request for proposal which includes instructions, forms, a sample earnest money contract, and standard technical provisions. A pre-proposal conference was held to clarify the technical requirements and evaluation process. A multi-disciplined evaluation team narrowed the number of proposers to one or two, which are interviewed prior to selecting the winner. The Metro Board of Directors awarded the earnest money contract/purchase agreement, which was an agreement to purchase the improved real estate provided that the improvements met Metro's approval.

### **B.2.9 Manhattan Light Rail<sup>27</sup>**

A \$1.5 million UMTA-funded study in 1988 reviewed financing options for a \$281 million light rail line in midtown Manhattan, one of the most densely developed and heavily traveled transit hubs in the world. It was concluded that even in that situation, a pure privatization project (built under a franchise approach) based on ridership revenues alone, could not be implemented since it would not have a high enough internal rate-of-return to attract investors. The study concluded that some public financial participation would be required to implement transit projects in the U.S.

### **B.2.10 Hennepin County Light Rail Transit<sup>28</sup>**

Hennepin County, Minnesota has proposed a 29-mile light rail transit system in Minneapolis. The county's Regional Railroad Authority has been advancing a superturnkey approach that would select a consortium to implement the entire project and provide some of the financing from value capture on development. The remainder of funding would come from FTA, the state, and the region.

Tax-increment financing is planned to offset 6% of the total cost based on conservative estimates of the development generated by the light rail system. Tax-increment financing would require municipalities to designate districts around stations for development and to dedicate a portion of the incremental tax revenues derived from the new ratables to paying off the light rail construction debt. Project sponsors also hope to be able to integrate value capture from private development rights in the superturnkey approach with the tax-increment financing plan.

The Hennepin County Regional Railroad Authority sponsored an *LRT Implementation Alternatives Study*, to provide objective information about the various approaches for implementing a system, such as the one they are planning. The Study's purpose was to objectively and factually compare traditional and turnkey LRT implementation approaches and results, determine the most appropriate approach for implementing the region's LRT project, and

outline a project management framework to optimize project control versus risk to the project sponsor.<sup>7,8</sup> The results of the study are summarized in Section 2.3.

### **B.3 STATE AND LOCAL NON-TRANSPORTATION INITIATIVES**

#### **B.3.1 Honolulu Resource Recovery Project<sup>12,29</sup>**

A sophisticated turnkey procurement approach was utilized by the City and County of Honolulu to construct a resource recovery facility, Honolulu Project of Waste Energy Recovery (HPOWER). This complex project involved simultaneously advancing aspects of procurement, permitting, financing, and construction during which the EPA retroactively rescinded their permit after four months of construction and mandated \$30 million in additional technical requirements. The Honolulu project manager held the partnership (including the local utility) together through skillful negotiations, due in part to well-conceived contract documents. The City's project manager for the HPOWER Project, Frank Doyle, has since been designated as the Manager and Chief Engineer for the Honolulu Rapid Transit Development Project.

The City proposed the following project parameters:

- The contractor is responsible to design, engineering, construct, and test the facility, and operate and maintain it for 20 years.
- The City will require that all acceptable waste collected within the City and required by the facility be delivered to the facility.
- The City will own the facility and issue reimbursable general obligation bonds to finance the project.
- A minimum capacity for the facility was established.
- The local electric utility company is required to purchase power from qualifying facilities, such as HPOWER.
- Revenues from the sale of recovered products may be shared in any manner proposed by the offeror.

- Financial parent corporation guarantees will be required for the contractor's performance.

