



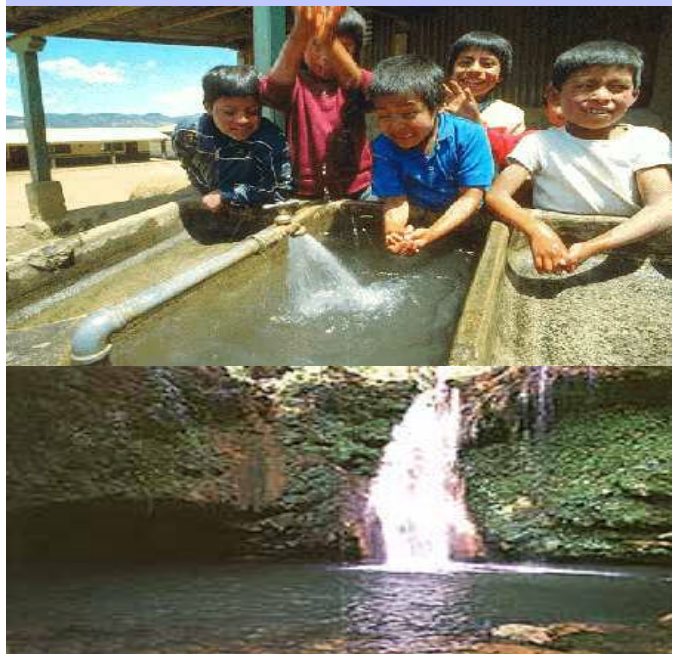
*The choice of a contract structure influences the entire life cycle cost of projects. Traditionally, for providing infrastructure facilities, public bodies have tendered out design, construction and operations as separate contracts. The selection criteria that has been commonly followed in these contracts is the lowest bid/lump-sum fee. These contracts have generally witnessed a number of interface problems between the design-construction-operations phases. Also, in such a structure, the life cycle cost of the project may not be optimised since the responsibility of cost minimisation is split between different agencies. Further, there being no single point responsibility for project delivery, the overall accountability for the entire project is low.*

*Recently, a lot of infrastructure projects have been attempted with private sector participation. Many of these have failed because the high level of risks led to a very high cost of private sector participation. Hence, in the short to medium term, the public bodies have no alternative but, to fund these projects through budgetary allocations or borrowings. As a result, more and more public bodies are being forced to look out for alternate contracting methods that reduce costs while retaining other benefits of private sector participation.*

*One such non-conventional contracting mechanism is the Design-Build-Operate (DBO) structure, which successfully combines the benefits of private sector efficiency while minimising the cost of its involvement. CRISIL Infrastructure Advisory has provided advisory assistance in projects involving the DBO structure. This note draws on CRISIL Infrastructure Advisory's experience and describes the issues related to the Design-Build-Operate method of project delivery.*



## **DESIGN-BUILD-OPERATE CONTRACTING FOR INFRASTRUCTURE PROJECTS**



## **WHAT IS DBO?**

The Design-Build-Operate (DBO) structure is a public-private partnership approach to project implementation, where, private sector participants compete for an integrated contract that includes design, construction and long-term facility-operation. The private sector participant may be a single DBO operator or, as is usually the case, a consortium of designers, construction contractors and O&M contractors. The DBO team will manage the design and construction and assume the risk for coordinated project implementation. When the project facilities are completed, the DBO team assumes responsibility for operating the plant, training staff, implementing a detailed operation and maintenance plan, and guaranteeing operational performance of the facility in accordance with the specifications. The responsibility for providing finances lies with the public body, as does the ownership of the facility.

## **WHAT MAKES DBO DIFFERENT?**

In contrast with the traditional method of contracting, design-build (DB) and DBO procurement processes involve creation of performance specifications that describe the desired outputs and then asking the proposers to develop their own concepts on how best to achieve those outputs. This encourages the bidder teams to use their entrepreneurial initiative to provide the best solution for the project.

## **PRIMARY BENEFITS**

<b>Benefit</b>	<b>Description</b>
<b>Single point responsibility</b>	There is a single point of contact for the contracting body.
<b>Reduction of project duration</b>	Because design and construction is provided within one entity, there is greater potential to shorten project duration through phased construction.
<b>High Constructability</b>	A DBO structure allows for higher constructability (infusion of contractor knowledge into design), resulting in faster delivery and reduction of claims stemming from errors/omissions in the designs.
<b>Reduced Costs</b>	A close working relationship between the designer and contractor can lead to a more economical design, application of cost-saving & construction-saving techniques, and can enable purchase of critical components before final design completion.
<b>Higher operational efficiencies</b>	Since the project is awarded on the basis of lower lifecycle costs, it gives an incentive to the DBO operator to bring in operational efficiencies and reduce the overall cost.

