Delivering infrastructure projects in volatile times

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While it appears that Canada has escaped the worst of the global economic turmoil, public funds are increasingly scarce. At the same time, experts agree that our infrastructure is in dire need of repair or replacement. How do municipalities deliver much needed infrastructure improvements with tighter constraints? The choice of delivery model is key to managing risks and ensuring a successful project. The traditional design-bid-build model that is the mainstay of municipalities across North America suits a purpose, but is not necessarily the best or only option for all projects.

Design-Bid-Build (DBB)

The Design-Bid-Build delivery model is the most familiar model to the Canadian municipal market and represents the conventional delivery model for municipal water and wastewater infrastructure in North America. In this scenario, the municipality retains a consultant to design the project and develop tenders for its various aspects. Multiple equipment suppliers tender on prescribed parts of the project with contractors subsequently tendering on equipment installation and associated civil works.

To ensure success with this model, projects should be very well-defined and confined to a specific solution, since these projects typically involve technology pre-selection. The overall project risk is assumed by the municipal client, since product and service suppliers are merely responding to pre-ordained specifications. There is little room for innovation in this approach as the project boundaries and scope must be firm to execute under this model. Key decisions are made by the municipal consultant and client prior to the RFQ process. Evaluations are capital cost-based since solutions are pre-determined and straight forward.

Cost and schedule overruns are possible if the process is not well-managed, and finger pointing between suppliers and contractors is common if the project is not well-enough defined and managed by the municipality. However, for very confined scope projects with single solutions, this is a very well-understood delivery model.

Bearspaw WTP, Calgary, AB - a DBB project - under construction

Design-Build (DB)

The Design-Build model is gaining popularity as a means of controlling schedule and cost overruns. Municipalities are weary of projects delivered over budget and late and are looking for means to mitigate these important aspects of project execution. The Design-Build scenario involves multiple teams bidding on a performance-based specification. These teams include general contractors, consultants, and often, technology providers.

Design-build scenarios work well when there are multiple technological solutions to a project and where schedule and cost-efficiencies can be gained by promoting optimization across all aspects of the project. By encouraging technology providers and contractors to work together, competitive pressure results in better schedules and project costs. This delivery model does require the municipality to establish an appropriate, performance-based specification and necessitates more sophistication with respect to bid evaluation. Essentially, this model is still a capital cost-based evaluation model, much like the conventional design-bid-build model, but assigns more risk with respect to cost and schedule to the design-build team.

Design-Build-Operate (DBO)

To add to the cost- and schedule-control benefits of a Design-Build, including the Operate component ensures that a cost-effective plant is cost-effective long-term. Over the life of the average plant, its associated costs become increasingly linked to operating costs the longer you expect that plant life to be. To include the operations in the contract, a municipality encourages the constructor and technology provider to work with the operator to optimize the plant's design. The overall value to the municipality is significant.

To maximize the value associated with this procurement model, it is important to select the most representative operating period for evaluating and selecting the successful proponent team. If you expect your plant to last 25 years, choosing a 10-year period for the Life Cycle Analysis short-changes the municipality, and its taxpayers, in this contractual scenario. The LCA

This Veolia DBO project in Tampa Bay is a state-of-the-art surface water treatment plant

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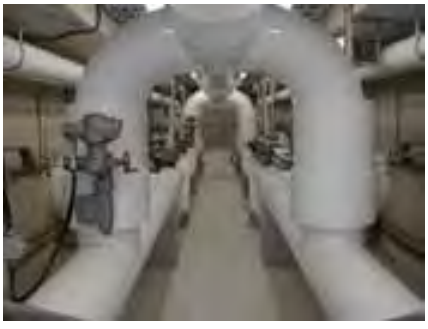
period does not have to match the operations contract period, but to gauge the full benefit of a DBO team's offer, the LCA period should be at least 20 years to balance the capital cost with the operating costs.