Some aspects of the project and procurement process are worth noting. Recognizing that the traditional low-bid approach offered little protection from the myriad technical and financial risks inherent in type of a project, and that Hawaiian law precluded negotiated procurements, a two-step procurement process was utilized modeled after the Federal procedure for complex systems. Step I - Qualifications and Technical Proposals allows the selection of financially and technically qualified firms based on the following factors:

- Technical System
  - Design
  - Availability
  - Energy and Materials Balance
  - Market Compatibility
- Systems Management
  - Management Concepts and Policies
  - Design, Engineering, and Construction Personnel
  - Operating Personnel
  - Marketing
  - Schedule
  - Financial Impact
- Environmental Impact
  - Architecture, Site Design
  - Air Quality
  - Water Impacts
  - Noise and Traffic
  - Health and Safety
  - Consistency with Land Use Controls
  - Socio-Cultural Effects

The goals for the entire process were clearly stated to potential proposers and related to areas of risk. Proposers were asked to offer the following guarantees:

- A guaranteed firm fixed-price construction contract without escalation.
- A guaranteed amount of product to be recovered from the operation of the facility with firm markets for that product.

- A guaranteed O&M cost, portions of which might be subject to escalation.
- Guaranteed operational performance of the facility including:
  - Processing Capacity
  - Energy Recovery
  - Material Recovery
  - Electrical Generation
  - Environmental Regulations
  - Residue Quality
  - Weight Reduction of Acceptable Waste

Several principles were applied to HPOWER contractual risk-sharing arrangements:

- Risk acceptance should be with the project participant with the greatest measure of control over the cause or results of a risk event.
- The initiation by and strong continued involvement of government means governmental acceptance of risks normally involved in ownership, even when ownership for purposes of tax benefits might be vested in a contractor/operator or a third party.
- A private contractor must be willing to sacrifice the freedom of price setting to cover cost increases incident to a contractually unforeseen event; nor can it anticipate any significant payments or subventions from the governmental sponsor to induce it to undertake risks.
- Any risk for which insurance can be obtained at reasonable cost should be so covered.

Major risk elements in the HPOWER project which were the subject of discussions included:

- Force Majeure
- Project Schedule
- Performance of the Resource Recovery Facility
- Changes in the Quantity and Composition of Waste
- Cost of Construction and Operation
- Changes in Law or Regulation
- Project Financing Structure and Safeguards

These were the subject of discussions in contract negotiation workshops which were held with the qualified proposers, prior to requesting bid prices. The purpose was to ensure that a single, definitive contract, acceptable to the City and qualified bidders, could be obtained.



Step II - Price Bid involved selecting the lowest bid of those offerors whose proposals were found to be acceptable. The basis for determining the low bid was the lowest average net present value of the discounted cash flow for disposal over a 20-year period.

### **B.3.2 Miami Arena Public-Private Partnership<sup>30</sup>**

A turnkey development team successfully built a 16,500 seat sports and entertainment arena in Miami, home for their new NBA basketball franchise. It was completed faster and about 40% less expensively than a comparable facility in Orlando which was a totally public venture. The private operation is financially successful for both the public owners (the Miami Sports and Exhibition Authority) and private operators.

The developer-contractor-facility manager team from Houston provided equity, risk and expertise for a 32-year license agreement that guarantees the city \$300,000 a year in land-lease payments and a split of the operating profits. The public sector provided the land, mass transit, help with off-site parking, an off-site source of chilled water, half of the equity, and tax exempt debt. The arena was constructed using fast-track methods under a guaranteed maximum-price contract. Most of the return on equity is derived from a 75-cent seat charge on each ticket after all other costs are accounted for.

## **B.4. U.S. FEDERAL GOVERNMENT INITIATIVES**

### **B.4.1 Environmental Protection Agency (EPA)**

The EPA is very advanced in its outreach program to encourage public-private partnerships. EPA publications provide information about such partnerships and case studies which document implementation experience on projects to improve environmental quality.<sup>4,5</sup>

The following three sections summarize the guidance from these documents in terms of the benefits of public-private partnerships, contract provisions, and success factors.

#### B.4.1.1 Benefits

The EPA has been promoting public-private partnerships as a means to increase the resources available for environmental projects such as solid waste management, wastewater treatment, drinking water supply, etc. in at least two ways:

- Private equity can free municipal resources for other investments.
- Properly designed and executed partnerships can provide improved environmental services at the lowest possible cost to the public.