## **WHEN DOES ONE USE DBO?**

All forms of private sector participation have two principle objectives - **leveraging private sector efficiency** and/or **attracting private capital**. The DBO form of project delivery structure utilises private sector efficiencies in design, construction and operations without involving private funding and, therefore, can be used in the following cases:

<b>Situation</b>	<b>Description</b>
<b>Adequate public finance is available</b>	When public bodies/government have sufficient financial resources to undertake the project, but, desired efficiencies in design, construction and O&M are not there.
<b>Public finance can be raised</b>	When the public body/implementing agency does not have the funds, but can raise them on more cost-effective terms vis-à-vis the private sector.
<b>Financing risk is high</b>	If private sector has to assume a high degree of financing risk, BOT/DBFO form of contracting could have higher overall costs. In such cases, the DBO structure can turn out to be a more cost-effective option. However, this requires a Guarantor to enable the public body to raise finances.

## **CONTRACT STRUCTURE FOR DBO PROJECTS**

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The **payment and enforcement mechanisms** determine the bulk of the contract structure. Since the contractor will not be taking any commercial risk, reimbursement of fixed expenses has to be guaranteed. The payments for fixed costs i.e. construction costs and fixed component of O&M expenses are in the form of lumpsum fee paid substantially at the end of the construction period. The variable component of O&M expenses are compensated on the basis of a predetermined per unit fee.

The enforcement mechanisms used to ensure the desired levels of performance could be a mix of penalties and incentives. The ability to consistently meet performance standards, in the initial and subsequent periods of operation, is ensured through disincentives like termination of the contract and the levy of liquidated damages. Incentives such as performance bonus, sharing of savings in operating costs can be built in to encourage the contractor to achieve higher quality standards or finish construction ahead of time.

Although the DBO concept is expected to be a seamless transition from design to construction to operations, there are practical difficulties in specifying such structures. In practice the contracts may tend to become a back to back Design-build and O & M contract.

## **SELECTION PROCESS FOR DBO PROJECTS**

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The cost of bidding for DBO projects is substantially large and the extent of design work required to finalise a DBO bid is quite high. Hence:

1. The selection process should automatically value innovative designs.
2. Number of bidding firms should be kept in a reasonable range that encourages competition as well as provides certainty to the bidding firms.
3. The project risks should be discussed extensively and a balanced risk allocation should be arrived at before final bidding.

A model process that encourages innovation and competition in the bidding stage is described below:

<b>Stage of the process</b>	<b>Activities</b>
<b>Project preparatory stage</b>	<i>Finalise:</i> First estimates of system costs under conventional contracting to evaluate the cost benefits that the DBO bids are offering, Operator responsibilities, Required DBO operator profile, Pre-qualification criteria. <i>Appoint:</i> Transparency auditors for the bidding process – to provide comfort to the bidders about the seriousness of the public body.
<b>Pre-qualification stage</b>	<i>Share/Discuss:</i> Project scope, DBO operator responsibilities, Broad risk sharing matrix, RFP process and the final selection criteria, Nature of information available on the project. <i>Finalise:</i> A limited number of firms to whom the Request for Proposals will be issued, Undertake a thorough detailed information compilation exercise to minimize the costs of bidding.
<b>Request for Proposals</b>	<i>Share:</i> Detailed selection criteria, Draft DBO contract, Performance specifications. <i>Arrange for:</i> Bidders to pool their resources to undertake surveys/ studies to minimize bidding costs.
<b>Pre-bid conference</b>	<i>Discuss:</i> DBO contract principles, Performance specifications, Selection criteria.
<b>Final bid submission</b>	<i>Provide:</i> Final DBO contract principles, Final selection criteria, Firm performance specifications.

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Stage of the process	Activities
<b>Technical evaluation</b>	<p><i>Engage:</i> Independent consultants to gauge the Practicality and Acceptability of the designs.</p> <p><i>Gauge:</i> Cost savings to the public body as compared to conventional contracting.</p> <p><i>Assess:</i> If the DBO process is providing any tangible benefits to the public body.</p> <p><i>Qualify:</i> Acceptable and practical designs for financial evaluation.</p>
<b>Financial evaluation</b>	Rank the proposals based on the predetermined criteria and commence discussions to finalise the DBO contract.

## SELECTION CRITERIA

In complex DBO projects that require substantial innovation, a mix of technical and financial score may be used to select the successful bidder. The recommended selection criteria are:

1. Technical vetting of the design for acceptability with the design requirements.
2. Financial ranking based on lumpsum design cum construction cost, annual fixed operation and maintenance payments, annual reimbursable payments per unit of output.

