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Privatization Financing Alternatives: *Blending Private Capital and Public Resources for a Successful Project*

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October 1998

Prepared for the U.S. Department of Energy
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(a) Scully Capital Services

Summary

The U.S. Department of Energy (DOE) launched the Contract Reform Initiative in 1994 in order to improve the effectiveness and efficiency of managing major projects and programs. The intent of this initiative is to help DOE harness both technical and market forces to reduce the overall cost of accomplishing DOE's program goals. The new approach transfers greater risk to private contractors in order to develop incentives that align contractor performance with DOE's objectives. In some cases, this goal can be achieved through public-private partnerships wherein the government and the contractor share risks associated with a project in a way that optimizes its economics. Generally, this requires that project risks are allocated to the party best equipped to manage and/or underwrite them.

While the merits of privatization are well documented, the question of how privatized services should be financed is often debated. Given the cost of private sector equity and debt, it is difficult to ignore the lure of the government's "risk free" cost of capital. However, the source of financing for a project is an integral part of its overall risk allocation, and therefore, participation by the government as a financing source could alter the allocation of risks in the project, diminishing the incentive structure. Since the government's participation in the project's financing often can be a requirement for financial feasibility, the dilemma of structuring a role for the government without undermining the success of the project is a common and difficult challenge faced by policymakers around the world. However, before reverting to a traditional procurement approach where the government enters into a cost-plus risk profile, the government should exhaust all options that keep the private entity at risk for important aspects of the project.

Government participation in a project can include a broad range of options and can be applied with precision to bridge a gap in the project's financial structure. As a general rule, the method and magnitude of this participation should depend on the unique requirements of the project and should serve to enhance the ability to raise private financing and lower overall project cost to the government. In order to properly evaluate the available options, it is important first to define the government's objectives in the project. The government then needs to analyze and determine the risk allocation structure, including the appropriate mix of private and government financing, which maximizes the project's efficiency and still allows the project to proceed in a way that meets the government's objectives for privatization.

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I. Introduction

Across the globe, in emerging economies, as well as highly developed countries, privatization is widely accepted as a means for increasing the effectiveness and efficiency of services traditionally performed by governments. While the merits of privatization are well documented, the question of how privatized services should be financed is often debated. However, since financing is an integral part of the risk-shifting process, evaluating financing sources requires moving well beyond simple comparisons of interest rates. The government needs to analyze and determine the risk allocation structure, including the appropriate mix of private and government financing, which maximizes a project's efficiency and still allows it to proceed in a way that meets the government's objectives for privatization.

This paper discusses the background and approaches to financing privatized projects and addresses the challenge of balancing the use of government financial resources with the requirement to preserve the inherent incentive structure of privatized contracts.

II. Background

With approximately 90% of its work contracted to the private sector, we could say the U.S. Department of Energy (DOE) is already a highly privatized organization. Despite the large contractor presence, DOE's track record in Major Systems Acquisitions (MSAs) has come under criticism. According to the U.S. General Accounting Office (GAO), management problems and/or ineffective oversight by DOE have led to cost overruns, schedule slippage, and/or termination. From 1980 through 1996, for example, 31 of the 80 MSAs were terminated prior to completion, after expenditures of over $10 billion (GAO 1996). Although some of the projects were terminated due to changing circumstances, the GAO's analysis of these projects indicated that cost overruns and schedule delays were common in MSAs. GAO analyzed 35 projects and found that 8 were expected to be completed at or below their original budgeted cost. The remaining 27 projects were expected to have cost overruns averaging over 70%. The analysis also indicated that schedule slippages were prevalent with a few projects being over 10 years behind schedule (GAO 1996).

When reviewing the results of DOE's MSAs, it is important to recognize that these are often first-of-a-kind projects, involving significant risks and high costs. As such, they are very challenging projects and often are subjected to significant scrutiny and, in some cases, interference. Nonetheless, few will argue that the process DOE has used to procure major systems has worked well, particularly when considering the significant undertakings that have been successfully achieved in the private sector. Although DOE uses private contractors to execute a majority of functions, the cost-reimbursement contract mechanism provides few risks and rewards to the contractors, effectively insulating them from the program mission and objectives.

In recognition of the problems associated with DOE's traditional approach and the benefits of harnessing market forces, DOE initiated reforms in 1994. Through these reforms, DOE sought to transfer greater risk to its private contractors and to develop incentives to align contractor performance with its objectives.

Contract Reform Initiative

Under the Contract Reform Initiative, DOE has introduced reforms seeking to

- remove the agency from those activities that are not inherently governmental functions or core business lines
- improve the management of remaining activities
- reduce the costs of doing business
- shift greater performance and financial risk to the private sector (DOE 1997).

Based on these objectives, DOE embraced privatization as a tool that, when applied appropriately, could harness the competitive forces of the marketplace and improve the efficiency and effectiveness of DOE's activities. DOE has pursued three types of privatization: divestiture of functions, contracting out, and asset transfers. The majority of privatization efforts fall into the second category and cover a broad range of activities and contract structures. Some of these projects require investment of significant amounts of capital. In the past, capital-intensive projects were financed on a pay-as-you-go basis, with the contractor assuming little or no performance risk. Under the fully privatized approach, the contractor does not get paid until performance is demonstrated, requiring the contractor to back the project's budget, schedule, and performance with its own funds.

Project Finance Approach

In order to finance facilities constructed under a privatized contract, private companies generally will turn to a project financing approach instead of corporate borrowing. In project financing, lenders look to the performance of the project for payment rather than the borrower's balance sheet. This enables the borrower to isolate the risks presented by the project, making the loan "nonrecourse" to the borrower. In addition, through the introduction of outside capital, the borrower can leverage its resources and expertise and undertake projects it would not be able to do if relying solely on the strength of its balance sheet.

Since the lender cannot look to the borrower's balance sheet for loan security, it will look to the project's structure and analyze the project on a stand-alone basis. The analytical process of reviewing a project's structure is used to identify the level of certainty at which the lender can expect timely payment of principal and interest. This involves

- identifying all transaction risks
- determining whether the risks are manageable
- assessing whether the party accepting the risk is capable of doing so
- identifying uncovered risks that lenders bear.

Based on this analysis, the lender can determine whether to lend to the project and how much interest to charge. Since the objective is to identify uncovered risks, this process necessarily involves a "worst case" outlook and begins with an analysis of project level risks. These risks can be categorized as follows:

- *Revenue Structure*: Lenders will be concerned with the stability and predictability of revenues, generally requiring that fixed payments be structured at a level that matches debt service obligations. In addition, lenders will require that the contracts minimize the project's exposure to market risks, inflation, change-in-law, and force majeure ("Acts of God") events.

- *Technology and Operations*: Lenders will look for commercially proven technology and will seek assurances that the facility can be built within budget, on schedule, and as designed. These assurances can usually be found in the agreement the project sponsor has with its subcontractor(s). Lenders will investigate the background and capabilities of the subcontractors and the security packages (incentives, penalties, and warranties) provided to back their performance. Based on this analysis, the lender will gain comfort that in the event of a performance problem, whether in construction or operations, the cash flows of the project will be protected.

- *Site Conditions:* This covers a broad array of environmental conditions at the site on which the facility is being built. Since the facility's construction or operation could be affected by a site condition, whether it is the discovery of environmental hazards or previously unknown geological conditions, the lenders will require that a project participant absorb these risks.

- *Comparative Economics:* To the extent a substitute product or process exists, lenders will be concerned about the economics of the project. Specifically, if there is a cheaper way to accomplish the objectives of the project, lenders will want assurances as to the strategic significance of the project to the purchasers.