According to the EPA, the benefits of public-private partnerships include:

- **Reduced Costs** - (capital and operating) of 5% to 40% due to:
  - Freedom from competitive bidding
  - Less paperwork associated with intergovernmental grants
  - Design/construct/operate efficiencies
  - Private access to new, low-cost, technologies
- **Rapid Project Completion** - up to 50% faster due to avoidance of competitive bidding and contracting constraints associated with intergovernmental grants.
- **Guaranteed Performance** - where private operation is involved, responsibility is shifted from the public to the private sector for permitting, proper O&M, compliance with all applicable regulations, and adequate sampling/monitoring. This represents a primary benefit especially in a small community.
- **Access to More Sophisticated Technology** - private partners often have greater technical and design expertise that enables them to assess opportunities for using more advanced technologies and make knowledgeable predictions of cost and performance benefits. For this reason, they may be more willing to undertake the risk of new technologies.
- **Flexible Financing** - in those situations where the private partners have responsibility for providing some or all of the project financing in exchange for rights to use the new facility and/or receive future income from user fees. Any private financing reduces the need to encumber local government debt ceilings or to schedule referendums. If tax-exempt financing is available, the private partner may be willing to undertake a longer amortization term (reducing annual costs) than the public sector can.
- **Delegation of Responsibility and Risk** - such as design and construction delays, plant performance and environmental compliance, financial liabilities, tax liability, labor

stability, and long-term demand for services will need to shift between the public and private sectors depending on where the project lies in the continuum between traditional public transit delivery and full private delivery. The assumption of risk by the private sector would have to be offset by a compensating adjustment of price.

- **Guaranteed Cost** - is possible and may permit the community to accurately budget for an environmental facility or service over a set period of time.

#### **B.4.1.2 Contract Provisions**

General contract provisions should include the following:

- **Contract Term** - noting the benefits of multi-year operating contracts.
- **Project Description and Performance Criteria** - including the use of incentive and penalty provisions which typically cover:
  - On-time performance
  - Quality of performance
  - Safety
  - Cost control
  - Community relations
  - Compliance
- **Compensation Method and Timing** - which are typically structured three possible ways:
  - Fixed price for a specific term
  - Cost-plus-fixed-fee
  - Fixed unit price
- **Changing Situation and Risk Allocations** - should address at least the following types of changes:
  - Changes in tax law, either before or after closing on the project financing
  - Increased construction costs
  - Resolution of conditions which reasonably cannot be anticipated nor controlled
  - Differing site conditions
  - Increased operating and maintenance costs
  - Increased costs due to a change in the character, strength or volume of the waste stream being treated
  - Warranty obligations not originally contemplated
  - Changes in environmental compliance requirements
  - Changes in ownership

- **Contract Termination and Step-in Rights** - circumstances under which the public sector can intervene and take over performance including "acceptance" that construction is complete and "termination" for convenience, default, or cause.
- **Insurance and Bonding** - considering the following coverages:
  - Property damage
  - Business interruption
  - Liability
  - Cost overruns on unforeseen events or conditions
  - Systems performance
  - Bond
  - Professional liability
  - Environmental impairment
- **Other Issues** - including the following provisions:
  - Oversight and reporting (including audits)
  - Dispute resolution
  - Subcontracting
  - Warranties
  - Handling of residuals

#### **B.4.1.3 Success Factors**

Components of successful EPA public-private partnerships include:

- **Local Incentive** - poor environmental performance or capacity limitations, coupled with inadequate access to governmental funding.
- **Supportive Legal and Institution Environments** - for public-private partnerships including:
  - Broad exceptions from competitive bidding
  - Requirements that either provide exemptions for privatization projects or do not require that the low bid be selected
  - Exemptions from some or all local taxes or usury laws
  - Authorizations to enter into take-or-pay agreements
  - Acknowledgements that service contracts do not constitute debt
  - Powers granted to special authorities to issue debt
  - Authorizations to assess service charges and to pledge them and other revenues to payment of debt obligations
- **Ability to Secure Reasonable Private Returns** - The ability to charge proper rates for the services provided by the EPA project to cover the capital depreciation, adequate revenues

to support the lowest-cost public debt, all operating and maintenance costs, a reserve account for capital improvements in future years, and a reasonable return on the private sector investment.