Technically, these criteria should choose the bid with the lowest life cycle cost. However, in some cases, **greater weightage** may be given to operation and maintenance expenditure quotes. **(A bid with a lower maintenance cost over the project life is more likely to have a lower life cycle cost also.)**

A critical issue is the definition of life cycle cost. Often the O & M period is much shorter than the life of the assets (15 years and above based on the category of assets). In such a situation the bidder can be expected to quote O & M fees for this shorter duration only. Theoretically this could discriminate against designs that have a stable O & M expense pattern as compared to a design that involves substantial renovation in later stages.

## OUTSTANDING ISSUES IN D-B CLASS OF CONTRACTS

<b>Complex contracting procedures</b>	The cost of bidding under these structures is very high. The consortia also tend to be complex. Such procedures may discourage wider participation, attempting to neutralise the cost benefits of DB approach.
<b>Ability of contractors to price risks</b>	DBO contracts rely on the ability of the bidders to realistically assess and price the risks that they have to assume. If the bidders interpret risks differently, the theoretical benefits of the structure will not be realised.
<b>Consolidation in the industry</b>	High bidding costs and large warranty requirements may force small contractors out of the industry or lead to consolidation of businesses. The drop in competition can neutralise the benefits of the innovative structure.
<b>High cost consortia</b>	Firms with limited exposure to risk taking may be slow to adapt to the new contracting structure. Second rung but daring firms can submit winning but high cost bids. Personnel with international experience in such structures may be limited and expensive. The need to use such personnel could add to the bid cost in the first few projects.
<b>Ability to estimate life cycle costs</b>	The DBO approach does not succeed till the time life cycle costs are captured in the selection criteria. This will pose a challenge when the O & M period and the life of the plant do not match. Matching the period may pose other problems such as a lengthy and hence a riskier operations phase.
<b>Default – in the construction-operation interface, in operations &amp; in transfer</b>	Adequate project experience in these issues is limited. When a critical mass of projects goes on stream and faces such issues, the practicality of the seamless interface will be known.

## CASE STUDY : THE INDIAN EXPERIENCE

### The Project

The Delhi Jal Board is augmenting its water treatment and distribution systems to meet the growing demand for drinking water in the city. The water board intends to develop a 140-mgd Water Treatment Plant.

### DJB invited CRISIL Infrastructure Advisory for advisory assistance in:

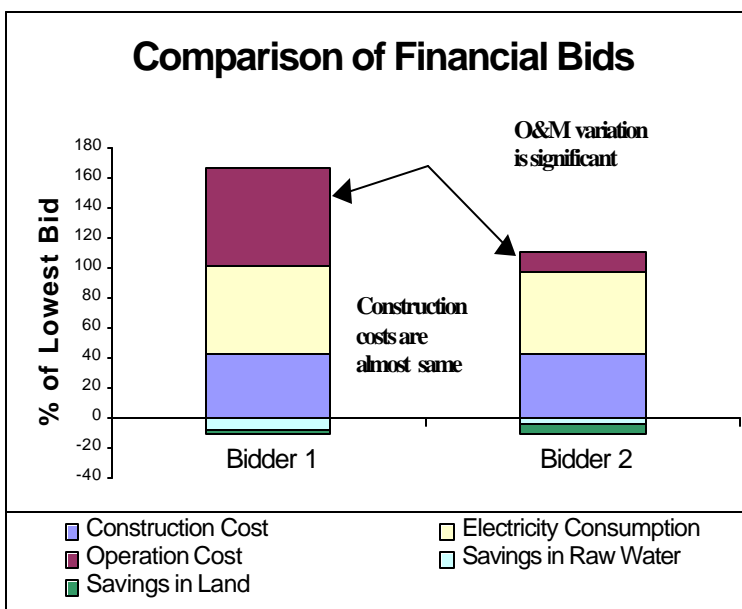
- ❖ Developing the contractual structure & contract documents for the project
- ❖ Design of developer selection process
- ❖ Design of evaluation criteria

### The Evaluation Criteria

The evaluation criteria consisted of Cost Factors and incentive factors (that were subtracted from the costs). The selection process aimed at identifying all factors that have a bearing on the long-term life cycle cost of designing, constructing and operating the plant.

### Result of Using The D-B-O Process

The Board shortlisted six bidders after pre-qualification. Three bidders submitted firm proposals. The technical proposal of one of the bidders was rejected during technical evaluation. The Alternative technology proposed by one of the remaining bidders was evaluated and found unsuitable. The financial bids were evaluated based on the life cycle cost. Although the **firm construction price of the bidders was within 0.5 % of each other, the life cycle cost differed by almost 55 %**. The Board is in the process of formalising the award of the contract based on the lowest life cycle cost.