- *Feedstock Risks:* The cost, availability, and quality of critical inputs such as power, water, or other raw materials can dramatically affect the operations of a project and are therefore key factors in a lender's analysis. If costs can be fixed (e.g., long-term fuel supply agreements), the financeability of the project will be enhanced. In waste processing facilities, the most critical feedstock is waste, and lenders will require that the project cash flows be protected in the event of an interruption in waste feed or deviation in waste characteristics.

- *Legal and Financial Structure:* Lenders will analyze the capitalization of the project to ensure that the mix of equity and debt results in a structure wherein the contractor remains highly motivated. In addition, the lenders will investigate the legal structure of the project and require financial and ownership covenants that provide for contract enforceability; protect security interests in assets; and maintain strict controls on reserve funds, cash distributions, and the ability to obtain additional debt.

- *Purchaser Credit Strength:* Under this category of risk, lenders are concerned with the ability and willingness of the purchaser to pay for services. Under DOE's privatization programs, the contractor relies on the U.S. government as the sole purchaser. While the credit strength of the government is unmatched, lenders will be concerned about the willingness of the purchaser (i.e., government) to pay, and therefore will require that the timing and mechanics of purchaser payments be clearly defined under all foreseeable events. In general, single customer projects should be strategically significant to the purchaser and should enjoy broad political support.

- *Forecasted Financial Results:* Lenders and analysts will perform pro forma analyses of the project's cash flows, often subjecting the project to "worst case" conditions to assess whether there will always be adequate cash flows to cover all fixed obligations.

Risk Allocation Process

In project financing, contracts create the underpinnings of the security for the project debt. As such, the agreement between the government and the prime contractor allocates key risks and forms the linchpin

of the entire transaction. The prime contractor, in turn, has its team allocate the risks to the parties best equipped to manage and underwrite them. For example, the engineer, procurement, and construction subcontractor or "EPC contractor" will assume the responsibility for constructing the facility according to strict schedule, budget, and performance requirements. These commitments will be backed by penalties in the event that the EPC contractor fails in some way. The penalties typically take the form of liquidated damages and range from 10% to 100% of the contract value. In return, the contractor often receives bonuses for early completion and will earn higher margins on the work performed under this arrangement.

Ideally, project risks will be spread among the project participants in a way that optimizes the economics of the project. Generally, project risks should be allocated to the party best equipped to manage them. For example, change-in-law risk should be allocated to the government because it controls this risk element. Alternatively, commercial risks, such as construction and operations, should be allocated to the private contractor. For risks that are beyond the control of both the contractor and the government (e.g., force majeure events) it is usually more economical to allocate these risks to the government because it has greater capacity than the private insurance market to underwrite them. Although the government will negotiate with one contractor, the risk allocation process will involve other parties as the contractor spreads the risk among its team including the EPC contractor, the O&M contractor, technology and equipment suppliers, insurance providers, etc. As can be seen in Figure 1, the process of risk allocation involves assigning specific risks to specific parties with the objective of effecting an optimal allocation of risks that results in the least cost to the government.

RISKS	WHO TAKES?										
	DEV	EPC	O&M	CUS-TOMER	EQUIP	TECH	INSUR	EQUITY	SUPPLIER	OFF-TAKE	EQUIP
1. Revenue Structure											
2. Technology Performance											
3. Construction											
4. Operations											
5. Site Conditions											
6. Feedstock (Waste Supply)											
7. Permitting & Development											
8. Comparative Economics & Price											
9. Inflation											
10. Change-in-law											
11. UCC (Force Majeure)											
12. Ownership Risk & Liability											

** UCC = Uncontrollable Circumstances; C.I.L. = Change in Law*

Figure 1. Project Risk Allocation

This optimization process recognizes that the costs of the project may increase as greater amounts of risks are placed on the contractor. As shown in Figure 2, shifting risk to the contractor can move the project to an optimization point where overall project costs are minimized. However, if too much risk is passed to the contractor, the contractor may not be able to obtain nonrecourse financing for the project. This constraint requires the government, the contractor, and the lenders to reach a balance of project risk assumption.

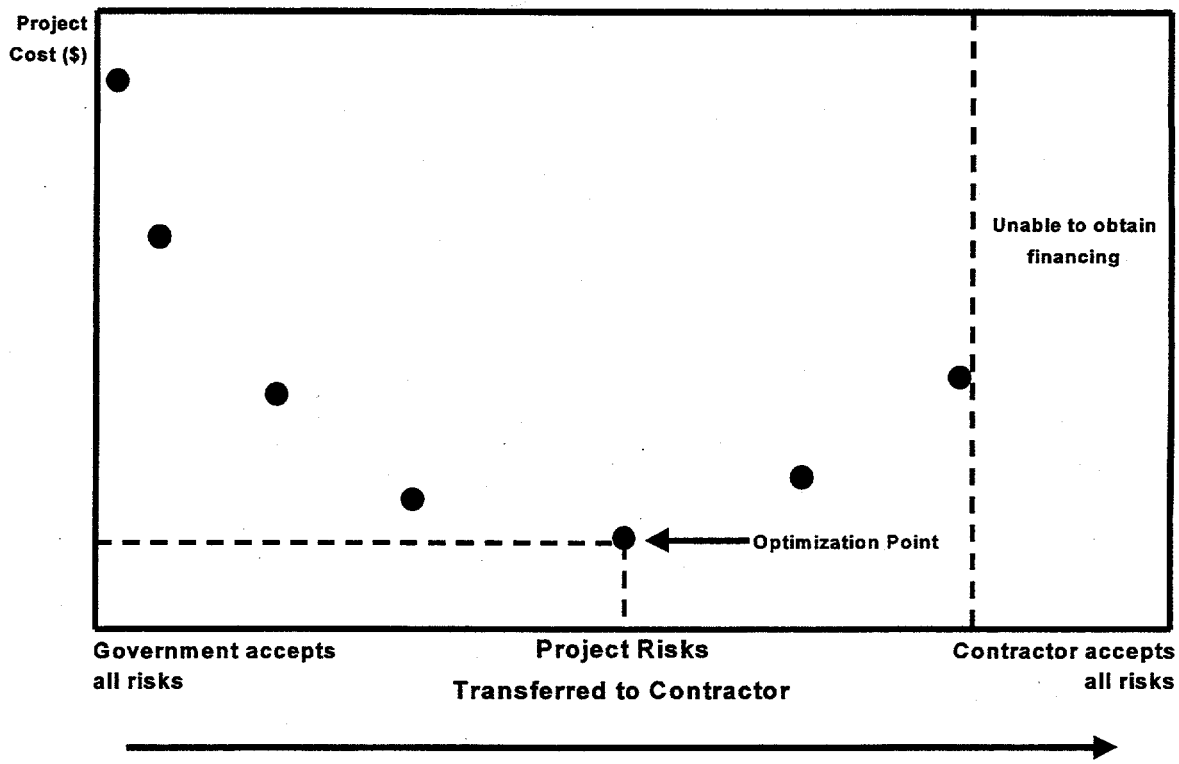

Figure 2. Optimization Curve

The risk allocation result directly affects the financial feasibility of the project. As depicted in Figure 3, the process used by lenders and credit analysts attempts to identify any risk that remains uncovered by the project participants. Lenders will analyze the project risks and will determine their magnitude and ability to be managed. In the event the "remaining uncovered risks" are significant or unmanageable to the parties in the transaction, the lenders will avoid the transaction.