- **Regionalization** - The desirability of local governmental units to work together to support a project larger than could be accommodated by any one jurisdiction alone.
- **Communication and Public Support** - Community support, public education, and communications are critical to the success of any public project, but especially those which involve private partnerships.
- **Equitable Allocation of Risk** - The risks associated with a project can make or break an investment decision. The process of allocating risks among the public and private parties is a critical element of a partnership negotiation. Often the private partner is responsible for the technological and project management risk while the public partner is responsible for obtaining the site, assuring demand, and the financing.

#### **B.4.2 General Services Administration (GSA)<sup>31</sup>**

In the past, GSA has rented space for Federal government agencies in private buildings at market rates, with profits going to developers and lenders. A few years ago, in search for a more cost-effective approach to finance long-term leases, they initiated build-to-suit installment-purchase arrangements. GSA utilizes a securitized lease which does not allow termination of payments. The Federal agency signing the lease must find the money in its budget to pay bondholders, with or without specific appropriations from Congress. Once it signs a long-term lease or a lease-purchase contract, the government has created a valuable asset because it has the best credit.

With many lease coming up for renewal, the GSA saw the benefit of obtaining better quality office space at a lower price, and would own the buildings after a period of time. Developers design buildings according to government specifications and assume the construction/completion risk. The government's risk is that Treasury Bonds could be selling at significantly higher rates in the future. Recently, OMB issued Bulletin No. 91-02 which restricts the use of the lease-purchase approach.

A recent article in the *Philadelphia Inquirer* was entitled: "The 'biggest boondoggle' in Washington: A costly federal building defies control." It describes the GSA's attempt to develop the Federal Triangle Building using a lease-purchase approach. Construction costs have doubled to more than \$750 million, not including donated Federal land worth an estimated \$300 million.

#### **B.4.3 Federal Highway Administration (FHWA)**

At the request of TRB Task Force (A2T51) - Innovative Contracting Practices, FHWA established Special Experimental Project (SEP) No. 14 to identify for trial evaluation and documentation, innovative contracting practices which have the potential to reduce life cycle costs while maintaining product quality and an acceptable level of contractor profitability. Major issues that FHWA is dealing with are concerns by general contractors on the competitive bidding process, and compliance with the Brooks Bill which defines the process for selecting consultants.

#### **B.4.4 U.S. Army and Navy**

Both the U.S. Army Corps of Engineers and the U.S. Navy Facilities Engineering Command have utilize turnkey contracts for the acquisition of facilities such as housing and commissaries. Fixed-price procurements are made at about the 35 % design stage with the project requirements and specifications clearly defined. Problems have occurred when subsurface conditions were different from what the investigations had indicated, for which change orders would have to be negotiated. In another situation, a sewer connection created a problem when the DOT changed the criteria, after the government turnkey contractor was underway.

Both organizations are in the process of promoting public-private partnerships. The Navy for instance, is reaching out to prospective contractors and providing technical assistance to stimulate their creativity with respect to definition of applicable projects; project planning; feasibility, market, and economic analysis; environmental reviews; and contract solicitations. Candidate

projects include administrative offices, quarters and housing, child development centers, welfare and recreation centers, and warehouses. The potential role for private contractors could include financing, design, construction, owning, and operating facilities and related services. Navy contributions to public/private ventures could include non-cash assets such as land, access to a large and stable market, or long-term lease arrangements. The private sector offers capital and expertise in design, construction, and business operations.<sup>32</sup>

## **B.5 FOREIGN EXPERIENCE**

### **B.5.1 World Bank Research on BOT Approach**

A working paper was prepared by the World Bank in August 1990 entitle: *The Build, Operate, and Transfer ("BOT") Approach to Infrastructure Projects in Developing Countries*.<sup>33</sup> It reviews the BOT approach for building and financing infrastructure projects in developing countries and provides guidance applicable to fixed guideway transit projects supported by FTA. This guidance is outlined in the following sections. FTA and the World Bank have initiated a working relationship to share information on programs and research related to innovative procurement and financing approaches.