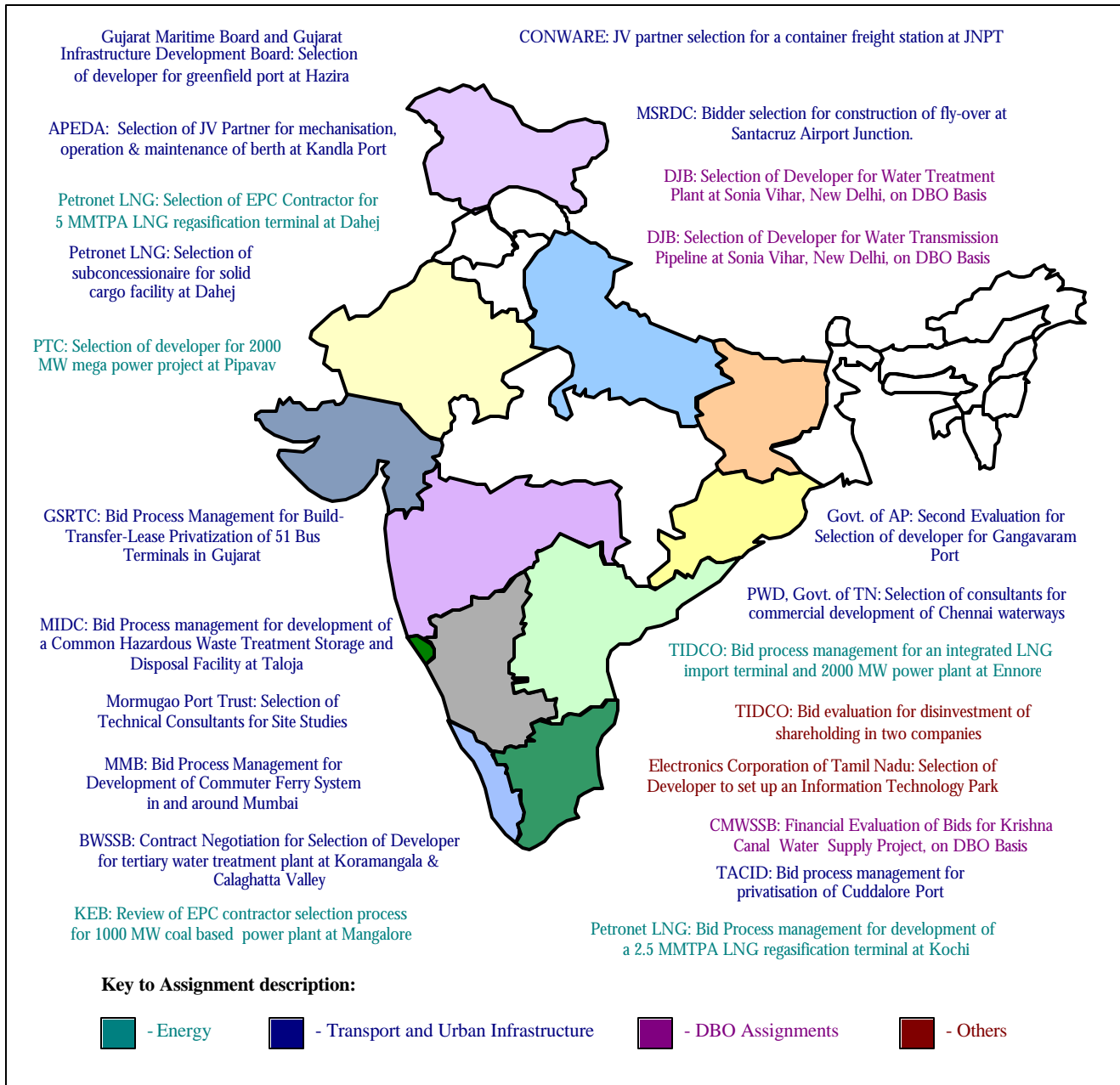
**The DBO method of project delivery offers a practical solution when:**

- 1. Public Funding is possible**
- 2. The project risks make it unsuitable for implementation under a traditional private investment framework (BOT or a Concession type )**
- 3. All possible efficiencies of PSP can be brought in the form of EPC and O & M contracts**

**Under these conditions, it provides ample scope for the bidders to develop their own concepts on how best to achieve the output specifications laid down by the public body.**

**The main issues for concern though, that will need to be addressed in DBO projects, are the high cost of bidding and the extent of design work required, as these may prove to be deterrents to wider participation by bidders and, thus, may serve to offset the benefits of the DBO approach.**

## CRISIL Infrastructure Advisory' Experience in Competitive Bidding



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