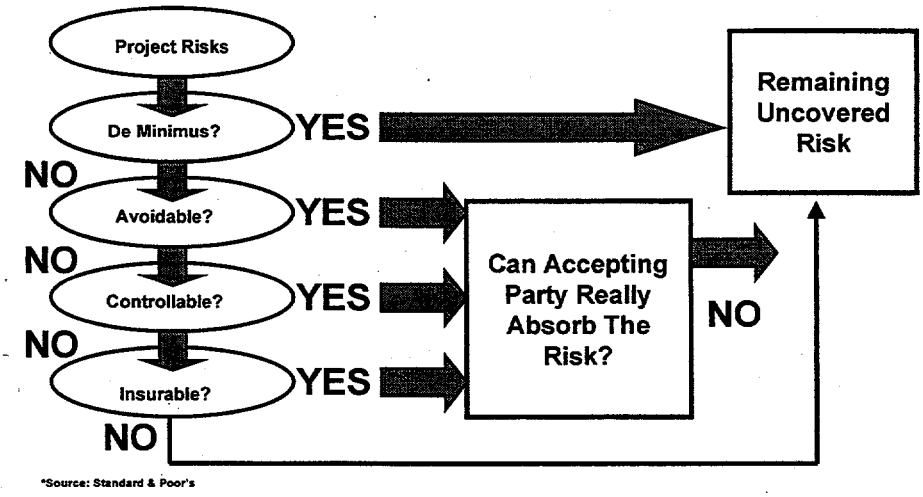

Figure 3. Lender Risk Analysis

To mitigate the lender's concerns, the contractor may find alternative sources, such as additional equity or "mezzanine financing" (i.e., subordinated debt). Alternatively, the borrower will obtain commercially available insurance to cover specific risks or will guarantee a portion of the debt with its balance sheet. This will increase the comfort senior lenders will have in the timely repayment of principal and interest. However, it also will increase the cost of financing associated with project. To the extent risks remain unmitigated, they are risks that the lender is assuming. Although the lenders will be compensated for this added risk, there is a point at which they simply will not lend to the project (see Figure 2), rendering the project financially infeasible. Therefore, the challenge in structuring a project is to develop terms and conditions which result in a risk allocation that places risks under the control of the party best equipped to manage them. This, in turn, provides incentives that are well aligned with the programmatic mission behind the function being privatized.

III. The Case for Private Financing

In emerging economies, the demand for infrastructure far outweighs the government's financing capabilities and, despite its higher required returns, private capital is a welcomed necessity. Since this is not an issue for the U.S. government, it is difficult to ignore the lure of the government's "risk free" cost of capital. Holding all other things equal, it would appear that substituting the project's private financing sources with public funding would allow the project sponsor to tap the credit strength represented in the government's taxing powers and effect cost reductions in the project. Although this argument appears logical, it oversimplifies the process of allocating risks and responsibilities between the government and its contractor. All too often the debate over private financing assumes the project being financed will achieve the same degree of success regardless of its financing source. Indeed, under this analytical framework, the 2% to 4% interest rate premium attached to private financing is difficult to justify. If one were to attach probabilities of success to each of the financing options, however, it is unlikely that public financing would emerge as the cheaper alternative. The case for private financing can be made by examining the inherent incentives associated with the private finance approach, the requirements of third-party financing sources, and the contingent liabilities associated with government financing.

Incentives Associated with Private Financing

Historically, governments have financed large infrastructure facilities on a current basis, making what often are referred to as "progress payments" to a lead contractor as contract milestones are achieved. In this fashion, the government effectively assumed a significant degree of the risks of project completion and performance. This approach offered few and often ineffective mechanisms for the government to control project costs and complete development in a timely fashion. Proponents of private finance point to the built-in incentives associated with having a contractor's money at risk. In these structures, the team members' participation, as equity providers, is a critical tool in allocating risk because, if the project were to fail, the team would risk losing its entire equity investment. This factor, among others such as performance guarantees, is a strong incentive for the team to bring the project to completion on time and under budget in accordance with performance specifications. This incentive structure has been used under the U.K.'s Private Finance Initiative, which has produced efficiency gains that far exceed the financing benefits associated with government financing (Rodgers 1996).

Formalization of Roles and Responsibilities for Performance

Infrastructure facilities are often designed, constructed, and operated by a team of firms, each bringing their respective skills (i.e., design engineering, turnkey contracting, equipment supply, and facility operation) and expertise to the project's undertaking. Privately financed projects focus accountability on team members for the scope under their control. For example, these projects are typically based on a fixed-price, turnkey contract for the design and construction of the facility. The turnkey contractor is often a partner in the joint venture. This approach shifts the risk of completion and performance to the turnkey service provider who must build the facility to exact performance specifications for a specified price under a strict timetable.

Requirements of Third-Party Financing Sources

The presence of third-party lenders and investors adds additional perspectives and interests that need to be addressed in the project structure. This often requires very specific terms and conditions in contract documents and introduces additional project oversight. For example, lenders monitor project performance closely, ensuring that, among other things, construction is proceeding on time and within budget specifications. This presence of third-party financing sources imposes added structure into the project's planning, construction, and operation.

Contingent Liabilities Associated with Government Financing

A recently published World Bank paper analyzed the apparent cost advantage of public borrowing and concluded that "under government finance, the taxpayers bear a contingent liability which, if properly remunerated would wipe out any cost advantage of sovereign borrowing" (Klein 1996). In other words, the true cost of government financing is not reflected in the interest rate and budget authorization estimates and often will not show up at all in economic analyses of the project. However, just as an insurance company experiences claims on risks it covers, the government will experience the cost of absorbing this contingent liability.

IV. Risks and Benefits of Increasing Government's Role

As detailed above, the source of financing is an integral part of the overall risk allocation, and therefore, the participation by the government as a financing source could alter the allocation of risks in the project, diminishing the incentive structure. However, in some cases, the government's participation, whether through partial financial participation, credit enhancements, or risk assumption, is a requirement for financial feasibility. The challenge rests in structuring a role for the government without undermining the success of the project. As governments all over the world have sought more effective and efficient means for providing services, they repeatedly have had to determine what role the government's participation should take in the final privatized contract.

Methods for Government Participation

Government participation in a specific transaction can include a broad range of options, but as a general rule, the method and magnitude of this participation should depend on the unique requirements of the project and should serve to enhance the project's ability to raise private financing. As the project's risk allocation between the government and the contractor forms the foundation on which other enhancements can build, it is first important to analyze methods for directly improving the project's financeability through alternative risk allocation structures. DOE contracts, for example, often involve the handling and treatment of mixed radioactive materials. The risks presented to the contractor are often unique and therefore raise concerns to lenders and investors because they have a difficult time in analyzing and quantifying the risks. For this reason, DOE often takes certain risks that the private sector cannot absorb (e.g., radiological risks under Price Anderson). In some cases, this process may involve clarifying the risk allocation to make it conform to the commercial models that are familiar to the financial community. This can be accomplished with special contract clauses that provide clarifications to or deviations from language contained in the Federal Acquisition Regulations (FAR).

Having developed a risk allocation that provides a strong foundation for the project's success, the challenge for the government is to consider alternatives which build on this foundation and preserve its integrity. Since each project is unique, the number and combinations of potential options is unlimited, but generally fall into the following categories:

- *In-Kind Investments*: The economics of a project often benefit from in-kind investments such as the contribution of the project site, right-of-way, or natural resource. Alternatively, the government may agree to develop infrastructure improvements to the project site, serving to keep these costs out of the contractor's investment requirements. Through tax-increment-financing, municipalities often find that they can finance these improvements based on the increased tax revenues generated at the site.

- *Pass-Through Costs*: Recognizing that the assumption of certain costs expose the contractor to additional risks, and in turn, raise the contractor's price of providing services, governments often choose to supply services for free or allow the contractor to treat the costs as "pass throughs." For example, the government may pay for utilities or property taxes on a "pass-through" basis. By participating in this way, the government eliminates any premium charged by the contractor for these services and reduces the supply risks associated with the project. While this will help the economics of the project by reducing volatility, it also shifts certain risks to the government.