#### **B.5.1.1 Host Government Support**

Strong host government support, including financial commitment, is an essential ingredient for the development and implementation of BOT projects. Areas of this support can include:

- Political and Bureaucratic Support
- Retain Outside Advisers
- Assured Supplies/Logistics
- Assured Revenues
- Loans; Equity Contributions
- Commit Some Earning Assets
- Regulatory, Fiscal and Other Support
- Accept Some Project Risk
- Support to Cover Force Majeure Risks
- Protection Against Inflation Risks

- Foreign Exchange of Local Currency
- Sovereign Guarantees Backed by "Full Faith and Credit"
- Protection from Competition

#### **B.5.1.2 Risk Allocation**

Conventional wisdom in project financing is that each risk should be assumed by the party within whose control the risk most lies. Typical risks in a BOT project include:

- Completion Risk
- Performance and Operating Risk
- Cash Flow Risk
- Inflation and Foreign Exchange Risk
- Insurable Risks
- Uninsurable Risks (Force Majeure)
- Political Risk
- Commercial Risk Insurance

#### **B.5.1.3 Necessary Conditions for Successful BOT Projects**

- Mature Legal Environment or Special Legislation
- Economic Environment (Developed Banking System and Financial Markets)
- Host Country Credit Rating
- Political Environment (Stability)
- Sector Characteristics of the Economy (Assured Sources of Revenue)
- Cyclical Considerations (Construction Economic Environment)

#### **B.5.1.4 Cost Issues**

Issues to be considered in a study to determine how the cost of a BOT project compares to other alternatives includes:

- Cost of Senior Debt
- Cost of Equity
- Project Efficiencies Related to BOT Approach
- Other Benefits of Privatization (Especially During Operations)
- BOT vs. BOO (Build, Own, Operate)



#### **B.5.1.5 Procurement Issues**

- Unsolicited Proposals (Politically Dangerous to Accept)
- Competitive Bids (Should Be Normal Procedure)
- Integrity of the Process (Must Maintain)

#### **B.5.1.6 Arguments for and Against BOT Projects**

- Additionality of Equity with BOT Projects
- Credibility Provided by BOT Projects
- Efficiencies of BOT Due to Economic Incentives
- BOT is a Benchmark for Similar Public Sector Projects
- Technology Transfer and Training with BOT Projects
- BOT Projects Meet Privatization Goals
- BOT Projects are More Complicated
- Overall Cost Efficiencies of BOT Disputed

#### **B.5.1.7 Observations on the BOT Approach**

The World Bank research on using the BOT approach for infrastructure projects in developing countries concludes:

- BOT projects are exceedingly complex from both a financial and legal point of view.
- They require an extended period of time to develop and negotiate.
- Due to time savings plus the greater certainty of the project going forward, it would be desirable for a project to be implemented with a turnkey construction contract financed by sovereign borrowings.
- BOT projects appear to provide some "additionality" in tapping sources of private sector financing which otherwise might not be available.
- The sponsors' commitment of substantial equity to a project assures that they will also remain committed to the project's successful operation over the concession period. Their "at risk" investment provides a strong incentive to have the project perform above its minimum expectations.
- Having the design, implementation and operation of a BOT project largely in the hands of the private sector may provide economies and efficiencies that will balance out or even outweigh the higher financing costs of non sovereign borrowing and equity investment.

- The host government must understand and accept the complexity and time consuming nature of the BOT process, the support which will have to be provided, and the rates of return which commercial lenders and private sector equity investors will expect.

## **B.5.2 Foreign Transportation Projects**

### **B.5.2.1 Hong Kong Eastern Harbour Crossing Project<sup>34</sup>**

The Hong Kong Eastern Harbour Crossing Project was an essential part of the plan to maintain Hong Kong's infrastructure, critical to its success as an international trading and financial center. The crossing is the largest single transportation project undertaken by the private sector in Hong Kong. It is a complex tunnel project comprising 8.6km of roads and a 5km extension to the Mass Transit Railway.