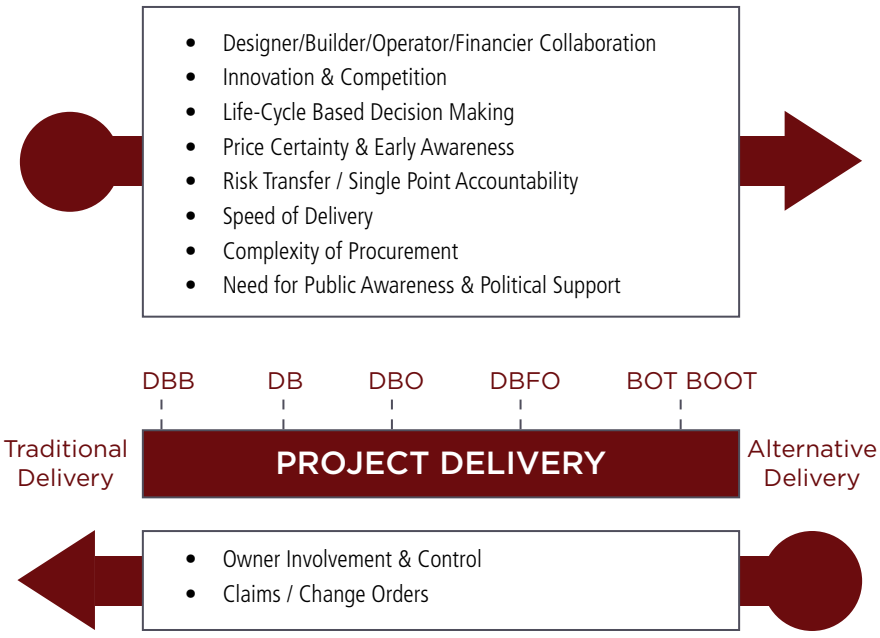
This model transfers the schedule, process, capital and operating cost risks to the developer for the period of the contract. This approach does require more Request for Proposal (RFP) pre-planning and bid evaluation design than traditional contracting models. Therefore, it is important for the municipality to allot sufficient front-end time to these activities. It is also critical for the municipality to ensure that they receive advice from a sophisticated consultant experienced in designing the DBO procurement process for maximum benefit to the municipality long-term.

Design-Build-Finance-Operate (DBFO)



A Moncton WTP Plant - a DBFO project

The finance component of the DBFO model allows the municipal client the opportunity to access private sector funds, federal contributions, and to ensure that the project developer shares a significant stake in the overall success of the project over the term of the contract. The client team includes the provincial infrastructure development organization, such as Infrastructure Ontario or Partnerships BC, P3 Canada, the client technical consultant, the financial consultant, and the municipality. The pre-planning requirement for this contract model is significant along with the need for experienced, sophisticated advisors. The access to the innovation available from the private sector via this model results in widely varied proposal submissions, the evaluation of which requires clear life-cycle project goals and comprehensive evaluation grids from the municipality. For very complex, multi-faceted, multi-solution infrastructure projects, this is a very good option for municipalities to access the creativity and value available from the marketplace.



Build-Own-Transfer (BOT), Build-Own-Operate-Transfer (BOOT)

The BOT/BOOT model is more prevalent in other regions globally than in North America because it is not as politically desirable here. This model involves private sector ownership of the treatment facility for a specified period of time with ownership transfer to the municipality at the end of the term. Payment is on a treated volume basis or price per treated volume of water. In North America, however, this is a very sensitive contracting model to attempt. Already it is important for the municipality to understand the level of public communication and political support required for the above-mentioned contracting models. As risk transfer to the private sector increases, so do the requirements for communication campaigns and political support.

OTHER DELIVERY MODELS

Design-Build with Service Contract

An extension of the DB model is the addition of an extended service contract. In scenarios whereby outsourced operation is not possible, an extended service contract allows for operational support and enhanced performance guarantees. This allows aspects of operating costs to be controlled and optimized by the plant provider and operability requirements built into the facility design. This also permits the city to implicate the private sector more in the performance of the facility beyond the commissioning period.

Strategic Partnerships

Strategic Partnerships are attractive when a municipality has multiple infrastructure projects but limited internal resources to manage them. Typically, this involves the creation of a separate group with resources 'donated' by both the private sector and the municipality. The municipality retains overall control and final decision-making, however, it allows them to access the experience and advice of the private sector in the project development, division of project scope, contractual modeling, and proponents selection. There is usually a risk/reward sharing for the private sector incentivizing innovation, adherence to budget and schedule, and long-term responsibility. It is important to understand that the private sector involved in the Strategic Partnership collaborates with the city for the procurement process, but does not execute the infrastructure projects.

Savings-Funded Projects

An innovative project model is one based on funding improvements via savings and/or revenue streams incurred through the implementation of a solution or technology. The limitation to optimization in most municipalities is the historic structure of organizational 'silos' with corresponding, separate budgets. This traditional structure ascribes responsibility in a narrow area inhibiting collaboration between departments to implement improvements to realize overall value for the taxpayers. This model allows municipalities to upgrade facilities without the need for bureaucratic funding requests and does not result in the requirement for greater taxpayer load. This model typically requires more forward-thinking municipal departments and city councils.

Conclusions

At a time when Canadian municipalities are pressured to think creatively about how to operate within their budgets while addressing more stringent environmental regulations, increasing demand for their utilities, and upgrading crumbling infrastructure, the implementation of alternative delivery models becomes essential.

Water and wastewater plants are long-term assets and in all cases, their lifetime costs must be accurately assessed. By understanding performance and risk transfer challenges upfront, the municipalities can make life-cycle based decisions and choose the project delivery model that brings the best value for their money. ■

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