- *Contract Extensions*: In projects where significant capital investment by the contractor is required, extending the service period can improve the economics of the project by spreading the project's fixed cost over a longer term. This allows the project investors to realize a level stream of depreciation benefits and perhaps access financing sources that provide longer debt terms. This option is particularly attractive for projects that are assuming market risk for their product because by lowering the annual fixed cost requirements, the price for the product can be more competitive.

- *Financial Guarantees*: There are a host of financial guarantees that governments can make to improve the project's feasibility. These guarantees can be placed on a portion of the project's debt or equity and can be crafted to address specific risks and/or events. For example, the procedures under the FAR for a "termination for convenience" constitute a partial guarantee for project costs. Often investor and lender confidence in a project can be improved by providing guarantees for specific events and risks

and clearly defining the payment mechanics of these guarantees. In international projects, loans from multilateral banking institutions are usually guaranteed by the central government and commercial loans are often guaranteed for certain risks by export credit agencies such as the U.S. Export-Import Bank or the Overseas Private Investment Corporation (OPIC).

- *Fixed Payment Mechanisms (Revenue Guarantees):* Project lenders and credit rating agencies apply significant scrutiny on the payment mechanisms provided in project agreements and will look for fixed payments which maintain debt service coverages under all foreseeable circumstances. In waste processing facilities, for example, contracts typically have "put-or-pay," "availability," or "capacity payment" provisions, each of which requires minimum payments that are unrelated to actual throughput. Depending on the level of volatility associated with the feedstock or other critical supplies provided by the government, the agreements may call for a "true-up" at the end of a period to ensure the government is not overpaying. This type of provision insulates creditors from the risks associated with revenue volatility, which is a critical requirement for financial feasibility.

- *Project Loans*: In order to preserve the structure of the financing, the government may provide loans to the project. Generally, this participation is most useful on a subordinated basis (i.e., a subordinate position to the senior lenders) because it will provide a substitute for more expensive debt and it avoids inter-creditor issues associated with the collateral value of the project's assets. By providing a subordinated loan, a government can fill important gaps in the project's financing and can maintain the equity committed by the contractor.

- *Project Equity*: The government also can play a role as an equity investor to the project. This has been done on international infrastructure projects and improves the project's economics while preserving the incentive structure of the project. If, for example, the government recognizes that experience curve effects will lead to efficiency improvements in a privatized waste processing facility and is concerned about the generation of excess profits, it can participate in the project as an equity investor. This will entitle the government to a share of those returns.

- *Advanced Payments*: Like project loans and equity investments, advanced payments represent a cash outlay to the project prior to completion of construction. In the U.S., progress payments by the government are typically associated with this option and generally have been timed with contractor's expenditures rather than performance. Of all of the financial alternatives, this option carries the greatest potential for undermining the incentive structure of the project unless linked in some way to measurable performance.

- *Performance Payments*: Although a type of advanced payment, performance payments are identified as a separate category because the payment trigger is usually linked to contractor performance on the project. In much the same way as cash outlays on a construction loan are staged and released based on progress, performance payments can be based on completion of project milestones. Like other types of advanced payment mechanisms, this category can threaten the risk allocation structure. However, it also can be used strategically to address specific objectives. For example, options to consider include

  - providing cash payments during development or permitting
  - providing co-payments during development or permitting
  - funding a portion of the engineering and design
  - providing a performance payment at the end of design

- providing a portion of the construction funding
- investing equity in the project company which is then repurchased by the private entity after startup
- purchasing the facility after startup
- providing funds for pre-payment of major equipment items that might revert to the government in the event of performance problems at the facility
- pre-funding a portion of the operations and management budget during the startup period.

The options outlined above can be applied with precision to bridge a gap in the project's financial structure. As depicted in Figure 4, often these options can build on commercially available financing alternatives to improve the project's attractiveness to private capital.

In some cases, incorporating one or more of these alternatives is necessary simply to make the privatization feasible, and in other cases, it can fine-tune the economics of the transaction. However, as discussed above, substitution of public financial resources for private financing can alter the risk allocation and prove more costly in the long run. Therefore, when developing the options, it is important to consider participation as just as another step in the allocation of risk for the project and to use appropriate caution.

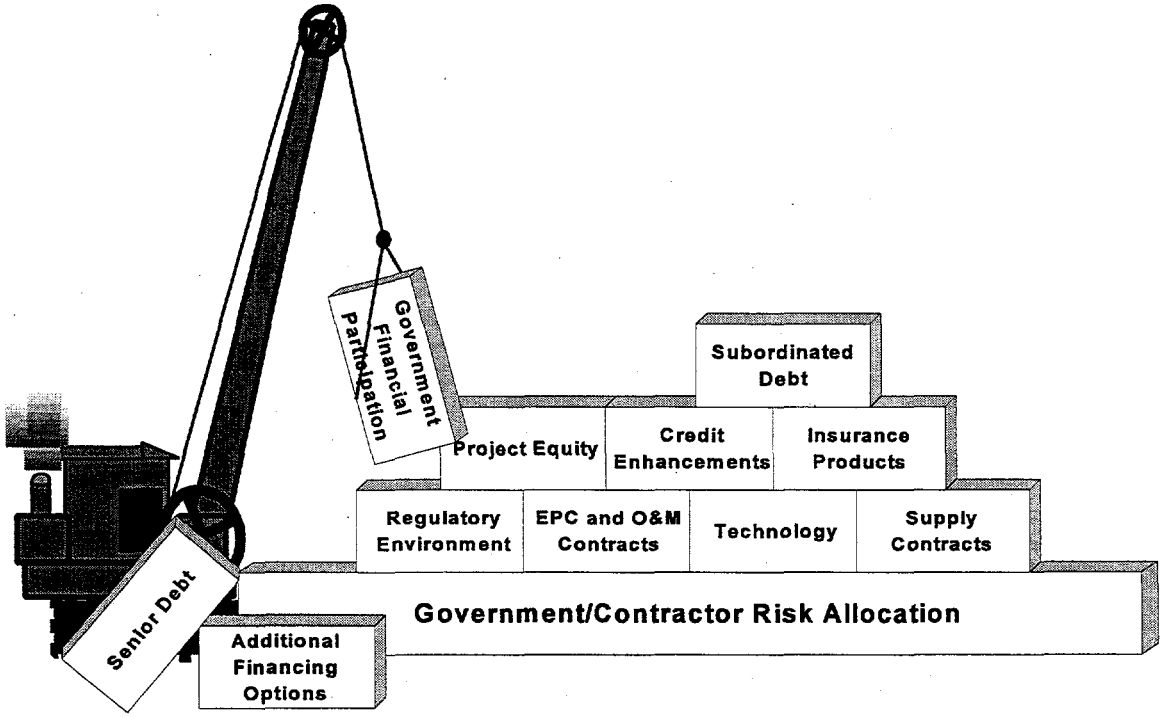

Figure 4. Financial Layering

Risks Associated with Greater Government Involvement

As the government considers participation options, there is a need for a thorough analysis of all the risks that are being taken by the government and determination of whether the risk sharing is appropriate for proper execution of the project. The primary risks of government participation include the following:

- *Increased Financial Exposure:* As illustrated in Figure 5 (Babbar and Fishbein 1996) and discussed in Section III, the participation of the government in a project's financing carries varying degrees of contingent liability. As the government assumes more risk or invests more money into the project, it becomes exposed to a greater share of the damages should the project fail. Therefore, the level of involvement should be strategically and uniquely suited to the needs of the project.