After receiving a proposal from Kumagai Gumi, Marubeni Corp. and the Mass Transit Railway Corporation in June 1984 for a combined road and rail crossing, the government called for open tenders in October 1984. In April 1985, nine international bids were received from which a shortlist of three was selected in June. After extensive negotiations, a consortium led by Kumagai Gumi known as The New Hong Kong Tunnel Consortium was selected as the successful bidder in December 1985. The Eastern Harbour Crossing Ordinance, providing the legislation granting the franchise was passed and construction was started in August 1986, and was completed in September 1989, four months ahead of schedule.

The organization of the project includes separate road and rail companies and franchises. The New Hong Kong Tunnel Company Ltd. (NHKTC), the road tunnel company, is owned by the government of Hong Kong and five private construction and investment companies including Kumagai Gumi. The Eastern Harbour Crossing Company (EHCC), the rail finance company, is owned by Kumagai Gumi and China International Trust and Investment Corp. The main contractor is Kumagai Gumi, which entered into a fixed-price, lump-sum turnkey contract with the NHKTC, which has contracted with EHCC for design, construction, and management.

A \$565 million multi-source debt and equity financing package was arranged for the project. The financing structure was designed to accommodate the objectives and constraints of the project sponsors and future shareholders, financial institutions, and the Hong Kong government. Security rests largely on the 30-year road and 22-year rail franchises granted to the consortium in August 1986.

#### **B.5.2.2 Sydney Harbour Tunnel Project<sup>35</sup>**

The Sydney Harbour Tunnel will provide a 50% increase in harbour crossing capacity, reduce growing congestion, and cut crossing travel time by 10 minutes per trip. A private joint venture involving Transfield, an Australian construction firm, and the Australian arm of Kumagai Gumi, in cooperation with The New South Wales' Department of Main Roads, is responsible for feasibility study, environmental impact statement, design, construction, financing, and operations through 2022. The initial proposal was made in 1986, construction began in January 1988, and is to be completed in 1992.

Transfield and Kumagai Gumi formed a 50/50-owned special purpose company -- the Sydney Harbour Tunnel Company (SHTC) -- to design, finance, construct, and operate the project via Tunnel Holding Pty., Ltd. SHTC entered into all contracts with the Department of Main Roads and makes all borrowings necessary to ensure construction of the tunnel. The Sydney Harbour Tunnel Joint Venture acts as head contractor.

At \$620 million, this is the largest privately-financed public works project in Australia. Finance arrangements combine government financing (loan) via harbour bridge tolls with innovative private financing to make the second harbour crossing possible in this century. The project had to be financed exclusively on a "user pays" basis with "user" meaning all those crossing the harbour. The Transfield-Kumagai joint venture takes the risks of time and cost overruns and backs it up with a \$32 million performance bond. During the operating phase, the government provides an ensured revenue stream to repay bondholders and meet O&M costs. The balance of project costs are funded by inflation-indexed bonds repaid from bridge and tunnel tolls over

a 30-year period.

### **B.5.2.3 London Docklands Light Rail Project<sup>8</sup>**

The Docklands Light Railway is a 7.6 route mile light rail transit system with 16 stations implemented in the 1980's utilizing a turnkey contract to design and construct. The cost was \$112 million for the initial portion with \$73 million additional for upgrading with funding on a pay-as-you-go through drawdowns from the British government. Preliminary Engineering was performed by consultants under contract to London Transport. The project owner is London Regional Transport with London Docklands Development Corporation (LDDC) as a joint sponsor. Dockland Light Railway, Ltd., a subsidiary of London Regional Transport, is the system operator.