- *Degree of Government Involvement:* A second risk associated with greater government participation may be a temptation on the part of the government to become too involved in the performance of the project, potentially to the point of interfering with the private party's ability to perform the service. As the government's risk profile increases, there is a need to develop a healthy balance between timely reviews of project progress versus interference in the planning and implementation of the project.

- *Loan Security Issues*: A third risk of greater government involvement is the complexities that may arise in the relationships with the potential investor or lender to a project versus other lenders or investors. In certain scenarios, the government could be a subordinated lender to a project leaving a majority of the assets of the project pledged to outside senior lenders.

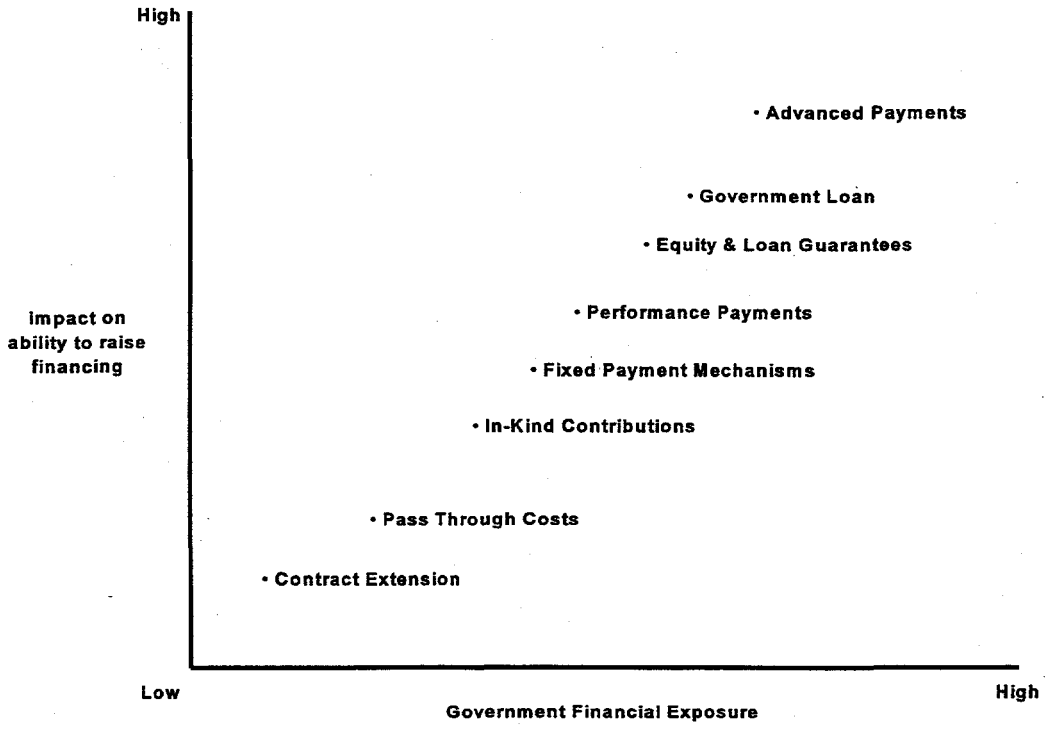

Figure 5. Government Financial Exposure

In addition, certain roles potentially available to the government could place the government at risk as a part of the private consortium with potential exposure to third-party liability or claims.

V. Getting There from Here: Process Considerations

Unlike the procurement of computers or certain management and integration services, where the needs are well defined and the risks are known and quantifiable, many of DOE's privatization projects carry uncertainties with regard to programs and policy, waste characterization, and project integration with other site activities and DOE programs (to name a few). As a result, these procurements do not lend themselves to significant standardization and have been appropriately dubbed "thinking persons' contracts." Therefore, there is no recipe that can be prescribed which will guarantee success. Instead, crafting a successful partnership requires an iterative process that studies market indicators and adjusts accordingly.

In order to properly evaluate the available options, it is first important to define the government's objectives in the transaction. Based on these objectives, then it is possible during the procurement process to determine what creative steps the government can take to move the transaction as close as possible to those objectives. Depending on the project, these objectives may include shifting specific risks to the private sector, reducing costs of delivering the service, or "fast tracking" a project to completion. In the Philippines, for example, a priority for the government was to eliminate the brown-outs that had been plaguing the country's energy supply. To encourage the private development of power facilities, the government adopted privatization guidelines that left key risks with the government, including currency risk, force majeure, revenue risk, hydrologic risk (for hydropower facilities), and a number of others. However, construction and performance risks remained with the private contractors including, in one case, the fixed-price construction of 13 miles of tunnels through a mountain (see Case Study 4 in the Appendix). The privatization guidelines mobilized significant private investment in the Philippines and met its objective of solving its chronic power problems.

As depicted in Figure 6, having defined its objectives, the government can begin designing the procurement based on trends in the marketplace, recent experience, and procurement policies and guidelines. Often, through distributing a draft request for proposal (RFP), holding pre-bid conferences, and/or soliciting expressions of interest, the government can obtain stakeholder input. After validating this feedback, the stakeholder concern can be evaluated against the government's objectives. In some cases, the procurement design can satisfy the stakeholder concerns and the government's objectives, and modifications to the conceptual design can be implemented before the release of an RFP.

This process can continue after receiving responses to the RFP. To the extent the government has been able to foster competition in the solicitation, these responses will be an excellent indication of the market's ability to address the government's requirements. As the government enters into negotiations with the contractor, the process of validating feedback and identifying creative solutions will continue. Through this process, the government will determine the risk profile for the project that best achieves the government's objectives. The secret to a successful negotiation is identifying those options for participation which, when included in the transaction, improve the overall cost position of the project and significantly enhance the chances of the public-private partnership going forward.

VI. Conclusion: Unique Challenges Require Unique Solutions

Often the complexity of the project requires innovative thinking that does not necessarily conform to a particular federal procurement approach. For example, Figure 7 plots various procurement approaches against the complexity of the project. In many cases, traditional procurement approaches are easily applied and are well tested in the marketplace (e.g., purchase of materials, consulting services, etc.). In other cases, the traditional options have not served the federal government well and other options have been explored that move a significant portion of the risk to the private party. For example, the development of housing and/or prisons lend themselves to a "full privatization" approach because these projects are not overly complex and the risks are easy to identify and quantify.