The project began as a conventional procurement of separate bids for electrical and mechanical aspects and for civil works. The central government directed it to become a turnkey procurement, because it thought that would ensure project completion within budget and on schedule. Six international consortia -- two British and four foreign -- to offer a fixed, lump-sum bid to design, construct, and equip the railway based on the preliminary design and options to provide upfront/ongoing training and maintenance services on an annual contract basis. After negotiations, the turnkey bid of the selected consortium evolved into a contract for a "minimum viable railway" within the \$112 million budget.

All project risks were borne by the turnkey contractor. The contract specified a period of 32 months from the start of final design to transfer of the completed railway. Liquidated damages were set at \$225,000 per week, with no incentives for early completion. Project personnel cited the contractor's ability to make immediate and cost-effective decisions regarding utility relocations as a major advantage of the turnkey approach. The contractor was successful in completing the project on time and within budget.

### **B.5.3 Successful BOT Projects - Lessons Learned**

Mr. Joseph W. Ferrigno III is an investment banker who specializes in project development and finance. He is an advisor to Kumagai Gumi Company Ltd., a major Japanese international general contractor and real estate development company. Previously, he headed the international project advisory and financing activities of Shearson Lehman Hutton Inc. Major projects in which he has been involved include:

- The \$435 million Hong Kong Eastern Harbour Crossing Project
- The \$620 million Sydney Harbour Tunnel Project
- The \$1.1 billion Bangkok Second Stage Expressway Project
- The \$2.5 billion Florida High Speed Rail Project
- The \$14 billion Eurotunnel Project between England and France
- The \$1 billion E-470 Toll Road around Denver

He has documented his experience with these and other BOT projects.<sup>36,37</sup> The results of Mr. Ferrigno's experience and observations are summarized as follows:

#### **B.5.3.1 Characteristics of Successful BOT Projects**

- High Need Perceived for the Project
- Inadequate Funding Available
- Highly Credible Contractors Willing and Available
- Private Sector has Required Expertise
- Project is Considered Financeable by Experts

#### **B.5.3.2 Problems and Difficulties with the BOT Approach**

- Availability of Credible and Experienced Developers and Investors
- Government's Ability to Provide Cooperation and Support
- Formulation of Workable Corporate and Financial Structures
- Untrusting Relationships Between Public and Private Partners
- Limited Experience in the Private Sector
- Lack of Commercial Standards in the Public Sector
- Reluctance of Governments to Accept Project Risks
- High Complexity
- Failure to Manage Conflicts of Interests
- The "Typhoon" Phenomenon (rash decisions)
- The High Dependency on Contractor Joint Ventures/Consortia

- Long Economic Lives of BOT Projects
- The Schizophrenic Nature of Project Creditors
- Changing Requirements for Project Management Styles
- High Development Costs
- The Scarcity of Appropriate Sources of Cash Equity
- The Project Blues (inevitable set-backs and surprises)

### **B.5.3.3 BOT Project Packaging Principles**

#### **During the Initial Planning and Implementation Phases**

- High Need for the Project
- High Political Will
- Credible Turnkey Design/Build Contract
- Proven Technology
- Financeable

#### **During the Promotion and Development Phases**

- Undoubted Technical Capability
- High Project Management Capability
- Early Involvement of Contractors
- Careful Selection of Contractors
- Compatibility of Objectives
- Need for Government Advisors
- Competitive Selection Process
- Timely Selection for Exclusive Negotiations
- Need for Subjective Judgements in Selection
- Need for Collaborative Attitude
- Governments Share Project Risk/Resources

#### **During Implementation Phase**

- Early Establishment of Project Company
- Use of Incentives/Penalties
- Need for Provisions for Contingency Funds
- Public Sector should Accept Exchange-Rate Risk
- Financing Tailored to the Project
- Involve Project Creditors at the Right Time
- Economic Use of Insurances

### **During All Phases**

- **Appropriate Leadership**
- **Rigorous Cost/Benefit Analyses**
- **Respect for Political Factors**
- **Loose/Tight Management of Conflicts of Interest**
- **Frequent Application of Motherhood Values (high degrees of commitment, perseverance, patience, and good-faith cooperation)**





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