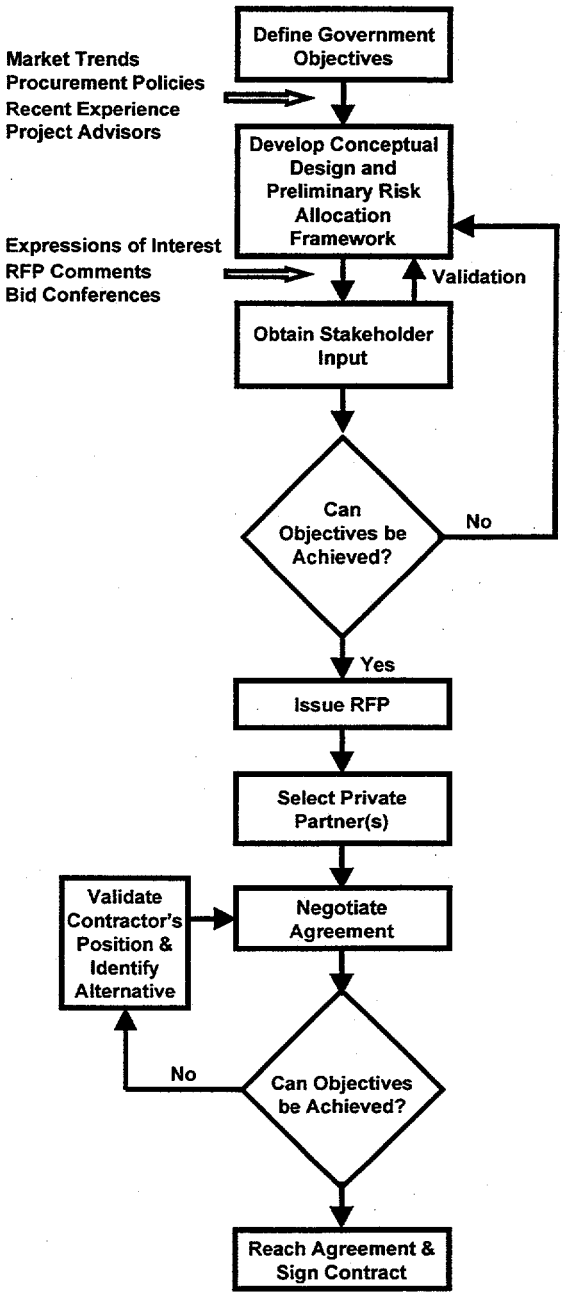

Figure 6. Procurement Process

In more complex cases, such as waste remediation, the government needs to determine if the private sector will accept technology, performance, and schedule risks and, if so, pass those risks in whole or substantially to the private entities. If investors and lenders are not comfortable with that risk profile, the government might still be able to achieve a significant portion of its objectives by entering into additional risk sharing and financing strategies. As shown in Figure 7, the government can move within Box A to craft a risk allocation and financing strategy that maintains the procurement's objectives. Before reverting to a procurement type as shown in Box B, where the government enters into to a cost-plus risk profile, the government should exhaust all options that keep the private entity at risk for important aspects of the project and keep the final transaction description close to the parameters of Box A. Although the result may look different from the original design, it will represent an improvement over a scenario where the government assumes 100% of the costs, the uncertainties, and risks.

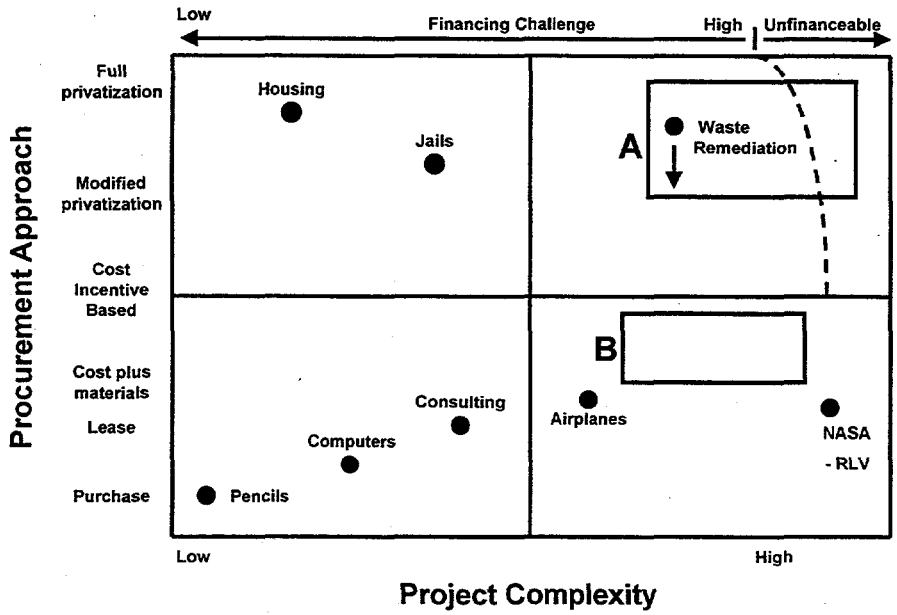

Figure 7. Procurement Approach and Project Complexity

Although proponents of progress payments or other forms of government financing point to simple comparisons of the cost of money under differing financing approaches and declare government financing to be less costly, comparisons of the cost of money ignore the principal objective of privatization: shifting risk to the private sector. As described in detail above, this process is often challenging, but it is not unattainable. By analyzing market trends and being aware of the opportunities and constraints of private markets, government managers can craft creative solutions, which include an appropriate mix of private and government financing and which maximize the project's efficiency. This approach will allow the project to proceed in a way that meets the government's objectives for privatization.

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Appendix

Case Studies

CASE STUDIES

As the Department of Energy moves forward with Contract Reform Initiatives, it will note the variety of unique options presented by each project. The following case studies illustrate the challenges faced by other communities in structuring public-private partnerships and the variety of approaches used. In some cases, the resulting risk allocation has been effective in insulating the government from certain risks and in other cases it has not. The case studies include the following projects:

1. Seattle Tolt River Filtration Plant
2. Portland Solid Waste Composting Facility
3. Prison Service Agency, UK Government
4. CE Casecnan Water and Energy Project
5. Iridium, Global Wireless Telecom Project
6. Florida High Speed Rail
7. Mercer County Sludge Processing Facility.

These projects faced a variety of challenges that offer parallel examples to consider as the DOE moves forward in crafting unique and innovative approaches to achieving its goals. The purpose of the case studies is to illustrate the variety of techniques used in the U.S. and around the world for addressing the challenges presented by the risk allocation process.

CASE STUDY #1
SEATTLE TOLT RIVER FILTRATION PLANT

CUSTOMER:	City of Seattle, Washington
SERVICE PROVIDER:	CDM Philip, a consortium consisting of Camp Dresser & McKee, Philip Utilities Management Corporation and Dillingham Construction N.A., Inc.
TRANSACTION STRUCTURE:	Design, Build, Operate a Water Treatment Plant
YEAR:	1997 **DURATION:** 25 years

ILLUSTRATION: This case study illustrates how public financing can be used in conjunction with private sector financial backstops. Reducing cost of capital through public financing and ownership can be accomplished particularly when technological and commercial risks are well understood. In this case, public sector financing was particularly attractive because of the tax-exempt status of municipal debt, and the technology, a water filtration plant, was well known and understood. However, the City recognized the commercial risks involved in the project and required additional financial guarantees or "backstops" to protect its interests.

BACKGROUND: The Seattle Water Department provides both wholesale and retail drinking water for approximately 1.25 million people in the City of Seattle, King and Snohomish Counties. In 1996, the Department issued an RFP for the development and operation of a water filtration plant. Although ownership and financing responsibilities reside with the City, most commercial risks were placed on the contractor through a design-build-operate transaction structure.

KEY TERMS OF CONTRACT/RISK ALLOCATION: Under the procurement, the City assumed the risks of site selection, financing, change-in-law, and water (feedstock) supply and quality. The contractor assumed permitting, design, construction, operations, and treated water quality risk. The RFP called for a 12-month development period (permitting and financing), a 30-month construction period, and a 15-to 25-year operations period. Proposals were evaluated based on the present value of the contract's life cycle costs. Construction payments and inflation adjustments were to be based on a schedule submitted by proposers, and therefore, the contractor chose the degree of inflation risk it assumed.

ISSUES CONFRONTED: Since the City intended to finance and own the plant, it required financial assurances that, should the contractor fail, it would be sufficiently protected. Therefore, the RFP required the contractor to guarantee its performance with liquidated damages in both the construction period and the operations period. These guarantees had to be backed by letters of credit of $15 million during construction and $3 million during operations.

OUTCOME/CURRENT STATUS: The contract was awarded in the summer of 1997. The total contract value was $101 million in present value terms and the City maintains that it represents a savings of $70 million over the life of the contract.

CASE STUDY #2
PORTLAND SOLID WASTE COMPOSTING FACILITY

CUSTOMER:	City of Portland, Oregon	
SERVICE PROVIDER:	Riedel Oregon Composting Company, Inc.	
TRANSACTION STRUCTURE:	Design, Build, Own, Operate a Municipal Solid Waste Composting and Resource Recovery Facility	
YEAR:	1989	**DURATION:** 20 years

ILLUSTRATION: This case study illustrates how one municipality insulated itself from the performance risks associated with a technology by limiting its involvement in the financing and ownership of the composting facility. In addition, the presence of third-party financing sources imposed additional scrutiny on the project, leading to a search for a replacement contractor conducted at a commercial bank's expense. Ultimately, the facility failed to pass its performance test and was decommissioned. Since the city's exposure in the agreement was limited to a commitment to send its waste to the facility, it was able to "walk away" from the transaction at minimal cost.

BACKGROUND: The Portland, Oregon Metropolitan Service District entered into an agreement with the contractor to build a facility capable of composting municipal solid waste. The city committed to provide up to 185 tons per year solid waste to the facility. In return, the contractor agreed to construct the facility and operate it based on a tip fee that consisted of debt service payments, operating and maintenance expense, and pass-through costs less credits for recovered materials.

KEY TERMS OF CONTRACT/RISK ALLOCATION: Under the agreement, the city assumed the risk of providing waste feed of sufficient quantity and quality. This was handled through a put-or-pay agreement wherein the contractor would be paid for accepting 185,000 tons per year even in the event the waste flow was less than that amount. Market risks for recovered materials were borne between the contractor and the city. The contractor assumed all commercial risk for the project including development, permitting, construction, operations, financing, and ownership.

ISSUES CONFRONTED: After the facility was substantially completed and performance testing had begun, the contractor was unable to complete the testing successfully due to complaints concerning the emission of malodors from the facility. Due to this problem, the contractor defaulted under its agreement with a commercial bank which had provided the letter of credit. The purpose of the letter of credit was to provide a credit enhancement and liquidity support for the bonds issued by the contractor to finance the facility. The contractor had agreed to secure its obligation under the letter of credit agreement by pledging to the bank, among other things, its entire right, title, and interest in the facility and the related contract rights. Due to its inability to solve the emissions problem, the contractor defaulted under the agreement and the bank acquired ownership of the facility and the related contract rights.

OUTCOME/CURRENT STATUS: Through a "workout" process, the bank initially attempted to replace the contractor. However, since a solution for the odor problem did not appear to be forthcoming, the bank was able to collect on an efficacy insurance policy it had placed with an insurance syndicate. Therefore, the bank was able to terminate its debt obligation of $27 million and decommission the plant. Although the project was a failure from the City's standpoint, its initial risk allocation protected it from owning a failed project.

CASE STUDY #3
PRISON SERVICE AGENCY, UK GOVERNMENT

CUSTOMER:	Bridgend Prison, UK	
SERVICE PROVIDER:	Securior, Siefert, WS Atkins	
TRANSACTION STRUCTURE:	Design, Build, Operate, and Finance	
YEAR:	1996	**DURATION:** 25 years

ILLUSTRATION: This case study illustrates the cost associated with pursuing a one-sided risk allocation. Aiming for optimization, rather than maximization, of risk transfer will lead to increased competition and a more expeditious procurement process. In this case, the British government attempted to transfer risks which were out of the contractors' control. As a result, no conforming bids were received, and the UK government was forced to rebid the project based on a revised risk allocation.

BACKGROUND: In November 1993, the Prison Service invited expressions of interest in the design, construction, management, and financing of a prison in Bridgend, South Wales. One year later, of the ten consortia that expressed interest, six were invited to submit tenders. This was one of the first projects to be procured under the UK's Private Finance Initiative, which is a program seeking to access the efficiencies available in the private sector by paying for services delivered, rather than financing capital assets through traditional government procurement processes.

TERMS OF CONTRACT/RISK ALLOCATION: The Prison Service viewed the procurement as buying custodial services from the consortium for a period of twenty-five years. The capital investments required were considered to be ancillary to the main purpose of the contract. As supplier of the custodial service, the consortium assumed the risk of making a minimum of 800 prisoner spaces available on a continuous basis throughout the life of the agreement. As such, the consortium assumed design, construction, availability, and operating risks. In short, the consortium was to be paid only for the supply of prisoner spaces to the extent that they were available on any day during the period of the agreement. "Availability" involved both the prison itself being in accordance with the specifications and that the operating and maintenance activities fell within certain predefined parameters. The government, in turn, committed to a stream of payments for services over a twenty-five year period.

ISSUES CONFRONTED: The key issue faced in the procurement process related to the initial transfer of risk to the private sector. In its first invitation for bids, the government tried to transfer demand risk. That is, it intended to pay the consortium for the number of prisoners actually occupying the prison in any given day. Since the government was a monopoly supplier (through sentencing policy), it could determine the number of prisoners who occupy the prison at any given time, and therefore was attempting to transfer a risk over which it had ultimate control. As a result, no conforming bids were received and the project had to be recompeted.

OUTCOME/CURRENT STATUS: Due to the problems experienced in the first tender, the government revised the risk allocation and rebid the contract. In June 1995, a winning consortium was selected and the contract closed in early 1996.

CASE STUDY #4
CE CASECNAN WATER & ENERGY PROJECT

CUSTOMER:	National Irrigation Administration, Government of the Philippines	
SERVICE PROVIDER:	Cal Energy (and local investors)	
TRANSACTION STRUCTURE:	Design, Build, Operate, Finance a Power Facility	
YEAR:	1995	**DURATION:** 20 years

ILLUSTRATION: This case study illustrates how an equitable risk allocation resulted in a financeable project with the shifting of significant technological risk to the private sector. Identifying government objectives and developing a risk allocation that supports those objectives can result in the transfer of key performance risk, as well as an expedited procurement process. In this project, the government of the Philippines adopted a risk-sharing scheme that appropriately assumed risks which were out of the contractor's control, yet transferred significant technological and performance risks which the contractor was prepared to accept. This case study also illustrates how the private sector risks can be allocated among the developer's team.

BACKGROUND: The CE Casecnan Water & Energy Project was conceived in the late 1970s by government planners in the Philippines. The hydrologic and geologic conditions were well studied and the potential for the project clearly defined. Due to recurring rice shortages and frequent brown-outs, the government adopted privatization guidelines that it thought would facilitate private investment in thermal power and hydroelectric facilities. The CE Casecnan Water & Energy Project was particularly appealing because it would serve the dual purpose of addressing the country's rice shortages through providing needed irrigation resources and it would provide power during peak consumption periods. As a result, the project enjoyed widespread political support.

TERMS OF CONTRACT/RISK ALLOCATION: Under the government's privatization guidelines, the government assumed risks that were generally out of the contractor's control including: hydrology risk, currency risk, payment risks, force majeure events, change in law, watershed maintenance, and the risk of institutional changes within the Philippine government. In return, the contractor guaranteed a minimum amount of energy during peak periods at rates which were fixed through the duration of the project (with the exception of adjustment for inflation). In addition, the contractor guaranteed the collection and delivery of water to a distribution point for irrigation. Since the project involved the construction of 23 kilometers of tunnels at depths of up to 1400 meters, the technical risks associated with this project were considerable.

ISSUES CONFRONTED: Although developers are generally comfortable with the types of risks associated with designing, constructing, and operating a power facility, few developers have been asked to assume sub-surface or geologic conditions risk. Therefore, the developer sought to allocate the risk of the project to its subcontractors, namely its construction contractor. To that end, the contractor secured a fixed-price, date-certain construction contract for all the civil works and generation facilities associated with the project. This was the first such tunneling project to be procured under a fixed price. Due to the technical risks involved, the construction contractor supported his bid with liquidated damages of 100% of the contract price for lack of performance or scheduled delays. This was supported by a standby Letter of Credit for 50% of the amount of liquidated damages.

OUTCOME/CURRENT STATUS: After making initial progress in the site development work, the construction contractor, for reasons unrelated to this project, became insolvent. Since this was a default condition under its agreement with the developer, the developer terminated the contractor and drew on the Letter of Credit for damages. In addition, the developer entered into a new agreement with a different construction contractor. Should this problem result in a delay of the project's start date, the developer will use the proceeds from the liquidated damages to serve as debt until the facility becomes operational.

CASE STUDY #5
IRIDIUM, GLOBAL WIRELESS TELECOM PROJECT

CUSTOMER:	High-end, Traveling, Professional, Telecom Market
SERVICE PROVIDER:	Iridium, LLC, a consortium consisting of numerous telecom companies, as well as Motorola, Lockheed Martin and Raytheon.
TRANSACTION STRUCTURE:	Commercial Venture
YEAR:	1998 **DURATION:** Indefinite

ILLUSTRATION: This case study illustrates the dynamic nature of the nonrecourse project finance market. As unique transactions are brought to the market for funding, they test the limits of the market, often requiring adjustments to risk allocations and financial structures. The financing of Iridium illustrates this process as the market tried to balance the significant prospects associated with wireless communications against the technical risks of establishing a sixty-six satellite communications network in space. This case study also illustrates the current trend of bolstering the credit structure of risky transactions with limited recourse to developers' balance sheets for portions of debt.

BACKGROUND: The Iridium system is a satellite-based, wireless, personal communications network designed to allow any type of telephone transmission to reach its destination anywhere on Earth at any time. Originally conceived by Motorola engineers, this system will consist of a constellation of sixty-six satellites located 420 nautical miles above the Earth's surface. The low earth orbit of Iridium's satellites will allow more tightly focused beams to be projected on the ground, providing transmissions that are clear and strong.

TERMS OF CONTRACT/RISK ALLOCATION: As a commercial venture, the significant market, technology, construction, and launch risks, as well as the regulatory risks associated with securing transmission rights for more than 180 countries, are assumed by the consortium. Therefore, the primary sponsors of the consortium pursued non-recourse debt structures which insulated their exposure in the project.

ISSUES CONFRONTED: Iridium and its primary competitor Globalstar, pushed the boundaries of the debt market tolerance for risks in multiple financings during the 1994-97 period. Iridium had hoped to fund the $5 billion project cost through a combination of contributions from the thirteen sponsor organizations, a public stock offering, and a mixture of commercial loans and project bonds. In its original foray into the debt markets, Iridium sought to raise $300 million in the bond market and found the market was uncomfortable with the risk profile at that time. In response, Iridium raised an additional $315 million from its equity investors and secured a line of credit of $750 million from a group of 62 banks. This line was guaranteed by Motorola and therefore provided recourse to the main sponsors' balance sheet.

OUTCOME/CURRENT STATUS: Given the increased equity commitment and the balance sheet risks assumed by Motorola, Iridium was able to raise an additional $800 million in bonds the following year. Given the market's appetite for Iridium's debt, the consortium has been able to launch satellites and a system is scheduled to be online by September 1998.

CASE STUDY #6
FLORIDA HIGH SPEED RAIL

CUSTOMER:	State of Florida
SERVICE PROVIDER:	Florida Overland Express (FOX), a consortium led by Fluor Daniel Inc, which includes Odebrecht Contractors, Bombardier, and GEC Alsthom
TRANSACTION STRUCTURE:	Build, Operate, Transfer
YEAR:	1996 (Awarded) **DURATION:** 40 Years

ILLUSTRATION: This case study illustrates how far government participation can go in crafting a public-private partnership. Depending on the risks associated with a project, the government will have to achieve an appropriate level of participation in the form of risk assumption or financing while preserving the incentives contained in a privatized contract. In this case, the State of Florida has assumed significant market risk by committing to a series of payments over the first thirty years of the project.

BACKGROUND: This project involves the construction of a 320-mile high-speed rail system running from Miami through Orlando to Tampa. The rolling stock consists of all electric trains and will operate at speeds of up to 200 mph. The project is the first true high-speed rail system in the United States.

TERMS OF CONTRACT/RISK ALLOCATION: Under the agreement, the state of Florida will invest $70 million a year in public funds over the next thirty years for capital development in return for the right of ownership of the land and its facilities. The private partners will invest $350 million in equity and will assume ownership of all rolling stock. Revenue bonds secured by ticket sales will be issued by a state entity acting as owner of the property and improvements.

ISSUES CONFRONTED: Despite previous attempts, the introduction of high-speed rail in the United States has proven too risky to be developed on a purely privatized basis. Under this structure, the estimated $4.8 billion in project cost will be supported substantially by recurring contributions from the State and will benefit from tax-exempt debt secured by revenues. Subsidies, together with the ability of the private partner to depreciate rolling stock, results in competitive fares ($54 Miami to Orlando) and therefore make the economics of this transaction feasible.

OUTCOME/CURRENT STATUS: Contract award was made in 1996. Inaugural run is scheduled for January 2004 with full operation expected by January 2006.

CASE STUDY #7
MERCER COUNTY SLUDGE PROCESSING FACILITY

CUSTOMER:	Mercer County Improvement Authority, Trenton, New Jersey		
SERVICE PROVIDER:	Various		
TRANSACTION STRUCTURE:	Design, Bid, Construct (Under EPA Construction Grants Program)		
YEAR:	1984	**DURATION:**	

ILLUSTRATION: This case study illustrates the potential financial exposure associated with 100% public financing of unique and potentially risky projects. Under traditional municipal procurements, construction of facilities was incrementally funded through the issuance of municipal bonds and in some cases grants. In this case, an advanced technology was introduced for the treatment of the municipal wastewater sludge. Due to the funding approach however, minimal risk was transferred to the contractor, costing the municipality and U.S. government millions of dollars.

BACKGROUND: Under EPA's construction grants program, municipalities were entitled to seventy-five percent of construction cost. For this reason, municipalities often made additional investments in capital if savings in operations could be realized. In Mercer County, the original design of the facility was based on an innovative sludge drying technology which was modified to increase plant capacity and lower unit operating cost.

TERMS OF CONTRACT/RISK ALLOCATION: The allocation of risk under this procurement was decidedly one-sided with the public entities providing 100% of the financing. The contractor designed improvements to the process to improve throughput, yet did not fully guarantee the performance of the system.

ISSUES CONFRONTED: The original facility cost $30 million to construct. At that time, problems were being experienced at other facilities around the country which had similar designs, and the County, with EPA's financial assistance, approved an additional $50 million in expenditures which the contractor indicated would address the performance problems. As the improvements were being finalized, other municipalities using the same technology deemed their facilities as "failures." Recognizing that this facility had the same design flaws as those failed facilities, Mercer County canceled further development of the facility, choosing not to spend additional funds on start-up activities. At this point, the County had spent over $80 million in design and construction costs.

OUTCOME/CURRENT STATUS: Although the plant was completed, it has remained idle since 1992 and the County has been servicing approximately $50 million dollars in outstanding debt on the facility. In June 1997, a developer who had acquired the rights to the technology entered into a Letter of Intent with the county to retrofit and operate the facility over a forty-year term. Rather than committing additional funds, the county has simply guaranteed a portion of its waste stream at competitive prices and will lease the facility to the developer. The developer is currently arranging project financing for the facility.

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